UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 20-F

☐ **REGISTRATION STATEMENT PURSUANT TO SECTIONS 12(b) OR 12(g) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the Fiscal Year Ended **December 31, 2017**

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☐ **SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended **December 31, 2017**

Commission file number: **001-35932**

ARCTURUS THERAPEUTICS LTD.

(Exact name of Registrant as specified in its charter)

State of Israel
(Jurisdiction of incorporation or organization)

10628 Science Center Drive, Suite 250
San Diego, California
(Address of principal executive offices)

Mark R. Herbert
Interim President
Arcturus Therapeutics Ltd.
10628 Science Center Drive, Suite 250
San Diego, California 92121
(858) 900-2660
(Name, Telephone, Email and/or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Ordinary Shares, par value of NIS 0.07	**Nasdaq Global Market**

Securities registered or to be registered pursuant to Section 12(g) of the Act: **None**

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act: **None**

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

10,699,271 Ordinary Shares, par value NIS 0.07 per share

Indicate by check mark whether the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. ☐ **Yes** ☑ **No**

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. ☐ **Yes** ☑ **No**

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days**.** ☑ **Yes** ☐ **No**

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files**).** ☑ **Yes** ☐ **No**

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	**Accelerated filer**	☐
Non-accelerated filer	☑	**Emerging growth company**	☑

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP ☑	**International Financial Reporting Standards as issued by the International Accounting Standards Board** ☐	**Other** ☐

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. **Item 17** ☐ **Item 18** ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). ☐ **Yes** ☑ **No**

TABLE OF CONTENTS

INTRODUCTION

Merger of Alcobra Ltd. and Arcturus Therapeutics, Inc.

On November 15, 2017, Alcobra Ltd. acquired Arcturus Therapeutics, Inc. pursuant to a merger between the companies (the "merger"). Prior to the merger, Alcobra Ltd.'s net assets consisted of cash, investments and nominal non-operating assets. Upon consummation of the merger, Alcobra Ltd. adopted the business plan of Arcturus Therapeutics, Inc. In connection with the merger, Alcobra Ltd. agreed to acquire all of the outstanding common stock of Arcturus Therapeutics, Inc. in exchange for the issuance of an aggregate 6,631,712 of Alcobra Ltd.'s Ordinary Shares, par value 0.07 NIS per share, after giving effect to a 1-for-7 reverse split effected immediately prior to the merger. As a result of the merger, Arcturus Therapeutics, Inc. became a wholly-owned subsidiary of Alcobra Ltd. While Alcobra Ltd. was the legal acquirer in the transaction, Arcturus Therapeutics, Inc. was deemed the accounting acquirer. Immediately after giving effect to the merger, on November 15, 2017, Alcobra Ltd. changed its name to Arcturus Therapeutics Ltd. Our current trading symbol is "ARCT." Our principal executive offices are located in San Diego, California.

Unless otherwise indicated herein, all references in this Annual Report on Form 20-F to the "Company," the "registrant," "our company," "we," "our" and "Arcturus" refer in each case collectively (on a consolidated basis) to Arcturus Therapeutics Ltd. (formerly known as Alcobra Ltd.), an Israeli company, and its subsidiaries, Alcobra, Inc. and Arcturus Therapeutics, Inc., which are Delaware corporations. References to "U.S. dollars" and "$" are to currency of the United States of America, and references to "NIS" are to New Israeli Shekels. References to "Ordinary Shares" are to our Ordinary Shares, par value NIS 0.07 per share after the November 15, 2017 merger and $0.0001 prior to the merger.

We do not endorse or adopt any third-party research or forecast firms' statements or reports referred to in this annual report and assume no responsibility for the contents or opinions represented in such statements or reports, nor for the updating of any information contained therein.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 20-F, or this annual report, and the documents incorporated by reference herein may contain "forward-looking statements" within the meaning of the federal securities laws made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth below under Part I, Item 3.D, "Risk Factors" in this annual report. Except as required by law, we assume no obligation to update these forward-looking statements, whether as a result of new information, future events or otherwise. These statements, which represent our current expectations or beliefs concerning various future events, may contain words such as "may," "will," "expect," "anticipate," "intend," "plan," "believe," "estimate" or other words indicating future results, though not all forward-looking statements necessarily contain these identifying words. Such statements may include, but are not limited to, statements concerning the following:

- the initiation, cost, timing, progress and results of, and our expected ability to undertake certain activities and accomplish certain goals with respect to, our research and development activities, preclinical studies and clinical trials;
- our ability to obtain and maintain regulatory approval of our product candidates, and any related restrictions, limitations, and/or warnings in the label of an approved product candidate;
- our ability to obtain and deploy funding for our operations;
- our plans to research, develop and commercialize our product candidates;
- our strategic alliance partners' election to pursue development and commercialization of any programs or product candidates that are subject to our collaboration and license agreements with such partners;
- our ability to attract collaborators with relevant development, regulatory and commercialization expertise;
- future activities to be undertaken by our strategic alliance partners, collaborators and other third parties;
- our ability to avoid, settle or be victorious at costly litigation with shareholders, former executives or others;
- our ability to obtain and maintain intellectual property protection for our product candidates;

- the size and growth potential of the markets for our product candidates, and our ability to serve those markets;
- our ability to successfully commercialize, and our expectations regarding future therapeutic and commercial potential with respect to, our product candidates;
- the rate and degree of market acceptance of our product candidates;
- our ability to develop sales and marketing capabilities, whether alone or with potential future collaborators;
- regulatory developments in the United States and foreign countries;
- our ability to attract and retain experienced and seasoned scientific and management professionals to lead the Company;
- the performance of our third-party suppliers and manufacturers;
- the success of competing therapies that are or may become available;
- our expectations regarding the time during which we will be a foreign private issuer;
- our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act"); and
- the accuracy of our estimates regarding future expenses, future revenues, capital requirements and need for additional financing.

Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results or performance to differ materially from those projected. These statements are only current predictions and are subject to known and unknown risks, uncertainties, and other factors that may cause our or our industry's actual results, levels of activity, performance or achievements to be materially different from those anticipated by the forward-looking statements. In addition, historic results of scientific research, preclinical and clinical trials do not guarantee that the conclusions of future research or trials would not suggest different conclusions or that historic results referred to herein would not be interpreted differently in light of additional research, preclinical and clinical trials results. The forward-looking statements contained in this annual report are subject to risks and uncertainties, including those discussed in our other filings with the Securities and Exchange Commission, or the SEC. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date hereof. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance, or achievements.

PART I

ITEM 1. IDENTITY OF DIRECTORS, SENIOR MANAGEMENT AND ADVISERS

Not applicable.

ITEM 2. OFFER STATISTICS AND EXPECTED TIMETABLE

Not applicable.

ITEM 3. KEY INFORMATION

3.A. Selected financial data

As noted in the “Introduction” to this annual report above, from a legal perspective, pursuant to the merger, our company (formerly known as Alcobra Ltd.) acquired Arcturus Therapeutics, Inc. with Arcturus Therapeutics, Inc. surviving as our wholly-owned subsidiary. While Alcobra Ltd. was the legal acquirer in the transaction, Arcturus Therapeutics, Inc. was deemed the accounting acquirer. Prior to the merger, Alcobra Ltd.’s net assets consisted of cash, investments and nominal non-operating assets. Upon the closing of the merger, Alcobra Ltd. adopted the business plan of Arcturus Therapeutics, Inc. Our historical consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States and are presented in U.S. dollars. The selected historical consolidated financial information as of December 31, 2017, 2016 and 2015 and for the years ended December 31, 2017, 2016 and 2015 has been derived from, and should be read in conjunction with, the consolidated financial statements of Arcturus Therapeutics Ltd. and notes thereto appearing elsewhere in this annual report. The selected financial data as of December 31, 2014 and 2013 and for the year ended December 31, 2014 and the period February 6, 2013 to December 31, 2013 have been derived from the unaudited financial statements of Arcturus Therapeutics, Inc. not included in this annual report.

The information presented below is qualified by the more detailed historical consolidated financial statements set forth in this annual report, and should be read in conjunction with those consolidated financial statements, the notes thereto and the discussion under Item 5 – “Operating and Financial Review and Prospects” – included elsewhere in this annual report. Our historical results set forth herein are not necessarily indicative of our future results.

Consolidated Statement of Operations Data
(in thousands of U.S. dollars, except per share data)

	For the year ended December 31,				For the period February 6 to December 31,
	2017	2016	2015	2014 (Unaudited)	2013 (Unaudited)
Revenue in conjunction with strategic alliances and collaborations	$ 12,998	$ 20,382	$ 6,138	$ 25	$ -
Research and development expenses, net	15,918	17,934	5,476	3,975	1,665
General and administrative expenses	7,572	3,448	2,574	2,027	892
Net loss from operations	(10,492)	(1,000)	(1,912)	(5,977)	(2,557)
Net loss	(10,902)	(1,571)	(1,902)	(6,018)	(2,696)
Net loss per share, basic and diluted	$ (3.53)	$ (0.77)	$ (0.94)	$ (2.99)	$ (2.50)
Weighted average shares outstanding, basic and diluted	3,087	2,032	2,016	2,015	1,079

Consolidated Balance Sheet Data as of December 31,
(in thousands of U.S. dollars)

	2017	2016	2015	2014 (Unaudited)	2013 (Unaudited)
Working capital	$ 39,662	$ 3,597	$ 1,208	$ 1,416	$ 3,229
Total assets	$ 52,024	$ 13,736	$ 14,947	$ 2,895	$ 3,522
Shareholders' equity (deficit)	$ 33,794	$ 1,577	$ (3,631)	$ (1,845)	$ 3,329

3.B. Capitalization and indebtedness

Not applicable.

3.C. Reasons for the offer and use of proceeds

Not applicable.

3.D. Risk factors

In conducting our business, we face many risks that may interfere with our business objectives. Some of these risks could materially and adversely affect our business, financial condition and results of operations. In particular, we are subject to various risks resulting from inherent unknowns and uncertainties in the drug development process, as well as changing economic, political, industry, regulatory, business and financial conditions. The risks and uncertainties described below are not the only ones we face.

You should carefully consider the following factors and other information in this annual report before you decide to invest in our Ordinary Shares. If any of the negative events referred to below occur, our business, financial condition and results of operations could suffer. In any such case, the trading price of our Ordinary Shares could decline, and you may lose all or part of your investment.

RISKS RELATED TO OUR FINANCIAL CONDITION AND NEED FOR ADDITIONAL CAPITAL

We have a limited operating history, have incurred significant losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future.

We are a preclinical nucleic acid medicines company with a limited operating history. Since inception, our operations have been primarily limited to acquiring and licensing intellectual property rights, developing our nucleic acid product platform, undertaking basic research around nucleic acid targets and conducting preclinical studies for our initial programs. We have not yet obtained regulatory approval for any product candidates. Consequently, any predictions about our future success or viability, or any evaluation of our business and prospects, may not be accurate.

We have incurred losses in each year since our inception. Our net losses were $10.9 million, $1.6 million and $1.9 million for the years ended December 31, 2017, 2016 and 2015, respectively. As of December 31, 2017, we had an accumulated deficit of $23.1 million.

We have devoted most of our financial resources to research and development, including our preclinical development activities. To date, we have funded our operations primarily through upfront payments, research funding and milestones from strategic alliances and collaborations, and through the sale of equity and convertible securities. We expect to continue to incur substantial and increased expenses, losses and negative cash flows as we expand our development activities and advance our preclinical programs. If our product candidates are not successfully developed or commercialized, including because of a lack of capital, or if we do not generate enough revenue following marketing approval, we will not achieve profitability and our business may fail. Even if we or our strategic alliance partners successfully obtain regulatory approval to market a product candidate, our revenues will also depend upon the size of any markets in which our product candidates have received market approval, and our ability to achieve sufficient market acceptance and adequate market share for our products.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. The net losses we incur may fluctuate significantly from quarter to quarter. We anticipate that our expenses will increase substantially if and as we:

- continue our research and preclinical development of our product candidates, both independently and under our strategic alliance agreements;
- seek to identify additional targets and product candidates;
- acquire or in-license other products and technologies;
- advance product candidates into clinical trials;
- seek marketing approvals for our product candidates that successfully complete clinical trials;
- ultimately establish a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical, regulatory, research, executive and administrative personnel;
- create additional infrastructure to support our operations and our product development and planned future commercialization efforts; and
- incur legal and other expenses in connection with legal proceedings, including our ongoing proxy contest.

We have never generated any revenue from product sales, have generated only limited revenue since inception, and may never be profitable.

Our ability to generate revenue and achieve profitability depends on our ability, alone or with strategic alliance partners, to successfully complete the development of, obtain the necessary regulatory approvals for and commercialize our product candidates. We do not anticipate generating revenues from sales of our products for the foreseeable future, if ever. Our ability to generate future revenues from product sales depends heavily on our success in:

- completing our research and preclinical development of product candidates;
- initiating and completing clinical trials for product candidates;
- seeking and obtaining marketing approvals for product candidates that successfully complete clinical trials;
- establishing and maintaining supply and manufacturing relationships with third parties;
- launching and commercializing product candidates for which we obtain marketing approval, with an alliance partner or, if launched independently, successfully establishing a sales force, marketing and distribution infrastructure;
- maintaining, protecting and expanding our intellectual property portfolio; and
- attracting, hiring and retaining qualified personnel.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to predict the timing or amount of increased expenses and when we will be able to achieve or maintain profitability, if ever. In addition, our expenses could increase beyond expectations if we are required by the Food and Drug Administration, or FDA, or other foreign regulatory agencies to perform studies and trials in addition to those that we currently anticipate.

Even if one or more of the product candidates that we independently develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any approved product. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations.

We may need to raise additional capital, which may not be available on acceptable terms, or at all.

Developing pharmaceutical products, including conducting preclinical studies and clinical trials, is expensive. We expect our research and development expenses to substantially increase in connection with our ongoing activities, particularly as we advance our product candidates towards or through clinical trials. We may need to raise additional capital to support our operations and such funding may not be available to us on acceptable terms, or at all. As of December 31, 2017, we had unrestricted cash and cash equivalents and short-term investments of $48.6 million. We believe that our existing capital resources will be sufficient to fund our existing capital resources for at least twelve months from the filing of this Annual Report. We cannot provide assurances that our plans will not change or that changed circumstances will not result in the depletion of our capital resources more rapidly than we currently anticipate. For example, our preclinical trials may encounter technical or other difficulties. Additionally, our strategic alliance partners may not elect to pursue the development and commercialization of any of our product candidates that are subject to their respective strategic alliance agreements with us. Any of these events may increase our development costs more than we expect. In order to support our long term plans, we may need to raise additional capital or otherwise obtain funding through additional strategic alliances if we choose to initiate preclinical or clinical trials for new product candidates other than programs currently partnered. In any event, we will require additional capital to obtain regulatory approval for, and to commercialize, future product candidates.

Any additional fundraising efforts may divert our management from our day-to-day activities, which may adversely affect our ability to develop and commercialize future product candidates. In addition, we cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. If we are unable to raise additional capital when required or on acceptable terms, we may be required to:

- significantly delay, scale back or discontinue the development or commercialization of any future product candidates;
- seek strategic alliances for research and development programs at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available; or
- relinquish or license on unfavorable terms, our rights to technologies or any future product candidates that we otherwise would seek to develop or commercialize ourselves.

If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we will be prevented from pursuing development and commercialization efforts, which will have a material adverse effect on our business, operating results and prospects.

RISKS RELATED TO THE DISCOVERY AND DEVELOPMENT OF PRODUCT CANDIDATES

Preclinical and clinical studies of our product candidates may not be successful. If we are unable to generate successful results from preclinical and clinical studies of our product candidates, or experience significant delays in doing so, our business may be materially harmed.

We have no products on the market and all of our product candidates are in preclinical development. In particular, none of our product candidates have ever been tested in a human subject. Our ability to achieve and sustain profitability depends on obtaining regulatory approvals for and, if approved, successfully commercializing our product candidates, either alone or with third parties. Before obtaining regulatory approval for the commercial distribution of our product candidates, we or an existing or future collaborator must conduct extensive preclinical tests and clinical trials to demonstrate the safety, purity and potency of our product candidates.

The success of our product candidates will depend on several factors, including the following:

- successfully designing preclinical studies which may be predictive of clinical outcomes;
- successful results from preclinical and clinical studies;
- receipt of marketing approvals from applicable regulatory authorities;
- obtaining and maintaining patent and trade secret protection for future product candidates;
- establishing and maintaining manufacturing relationships with third parties or establishing our own manufacturing capability; and
- successfully commercializing our products, if and when approved, whether alone or in collaboration with others.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully complete the development or commercialization of our product candidates, which would materially harm our business.

The approach we are taking to discover and develop drugs is novel and may never lead to marketable products.

We have concentrated our therapeutic product research and development efforts on nucleic acid technology, and our future success depends on the successful development of this technology and products based on our nucleic acid product platform. Except for Kynamro (mipomersen) and Spinraza (nusinersen), which are marketed by Biogen Inc., neither we, nor any other company, has received regulatory approval to market nucleic acid therapeutics. The scientific discoveries that form the basis for our efforts to discover and develop product candidates are relatively new. The scientific evidence to support the feasibility of developing product candidates based on these discoveries is both preliminary and limited. If we do not successfully develop and commercialize product candidates based upon our technological approach, we may not become profitable and the value of our Ordinary Shares may decline.

Further, our focus solely on nucleic acid technology for developing drugs as opposed to multiple, more proven technologies for drug development increases the risks associated with the ownership of our Ordinary Shares. If we are not successful in developing any product candidates using nucleic acid technology, we may be required to change the scope and direction of our product development activities. In that case, we may not be able to identify and implement successfully an alternative product development strategy.

We may not be successful in our efforts to identify or discover potential product candidates.

The success of our business depends primarily upon our ability to identify, develop and commercialize nucleic acid medicines. Our research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for a number of reasons, including:

- our research methodology or that of our strategic alliance partners may be unsuccessful in identifying potential product candidates;
- potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval; or
- our strategic alliance partners may change their development profiles for potential product candidates or abandon a therapeutic area.

If any of these events occur, we may be forced to abandon our development efforts for a program or programs, which would have a material adverse effect on our business and could potentially cause us to cease operations. Research programs to identify new product candidates require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs or product candidates that ultimately prove to be unsuccessful.

If future clinical trials of our product candidates fail to demonstrate safety and efficacy to the satisfaction of regulatory authorities or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

Before obtaining marketing approval from regulatory authorities for the sale of product candidates, we or our strategic alliance partners must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates in humans. Clinical trials are expensive, difficult to design and implement, can take many years to complete and are uncertain as to the outcome. A failure of one or more clinical trials can occur at any stage of testing. The outcome of preclinical studies and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval for their products.

Events which may result in a delay or unsuccessful completion of clinical development include:

- delays in reaching an agreement with the FDA or other regulatory authorities on final trial design;
- imposition of a clinical hold of our clinical trial operations or trial sites by the FDA or other regulatory authorities;
- delays in reaching agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites;
- our inability to adhere to clinical trial requirements directly or with third parties such as CROs;
- delays in obtaining required institutional review board approval at each clinical trial site;
- delays in recruiting suitable patients to participate in a trial;
- delays in the testing, validation, manufacturing and delivery of the product candidates to the clinical sites;

- delays in having patients complete participation in a trial or return for post-treatment follow-up;
- delays caused by patients dropping out of a trial due to protocol procedures or requirements, product side effects or disease progression;
- clinical sites dropping out of a trial to the detriment of enrollment;
- time required to add new clinical sites; or
- delays by our contract manufacturers to produce and deliver sufficient supply of clinical trial materials.

If we or our strategic alliance partners are required to conduct additional clinical trials or other testing of any product candidates beyond those that are currently contemplated, are unable to successfully complete clinical trials of any such product candidates or other testing, or if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we or our strategic alliance partners may:

- be delayed in obtaining marketing approval for our future product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as originally intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in testing or marketing approvals. We do not know whether any clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do, which would impair our ability to successfully commercialize our product candidates and may harm our business and results of operations. Any inability to successfully complete preclinical and clinical development, whether independently or with our strategic alliance partners, could result in additional costs to us or impair our ability to generate revenues from product sales, regulatory and commercialization milestones and royalties.

Any of our product candidates may cause undesirable side effects or have other properties impacting safely that could delay or prevent their regulatory approval or limit the scope of any approved label or market acceptance.

Undesirable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other regulatory authorities. While we have not yet initiated clinical trials for any of our product candidates, it is likely that there may be side effects associated with their use. Results of our trials could reveal a high and unacceptable severity and prevalence of these or other side effects. In such an event, our trials could be suspended or terminated and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. Such side effects could also affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims. Any of these occurrences may materially and adversely affect our business, financial condition, results of operations and prospects.

Further, clinical trials by their nature test product candidates in only samples of the potential patient populations. With a limited number of patients and limited duration of exposure in such trials, rare and severe side effects of our product candidates may not be uncovered until a significantly larger number of patients are exposed to the product candidate.

If any of our future products, if and when approved for commercial sale, cause serious or unexpected side effects, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy;
- regulatory authorities may require the addition of labeling statements, such as warnings or contraindications;
- we may be required to change the way the product is administered or conduct additional clinical trials;
- we could be sued and held liable for harm caused to patients; or
- our reputation may suffer.

Any of these events could prevent us or our partners from achieving or maintaining market acceptance of the affected product and could substantially increase the costs of commercializing our future products and impair our ability to generate revenues from the commercialization of these products either by us or by our strategic alliance partners.

Even if we complete the necessary preclinical studies and clinical trials, we cannot predict whether or when we will obtain regulatory approval to commercialize a product candidate and we cannot, therefore, predict the timing of any revenue from a future product.

Neither we nor our strategic alliance partners can commercialize a product until the appropriate regulatory authorities, such as the FDA, have reviewed and approved the product candidate. The regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval. Additional delays may result if an FDA Advisory Committee recommends restrictions on approval or recommends non-approval. In addition, we or our strategic alliance partners may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory agency policy during the period of product development, clinical trials and the review process.

Even if we obtain regulatory approval for a product candidate, we will still face extensive regulatory requirements and our products may face future development and regulatory difficulties.

Even if we obtain regulatory approval in the United States, the FDA may still impose significant restrictions on the indicated uses or marketing of our product candidates, or impose ongoing requirements for potentially costly post-approval studies or post-market surveillance. The holder of an approved NDA is obligated to monitor and report adverse events, or AEs, and any failure of a product to meet the specifications in the NDA. The holder of an approved NDA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws.

In addition, drug product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with current good manufacturing practices, or cGMP, and adherence to commitments made in the NDA. If we or a regulatory agency discovers previously unknown problems with a product such as AEs of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions relative to that product or the manufacturing facility, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

If we or our partners fail to comply with applicable regulatory requirements following approval of any of our product candidates, a regulatory agency may:

- issue a warning letter asserting that we are in violation of the law;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend or withdraw regulatory approval;
- suspend any ongoing clinical trials;

- refuse to approve a pending NDA or supplements to an NDA submitted by us;
- seize product; or
- refuse to allow us to enter into supply contracts, including government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our future products and generate revenues.

We may use our financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

As a result of our limited financial and human resources, we will have to make strategic decisions as to which targets and product candidates to pursue and may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on research and development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic alliance, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate, or we may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

RISKS RELATED TO OUR RELIANCE ON THIRD PARTIES

We depend upon our third-party alliances for the development, manufacture and eventual commercialization of certain nucleic acid product candidates. If these third-party alliances are unsuccessful or are terminated, we may be unable to commercialize certain product candidates and we may be unable to generate revenues from our development programs.

We depend upon third party alliance partners for financial and scientific resources for the clinical development, manufacture and commercialization of certain of our nucleic acid product candidates. These alliances will likely provide us with limited control over the course of development of a nucleic acid product candidate, especially once a candidate has reached the stage of clinical development. For example, in our alliance with Ultragenyx, Ultragenyx has the option to obtain an exclusive worldwide license to develop, manufacture and commercialize product candidates upon the achievement of relevant endpoints in preclinical studies and clinical trials. However, Ultragenyx is not under any obligation to exercise these options to progress any of our nucleic acid product candidates. While Ultragenyx has development obligations with respect to programs that it may elect to pursue under our agreement, our ability to ultimately recognize revenue from this and future relationships will depend upon the ability and willingness of our alliance partners to successfully meet their respective responsibilities under our agreements with them. Our ability to recognize revenues from successful strategic alliances may be impaired by several factors including:

- an alliance partner may shift its priorities and resources away from our programs due to a change in business strategies, or a merger, acquisition, sale or downsizing of its company or business unit;

- an alliance partner may cease development in therapeutic areas which are the subject of our strategic alliances;
- an alliance partner may change the success criteria for a particular program or potential product candidate thereby delaying or ceasing development of such program or candidate;
- a significant delay in initiation of certain development activities by an alliance partner will also delay payment of milestones tied to such activities, thereby impacting our ability to fund our own activities;
- an alliance partner could develop a product that competes, either directly or indirectly, with an alliance product;
- an alliance partner with commercialization obligations may not commit sufficient financial or human resources to the marketing, distribution or sale of a product;
- an alliance partner with manufacturing responsibilities may encounter regulatory, resource or quality issues and be unable to meet demand requirements;
- an alliance partner may exercise its rights under the agreement to terminate a strategic alliance;
- a dispute may arise between us and an alliance partner concerning the research, development or commercialization of a program or product candidate resulting in a delay in milestones, royalty payments or termination of a program and possibly resulting in costly litigation or arbitration which may divert management attention and resources; and
- an alliance partner may use our proprietary information or intellectual property in such a way as to invite litigation from a third party or fail to maintain or prosecute intellectual property rights such that our rights in such property are jeopardized.

If any of our alliance partners do not elect to pursue the development and commercialization of our nucleic acid development candidates or if they terminate the strategic alliance, then, depending on the event:

- product candidates subject to our alliances may be terminated or significantly delayed;
- our cash expenditures could increase significantly if it is necessary for us to hire additional employees and allocate scarce resources to the development and commercialization of product candidates that were previously funded, or expected to be funded, by our alliance partners;
- we would bear all of the risks and costs related to the further development and commercialization of product candidates that were previously the subject of our strategic alliance, including the reimbursement of third parties; and
- in order to fund further development and commercialization, we may need to seek out and establish alternative strategic alliances with third-party partners; this may not be possible, or we may not be able to do so on terms which are acceptable to us, in which case it may be necessary for us to limit the size or scope of one or more of our programs or increase our expenditures and seek additional funding by other means.

Any of these events would have a material adverse effect on our results of operations and financial condition.

We rely on third parties to conduct some aspects of our compound formulation, research and preclinical studies, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such formulation, research or testing.

We do not expect to independently conduct all aspects of our drug discovery activities, compound formulation research or preclinical studies of product candidates. We currently rely and expect to continue to rely on third parties to conduct some aspects of our preclinical studies and formulation development.

Any of these third parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it would delay our product development activities. Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibilities. For example, for product candidates that we develop and commercialize on our own, we will remain responsible for ensuring that each of our IND-enabling studies and clinical trials are conducted in accordance with the study plan and protocols for the trial.

If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our studies in accordance with regulatory requirements or our stated study plans and protocols, we will not be able to complete, or may be delayed in completing, the necessary preclinical studies to enable us or our strategic alliance partners to select viable product candidates for IND submissions and will not be able to, or may be delayed in our efforts to, successfully develop and commercialize such product candidates.

We rely on third-party manufacturers to produce our preclinical product candidates, and we intend to rely on third parties to produce future clinical supplies of product candidates that we advance into clinical trials and commercial supplies of any approved product candidates.

Reliance on third-party manufacturers entails risks, including risks that we would not be subject to if we manufactured the product candidates ourselves, including:

- the inability to meet any product specifications and quality requirements consistently;
- a delay or inability to procure or expand sufficient manufacturing capacity;
- manufacturing and product quality issues related to scale-up of manufacturing;
- costs and validation of new equipment and facilities required for scale-up;
- a failure to comply with cGMP and similar foreign standards;
- the inability to negotiate manufacturing or supply agreements with third parties under commercially reasonable terms;
- termination or nonrenewal of manufacturing agreements with third parties in a manner or at a time that is costly or damaging to us;
- the reliance on a limited number of sources, and in some cases, single sources for raw materials, such that if we are unable to secure a sufficient supply of these product components, we will be unable to manufacture and sell future product candidates in a timely fashion, in sufficient quantities or under acceptable terms;
- the lack of qualified backup suppliers for any raw materials that are currently purchased from a single source supplier;
- operations of our third-party manufacturers or suppliers could be disrupted by conditions unrelated to our business or operations, including the bankruptcy of the manufacturer or supplier;
- carrier disruptions or increased costs that are beyond our control; and
- the failure to deliver products under specified storage conditions and in a timely manner.

Any of these events could lead to clinical study delays or failure to obtain regulatory approval, or impact our ability to successfully commercialize future products. Some of these events could be the basis for FDA action, including injunction, recall, seizure or total or partial suspension of production.

We rely on limited sources of supply for the drug substance of product candidates and any disruption in the chain of supply may cause a delay in developing and commercializing these product candidates.

We have established manufacturing relationships with a limited number of suppliers to manufacture raw materials and the drug substance used to create our product candidates. The availability of such suppliers to manufacture raw materials for our product candidates may be limited. Further, each supplier may require licenses to manufacture such components if such processes are not owned by the supplier or in the public domain. As part of any marketing approval, a manufacturer and its processes are required to be qualified by the FDA prior to commercialization. If supply from the approved vendor is interrupted, there could be a significant disruption in commercial supply. An alternative vendor would need to be qualified through an NDA supplement which could result in further delay. The FDA or other regulatory agencies outside of the United States may also require additional studies if a new supplier is relied upon for commercial production. Switching vendors may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines.

In addition, if our alliance partners elect to pursue the development and commercialization of certain programs, we will lose control over the manufacturing of the product candidate subject to the agreement. Also, we will not be able to ensure that the product candidates will be manufactured under the correct conditions to permit the product candidates to be used in such clinical trials.

These factors could cause the delay of clinical trials, regulatory submissions, required approvals or commercialization of our product candidates, cause us to incur higher costs and prevent us from commercializing our products successfully. Furthermore, if our suppliers fail to deliver the required commercial quantities of active pharmaceutical ingredients on a timely basis and at commercially reasonable prices, and we are unable to secure one or more replacement suppliers capable of production in a timely manner at a substantially equivalent cost, our clinical trials may be delayed or we could lose potential revenue.

Manufacturing issues may arise that could increase product and regulatory approval costs or delay commercialization.

As we scale-up manufacturing of product candidates and conduct required stability testing, product, packaging, equipment and process-related issues may require refinement or resolution in order to proceed with any clinical trials and obtain regulatory approval for commercial marketing. We may identify significant impurities, which could result in increased scrutiny by the regulatory agencies, delays in clinical programs and regulatory approval, increases in our operating expenses, or failure to obtain or maintain approval for product candidates or any approved products.

We intend to rely on third parties to conduct, supervise and monitor our clinical trials, and if those third parties perform in an unsatisfactory manner, it may harm our business.

We or our strategic alliance partners intend to rely on CROs and clinical trial sites to ensure the proper and timely conduct of our clinical trials. While we will have agreements governing their activities, we and our strategic alliance partners have limited influence over their actual performance. We will control only certain aspects of our CROs' activities. Nevertheless, we or our strategic alliance partners will be responsible for ensuring that each of our clinical trials are conducted in accordance with the applicable protocol, legal, regulatory and scientific standards and our reliance on the CROs will not relieve us of our regulatory responsibilities.

We, our alliance partners and our CROs will be required to comply with the FDA's or other regulatory agency's good clinical practices, or GCPs, for conducting, recording and reporting the results of IND-enabling studies and clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of future clinical trial participants are protected. The FDA and non-U.S. regulatory agencies enforce these GCPs through periodic inspections of trial sponsors, principal investigators and clinical trial sites. If we or our future CROs fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or applicable non-U.S. regulatory agency may require us to perform additional clinical trials before approving any marketing applications for the relevant jurisdiction. Upon inspection, the FDA or applicable non-U.S. regulatory agency may determine that our future clinical trials did not comply with GCPs. In addition, our future clinical trials will require a sufficiently large number of test subjects to evaluate the safety and effectiveness of a potential drug product. Accordingly, if our future CROs fail to comply with these regulations or fail to recruit a sufficient number of patients, we may be required to repeat such clinical trials, which would delay the regulatory approval process.

Our future CROs will not be our employees, and we will not be able to control whether or not they devote sufficient time and resources to our future clinical and nonclinical programs. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials, or other drug development activities which could harm our competitive position. If our future CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements, or for any other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for, or successfully commercialize our product candidates. As a result, our financial results and the commercial prospects for such products and any product candidates that we develop would be harmed, our costs could increase, and our ability to generate revenues could be delayed.

We intend to rely on other third parties to store and distribute drug products for any clinical trials that we may conduct. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our product candidates or commercialization of our products, if approved, producing additional losses and depriving us of potential product revenue.

RISKS RELATED TO OUR INTELLECTUAL PROPERTY

If we are unable to obtain or protect intellectual property rights related to our future products and product candidates, we may not be able to compete effectively in our markets.

Our success depends in part on our ability to obtain and maintain patents and other forms of intellectual property rights, including in-licenses of intellectual property rights of others, for our product candidates, methods used to develop and manufacture our product candidates and methods for treating patients using our product candidates, as well as our ability to preserve our trade secrets, to prevent third parties from infringing upon our proprietary rights and to operate without infringing upon the proprietary rights of others. As of April 1, 2018, we are the sole owner of 140 patents and pending patent applications including 16 U.S. patents, 25 pending U.S. patent applications, 40 foreign patents and 59 pending foreign patent applications. The strength of patents in the biotechnology and pharmaceutical field involves complex legal and scientific questions and can be uncertain. The patent applications that we own or in-license may fail to result in patents with claims that cover the products in the United States or in other countries. There is no assurance that all of the potentially relevant prior art relating to our patents and patent applications has been found; such prior art can invalidate a patent or prevent a patent from issuing based on a pending patent application. Even if patents do successfully issue, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed or invalidated. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property or prevent others from designing around our claims.

If the patent applications we hold or have in-licensed with respect to our programs or product candidates fail to issue or if their breadth or strength of protection is threatened, it could dissuade companies from collaborating with us to develop product candidates, and threaten our ability to commercialize, future products. We cannot offer any assurances about which, if any, patents will issue or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. A patent may be challenged through one or more of several administrative proceedings including post-grant challenges, re-examination or opposition before the U.S. PTO or foreign patent offices. For example, re-examination of, or oppositions to, patents owned by or licensed to us have previously been initiated, and while we believe these concluded proceedings did not result in a commercially relevant impact on the individual patents, any successful challenge of patents or any other patents owned by or licensed to us could deprive us of rights necessary for the successful commercialization of any product candidates that we or our strategic alliance partners may develop.

Since patent applications in the United States and most other countries are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we were the first to file any patent application related to a product candidate. Furthermore, in certain situations, if we and one or more third parties have filed patent applications in the United States and claiming the same subject matter, an administrative proceeding, known as an interference, can be initiated to determine which applicant is entitled to the patent on that subject matter. Such an interference proceeding provoked by third parties or brought by us may be necessary to determine the priority of inventions with respect to our patents or patent applications, or those of our alliance partners or licensors. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. Our defense of a patent or patent application in such a proceeding may not be successful and, even if successful, may result in substantial costs and distract our management and other employees.

In addition, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after it is filed. Various extensions may be available however the life of a patent, and the protection it affords, is limited. Once the patent life has expired for a product, we may be open to competition from generic medications. Further, if we encounter delays in regulatory approvals, the period of time during which we could market a product candidate under patent protection could be reduced.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable, processes for which patents are difficult to enforce and any other elements of our drug discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. Although each of our employees agrees to assign their inventions to us through an employee inventions agreement, and all of our employees, consultants, advisors and any third parties who have access to our proprietary know-how, information or technology to enter into confidentiality agreements, we cannot provide any assurances that all such agreements have been duly executed or that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. In addition, others may independently discover our trade secrets and proprietary information. For example, the FDA, as part of its Transparency Initiative, is currently considering whether to make additional information publicly available on a routine basis, including information that we may consider to be trade secrets or other proprietary information, and it is not clear at the present time how the FDA's disclosure policies may change in the future, if at all.

Further, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in protecting and defending our intellectual property both in the United States and abroad. If we are unable to prevent material disclosure of the non-patented intellectual property related to our technologies to third parties, and there is no guarantee that we will have any such enforceable trade secret protection, we may not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business, results of operations and financial condition.

Third-party claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we and our strategic alliance partners are pursuing development candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of any of our product candidates, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to commercialize such product candidate unless we obtained a license under the applicable patents, or until such patents expire. Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy, the holders of any such patents may be able to block our ability to develop and commercialize the applicable product candidate unless we obtained a license or until such patent expires. In either case, such a license may not be available on commercially reasonable terms or at all.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

If we fail to obtain licenses or comply with our obligations in these agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We are a party to intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various obligations on us. See the description of the Protiva agreement in Item 4.B. below under "Other Material Agreements."

We may need to obtain licenses from third parties to advance our research or allow commercialization of our product candidates, and we have done so from time to time. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we would be unable to further develop and commercialize one or more of our product candidates, which could harm our business significantly. We cannot provide any assurances that third-party patents do not exist which might be enforced against our future products, resulting in either an injunction prohibiting our sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation to third parties.

We may be involved in lawsuits to protect or enforce our patents or the patents of our licensees, which could be expensive, time consuming and unsuccessful.

Competitors may infringe our patents or the patents of our licensees. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensees is not valid or is unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.

Our defense in a lawsuit may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensees, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our Ordinary Shares.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties.

We employ individuals who were previously employed at other biotechnology or pharmaceutical companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed confidential information of our employees' former employers or other third parties. We may also be subject to claims that former employers or other third parties have an ownership interest in our patents. Litigation may be necessary to defend against these claims. There is no guarantee of success in defending these claims, and if we are successful, litigation could result in substantial cost and be a distraction to our management and other employees.

RISKS RELATED TO COMMERCIALIZATION OF PRODUCT CANDIDATES

The commercial success of our programs that are part of our strategic alliance agreements will depend in large part on the development and marketing efforts of our alliance partners. If our alliance partners are unable or unwilling to perform in accordance with the terms of our agreements, our potential to generate future revenue from these programs would be significantly reduced and our business would be materially and adversely harmed.

If or when our strategic alliance partners elect to further pursue the development and commercialization of any of the product candidates that are subject to its strategic alliance agreement with us, we will have limited influence and/or control over their approaches to development and commercialization. If strategic alliance partners do not perform in the manner that we expect or fail to fulfill their responsibilities in a timely manner, or at all, the clinical development, regulatory approval and commercialization efforts related to product candidates we have licensed to such strategic alliance partners could be delayed or terminated. If we terminate any of our strategic alliances or any program thereunder, we may have the right to assume the responsibility at our own expense for the development of the applicable product candidates. Assuming sole responsibility for further development will increase our expenditures, and may mean we will need to limit the size and scope of one or more of our programs, seek additional funding and/or choose to stop work altogether on one or more of the affected product candidates. This could result in a limited potential to generate future revenue from such product candidates and our business could be materially and adversely affected.

We face significant competition from other biotechnology and pharmaceutical companies and our operating results will suffer if we fail to compete effectively.

The biotechnology and pharmaceutical industries are intensely competitive. We have competitors both in the United States and internationally, including major multinational pharmaceutical companies, biotechnology companies and universities and other research institutions. Our competitors may have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations. Additional mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors may succeed in developing, acquiring or licensing on an exclusive basis, drug products that are more effective or less costly than any product candidate that we may develop.

All of our programs are preclinical and targeted toward indications for which there are product candidates in clinical development. We will face competition from other drugs currently approved or that may be approved in the future for the same therapeutic indications. For example, both Synlogic and Ultragenyx are currently conducting clinical trials with therapies to treat for ornithine transcarbamylase, or OTC, deficiency. Currently approved therapies for these patients include the small molecule nitrogen scavengers sodium benzoate, sodium phenylacetate, and sodium phenylbutyrate, and glycerol phenylbutyrate (brand name Ravicti®). Our ability to compete successfully will depend largely on our ability to leverage our experience in drug discovery and development to:

- discover and develop therapeutics that are superior to other products in the market;
- attract qualified scientific, product development and commercial personnel;
- obtain patent and/or other proprietary protection for our nucleic acid product platform and future product candidates;
- obtain required regulatory approvals; and
- successfully collaborate with pharmaceutical companies in the discovery, development and commercialization of new therapeutics.

The availability of our competitors' products could limit the demand, and the price we are able to charge, for any products that we may develop and commercialize. We will not achieve our business plan if the acceptance of any of these products is inhibited by price competition or the reluctance of physicians to switch from existing drug products to our products, or if physicians switch to other new drug products or choose to reserve our future products for use in limited circumstances. The inability to compete with existing or subsequently introduced drug products would have a material adverse impact on our business, financial condition and prospects.

Established pharmaceutical companies may invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make our product candidates less competitive. In addition, any new product that competes with an approved product must demonstrate compelling advantages in efficacy, convenience, tolerability and safety in order to overcome price competition and to be commercially successful. Accordingly, our competitors may succeed in obtaining patent protection, receiving FDA approval or discovering, developing and commercializing product candidates before we do, which would have a material adverse impact on our business.

The commercial success of our product candidates will depend upon the acceptance of these product candidates by the medical community, including physicians, patients and healthcare payors.

The degree of market acceptance of any product candidates will depend on a number of factors, including:

- demonstration of clinical safety and efficacy compared to other products;
- the relative convenience, ease of administration and acceptance by physicians, patients and healthcare payors;
- the prevalence and severity of any AEs;
- limitations or warnings contained in the FDA-approved label for such products;
- availability of alternative treatments;
- pricing and cost-effectiveness;
- the effectiveness of our or any collaborators' sales and marketing strategies;
- our ability to obtain hospital formulary approval;
- our ability to obtain and maintain sufficient third-party coverage and adequate reimbursement; and
- the willingness of patients to pay out-of-pocket in the absence of third party coverage.

Unless other formulations are developed in the future, we expect our compounds to be formulated in an injectable form. Injectable medications may be disfavored by patients or their physicians in the event drugs which are easy to administer, such as oral medications, are available. If a product is approved, but does not achieve an adequate level of acceptance by physicians, patients and healthcare payors, we may not generate sufficient revenues from such product and we may not become or remain profitable. Such increased competition may decrease any future potential revenue for future product candidates due to increasing pressure for lower pricing and higher discounts in the commercialization of our product.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to market and sell our product candidates, we may be unable to generate any revenues.

We currently do not have an organization for the sales, marketing and distribution of pharmaceutical products and the cost of establishing and maintaining such an organization may exceed the cost-effectiveness of doing so. In order to market any products that may be approved, we must build our sales, marketing, managerial and other non-technical capabilities or make arrangements with third parties to perform these services. With respect to certain of our current programs as well as future programs, we may rely completely on an alliance partner for sales and marketing. In addition, we intend to enter into strategic alliances with third parties to commercialize other product candidates, including in markets outside of the United States or for other large markets that are beyond our resources. Although we intend to establish a sales organization if we are able to obtain approval to market any product candidates for niche markets in the United States, we will also consider the option to enter into strategic alliances for future product candidates in the United States if commercialization requirements exceed our available resources. This will reduce the revenue generated from the sales of these products.

Our current and any future strategic alliance partners may not dedicate sufficient resources to the commercialization of our product candidates or may otherwise fail in their commercialization due to factors beyond our control. If we are unable to establish effective alliances to enable the sale of our product candidates to healthcare professionals and in geographical regions, including the United States, that will not be covered by our own marketing and sales force, or if our potential future strategic alliance partners do not successfully commercialize the product candidates, our ability to generate revenues from product sales will be adversely affected.

If we are unable to establish adequate sales, marketing and distribution capabilities, whether independently or with third parties, we may not be able to generate sufficient product revenue and may not become profitable. We will be competing with many companies that currently have extensive and well-funded marketing and sales operations. Without an internal team or the support of a third party to perform marketing and sales functions, we may be unable to compete successfully against these more established companies.

If we obtain approval to commercialize any approved products outside of the United States, a variety of risks associated with international operations could materially adversely affect our business.

If we obtain approval to commercialize any approved products outside of the United States, we expect that we will be subject to additional risks related to entering into international business relationships, including:

- different regulatory requirements for drug approvals in foreign countries;
- differing payor reimbursement regimes, governmental payors or patient self-pay systems and price controls;
- reduced protection for intellectual property rights;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenues, and other obligations incident to doing business in another country;
- workforce uncertainty in countries where labor unrest is more common than in the United States;

- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geopolitical actions, including war and terrorism, or natural disasters including earthquakes, typhoons, floods and fires.

Coverage and adequate reimbursement may not be available for our product candidates, which could make it difficult for us to sell products profitably.

Market acceptance and sales of any product candidates that we develop will depend on coverage and reimbursement policies and may be affected by future healthcare reform measures. Government authorities and third-party payors, such as private health insurers, government payors and health maintenance organizations, decide which drugs they will pay for and establish reimbursement levels. We cannot be sure that coverage and adequate reimbursement will be available for any future product candidates. Also, inadequate reimbursement amounts may reduce the demand for, or the price of, our future products. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage for the product. If reimbursement is not available, or is available only at limited levels, we may not be able to successfully commercialize product candidates that we develop.

In addition, we cannot be certain if and when we will obtain formulary approval to allow us to sell any products that we may develop and commercialize into our target markets. Obtaining formulary approval from hospitals and from payors can be an expensive and time-consuming process. Failure to obtain timely formulary approval will limit our commercial success.

There have been a number of legislative and regulatory proposals to change the healthcare system in the United States and in some foreign jurisdictions that could affect our ability to sell products profitably. These legislative and/or regulatory changes may negatively impact the reimbursement for drug products, following approval. The availability of numerous generic treatments may also substantially reduce the likelihood of reimbursement for our future products. The potential application of user fees to generic drug products may expedite the approval of additional generic drug treatments. We expect to experience pricing pressures in connection with the sale of any products that we develop, due to the trend toward managed healthcare, the increasing influence of health maintenance organizations and additional legislative changes. If we fail to successfully secure and maintain reimbursement coverage for our future products or are significantly delayed in doing so, we will have difficulty achieving market acceptance of our future products and our business will be harmed.

In addition, in some non-U.S. jurisdictions, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing vary widely from country to country. For example, the EU provides options for its member states to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. A member state may approve a specific price for the medicinal product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, products launched in the EU do not follow price structures of the U.S. and generally tend to be priced significantly lower.

RISKS RELATED TO OUR BUSINESS OPERATIONS AND INDUSTRY

Our future success depends on our ability to attract and retain key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on principal members of our executive team; the loss of whose services may adversely impact the achievement of our objectives. While we have entered into employment agreements with each of our executive officers, any of them could leave our employment at any time, as all of our employees are "at will" employees. Recruiting and retaining other qualified employees for our business, including scientific and technical personnel, will also be critical to our success. There is currently a shortage of skilled executives in our industry, which is likely to continue. As a result, competition for skilled personnel is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical companies for individuals with similar skill sets. In addition, failure to succeed in preclinical studies and clinical trials may make it more challenging to recruit and retain qualified personnel. The inability to recruit or loss of the services of any executive or key employee might impede the progress of our research, development and commercialization objectives.

We may need to expand our organization and may experience difficulties in managing this growth, which could disrupt our operations.

As of December 31, 2017 we had 60 employees. In the future we may expand our employee base to increase our managerial, scientific, operational, commercial, financial and other resources and to hire more consultants and contractors. Future growth would impose significant additional responsibilities on our management, including the need to identify, recruit, maintain, motivate and integrate additional employees, consultants and contractors. Also, our management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. We may not be able to effectively manage the expansion of our operations, which may result in weaknesses in our infrastructure, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Our expected growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of additional product candidates. Moreover, if our management is unable to effectively manage our growth, our expenses may increase more than expected, our ability to generate and/or grow revenues could be reduced, and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize product candidates and compete effectively will depend, in part, on our ability to effectively manage any future growth.

Our employees may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements and insider trading.

We are exposed to the risk of employee fraud or other misconduct. Misconduct by employees could include intentional failures to comply with the regulations of the FDA and non-U.S. regulators, provide accurate information to the FDA and non-U.S. regulators, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and cause serious harm to our reputation. We have adopted a code of conduct, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, fines, possible exclusion from Medicare, Medicaid and other government healthcare programs, additional reporting requirements and/or oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance, disgorgement, imprisonment, and contractual damages.

We may reincorporate in the U.S. and such reincorporation may result in disruptions to our business or otherwise materially harm our results of operations or financial condition. In addition, such reincorporation may result in taxes imposed on us or on our shareholders.

Arcturus Therapeutics Ltd. is incorporated in Israel, while all of our offices, assets, management, board members and most of our business partners are located in the United States. Accordingly, we may seek to reincorporate in Delaware or another jurisdiction in the United States, while maintaining our Nasdaq listing. Such reincorporation may require a significant amount of time, cost and focus from management and other employees, which may divert attention from our research and commercial activities. If any reincorporation activities we undertake in the future fail to achieve some or all of the expected benefits therefrom, our business, results of operations and financial condition could be materially and adversely affected.

In addition, a reincorporation of the company will be subject to all corporate approvals, which may include an approval of our shareholders, and, such reincorporation may result in certain shareholders recognizing taxable income in the jurisdiction in which such shareholders are tax residents or in, in certain cases, in which their members or partners are resident. Shareholders may be subject to withholding taxes or other taxes with respect to their ownership of the company after the reincorporation. If a plan to reincorporate the company is adopted and executed, we do not intend to make any cash distributions to shareholders to pay such taxes. A reincorporation of the company may also result in income recognition by, and tax liability for, the company. Such a tax liability could reduce our ability to fund our research and development activities or otherwise fund our business.

Certain current and future relationships with customers and third-party payors as well as certain of our business operations may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws and health information privacy and security laws. If we are unable to comply, or have not fully complied, with such laws, we could face criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings.

If we obtain FDA approval for any of our product candidates and begin commercializing those products in the United States, our operations may be directly, or indirectly through our customers, further subject to various federal and state fraud and abuse laws, including, without limitation, the federal Anti-Kickback Statute and the federal False Claims Act. These laws may impact, among other things, our proposed sales, marketing and education programs. In addition, we may be subject to patient privacy regulation by the federal government and by the U.S. states and foreign jurisdictions in which we conduct our business. The healthcare laws and regulations that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce, or in return for, either the referral of an individual, or the purchase or recommendation of an item or service for which payment may be made under a federal healthcare program, such as the Medicare and Medicaid programs;

- federal civil and criminal false claims laws and civil monetary penalty laws, including the federal False Claims Act, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment to the federal government, including Medicare or Medicaid, that are false or fraudulent;

- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created additional federal criminal statutes that prohibit, among other things, executing a scheme to defraud any healthcare benefit program and making false statements relating to healthcare matters;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their implementing regulations, which imposes certain requirements on certain types of individuals and entities, such as healthcare providers, health plans and healthcare clearing houses, known as “covered entities,” as well as their “business associates”, independent contractors or agents of covered entities that receive or obtain individually identifiable health information in connection with providing a service on behalf of a covered entity, relating to the privacy, security and transmission of individually identifiable health information;

- the federal Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children’s Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians, and further requires applicable manufacturers and applicable group purchasing organizations to report annually to CMS ownership and investment interests held by physicians and their immediate family members; and

- state and foreign law equivalents of each of the above federal laws, such as: anti-kickback and false claims laws which may apply to items or services reimbursed by any third party payor, including commercial insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; state and local laws that require the registration of pharmaceutical sales representatives; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

In addition, the European Union, or EU, has established its own data security and privacy legal framework, including but not limited to Directive 95/46/EC, or the Data Protection Directive. The Data Protection Directive will be replaced starting in May 2018 with the recently adopted European General Data Protection Regulation, or GDPR, which contains new provisions specifically directed at the processing of health information, higher sanctions and extra-territoriality measures intended to bring non-EU companies under the regulation. We anticipate that over time we may expand our business operations to include additional operations in the EU, including potentially conducting preclinical and clinical trials. With such expansion, we would be subject to increased governmental regulation in the EU countries in which we might operate, including the GDPR.

If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including, without limitation, civil, criminal and administrative penalties, damages, fines, possible exclusion from Medicare, Medicaid and other government healthcare programs, additional reporting requirements and/or oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance, disgorgement, imprisonment, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

Recent and future healthcare legislation may further impact our business operations.

The United States and some foreign jurisdictions are considering or have enacted a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our products profitably. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality or expanding access. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the ACA, was enacted, which made a number of substantial changes in the way healthcare is financed by both governmental and private insurers. Since its passage, there have been judicial and Congressional challenges to certain aspects of the ACA, as well as recent efforts by the Trump administration to repeal or replace certain aspects of the ACA. Since January 2017, President Trump has signed two Executive Orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. On December 22, 2017, President Trump signed into law H.R. 1, “An Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018,” informally titled the Tax Cuts and Jobs Act, which significantly revises the U.S. Internal Revenue Code of 1986, as amended (the Code). The Tax Cuts and Jobs Act of 2017 includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the “individual mandate.” Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called “Cadillac” tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amends the ACA, effective January 1, 2019, to increase from 50 percent to 70 percent the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the “donut hole.” As a result, there is significant uncertainty regarding future healthcare reform and its impact on our operations.

Further, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. At the federal level, the Trump administration’s budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. While any proposed measures will require authorization through additional legislation to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, to encourage importation from other countries and bulk purchasing.

We expect that healthcare reform measures that may be adopted in the future may result in more rigorous coverage criteria and lower reimbursement, and in additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government-funded programs may result in a similar reduction in payments from private payors.

We cannot predict what healthcare reform initiatives may be adopted in the future. Further federal, state and foreign legislative and regulatory developments are likely, and we expect ongoing initiatives to increase pressure on drug pricing. Such reforms could have an adverse effect on anticipated revenues from product candidates that we may successfully develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates.

We face potential product liability, and, if successful claims are brought against us, we may incur substantial liability and costs.

The use of our product candidates in future clinical trials and the sale of any products for which we obtain marketing approval exposes us to the risk of product liability claims. Product liability claims might be brought against us by consumers, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with our products. For example, unanticipated adverse effects could result from the use of our future products or product candidates which may result in a potential product liability claim. If we cannot successfully defend against product liability claims, we could incur substantial liability and costs. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- impairment of our business reputation;
- withdrawal of clinical trial participants;
- costs due to related litigation;
- distraction of management's attention from our primary business;
- substantial monetary awards to patients or other claimants;
- the inability to commercialize our product candidates; and
- decreased demand for our product candidates, if approved for commercial sale.

We plan to obtain product liability insurance relating to the use of our therapeutics in future clinical trials. However, such insurance coverage may not be sufficient to reimburse us for any expenses or losses we may suffer. Moreover, insurance coverage is becoming increasingly expensive and in the future we may not be able to obtain or maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses due to liability. If and when we obtain marketing approval for product candidates, we intend to expand our insurance coverage to include the sale of commercial products; however, we may be unable to obtain product liability insurance on commercially reasonable terms or in adequate amounts. On occasion, large judgments have been awarded in class action lawsuits based on drugs that had unanticipated adverse effects. A successful product liability claim or series of claims brought against us could cause our share price to decline and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business.

Cyber security risks and the failure to maintain the confidentiality, integrity, and availability of our computer hardware, software, and Internet applications and related tools and functions could result in damage to our reputation and/or subject us to costs, fines or lawsuits.

Our business requires manipulating, analyzing and storing large amounts of data. In addition, we rely on a global enterprise software system to operate and manage our business. We also maintain personally identifiable information about our employees. Our business therefore depends on the continuous, effective, reliable, and secure operation of our computer hardware, software, networks, Internet servers, and related infrastructure. To the extent that our hardware or software malfunctions or access to our data by internal research personnel is interrupted, our business could suffer. The integrity and protection of our employee and company data is critical to our business and employees have a high expectation that we will adequately protect their personal information. The regulatory environment governing information, security and privacy laws is increasingly demanding and continues to evolve. Maintaining compliance with applicable security and privacy regulations may increase our operating costs. Although our computer and communications hardware is protected through physical and software safeguards, it is still vulnerable to fire, storm, flood, power loss, earthquakes, telecommunications failures, physical or software break-ins, software viruses, and similar events. These events could lead to the unauthorized access, disclosure and use of non-public information. The techniques used by criminal elements to attack computer systems are sophisticated, change frequently and may originate from less regulated and remote areas of the world. As a result, we may not be able to address these techniques proactively or implement adequate preventative measures. If our computer systems are

compromised, we could be subject to fines, damages, litigation and enforcement actions, and we could lose trade secrets, the occurrence of which could harm our business. In addition, any sustained disruption in internet access provided by other companies could harm our business.

Business interruptions could delay us in the process of developing our future products.

Our headquarters are located in San Diego County. We are vulnerable to natural disasters such as earthquakes and wild fires, as well as other events that could disrupt our operations. We do not carry insurance for earthquakes or other natural disasters and we may not carry sufficient business interruption insurance to compensate us for losses that may occur. Any losses or damages we incur could have a material adverse effect on our business operations.

RISKS RELATED TO OUR ORDINARY SHARES

The market price of our Ordinary Shares may be highly volatile.

Since our merger on November 15, 2017 through May 9, 2018, our closing share price as reported on The Nasdaq Global Market ("Nasdaq"), has ranged from $4.91 to $10.22. The trading price of our Ordinary Shares is likely to continue to be volatile.

Our share price could be subject to wide fluctuations in response to a variety of factors, including the following:

- adverse results or delays in preclinical studies or clinical trials;
- inability to obtain additional funding;
- ongoing litigation or adverse rulings in relation to our proxy and shareholder litigation and litigation with our former chief executive officer and other former executives;
- any delay in filing an IND or NDA for any of our product candidates and any adverse development or perceived adverse development with respect to the FDA's review of that IND or NDA;
- failure to maintain our existing strategic alliances or enter into new alliances;
- failure of our strategic alliance partners to elect to develop and commercialize product candidates under our alliance agreements or the termination of any programs under our alliance agreements;
- failure by us or our licensors and strategic alliance partners to prosecute, maintain or enforce our intellectual property rights;
- failure to successfully develop and commercialize our product candidates;
- changes in laws or regulations applicable to our preclinical and clinical development activities, product candidates or future products;
- inability to obtain adequate product supply for our product candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services or technologies by our competitors;
- failure to meet or exceed financial projections we may provide to the public;
- failure to meet or exceed the estimates and projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;

- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us, our strategic alliance partners or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or licensing matters;
- changes in the market valuations of similar companies;
- sales of our Ordinary Shares by us or our shareholders in the future; and
- trading volume of our Ordinary Shares.

In addition, companies trading in the stock market in general, and Nasdaq in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our Ordinary Shares, regardless of our actual operating performance.

We are an "emerging growth company," and the reduced reporting requirements applicable to emerging growth companies could make our Ordinary Shares less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act. As an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not "emerging growth companies," including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, and delaying adopting new or revised accounting standards until such time as those standards apply to private companies. We expect that we will be an emerging growth company until December 31, 2018, although circumstances could cause us to lose that status earlier. We cannot predict if investors will find our Ordinary Shares less attractive because we may rely on these exemptions. If some investors find our Ordinary Shares less attractive as a result, there may be a less active trading market for our Ordinary Shares and our share price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards that have different effective dates for public and private companies until those standards apply to private companies. We have elected to use this extended transition period. As a result of this election, our timeline to comply with these standards will in many cases be delayed as compared to other public companies that are not eligible to take advantage of this election or have not made this election. Therefore, our financial statements may not be comparable to those of companies that comply with the public company effective dates for these standards.

In addition, if we cease to be an emerging growth company, we will no longer be able to use the extended transition period for complying with new or revised accounting standards. As a result, changes in rules of U.S. generally accepted accounting principles or their interpretation, the adoption of new guidance or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

The requirements of being a publicly traded company may strain our resources and divert management's attention.

As a publicly traded company, we have incurred, and will continue to incur, significant legal, accounting and other expenses that we did not incur as a private company. In addition, the Sarbanes-Oxley Act, as well as rules subsequently implemented by the SEC and Nasdaq have imposed various requirements on public companies. In July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas such as "say on pay" and proxy access. As an "emerging growth company" we are permitted to implement many of these requirements over a longer period and up to five years from the pricing of our initial public offering. We have taken advantage of this new legislation but cannot guarantee that we will not be required to implement these requirements sooner than budgeted or planned and thereby incur unexpected expenses. Shareholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in

which we operate our business in ways we cannot currently anticipate. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain our current levels of such coverage. In addition, most of our personnel consists of the Arcturus Therapeutics, Inc. employees prior to the merger, some of whom may not have previously managed and operated a public company. These employees will need to devote substantial time to gaining expertise regarding operations as a public company and compliance with applicable laws and regulations including the costs associated with the filing requirements under Section 16 of the Exchange Act.

Changes or modifications in financial accounting standards, including those related to revenue recognition, may harm our results of operations.

From time to time, the Financial Accounting Standards Board, or FASB, either alone or jointly with other organizations, promulgates new accounting principles that could have an adverse impact on our financial position, results of operations or reported cash flows. In May 2014, the FASB issued Accounting Standards Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606), which requires an entity to recognize the amount of revenue when promised goods or services to customers. The standard requires a company to recognize revenue to depict the transfer of goods or services to customers in the amount that reflects the consideration it expects to be entitled to receive in exchange for those goods or services. In August 2015, the FASB issued ASU 2015-14, Revenue from Contracts with Customers (Topic 606): Deferral of the Effective Date, which delayed the effective date of the new standard from January 1, 2017 to January 1, 2018, and January 1, 2019 for private companies. The FASB also agreed to allow entities to choose to adopt the standard as of the original effective date. In March 2016, the FASB issued additional ASUs which clarified certain aspects of the new guidance. Since we are an “emerging growth company" and opt to defer the adoption of new or revised accounting standards until such time as those standards apply to private companies, we will adopt the new standard for the year beginning January 1, 2019. We have not yet finalized our assessment of the impact of the new standard on our results of operations, internal controls and disclosures. Any difficulties in implementing this standard, or in adopting or implementing any other new accounting standard, and to update or modify our internal controls as needed on a timely basis, could result in our failure to meet our financial reporting obligations, which could result in regulatory discipline and harm investors’ confidence in us. Finally, if we were to change our critical accounting estimates, including those related to the recognition of collaboration revenue, our operating results could be significantly affected.

Sales of a substantial number of our Ordinary Shares in the public market by our existing shareholders could cause our share price to fall.

If our existing shareholders sell, or indicate an intention to sell, substantial amounts of those Ordinary Shares in the public market, the trading price of our Ordinary Shares could decline. In particular, the former shareholders, warrantholders and noteholders of Arcturus Therapeutics, Inc. received an aggregate of 6,631,712 of our Ordinary Shares pursuant to the merger in an unregistered transaction. Those shares remain restricted from resale under the Securities Act of 1933, as amended, or the Securities Act, for a six-month period following the closing of the merger pursuant to Rule 144 under the Securities Act. Once those restrictions lapse, those shareholders will be eligible to sell those shares in the public market without restriction, except for shareholders who are deemed “affiliates” of the Company under Rule 144 under the Securities Act. In addition, Ordinary Shares that are either subject to outstanding options or reserved for future issuance under our employee benefit plans are or may become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules and Rule 144 under the Securities Act. If these Ordinary Shares are sold, or if it is perceived that they will be sold, in the public market, that could create downward pressure on the trading price of our Ordinary Shares and cause the trading price to decline.

Future sales and issuances of our Ordinary Shares or rights to purchase Ordinary Shares, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our shareholders and could cause our share price to fall.

We expect that significant additional capital will be needed in the future to continue our planned operations. To the extent we raise additional capital by issuing equity securities, our shareholders may experience substantial dilution. Pursuant to our 2010 Incentive Option Plan, or the 2010 Plan, our management is authorized to grant options and other equity-based awards to our employees, directors and consultants. We may sell Ordinary Shares, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time, any of which may result in material dilution to investors and/or our existing shareholders. New investors could also be issued securities with rights superior to those of our existing shareholders.

We may be unable to comply with the applicable continued listing requirements of Nasdaq.

Our Ordinary Shares are currently listed on Nasdaq. In order to maintain this listing, we must satisfy minimum financial and other continued listing requirements and standards, including a minimum closing bid price requirement for our Ordinary Shares of $1.00 per share. There can be no assurance that we will be able to comply with the applicable listing standards. For example, if we were to fail to meet the minimum bid price requirement for 30 consecutive business days, we could become subject to delisting. Although Nasdaq may provide us with a compliance period in which to regain compliance with the minimum bid price requirement, we cannot assure you that we would be able to regain compliance within the period provided by Nasdaq. In order to regain compliance with such requirement, the closing bid price of our Ordinary Shares would need to meet or exceed $1.00 per share for at least 10 consecutive business days during the compliance period. If we were not able to regain compliance within the allotted compliance period for this requirement or any other applicable listing standard, including any extensions that may be granted by Nasdaq, our Ordinary Shares would be subject to delisting. In the event that our Ordinary Shares are delisted from Nasdaq and are not eligible for quotation or listing on another market or exchange, trading of our Ordinary Shares could be conducted only in the over-the-counter market or on an electronic bulletin board established for unlisted securities such as the Pink Sheets or the OTC Bulletin Board. In such event, it could become more difficult to dispose of, or obtain accurate price quotations for our Ordinary Shares and there would likely also be a reduction in our coverage by securities analysts and the news media, which could cause the price of our Ordinary Shares to decline further.

Our business and the market price of our ordinary shares could be negatively affected as a result of a proxy contest.

On February 1, 2018, Mr. Payne, the Company's former President and Chief Executive Officer, was terminated by the Company for cause. On February 12, 2018, Mr. Payne wrote a letter to the Company's board of directors demanding that the Company hold an extraordinary general meeting of shareholders. On March 11, 2018, the Company announced that it would hold an extraordinary general meeting of shareholders on May 7, 2018 as a result of Mr. Payne's demand. On April 8, 2018, upon the recommendation of the Executive Committee of the Company's board of directors, the board of directors approved postponing the extraordinary general meeting.

On May 13, 2018, the District Court at Tel Aviv ruled on a number of issues, including regarding the motion to extend the temporary restraining order, and ordered the Company to convene a Board meeting within seven days, and to summon an extraordinary general meeting within 35 days from that date. See Item 8.A. "Legal Proceedings" and Item 5.A. "Recent Developments" for additional information.

The Company's board of directors has recommended that shareholders vote against the removal of the current directors and against the election of Mr. Payne's nominees, and the Company is soliciting proxies from shareholders on this basis. Our business, operating results or financial condition could be harmed by this proxy contest because, among other things:

- responding to the proxy contest is costly and time-consuming, is a significant distraction for our board of directors, management and employees, and diverts the attention of our board of directors and senior management from the pursuit of our business strategy, which could adversely affect our results of operations and financial condition;

- perceived uncertainties as to our future direction, our ability to execute on our strategy, or changes to the composition of our board of directors or senior management team may lead to the perception of a change in the direction of our business, instability or lack of continuity which may be exploited by our competitors, and may result in the loss of current and prospective employees, customers, licensees, suppliers and other constituencies important to our success, which could adversely affect our results of operations and financial condition; and

- the expenses for legal and advisory fees and administrative and associated costs incurred in connection with responding to the proxy contest and the related litigation may be substantial.

In addition, the market price of our ordinary shares could be subject to significant fluctuation or otherwise be adversely affected by the uncertainties described above or the outcome of the proxy contest.

We are treated as a U.S. corporation for U.S. federal tax purposes.

Pursuant to Section 7874 of the Code, we are treated as a U.S. corporation for U.S. federal income tax purposes. As a result, we are subject to U.S. federal corporate income tax as if we were incorporated in the United States. Shareholders should consult their tax advisers regarding the tax consequences of holding our Ordinary Shares based on their particular circumstances.

The recently enacted U.S. federal income tax reform bill could adversely affect our business and financial condition.

As noted above, on December 22, 2017, President Trump signed into law the Tax Cuts and Jobs Act, which significantly revises the Code. The Tax Cuts and Jobs Act, among other things, contains significant changes to U.S. federal corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Cuts and Jobs Act is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the newly enacted federal tax law. The impact of the Tax Cuts and Jobs Act on holders of our Ordinary Shares is also uncertain and could be adverse. We urge our shareholders to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our Ordinary Shares.

As a foreign private issuer, we are permitted and actually do follow certain home country corporate governance practices instead of otherwise applicable SEC and Nasdaq requirements, which may result in less protection than is accorded to investors under rules applicable to domestic U.S. issuers.

We expect that we will be a foreign private issuer until January 1, 2019. As a foreign private issuer, we are permitted, and actually do follow certain home country corporate governance practices instead of those otherwise required under the Listing Rules of the Nasdaq Stock Market (the "Nasdaq Listing Rules") for domestic U.S. issuers. For instance, we follow home country practice in Israel with regard to, among other things, director nomination procedures and approval of compensation of officers. In addition, we may follow our home country law instead of the Nasdaq Listing Rules that require that we obtain shareholder approval for certain dilutive events, such as the establishment or amendment of certain equity based compensation plans, an issuance that will result in a change of control of the company, a public offering involving issuances of a 20% or greater interest in the company, and certain acquisitions of the stock or assets of another company. Following our home country governance practices as opposed to the requirements that would otherwise apply to a U.S. company listed on Nasdaq may provide less protection to you than what is accorded to investors under the Nasdaq Listing Rules applicable to domestic U.S. issuers.

In addition, as a foreign private issuer, we are exempt from the rules and regulations under the Exchange Act related to the furnishing and content of proxy statements, and our officers, directors and principal shareholders are exempt from the reporting and short-swing profit recovery provisions contained in Section 16 of the Exchange Act. In addition, we are not required under the Exchange Act to file annual, quarterly and current reports and financial statements with the SEC as frequently or as promptly as domestic U.S. issuers whose securities are registered under the Exchange Act. Also, although the Israeli Companies Law regulations require us to disclose the annual compensation of our five most highly compensated senior officer holders on an individual basis, this disclosure is not as extensive as that required of a U.S. domestic issuer. For example, this disclosure required under Israeli law is limited to compensation paid in the immediately preceding year without any requirement to disclose option exercises and vested stock options, pension benefits or potential payments upon termination or change of control. These exemptions and leniencies reduce the frequency and scope of information and protections to which you are entitled as an investor.

Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.

Under the Tax Cuts and Jobs Act, U.S. federal net operating losses, or NOLs, incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such federal NOLs is limited. It is uncertain if and to what extent various states will conform to the Tax Cuts and Jobs Act. To the extent that we continue to generate taxable losses for United States federal income tax purposes, unused NOLs will carry forward to offset future taxable income (subject to any applicable limitations), if any. Under Sections 382 and 383 of the Code, as amended, if a corporation undergoes an "ownership change," generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period, the corporation's ability to use its pre-change NOLs and other pre-change tax attributes (such as research tax credits) to offset its post-change income may be limited. We believe we may have triggered an "ownership change" limitation at the completion of our merger with Arcturus Therapeutics, Inc. in November 2017, however we have not completed a study in accordance with Sections 382 and 383 of the Code to determine whether this ownership change has occurred. We may also experience ownership changes in the future as a result of subsequent shifts in our share ownership. As a result, if we earn net taxable income, our ability to use our pre-change NOL carryforwards to offset U.S. federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us. Similar provisions of U.S. state tax law may also apply to limit our use of accumulated state tax attributes, including our state NOLs. In addition, at the state level, there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed. As a result, even if we attain profitability, we may be unable to use a material portion of our NOLs and other tax attributes, which could negatively impact our future cash flows**.**

We do not intend to pay dividends on our Ordinary Shares so any returns will be limited to the value of our shares.

We have never declared or paid any cash dividends on our Ordinary Shares. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Moreover, the Israeli Companies Law 5759 – 1999, or the Israeli Companies Law, imposes certain restrictions on our ability to declare and pay dividends. See Item 10.B. "Memorandum and Articles of Association – Rights, Preferences and Restrictions of Shares – Dividend and Liquidation Rights" for additional information. Any return to shareholders will therefore be limited to the appreciation of their shares.

RISKS RELATED TO ISRAELI LAW AND OUR OPERATIONS IN ISRAEL

Provisions of Israeli law may make it easy for our shareholders to demand that we convene a shareholders meeting, and/or allow shareholders to convene a shareholder meeting without the consent of our management, which may disrupt our management's ability to run our company.

Section 63(b) of the Israeli Companies Law may allow any one or more of our shareholders holding at least 5% of our voting rights to demand that we convene an extraordinary shareholders meeting. Also, in the event that we deny to convene an extraordinary shareholders meeting pursuant to such a request, Section 64 of the Israeli Companies Law provides that such shareholders may independently convene an extraordinary shareholders meeting and require us to cover the costs. If our shareholders decide to exercise these rights in a way inconsistent with our management's strategic plans, our management's ability to run our company may be disrupted, and this process may entail significant costs to us.

Provisions of Israeli law and our amended and restated articles of association may delay, prevent or otherwise impede a merger with, or an acquisition of, our company, which could prevent a change of control, even when the terms of such a transaction are favorable to us and our shareholders.

Israeli corporate law regulates mergers, requires tender offers for acquisitions of shares above specified thresholds, requires special approvals for transactions involving directors, officers or significant shareholders and regulates other matters that may be relevant to such types of transactions. For example, a merger may not be consummated unless at least 50 days have passed from the date on which a merger proposal is filed by each merging company with the Israel Registrar of Companies and at least 30 days have passed from the date on which the shareholders of both merging companies have approved the merger. In addition, a majority of each class of securities of the target company must approve a merger. Moreover, a tender offer for all of a company's issued and outstanding shares can only be completed if the acquirer receives positive responses from the holders of at least 95% of the issued share capital. Completion of the tender offer also requires approval of a majority of the offerees that do not have a personal interest in the tender offer, unless, following consummation of the tender offer, the acquirer would hold at least 98% of our outstanding shares. Furthermore, the shareholders, including those who indicated their acceptance of the tender offer, may, at any time within six months following the completion of the tender offer, petition an Israeli court to alter the consideration for the acquisition, unless the acquirer stipulated in its tender offer that a shareholder that accepts the offer may not seek such appraisal rights.

Furthermore, Israeli tax considerations may make potential transactions unappealing to us or to our shareholders whose country of residence does not have a tax treaty with Israel exempting such shareholders from Israeli tax. See Item 10.E. "Taxation – Israeli Taxation Considerations" for additional information.

Our amended and restated articles of association also contain provisions that could delay or prevent changes in control or changes in our management without the consent of our Board of Directors. These provisions include the following:

- no cumulative voting in the election of directors, which limits the ability of minority shareholders to elect director candidates; and
- the right of our Board of Directors to appoint a director to fill a vacancy created by the expansion of the Board of Directors or the resignation, death or removal of a director, which may prevent shareholders from being able to fill vacancies on our Board of Directors.

As a domiciliary of Israel, our results may be adversely affected by political, economic and military instability in Israel.

As an Israeli company, political, economic and military conditions in Israel may directly affect our business. Since the establishment of the State of Israel in 1948, a number of armed conflicts have taken place between Israel and its neighboring countries, the Hamas militant group and the Hezbollah. Any hostilities involving Israel or the interruption or curtailment of trade between Israel and its trading partners could adversely affect our operations and results of operations.

In addition, since 2010 political uprisings and conflicts have arisen in various countries in the Middle East. Such instability may lead to deterioration in the political and trade relationships that exist between the State of Israel and certain other countries. Several countries, principally in the Middle East, still restrict doing business with Israel and Israeli companies, and additional countries may impose restrictions on doing business with Israel and Israeli companies if hostilities in Israel or political instability in the region continues or increases. Similarly, Israeli companies are limited in conducting business with entities from countries that are considered to be in a state of war with Israel.

Further, in the past, the State of Israel and Israeli companies have been subjected to economic boycotts. Several countries still restrict business with the State of Israel and with Israeli companies. These restrictive laws and policies may have an adverse impact on our operating results, financial conditions or the expansion of our business.

It may be difficult to enforce a judgment of a U.S. court against us and the Israeli experts named herein in Israel or the United States, to assert U.S. securities laws claims in Israel or to serve process on certain of our officers and directors and these experts.

We were incorporated in Israel. Therefore, a judgment obtained against us, or any directors that reside outside of the United States, including a judgment based on the civil liability provisions of the U.S. federal securities laws, may not be collectible in the United States and may not necessarily be enforced by an Israeli court. It also may be difficult for you to effect service of process on these persons in the United States or to assert U.S. securities law claims in original actions instituted in Israel. Additionally, it may be difficult for an investor, or any other person or entity, to initiate an action with respect to U.S. securities laws in Israel. Israeli courts may refuse to hear a claim based on an alleged violation of U.S. securities laws reasoning that Israel is not the most appropriate forum in which to bring such a claim. In addition, even if an Israeli court agrees to hear a claim, it may determine that Israeli law and not U.S. law is applicable to the claim. If U.S. law is found to be applicable, the content of applicable U.S. law must be proven as a fact by expert witnesses, which can be a time consuming and costly process. Certain matters of procedure will also be governed by Israeli law. There is little binding case law in Israel that addresses the matters described above. As a result of the difficulty associated with enforcing a judgment against us in Israel, you may not be able to collect any damages awarded by either a U.S. or foreign court.

Your rights and responsibilities as a shareholder will be governed by Israeli law, which differs in some material respects from the rights and responsibilities of shareholders of U.S. companies.

The rights and responsibilities of the holders of our Ordinary Shares are governed by our amended and restated articles of association and by Israeli law. These rights and responsibilities differ in some material respects from the rights and responsibilities of shareholders in typical U.S.-based corporations. In particular, a shareholder of an Israeli company has certain duties to act in good faith and fairness towards the Company and other shareholders, and to refrain from abusing its power in the Company. See Item 10.B. “Memorandum and Articles of Association – Shareholder Duties” for additional information. There is limited case law available to assist us in understanding the nature of this duty or the implications of these provisions. These provisions may be interpreted to impose additional obligations and liabilities on holders of our Ordinary Shares that are not typically imposed on stockholders of U.S. corporations.

We are subject to anti-takeover provisions that could delay or prevent our acquisition by another entity.

Provisions of Israeli corporate and tax law and of our amended and restated articles of association may have the effect of delaying, preventing or making more difficult any merger or acquisition of us. In addition, any merger or acquisition of us may require the prior consent of the Israel Innovation Authority (formerly known as the Office of the Chief Scientist), as well as the Investment Center of the Israeli Ministry of Industry, Trade and Employment, or the Investment Center. Israeli law regulates mergers, votes required to approve a merger, acquisition of shares through tender offers and transactions involving significant shareholders. Any of these provisions may make it more difficult to acquire us. Accordingly, our acquisition by another entity could be delayed or prevented even if it would be beneficial to our shareholders.

ITEM 4. INFORMATION ON THE COMPANY

4.A. History and development

Our legal and commercial name is Arcturus Therapeutics Ltd., and we are the product of the 2017 merger of Arcturus Therapeutics, Inc. and Alcobra Ltd. Arcturus Therapeutics, Inc. was incorporated in Delaware in 2013, and Alcobra Ltd. was incorporated in Israel in 2008. On November 15, 2017, the two companies completed a merger (the “merger”) pursuant to which Arcturus Therapeutics, Inc. became a wholly-owned subsidiary of Alcobra Ltd., and Alcobra Ltd. changed its name to Arcturus Therapeutics Ltd. While Alcobra Ltd. was the legal acquirer in the transaction, Arcturus Therapeutics, Inc. was deemed the accounting acquirer. Also, as part of the merger, the Ordinary Shares of Arcturus Therapeutics Ltd. were listed on Nasdaq under the trading symbol “ARCT,” in place of the previous listing of the Ordinary Shares of Alcobra Ltd, which had traded under the symbol “ADHD.” The business plan of the post-merger company is that of Arcturus Therapeutics, Inc. As an Israeli company, we are subject to the Israeli Companies Law, 5759-1999, or the Israeli Companies Law.

Our principal place of business is located at 10628 Science Center Drive, Suite 250, San Diego, California, and our telephone number there is (858) 900-2660. Our agent in the United States is Arcturus Therapeutics, Inc., whose address is that of our San Diego, California headquarters. Our World Wide Web address is www.arcturusrx.com. The information contained on that web site is not a part of this annual report.

We are an "emerging growth company," as defined in Section 2(a) of the Securities Act of 1933, or the Securities Act, as modified by the JOBS Act. As such, we are eligible to, and intend to, take advantage of certain exemptions from various reporting requirements applicable to other public companies that are not "emerging growth companies," such as not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002. We could remain an "emerging growth company" for up to five years from our initial public offering in 2013, or, if earlier, until the earliest of (a) the last day of the first fiscal year in which our annual gross revenue exceeds $1.07 billion, (b) the date that we become a "large accelerated filer" as defined in Rule 12b-2 under the U.S. Securities Exchange Act of 1934, as amended, or the Exchange Act, which would occur if the market value of our Ordinary Shares that is held by non-affiliates exceeds $700.0 million as of the last business day of our most recently completed second fiscal quarter, or (c) the date on which we have issued more than $1.0 billion in nonconvertible debt during the preceding three-year period.

For additional information relating to the development of our company, see Item 4.B. "Business Overview." For additional information concerning our company's capital expenditures over the course of the last three fiscal years, see Item 5 B. "Liquidity and Capital Resources – Capital Expenditures in Last Three Fiscal Years."

4.B. Business overview

Nucleic Acid Medicines and Markets

The World Health Organization estimates there are 10,000 monogenic diseases. Monogenic diseases are caused by mutations in a single gene. These disorders affect 1/100 people at birth, and between 250 and 350 million people worldwide live with a rare genetic disease. Many of these diseases cause moderate to severe symptoms and significantly decrease the quality of life and life expectancy for patients. There are no FDA-approved drugs for over 95% of known rare genetic diseases. This is a significant unmet medical need.

Nucleic acid medicines have the potential to treat many diseases caused by genetic mutations including diseases that cannot be treated by conventional drugs such as small molecules and biologics. DNA carries the blueprint from which all proteins necessary for life are produced inside cells. Each gene has the code needed to make one or more proteins. Various types of nucleic acids, including messenger RNA ("mRNA"), small interfering RNA ("siRNA") and microRNA, work together to control how the genes contained in DNA are translated into proteins.

mRNA or DNA has the potential to be used as protein replacement therapy to treat diseases caused by a lack of protein, or by defective proteins, such as cystic fibrosis. If a gene has a mutation that stops it from producing protein or causes it to produce defective proteins, mRNA or DNA medicines may be used to ensure that a healthy version of the missing protein is produced. Nucleic acid vaccines are also being evaluated for their potential in infectious disease and oncology, using mRNA or DNA to express an antigen and trigger an immune response.

siRNA medicines can treat viral infections like HBV and diseases like Huntington's disease that are caused by malfunctioning proteins. Each siRNA binds perfectly to one mRNA which produces a result whereby the resulting cell destroys the mRNA. This mechanism, called RNA interference ("RNAi"), can be used to prevent mutated genes from being translated into defective proteins that cause disease. It can also stop viruses from replicating inside the body.

Naked RNA and DNA are quickly degraded by enzymes in the bloodstream and can cause a strong immune response. Therefore, nucleic acid medicines developed for systemic use must use a vector to deliver the nucleic acid to target cells. Viral delivery vectors and lipid-mediated delivery systems are the two main delivery systems used in nucleic acid therapeutics development.

Viral delivery vectors are very effective at delivering DNA to cells. However, they can cause liver damage and activate an immune response in human patients. Viral vectors may also cause accidental mutations in host DNA. Patients treated with viral vectors can also develop antibodies against these vectors that make the treatment less effective over time.

Lipid-mediated delivery systems are the most common non-viral vectors because they are biocompatible and do not cause insertional mutagenesis. They can also be manipulated to target specific cells in the body. Despite these advantages, older lipid-mediated delivery systems also stimulate adverse immune responses and cause liver damage in patients.

Who We Are

We are a preclinical nucleic acid medicines company focused on developing therapeutics for rare, infectious, fibrotic, and respiratory diseases with significant unmet medical needs. We have two proprietary technologies with the potential to address the major hurdles in nucleic acid medicine development, namely the effective and safe delivery of nucleic acids to disease-relevant target tissues. We believe the versatility of our platform to target multiple tissues, its compatibility with various nucleic acid therapeutic modalities, and our expertise developing scalable manufacturing processes puts us in a good position to deliver on the next generation of nucleic medicines.

- We have developed a novel lipid-mediated delivery system called Lipid-enabled and Unlocked Nucleomonomer Agent modified RNA ("LUNAR®"). Drawing from a library of over 150 proprietary lipids, LUNAR can be flexibly designed to deliver nucleic acids to many clinically important cells and tissues, including liver hepatocytes, liver stellate cells, myocytes and lung cells, resulting in knockdown or upregulation of target proteins. Our lipids are pH-sensitive and designed to be biodegradable, minimizing lipid accumulation in cells after multiple dosing and potentially improving chronic safety.

- Our proprietary Unlocked Nucleomonomer Agent ("UNA") oligomer chemistry technology can be incorporated into multiple types of nucleic acid medicines. UNA has the potential to improve the efficacy and/or safety profile of nucleic acid medicines.

Our LUNAR and UNA technologies are wholly-owned by us and covered by our patent portfolio of 140 patents and patent applications, issued in the United States, China, Europe, Japan and other countries. We believe that we can use our technologies to develop medicines in multiple nucleic acid-based therapeutic modalities: (1) mRNA, DNA, and replicon – up-regulation of proteins for therapeutics or vaccines; (2) siRNA, microRNA, and antisense oligonucleotides – knockdown of genes overexpressed in disease; and (3) CRISPR, TALEN, zinc finger proteins, and meganucleases – gene editing of errant genes.

We are using our proprietary technology to develop nucleic acid medicines to treat diseases with clear unmet medical needs, accelerated clinical paths and commercial opportunities. Our preclinical pipeline currently has seven active preclinical drug discovery and development programs. This includes programs which are wholly-owned, as well as programs in partnership with Ultragenyx Pharmaceutical, Inc. ("Ultragenyx"), Takeda Pharmaceutical Company Limited ("Takeda"), Janssen Pharmaceuticals, Inc, one of the Janssen Pharmaceutical Companies of Johnson & Johnson ("Janssen"), Synthetic Genomics, Inc. ("Synthetic Genomics" or "SGI") and CureVac AG ("CureVac").

- The LUNAR-OTC program is developing mRNA compounds to treat ornithine transcarbamylase ("OTC") deficiency, a life-threatening genetic disease that affects approximately 1 in 60,000 people. This is a co-development program with CureVac, and we have achieved preclinical proof of concept for LUNAR-OTC in a mouse model of the disease.

- The LUNAR-CF program is developing mRNA compounds to replace dysfunctional cystic fibrosis transmembrane conductance regulator ("CFTR") protein in cystic fibrosis ("CF") patients. CF is a common genetic disease in the United States, and approximately 1,000 patients are newly diagnosed each year. This program is supported by CFFT. We have demonstrated proof of concept for LUNAR delivery to lung epithelial cells in vivo and shown activity of an optimized CFTR mRNA in cultured cells.

- The LUNAR-RLD program is an internal research program focused on target validation of multiple pipeline LUNAR-mRNA program candidates. A rare liver disease will be selected as a future development program based on these efforts.

- We have partnered with Ultragenyx to develop up to ten mRNA therapeutic candidates for certain rare disease targets. LUNAR-GSDIII is the first program to be disclosed from the collaboration. Glycogen Storage Disease Type III ("GSD") is caused by genetic mutations in the glycogen debranching enzyme AGL which leads to glycogen accumulation in liver and muscle. There are approximately 10,000 patients worldwide.

- We have partnered with Takeda to develop nucleic acid-based therapeutic candidates for the treatment of nonalcoholic steatohepatitis ("NASH") and other gastrointestinal ("GI") disorders.

- We have partnered with Janssen, a Johnson & Johnson company, to develop nucleic acid-based products for the treatment of hepatitis B virus infection ("HBV") and potentially other infectious and respiratory diseases.

- We have a license and collaboration agreement with SGI focused on developing vaccines and therapeutics using their proprietary self-replicating nucleic acid technology. We have demonstrated proof of concept in preclinical animal models for both vaccines and therapeutics.

Our team has extensive experience in the discovery and development of nucleic acid medicines. We are led by Mark R. Herbert, Interim President. Mr. Herbert's background includes over 15 years of experience in business and technical development of large and small molecules working across a number of different platforms and therapeutic areas, including serving as Head of U.S. Development and Sales at STA Pharmaceutical Co., Ltd. and Director of Pharmaceutical Sciences at Aragon Pharmaceuticals, Inc. He is an author or inventor on over 35 peer-reviewed manuscripts and patents and has led or contributed to the submission of 13 investigational new drug ("IND") applications and one new drug application ("NDA"). Also, Dr. Christine Esau serves as our Vice President of Research and Development and Dr. Priya Karmali serves as our Senior Director of Pharmaceutical Development. Dr. Esau has over 15 years of experience in nucleic acid therapeutics drug discovery at Ionis Pharmaceuticals, Inc., Regulus Therapeutics, Inc. and as Chief Scientific Officer of AptamiR Therapeutics, Inc. She performed pioneering work in microRNA biology and targeting technology development, resulting in landmark, highly cited papers and early patent filings. Dr. Karmali has over 15 years of experience in lipid-based drug delivery systems at Nitto Denko and Regulus Therapeutics, Inc. where she led drug product development efforts for nucleic acid medicines currently in various stages of clinical trials. She is an author or inventor on over 35 scientific publications and patents. In addition, Stuart Collinson, Ph.D., serves as our Executive Chair. Dr. Collinson's experience includes Chief Executive Officer of Aurora Biosciences and senior roles at GlaxoWellcome plc and Baxter International Inc.

Our Strategy

We aim to leverage our proprietary and licensed intellectual property relating to LUNAR and UNA technologies to develop a pipeline of nucleic acid medicines for rare, infectious, fibrotic and respiratory diseases. In addition to our collaborations noted above, we are focused on developing a balanced portfolio of proprietary and partnered programs to advance our preclinical candidates in a timely and cost-effective manner.

Our internal programs are focused on significant unmet medical needs in rare diseases. These diseases affect between 250 and 350 million people around the world. There are no drugs approved by the U.S. Food and Drug Administration ("FDA") for over 95% of these conditions. Therefore, these diseases represent both a significant unmet medical need and a large potential market. We believe the versatility of our nucleic acid development platform technologies gives us a distinct advantage in developing nucleic acid medicines to treat the genetic cause of rare diseases.

Our novel UNA chemistry and LUNAR delivery technologies are covered by our extensive patent portfolio, and we believe that we can use our technologies to enable multiple types of nucleic acid medicines. We are actively pursuing technology alliances and strategic therapeutic partnerships to address other targets.

We continue to invest in further development of the LUNAR delivery, UNA oligomer chemistry, siRNA and mRNA technology platforms to improve their efficacy and safety profile and expand their applications. Our team is also exploring new nucleic acid chemistries and intellectual property opportunities, including locked nucleic acid ("LNA"), to expand our nucleic acid technology platform portfolio and facilitate our development of novel nucleic acid therapeutic candidates.

Our business strategy includes:

- *Develop a portfolio of nucleic acid therapeutics to treat rare diseases and become a clinical stage company. Our initial focus is on OTC deficiency and cystic fibrosis.* We have achieved preclinical proof of concept in the LUNAR-OTC and LUNAR-CF programs, including robust target protein expression and functional activity in preclinical disease models. We aim to establish the infrastructure required to move these programs into the clinic.

- *Leverage our UNA and LUNAR technologies to develop therapeutics for a broad range of additional rare diseases.* We believe that many other rare diseases would be good candidates for mRNA replacement therapy or siRNA-mediated gene silencing. Given that the delivery system will be similar across multiple programs, we anticipate that the costs and risks associated with developing new nucleic acid therapeutics for other orphan diseases will be greatly reduced. Efforts to prioritize rare liver diseases for progression to mRNA development programs are ongoing.

- *Drive existing collaborations and form new strategic collaborations that leverage our UNA and LUNAR technologies.* We are in discussions with several biopharmaceutical firms to develop nucleic acid, gene editing and vaccine programs for various disease indications. We intend to pursue partnerships in order to accelerate the development and maximize the market potential of our UNA and LUNAR technology platforms. In particular, we intend to partner with larger biopharmaceutical companies that possess market know-how and marketing capabilities to complete the development and commercialization of nucleic acid therapeutics.

- *Identify new chemistries and intellectual property opportunities to expand Arcturus' nucleic acid technology platform portfolio*. Our team is working to discover and develop new nucleic acid chemistries that will complement its LUNAR and UNA technology platforms and strengthen our ability to develop novel nucleic acid therapeutic candidates for a range of unmet medical needs.

Our Competitive Strengths

We believe our proprietary UNA and LUNAR technologies, extensive intellectual property portfolio and experienced scientific team will enable us to advance our drug candidates and existing partnerships, and further partner our technology platform to expand future development and commercial opportunities.

Our competitive strengths include:

- *LUNAR delivery technology is not limited to a specific nucleic acid modality.* Preclinical studies have shown that LUNAR delivery technology is compatible with different types of nucleic acids, from short double-stranded siRNAs, to long single-stranded mRNAs, to double-stranded DNA molecules. This means that we are not restricted in the types of nucleic acid medicines that we can develop.

- *LUNAR delivery technology is compatible with multiple routes of administration and can be targeted to diverse tissues and cell types.* Preclinical studies in both rodents and non-human primates have shown that LUNAR can deliver nucleic acid compounds specifically to hepatocytes via intravenous injection. Additionally, preclinical studies in rodents have shown that LUNAR can deliver nucleic acid compounds to liver stellate cells via intravenous injection, muscle cells via intramuscular injection, retinal cells via subretinal injection, and lung cells via nebulization. This is a clear advantage over the N-acetylgalactosamine ("GalNAc") delivery system that can deliver a single small nucleic acid molecule to hepatocytes. GalNAc technology is utilized by companies such as Ionis Pharmaceuticals, Inc., Alnylam Pharmaceuticals, Inc., Arrowhead Pharmaceuticals, Inc., Regulus Therapeutics Inc., Dicerna Pharmaceuticals, Inc. and Silence Therapeutics plc. This versatility in route of administration and cell type targeting, combined with the ability to use LUNAR delivery technology with many different types of nucleic acids, means that the platform can potentially be used to develop nucleic acid therapies for a range of different diseases.

- *LUNAR can deliver mixtures of different nucleic acids as one drug product.* LUNAR can deliver mixtures containing multiple nucleic acids to target cells *in vivo*, as we previously demonstrated for a combination of three HBV-targeting siRNAs which was efficacious in multiple mouse models of HBV infection.

- *Ability to repeat dose.* Multiple preclinical studies in rodents and non-human primates have shown no reduction in efficacy upon repeat dosing of LUNAR formulated siRNA or mRNA. We believe this indicates that LUNAR-delivered nucleic acids may not elicit antibody or cell-mediated immunity that can reduce potency upon repeat dosing.

- *Experienced team.* Our team has extensive experience in the discovery and development of nucleic acid medicines, as well as experience and know-how in lipid-mediated delivery technology. This combination of in-house expertise uniquely positions us to develop novel nucleic acid development technologies and nucleic acid medicines.

- *Our intellectual property portfolio.* The LUNAR and UNA technologies are wholly owned by us and covered by our patent portfolio of 140 patents and patent applications, issued in the United States, China, Europe, Japan and other countries. These intellectual property assets allow us to pursue nucleic acid therapeutic candidates and serve as a barrier-to-entry for competitors.

- *Ability to develop high barrier-to-entry products with rapid development of subsequent products with lower costs and risks*. The properties of our proprietary technologies, outlined above, allow us to develop high barrier-to-entry nucleic acid medicines. The versatility of our two development platforms will allow us to develop subsequent products relatively quickly with less risk and lower costs.

Our nucleic acid technology platforms

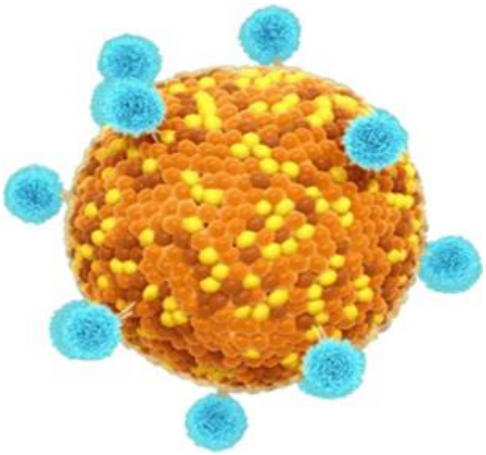
To address the challenges of nucleic acid medicine delivery and improve safety and tolerability *in vivo*, we have developed two nucleic acid technology platforms. We believe that our LUNAR delivery platform and UNA oligomer technology can be used together or separately to create the next-generation of safe, effective nucleic acid medicines. These technologies are wholly-owned by us and covered by our patent portfolio of 140 patents and patent applications, issued in the United States, China, Europe, Japan and other countries.

Our LUNAR approach can be paired with multiple classes of nucleic acid medicine-based therapeutics, including mRNA, self-amplifying mRNA (or replicon), siRNA, microRNA, antisense oligonucleotides and other oligonucleotide therapeutic approaches. We can combine our technology with nucleic acids that encode for transmembrane proteins (such as transporters, GPCRs, and receptors), secreted proteins (such as hormones and antibodies), engineered nucleases (CRISPR and TALEN), engineered antigen receptors (CAR-T) and intracellular proteins (chaperones and enzymes). We are also evaluating the potential for LUNAR to deliver DNA-based vaccines and therapeutics.

Our nucleic acid delivery technology – LUNAR

We have designed our LUNAR delivery platform to address major challenges with nucleic acid medicine delivery, including transfection efficiency, adverse immune reactions and liver damage. See below for a graphic representation of our LUNAR formulation, where blue spheres represent polyethylene glycol (“PEG”) lipids and the orange, darker orange, and yellow spheres represent the proprietary Arcturus lipid excipient and other structural components (phospholipid and cholesterol).

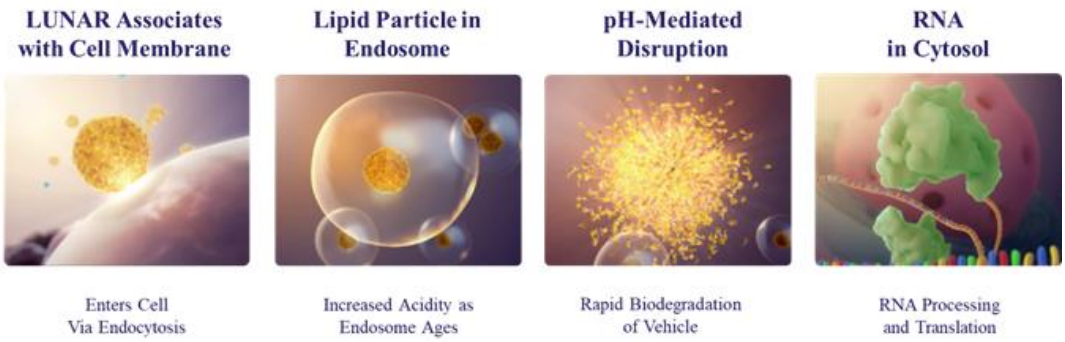
Graphic of LUNAR



LUNAR formulations are a multi-component drug delivery system that utilizes a proprietary lipid, called ATX. The ATX lipid contains an ionizable amino head group and a biodegradable lipid backbone. The amino head group makes the ATX lipid pH-sensitive. At acidic pH, LUNAR lipids are positively charged, facilitating interaction with the negatively charged nucleic acid, enabling particle formation. At physiological pH (e.g., pH 7.4), LUNAR formulations are neutrally charged. This pH-sensitivity avoids the toxicity often seen with permanently charged cationic lipid-mediated delivery vectors. Upon uptake into a cell by endocytosis, the amino head group again becomes protonated, disrupting the endosome and releasing the nucleic acid payload into the cytosol.

To deliver a nucleic acid payload, the LUNAR particles associate with the cell membrane of target cells and quickly enter the cell via endocytosis, causing the cell membrane to invaginate and form an endosome. The LUNAR formulations then become entrapped in the endosomes and with increased acidity as the endosome ages, a pH-mediated disruption enables release of the nucleic acid payload following rapid biodegradation of the LUNAR components. Once release of the RNA into the cytosol occurs, the translational machinery can interact with the nucleic acid and processing and/or trafficking can then take place to make functional protein (schematic diagram below represents delivery of an mRNA payload).

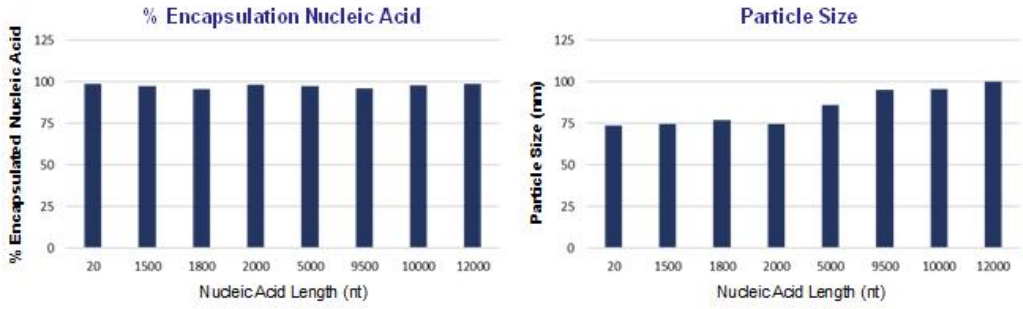
LUNAR-mediated delivery of RNA into cells



The ATX lipid backbone is designed to be biodegradable. This prevents the lipids from accumulating inside the cell and causing toxicity. Ester groups in the ATX lipid backbone can be cleaved by esterases inside the cell once the nucleic acid payload has been released, and the resulting lipid fragments are quickly metabolized by the cell.

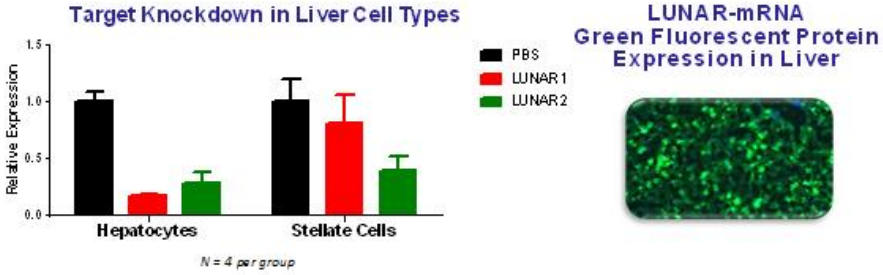
We have generated a library of over 150 proprietary ATX lipids. ATX lipids are rationally designed to fit the application and vary depending on the target cell type and route of administration. Formulation screening and optimization is performed for each program to determine the optimal ATX lipid and LUNAR composition. High encapsulation efficiency was observed when LUNAR was formulated with nucleic acids of 20 to 12,000 nucleotides in length (figure below, left) and particle size was within the acceptable range to maximize targeting and efficacy (figure below, right).

LUNAR compatibility with nucleic acids of various size



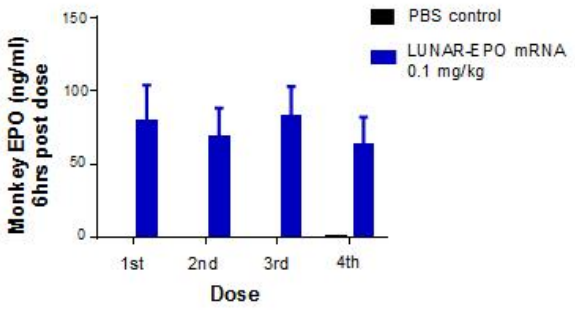
LUNAR can be optimized to deliver nucleic acids preferentially to different cell types in the liver after intravenous delivery. When mice were treated with a single intravenous dose of two different LUNAR-siRNA formulations, significant target mRNA knockdown was observed in hepatocytes 72 hours post-treatment (figure below, left). Shown in green, the composition of a different LUNAR-siRNA formulation was modified to also achieve significant target mRNA knockdown in stellate cells, an important cell type for certain liver indications, such as NASH. The hepatocyte-targeting (formulation 1, red bars) was also used to formulate a green fluorescent protein (GFP) mRNA and mice were treated with a single intravenous dose (figure below, right). 24 hours later, GFP protein was seen throughout the liver, particularly in hepatocytes.

LUNAR formulations can be designed to target different cell types in the liver



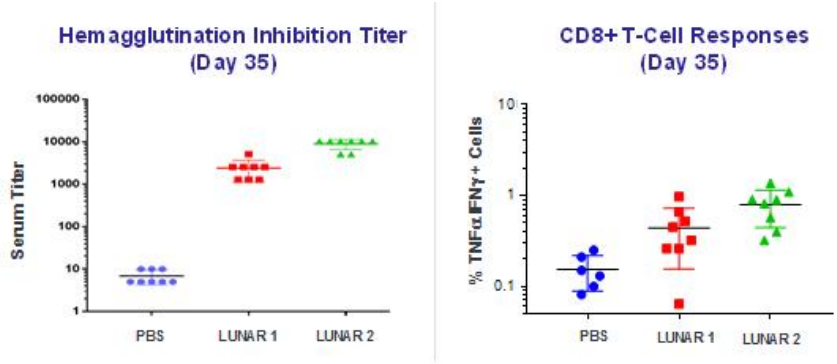
To demonstrate efficacy of LUNAR-mRNA in a repeat-dose setting, non-human primates were treated once weekly for four weeks with LUNAR-encapsulated EPO mRNA (figure below). EPO protein expression levels were determined 6 hours following each treatment, and elevated serum EPO levels were maintained following each treatment.

Repeat dose efficacy in non-human primates



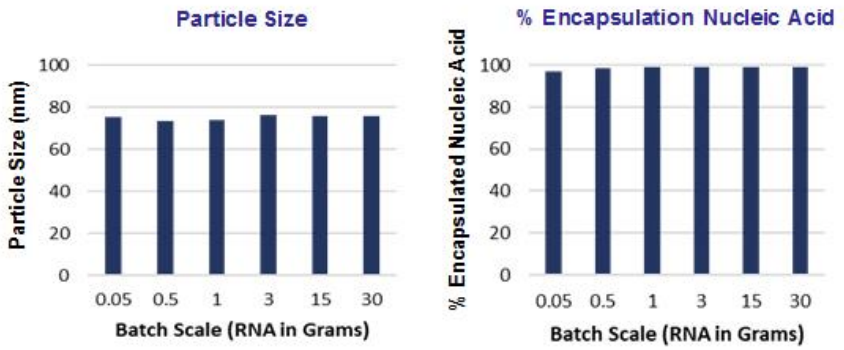
Proof-of concept studies were completed in mice to demonstrate LUNAR-mRNA use in oncology and infectious disease vaccine applications. Mice were treated at Day 0 (prime) and Day 21 (boost) via intramuscular delivery with 0.5 mg/kg LUNAR-encapsulated hemagglutinin mRNA (2 formulations; LUNAR 1 and LUNAR 2). At Day 35, serum titers were determined in a hemagglutination inhibition assay (figure below, left) and antigen-specific cytokine production was evaluated from CD8+ T-cells (figure below, right). With both formulations tested, titers between 10^3-10^4 were achieved and a significant increase in % of TNFα and IFNα expressing cells was observed.

Antigen-specific responses following IM delivery of LUNAR-mRNA in influenza vaccination mouse model

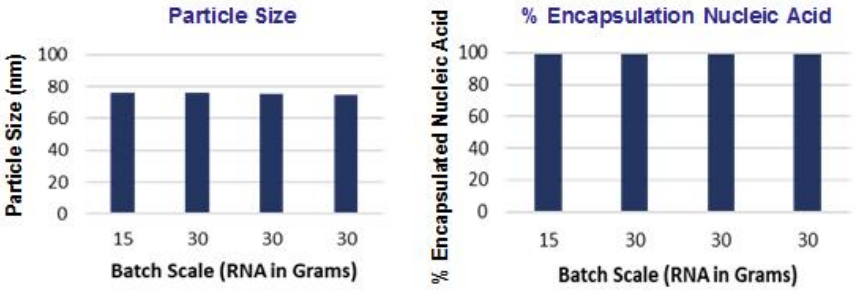


The safety and efficacy profile of first generation LUNAR 1.0 has been most extensively characterized in rodent and non-human primates, and its scalability for manufacturing has been demonstrated. Particle size and % RNA encapsulation were maintained in three separate 30 gram batches and in batch sizes from 50 milligrams to 30 grams (two figures below).

LUNAR Scalability



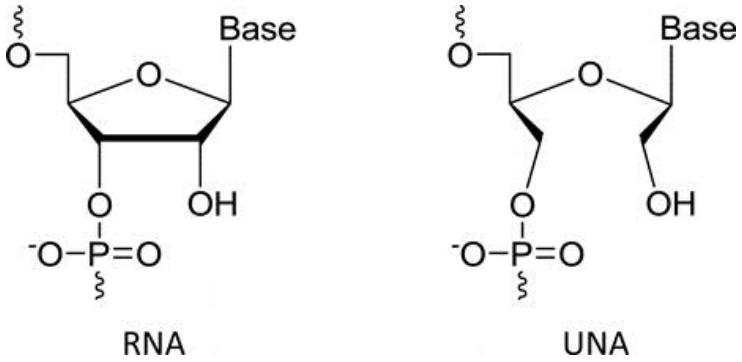
LUNAR Reproducibility



Our UNA oligomer chemistry

UNAs are RNA analogues in which the C2'-C3' bond of the ribose ring is absent (figure below). UNA chemistry technology can potentially be applied to multiple types of RNA medicines including mRNA, siRNA, microRNA and guide RNAs for gene editing. One or more UNAs can be positioned strategically along a nucleic acid strand to manipulate the chemical properties of the molecule.

RNA structure compared with UNA structure



UNAs can potentially improve the efficiency and specificity of siRNA-mediated protein suppression. siRNAs are short double-stranded RNA molecules. Once inside the cell, they become part of the RNA-induced silencing complex ("RISC") and are split into two single siRNA strands. One of these strands stays with RISC and binds to any mRNA with a complementary sequence. If the wrong siRNA strand stays with RISC, it can bind to different mRNAs than the target mRNA and therefore inhibit translation of other proteins. This is an undesired off-target effect and is one of the major barriers to developing effective siRNA medicines. Incorporating a single UNA into siRNA molecules can make one of the strands preferentially bind to RISC improving specificity. Additionally, incorporation of UNA modifications can reduce susceptibility of the siRNA to nuclease degradation, improving the efficiency of siRNA-mediated protein suppression.

We own a comprehensive suite of UNA technology patents for therapeutic and reagent use, enabling us to operate freely and to independently pursue nucleic acid therapeutic candidates. We are also actively pursuing other novel chemistry technologies with the aim of overcoming the development and therapeutic challenges of nucleic acid medicines. Our goal is to expand our nucleic acid technology portfolio and strengthen our ability to develop safer and more effective nucleic acid therapeutic candidates.

INTERNAL DEVELOPMENT PROGRAMS

We are developing mRNA and siRNA therapeutic candidates to treat rare and global diseases through the following internal development programs.

LUNAR-OTC

Our most advanced research program addresses OTC deficiency, a life-threatening genetic disease that affects approximately 1 in 60,000 people. OTC deficiency is the most common urea cycle disorder. A lack of the OTC enzyme in liver cells results in high blood ammonia levels, called hyperammonemia. This causes neurotoxicity and can lead to seizures, coma and death in untreated patients. There is no cure for OTC deficiency. Current standard of care aims to manage symptoms and control blood ammonia levels.

Together with our development partner CureVac, we are developing an mRNA replacement therapy that enables OTC patients to make healthy functional OTC enzyme in their liver cells. Preclinical studies have shown that our proprietary LUNAR technology safely and effectively delivers nucleic acid to liver cells in animal models.

In preclinical proof of concept studies, we used our LUNAR platform to deliver target human OTC mRNA to the liver cells of a mouse model of OTC deficiency. This treatment induced the production of human OTC enzyme at normal/physiological levels in the liver cells of treated mice and normalized levels of two key clinical biomarkers: blood ammonia and urinary orotic acid.

Overview of OTC Deficiency

OTC deficiency is caused by mutations in the OTC gene which leads to a non-functional or deficient OTC enzyme. OTC is a critical enzyme in the urea cycle, which takes place in liver cells, and converts ammonia to urea. This conversion does not occur properly in patients with OTC deficiency and ammonia accumulates in their blood, acting as a neurotoxin and liver toxin. This can cause severe symptoms including vomiting, headaches, coma and death. OTC deficiency is an inherited disease that can cause developmental problems, seizures and death in newborn babies. It is an X-linked disorder, so is more common in boys. Patients with less severe symptoms may present later in life, as adults.

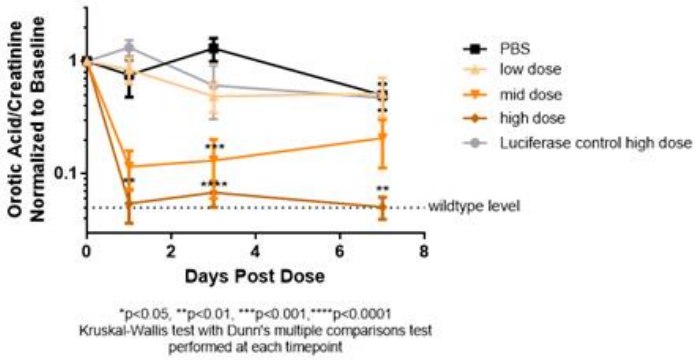
There is no cure for OTC deficiency, apart from liver transplant. However, this treatment comes with significant risk of complications such as organ rejection. Transplant recipients must take immunosuppressant drugs for the rest of their lives. Current standard of care for OTC patients is a low-protein diet and ammonia scavengers, such as Ravicti®, to try and prevent their bodies from accumulating ammonia. These treatments do not address the cause of the disease.

The LUNAR-OTC Solution

Patients with uncontrolled OTC deficiency have high levels of ammonia in their blood and orotic acid in their urine. Our preclinical proof of concept studies have shown that LUNAR-delivered human OTC mRNA can potentially reduce urinary orotic acid levels in a well-established mouse model of OTC deficiency: *OTC-spf ash* mice. These mice have elevated urinary orotic acid. Because they have a small amount of residual OTC enzyme activity, they are not hyperammonemic unless challenged with a high protein diet through inhibition of the residual OTC enzyme activity.

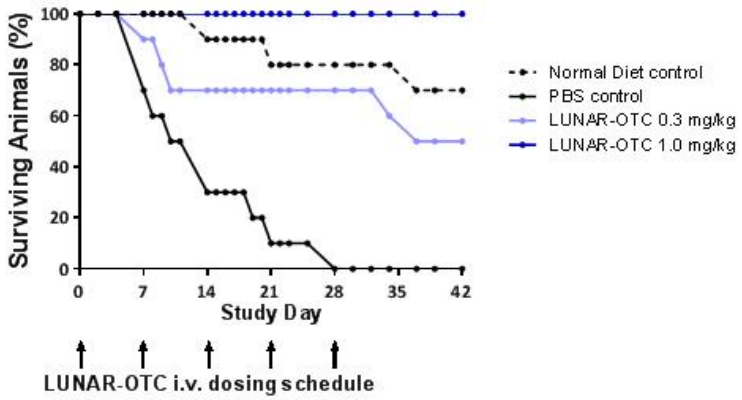
We treated *OTC-spf ash* mice with one intravenous dose of LUNAR-encapsulated human OTC mRNA (three lead candidate mRNA sequences tested at a low, middle, and high dose levels). As shown in the figure below, this single treatment significantly reduced urinary orotic acid levels for at least seven days post-treatment (n=4-6 animals per group).

Urinary orotic acid levels following single administration



Functional effects following repeat dosing of LUNAR-encapsulated human OTC mRNA in *OTC-spf ash* mice were then determined. *OTC-spf ash* mice were placed on a high-protein diet to induce hyperammonemia and treated with once weekly intravenous doses of LUNAR-encapsulated human OTC mRNA for 5 weeks at 0.3 and 1.0 mg/kg with a 2-week washout period. As shown in the figure below, animals in the 1.0 mg/kg LUNAR-OTC treatment group were completely protected from lethality (n=10 animals per group).

Survival of OTC-deficient mice on high protein diet following weekly LUNAR-OTC treatment



LUNAR-CF

The LUNAR-CF program addresses cystic fibrosis, a progressive lung disease caused by mutations in the CFTR gene. We use our LUNAR platform to deliver normal CFTR mRNA into airway epithelial cells. This allows airway cells to produce functional CFTR protein using their native translational machinery and protein trafficking pathways.

This approach has the potential to treat the underlying defect that causes CF (dysfunctional or absent CFTR protein) in *all* such patients, regardless of mutation type.

Overview of CF

According to the National Institutes of Health, CF is the most common lethal genetic disease in the United States. Currently, more than 30,000 people are living with CF in the United States, 75,000 people worldwide, and approximately 1,000 people are newly diagnosed each year. There are 2,000 known mutations in the CFTR gene. These mutations affect the function of the CFTR protein. CFTR is an ion channel that controls chloride and sodium movement in-and-out of cells. When this channel is absent or dysfunctional, thick mucus can accumulate in airways and pancreatic ducts, which can cause coughing, chronic bacterial infections, inflammation, tissue scarring, digestive problems and other serious complications. The median age of death for a person with CF in the United States is 37 years, and the cause of death is usually lung damage.

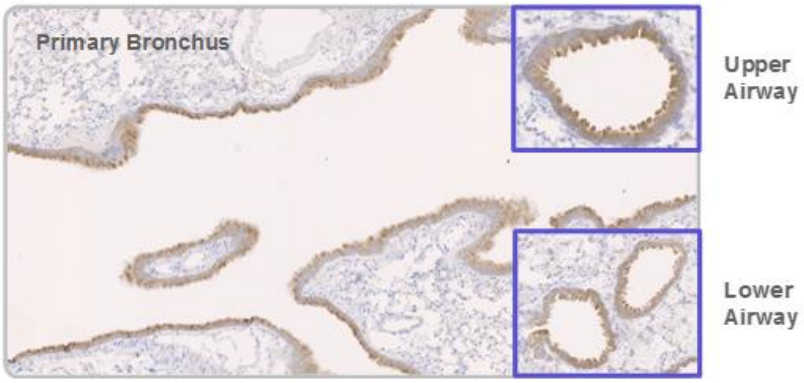
There are currently no FDA-approved drugs that can treat all 2,000 CFTR mutations. The FDA has approved three CFTR modulator therapies, Kalydeco®, Orkambi® and Symdeko™, to treat fewer than 40 CF-causing mutations. These drugs do not treat the underlying genetic cause of CF, but instead assist the mutant CFTR protein to reach the cell membrane and/or increase ion channel gating, thus increasing functional activity. For patients with other mutations, antibiotics and mucolytics are the primary standards of care. Many of these patients ultimately suffer from decreased lung function and require lung transplant.

Our LUNAR-CF Solution

With the support of CFFT, we are developing an mRNA therapeutic to treat and prevent lung disease in CF patients. Our LUNAR-CF compound comprises normal CFTR mRNA encapsulated by LUNAR delivery technology. This approach is a form of protein replacement therapy as it enables lung cells to produce normal CFTR protein.

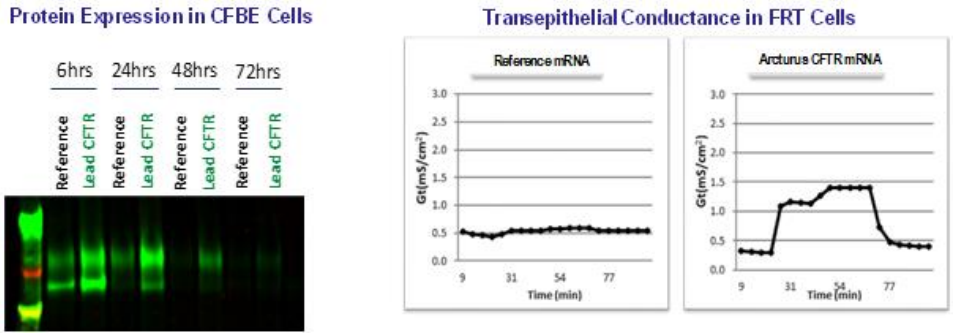
We have completed preclinical proof of concept studies, demonstrating that LUNAR is able to deliver a functional reporter mRNA efficiently into mouse lung epithelial cells and into primary lung epithelial cells *in vivo* (figure below). Six hours following intratracheal delivery of 0.1 mg/kg LUNAR-encapsulated green fluorescent protein (GFP) mRNA, GFP protein expression (shown in brown) is detected by immunohistochemistry in mouse lung epithelial cells of the primary bronchus and in bronchioles located in the upper and lower airways.

In vivo targeting to lung epithelial cells following treatment with LUNAR-reporter mRNA



Through optimization of the CFTR mRNA coding sequence and untranslated regions, we were also able to significantly improve CFTR expression and demonstrate enhanced channel activity in an *in vitro* model system. In CFBE cells transfected with a lead candidate CFTR mRNA sequence, protein expression was significantly increased and the duration of activity prolonged compared to a reference CFTR mRNA which is the natural coding sequence (figure below, left). When the Arcturus lead candidate CFTR mRNA was then transfected in FRT cells, a significant increase in transepithelial conductance was observed (figure below, right), indicating that the CFTR protein produced from the mRNA is functional. In this study, the same reference CFTR mRNA was included and minimal functional activity was observed, indicating significant improvement of Arcturus' mRNA design compared to the natural sequence.

CFTR protein expression (left) and functional activity (right)



LUNAR-RLD

We aim to achieve functional correction of rare diseases using our proprietary LUNAR-delivered mRNA therapeutic candidates. The LUNAR-RLD program is an internal research program focused on target validation of multiple pipeline LUNAR-mRNA program candidates. To accomplish this goal, we have prioritized a list of rare liver diseases. All have significant unmet medical needs and few treatment options are available to patients. Arcturus will use its LUNAR delivery platform to deliver normal mRNA into target cells of interest, allowing these cells to produce functional protein using their native translational machinery and protein trafficking pathways.

COLLABORATION AGREEMENTS

Arcturus has a number of externally funded development partnerships. We are collaborating with Janssen to develop nucleic acid-based candidates for HBV and potentially other infectious or respiratory diseases, with SGI to enable their self-replicating RNA technology for animal and human vaccines and therapeutics, with Takeda to develop nucleic acid therapeutic candidates for NASH and other gastrointestinal disorders, with Ultragenyx to develop mRNA therapeutic candidates for rare disease targets and with CureVac to develop mRNA therapeutic and vaccine candidates for various indications. We have also received funding from CFFT to support our LUNAR-CF development program, which is described above.

Janssen Agreement

On October 18, 2017, we entered into a new Research Collaboration and License Agreement ("Janssen Agreement") with Janssen that took a different approach to treat HBV. Under the Janssen Agreement, we and Janssen will use commercially reasonable efforts to create therapeutics intended to treat Hepatitis B, and at Janssen's option, other infectious or respiratory disease viruses. The parties will jointly own all patent rights covering inventions that are made jointly by employees, agents or subcontractors of both parties under the collaboration agreement.

Both parties will carry out their respective research obligations pursuant to applicable joint research plan(s). Janssen may select certain therapeutics in the field for further development by the parties under a joint research plan subject to the terms of the Janssen Agreement. Following the development efforts, if Janssen selects a development candidate, the compound comprising the candidate and the pharmaceutical product (if any) containing such compound are subject to an exclusive license to Janssen from us (which exclusivity is even as to us). In addition, we will not engage in certain research, commercialization or licensing activities or solicit counterparties to engage in such activities that negatively impact the programs conducted pursuant to the Janssen agreement. The exclusivity restrictions and related limitations on subsequent activities impacting the program does not extend to certain of our activities and agreements, and, subject to certain conditions, pre-existing or subsequently acquired programs of an acquirer of Arcturus.

The Janssen Agreement provides that Janssen will use commercially reasonable efforts to develop pharmaceutical products comprised of development candidate-compounds, obtain certain regulatory approvals and commercialize such products. With respect to rights in infectious and respiratory diseases, Janssen also has an option to have developed and license therapeutics for such infectious and respiratory disease viruses, provided that we may collaborate with third parties and license any rights in the option disease areas to third parties so long as Janssen has not exercised its option rights to products in the therapeutic area. Under the collaboration agreement, both parties also grant each other certain non-exclusive, royalty-free licenses.

Under the collaboration, Janssen paid us an up-front fee in the mid $5 million to $10 million range. On a development candidate-by-development candidate basis, Janssen will pay us certain development milestone payments of up to $56.5 million for each of the first two products in HBV and in each option indication for which Janssen exercises an option. In addition, Janssen will pay us aggregate payments in the $20 million to $40 million range, depending on net sales volume, in annual net sales milestone payments on a research program-by-research-program basis for the first calendar year in which such net sales milestone levels have been met. Janssen will also pay option exercise fees within the $1 to $5 million range, depending on timing of the election to include either of the option fields. In addition, Janssen will pay royalties on annual net sales of licensed products in the low to mid-single digits range, subject to reduction on a country-by-country and licensed-product-by-licensed-product basis and subject to certain events, such as expiration of program patents.

The Janssen Agreement will terminate when no further royalty payments on any licensed products are payable. Janssen may terminate the Janssen Agreement at any time on a licensed product-by-licensed product and country-by-country basis, or in its entirety, in each case upon 60 days' written notice.

SGI Agreement

On October 24, 2017, we entered into a Research and Exclusive License Agreement with Synthetic Genomics, Inc. (the "Synthetic Genomics Agreement"). Under the Synthetic Genomics Agreement, we will use commercially reasonable efforts to carry out research relating to lipid-mediated delivery ("LMD") for specifically agreed research programs.

We granted Synthetic Genomics an exclusive, worldwide license, under our intellectual property related to LMD, to research, develop, manufacture and commercialize (including, without limitation LUNAR products) for vaccine and human therapeutic self-amplifying RNA products but expressly excluding diagnosis, prophylaxis and treatment of respiratory disease viruses other than influenza.

Each party retains ownership rights over intellectual property invented jointly by Synthetic Genomics and us (with inventorship determined by U.S. patent law). Under the Synthetic Genomics Agreement, we own all LUNAR product manufacturing process and process technology within any jointly invented program intellectual property (pursuant to an assignment by Synthetic Genomics of its interest in the joint intellectual property). Synthetic Genomics owns all other intellectual property conceived by or for us or jointly invented in performing any research plan that is not expressly assigned to us. Synthetic Genomics will pay us a percentage of all cash payments received from any sublicense for a LUNAR product, in the mid 10% to 20% range, less payments made to third parties to obtain the right to practice intellectual property used to develop or necessary to make, use, or sell all or part of licensed LUNAR product (which reduction may not exceed 50% of the aggregate amount paid to us with respect to a specific LUNAR product for any calendar quarter).

If Synthetic Genomics enters into a LUNAR contemplated research agreement with a third party, does not develop a LUNAR product with such third party, but subsequently licenses non-LUNAR products to and develops non-LUNAR products with such third party, then Synthetic Genomics will pay us a percentage of the consideration received for such non-LUNAR product in the 5% to 10% range. In the event that Synthetic Genomics desires to sell LUNAR products for which it obtains marketing approval, the Synthetic Genomics Agreement provides that we and Synthetic Genomics will negotiate in good faith with respect to that specific product opportunity.

Under the Synthetic Genomics Agreement, in order to maintain exclusive rights, Synthetic Genomics must achieve certain specified milestones or pay us annual exclusivity maintenance fees.

Unless earlier terminated, the Synthetic Genomics Agreement continues in full force and effect until the expiration, abandonment, or termination of the last valid claim of a patent within the licensed intellectual property, provided that, the agreement will terminate on the seventh anniversary of the effective date if the agreement becomes non-exclusive and neither Synthetic Genomics nor its sublicensee have achieved specified preclinical milestones within designated time periods. In addition, Synthetic Genomics has the right to terminate the agreement for convenience on ninety (90) days' written notice.

Takeda Agreement

On December 6, 2016, we entered into a Research Agreement with Millennium Pharmaceuticals, Inc, a wholly-owned subsidiary of Takeda (collectively, "Takeda"), as amended December 21, 2017 (the "Takeda Agreement"). Under the Takeda Agreement, we and Takeda are conducting a research program ("Research Program") to discover siRNA medicine(s) for the treatment of Nonalcoholic Steatohepatitis ("NASH"). We will develop siRNA compounds formulated in LUNAR lipid-mediated delivery technology for in vivo studies.

The Takeda Agreement provides that for the (unless terminated or extended) research program term ending December 20, 2018 ("Research Term"), Takeda receives a non-exclusive and worldwide license, with a right to sub-license, our technology for the purpose of conducting the research program. We have further agreed, for a period of two years after the Research Term, not to engage in any research or development activities for which LUNAR and UNA oligomers are used against the same target as the Research Program. The Takeda Agreement further provides that if Takeda requests additional targets to be added to the Research Program, the parties will negotiate in good faith to amend the Takeda Agreement with respect to such targets.

During the Research Term, Takeda will fund our costs for the Research Program and pay milestone payments upon the achievement of specified events (which payments are in the low six-digit range). Further, pursuant to the Takeda Agreement amendment, Takeda agreed to additional fixed payments to support additional studies under the Research Program.

Under the Takeda Agreement, Research Program results specifically related to improvements to LUNAR or UNA oligomers are owned by Arcturus, while all other Research Program results are owned by Takeda. Takeda has an option to negotiate with Arcturus to obtain a non-exclusive, sub-licensable worldwide license to use our background technology and our owned Research Program results for the purposes of exploiting the Takeda-owned Research Program results.

The Takeda Agreement remains in effect until Takeda no longer has payment obligations to us for research milestones. Takeda may terminate the Takeda Agreement upon sixty days written notice.

Ultragenyx Agreement

On October 26, 2015, we and Ultragenyx Pharmaceutical Inc. entered into a Research Collaboration and License Agreement, as amended October 17, 2017 and April 20, 2018 (the "Ultragenyx Agreement"). Ultragenyx initially selected two development targets, including Glycogen Storage Disease III, and the parties agreed to a list of eight additional reserved targets related to rare diseases for which Ultragenyx has the exclusive right to evaluate for collaborative development. During the reserved target exclusivity period Ultragenyx may substitute a reserved target for a selected target, and/or exercise an expansion option by payment to us, whereby a reserved target will be deemed an additional target (and will preclude an additional reserved target in place of the converted reserved target). Further, during the reserved target exclusivity period, Ultragenyx may replace a reserved target with a proposed new target, subject to certain conditions including availability of such new target.

Under the Ultragenyx Agreement, during the development target exclusivity period, we have agreed to exclusivity with respect to any product containing mRNA (including modified mRNA) or UNA oligomer with respect to each development target, including prohibitions on our activities with third parties with respect to any development target. The exclusivity period ends on the earlier of (i) the date such development target becomes a discontinued target or (ii) termination of the Ultragenyx Agreement with respect to such

development target. On a development-target-by-development-target basis, during the corresponding development target exclusivity period, Ultragenyx receives an exclusive right of first negotiation to obtain an exclusive license to exploit RNA products that do not contain mRNA (including modified mRNA) or UNA oligomer. Following the development target right of first negotiation period, if the parties have not entered into an agreement during a specified time period, the rights of Ultragenyx terminate and we may grant a license or enter into a third-party arrangement with respect to such development target.

The Ultragenyx Agreement additionally provides for limitations on our activities with third parties utilizing LUNAR lipid-mediated delivery technology with respect to a development target for a specified period of time. During the reserved target exclusivity period, we have agreed to exclusivity with respect to any product containing mRNA, including modified mRNA, or UNA oligomer with respect to such reserved target, and will first offer Ultragenyx a right of first negotiation for any other RNA product or a product utilizing the LUNAR delivery technology with respect to such reserved target. The reserved target restrictions terminate upon expiration of the reserved target exclusivity period for each target, which may be extended on a reserved target-by-reserved target basis upon payment of an exclusivity extension fee.

On a reserved target-by-reserved target basis, following the target exclusivity period, Ultragenyx receives an exclusive right of first negotiation to obtain an exclusive license to exploit RNA products with respect to such reserved target. Following the reserved target right of first negotiation period, if the parties have not entered into an agreement during a specified time period, the rights of Ultragenyx terminate and we may grant a license or enter into a third-party arrangement with respect to such reserved target.

Under the Ultragenyx Agreement, Ultragenyx receives a co-exclusive, royalty-free, sublicenseable license under our technology and collaboration technology to conduct collaborative development of development targets, compounds and products. The license remains in effect for a specified option period based upon development plan milestones being achieved with respect to development targets and reserved targets and compounds and products with respect to such development targets and reserved targets. If Ultragenyx exercises its option with respect to a development target and the parties enter into a license agreement, Ultragenyx receives an exclusive (even as to us), royalty bearing, sublicenseable (subject to certain limitations), license under our technology and collaboration technology to exploit compound and products with respect to such development target.

For development and reserved targets that revert to us, we will pay Ultragenyx royalties on net sales of discontinued target on a country-by-country basis, until the expiration of the last valid claim or the product-specific patents or patent rights licensed by Ultragenyx to us covering such discontinued targets. Such royalties depend on the state of development of the corresponding discontinued target, set in the low to mid-single digits range.

Ultragenyx paid us an upfront fee of $10 million. We are entitled to certain additional payments upon exercise of the Ultragenyx expansion option and/or exclusivity extension (if any), and for costs incurred by us in conducting the activities assigned to us under each collaboration development plan. In addition, on a development target-by-development target basis, Ultragenyx will pay us a one-time milestone payment after the first optimized lead designation for the first product with respect of such development target. For each development target for which Ultragenyx exercises its option, Ultragenyx will pay us a one-time option exercise fee based upon on the total number of development targets for which option exercises have been made by Ultragenyx. The option exercise fee is subject to reduction if a development target does not, for example, utilize RNA delivery technology covered by our patent. Ultragenyx will also pay us certain milestone payments in the maximum amount of $49 million per development target with respect to clinical/regulatory development, and a maximum amount of $90 million per development target with respect to commercialization, in each case subject to reduction if such product does not utilize RNA delivered technology covered by our patent. Ultragenyx will pay royalties as a percentage of net sales on a product-by-product and country-by-country basis during the applicable royalty term up to 10%.

The Ultragenyx Agreement provides that each party owns their respective collaboration know-how and collaboration patents and jointly own all joint collaboration know-how and joint collaboration patents, provided that Ultragenyx owns all right, title and interest in and to all collaboration technology that specifically relates to (a) the composition or formulation of a particular compound or product, or (b) any method of using, making or administering a particular compound or product. Further, we will own all improvements to LUNAR lipid-mediated delivery technology and/or UNA oligomer chemistry.

The Ultragenyx Agreement expires on the last-to-expire royalty term for the last product on a development target-by-development target basis, unless earlier terminated. Upon expiration with respect to a particular development target, the licenses to Arcturus know-how granted to Ultragenyx to exploit products with respect to such development target will be fully paid-up, irrevocable and exclusive. On a target-by-target basis, Ultragenyx has the right to terminate for convenience with respect to such target upon 60 days written notice.

CureVac Agreements

Development and Option Agreement

On January 1, 2018, we entered into a Development and Option Agreement with CureVac, as amended May 3, 2018 ("CureVac," and such agreement, the "Development Agreement"). Under the terms of the Development Agreement, the parties have agreed to conduct joint preclinical development programs on the basis of which CureVac is granted an option for taking several licenses on pre-agreed license terms to develop and commercialize certain products incorporating our patents and know-how related to delivery systems based on or incorporating lipid-mediated delivery systems (including the LUNAR® platform) (the "Arcturus LMD Technology"), and CureVac patents and know-how related to mRNA technology. Under the terms of the Development Agreement, we granted to CureVac a worldwide, non-exclusive license to use the our LMD Technology, including the right to grant sublicenses, for the purpose of conducting research and preclinical development activities, subject to certain limitations. In addition, CureVac granted to us a worldwide, non-exclusive license under its mRNA technology, solely to the extent necessary to execute the activities contemplated by the agreement. Subject to certain restrictions, the parties will have an undivided one-half interest in the patents and know-how developed jointly by the parties during the course of the agreement. Pursuant to the May 3, 2018 amendment, we granted CureVac a security interest in certain of our intellectual property.

In consideration for the rights granted under the agreement, we received an upfront fee from CureVac. Each development program will be subject to the terms of a work plan under which the parties will use diligent efforts to develop defined products. CureVac may designate certain targets as reserved targets, subject to certain pre-existing restrictions. CureVac has options to obtain licenses from us for a pre-defined number of targets to use our LMD Technology for the development and commercialization of products. To the extent a reserved target is only available on a nonexclusive basis, CureVac may elect to enter into a non-exclusive license agreement. Such licenses shall be obtained under separate, pre-negotiated forms of license agreements to be entered into by the parties upon exercise of the option(s). If CureVac exercises its option under the agreement, it will be required to pay us an option exercise fee for an exclusive license – or non-exclusive license, as applicable – based on whether the target is a rare disease target or non-rare disease targets. Pursuant to the form of exclusive license agreement, if CureVac achieves all development and commercialization milestones with respect to the licensed product subject to an option, CureVac will be required to pay certain development and regulatory approval milestones depending on whether the target is a rare disease target or non-rare disease target. CureVac will also be required to pay us low single-digit royalties on the net sales of each product falling under a license agreement on a country-by-country and product-by-product basis. Such royalties are subject to reduction for third party payments with respect to licensed products or if there is no valid claim under the licensed patents, but may not fall below a specified percentage if the licensed product during the royalty term is not covered by a licensed claim. Further, if within 24 months after the license agreement effective date, CureVac grants a sublicense to a third party under the license agreement for the development and commercialization of licensed products, then CureVac will pay us a single-digit percentage of the total sublicense income actually received by CureVac to the extent the sublicense income exceeds the option exercise fee paid by CureVac under the Development Agreement to exercise the option for this license agreement and the milestone payments paid by CureVac under this license agreement. The fees, milestones and royalty payments for a non-exclusive license are fifty percent (50%) of the corresponding payments for an exclusive license.

The Development Agreement has an initial term of eight years unless earlier terminated or extended in accordance with its terms. Within 60 days prior to the expiration of the initial term, CureVac has the option to extend the initial term of the agreement on an annual basis for up to a total of three successive years upon payment to us of an annual non-refundable extension fee. CureVac has the right to terminate the agreement in full or on a program-by-program basis (i) in the event of material breach by us that is not cured within the cure period specified in the agreement, (ii) in the event of a change in control of Arcturus or (iii) without cause upon 60 days' notice to us. We have the right to terminate the agreement upon material breach by CureVac that is not cured within the period specified by the agreement. Upon termination, all licenses granted under the agreement will terminate, but any license agreement entered into pursuant to any option exercise will remain in effect.

Co-Development and Co-Commercialization Agreement

Concurrently with the Development Agreement, we entered into a Co-Development and Co-Commercialization Agreement with CureVac (the "Co-Development Agreement"). Under the terms of the agreement, the parties will collaborate to develop and commercialize mRNA-based products for treating ornithine transcarbamylase ("OTC") deficiency, incorporating CureVac mRNA technology, our mRNA technology and our LMD Technology ("OTC Products"). The overall collaboration will be managed by a joint steering committee. The parties also have the option to co-develop two mRNA programs for CureVac and one mRNA program for us, including targets for such programs selected from the reserved target list established under the Development Agreement.

The Co-Development Agreement includes an OTC preclinical development plan specifying the activities of the respective parties. Following selection as a development candidate by the steering committee, the steering committee will submit a clinical development plan to the parties outlining a comprehensive clinical development plan and budget and respective activities of the parties for each such OTC Product. In any event, we will have the primary responsibility to conduct the development activities under the OTC clinical development plan.

Under the Co-Development Agreement, CureVac has one option to co-develop and share operating profit and loss for a product using our mRNA technology and our LMD Technology ("Arcturus Product"). If CureVac exercises its option, CureVac will be responsible for 50% of our preclinical program costs for development prior to option exercise, and thereafter the parties will share costs equally. The Co-Development Agreement further provides for two options to us to co-develop and share operating profit and loss for two products using CureVac mRNA technology and our LMD Technology (each, a "CureVac Product"). If we exercise our option, we will be responsible for 50% of CureVac's preclinical program costs for development prior to option exercise and thereafter the parties will share costs equally. For each CureVac Product and Arcturus Product, the steering committee is responsible for preparing and submitting to the parties for approval a clinical development plan and budget for a co-developed product. For each OTC Product, Arcturus Product or CureVac Product, a party may elect to not pay a continuing share of its further development costs at specified decision points and upon such election, the applicable product will result in royalties being paid to the non-participating party at rates in a range of 5% to 25% dependent on the time of election not to participate. The royalty rate has been agreed upon by the parties for the OTC Product, and the parties will agree in good faith on royalty rates for the other products.

The Co-Development Agreement provides for respective licenses to applicable technology of a party to enable the other party (i) develop mRNA constructs and products in accordance with the development plans on a non-exclusive, royalty-free basis; (ii) commercialize co-developed CureVac Products on an exclusive profit sharing or royalty bearing basis depending on the commercialization or opt-out as set forth in the agreement; and (iii) a non-exclusive, royalty-free right to manufacture mRNA constructs included in the products subject to the development plans. Subject to certain restrictions, each party also has the right to grant sublicenses of its rights with respect to each such OTC Product, Arcturus Product or CureVac Product. Under the terms of the agreement, we have the primary responsibility for all aspects of the commercialization of OTC Products and Arcturus Products, and CureVac has the primary responsibility for all aspects of the commercialization of co-developed CureVac Products, in each case subject to a plan of commercialization agreed upon by the parties.

The parties shall use diligent effort to conduct all manufacturing activities allocated to such party under the development plans and the commercialization plans established under the agreement. The manufacture of the mRNA constructs and the products shall be overseen by the steering committee. CureVac shall manufacture all mRNA constructs in the products for use in development activities under the development plans and for commercial use, with the parties entering into preclinical and clinical supply agreements for the mRNA constructs. We shall manufacture and supply all products using mRNA constructs from CureVac for use in development activities under the development plans and for commercial use, with the parties entering into preclinical and clinical supply agreements for the products.

Unless earlier terminated, the Co-Development Agreement shall continue in full force and effect on a product-by-product and country-by-country basis until the commercialization party no longer sells product in such country, or with respect to opt-out products, the expiration of the royalty term for such product in accordance with the terms of the agreement. The agreement may be earlier terminated (i) by either party for convenience upon 180 days written notice, (ii) by either party in the event of material breach, if the breaching party has not cured such breach in the applicable cure period, or (iii) by either party in the event a party commences legal action against another challenging the scope of the non-challenging party's patents.

OTHER MATERIAL AGREEMENTS

The Company has certain other material agreements which includes the Protiva Agreement and CFFT Agreement which are discussed below.

Protiva Agreement

On August 9, 2013, Marina Biotech, Inc. ("Marina") assigned certain intellectual property, including patents, inventions and patent-related information related to UNA oligonucleotide therapeutics to us pursuant to a Patent Assignment and License Agreement, as well as Marina's rights and obligations under a License Agreement with Protiva Biotherapeutics Inc. ("Protiva"), a wholly-owned subsidiary of Arbutus Biopharma Corporation, dated November 28, 2012 (the "Protiva Agreement"). The intellectual property licensed from Marina and Protiva is a significant component of our UNA oligomer chemistry platform. As partial consideration for the assignment from Marina, we granted Marina a royalty-free, fully-paid, irrevocable, worldwide, non-exclusive license to use the inventions, ideas and information embodied in the assigned patents to develop, make, use and sell chemical compounds intended for human and animal therapeutic uses (including certain rights to sublicense in connection with continuing research, development and/or commercialization). We also paid an upfront fee to Marina, and agreed to maintain the assigned patents in certain countries.

Under the assigned Protiva Agreement, we granted Protiva a non-exclusive, irrevocable, perpetual, worldwide license with certain rights to sublicense (in connection with continuing research, development and/or commercialization) to exploit our patents, know-how and inventions relating to our technology for purposes of the development of human therapeutics. Protiva will pay us milestone

payments with an aggregate value of up to $3.25 million for each Protiva product directed to a specific gene target, upon achievement of certain development milestones with respect to each such product and target. If instead Protiva sublicenses the commercialization rights for a Protiva product, then Protiva will pay us a percentage of sublicense revenues paid to Protiva by such sublicensee, depending on the development stage of such Protiva product at the time of sublicense. In addition, Protiva will pay us royalties on net sales of Protiva products during the royalty term depending on the type of product, on a country-by-country basis. For licensed Protiva products, royalties will be paid in the low single digit range on net sales for such product, subject to reduction on net sales for such product in the event there is no patent coverage or generic products are introduced with respect to such Protiva product. A royalty reduction for a Protiva product will also apply if Protiva is required to license third party intellectual property to commercialize such product, subject to a floor for such reductions.

The Protiva Agreement term, for a particular Protiva product in a particular country, will expire (on a country-by-country basis) upon the earlier of (i) the expiration of the royalty term for such Protiva product in such country or (ii) the end of the calendar quarter in which sales in such country of generic products exceed a certain amount compared to sales of Protiva products in such country. The Protiva Agreement will expire in its entirety upon expiration of the last royalty term for any of our patents with respect to which Protiva has a license under the Protiva Agreement, unless earlier terminated. Protiva may terminate the Protiva Agreement for convenience in its entirety, or for a particular country or countries, upon ninety days' prior written notice to Arcturus.

CFFT Agreement

On May 16, 2017, CFFT awarded us with funds for a development program to identify lead CFTR mRNA sequences and LUNAR formulations, demonstrate tolerability of LUNAR CFTR mRNA, and demonstrate translatability of aerosolized LUNAR (the "CFFT Agreement"). The award of approximately $3.1 million will be received according to a milestone schedule and unused funds will be retained by CFFT. We will use commercially reasonable efforts to conduct the development program, and after the completion of a development program, we will use commercially reasonable efforts to continue to develop the product. The award includes a grant of rights under CFFT know-how to assist us to research, develop, commercialize, make or otherwise exploit a product.

If the award results in a successful product, we will pay CFFT a specified payment amount in installments following commercialization based on a formula that is a single-digit multiple of the total award amount, plus a payment equal to the awarded payments, after aggregate net sales of the product exceed certain thresholds. Further, in the event of a license, sale or other transfer of the product or our development program technology (including a change of control transaction), we will pay CFFT a percentage of such transfer payments actually received by us or our shareholders (subject to a royalty cap).

CFFT has an interruption license right under the CFFT Agreement so that if we fail to use commercially reasonable efforts to develop a product for a certain time period before the first commercial sale of the product, CFFT may, upon written notice of such interruption to us and our failure to effectively deny such interruption or cure such interruption as set forth in the CFFT Agreement, exercise certain rights pursuant to procedures set forth in the CFFT Agreement. CFFT's interruption license rights include, in certain cases, payments from us to CFFT, or the grant of an exclusive (even as to us), worldwide license to CFFT under our development program technology solely to the extent necessary to manufacture, have manufactured, license, use, sell, offer to sell, and support the product in the field of treatment of cystic fibrosis and other pulmonary diseases.

All inventions, data, know-how, information, results, analyses and other intellectual property rights resulting from the development program will be owned by us, and subject to certain exceptions, CFFT assigns and transfers to us all of CFFT's right, title, and interest in and to all inventions and other intellectual property resulting from the development program.

Either party may terminate the CFFT Agreement for cause (e.g., material breach by the other party of its covenants or obligations).

INTELLECTUAL PROPERTY

Our business success depends in part on our ability to obtain and maintain intellectual property protection for our proprietary technologies, inventions and know-how, and on its ability to operate without infringing on the proprietary rights of others. We strive to protect our intellectual property through a combination of patents, trademarks, trade secrets, licensing agreements and confidentiality agreements with employees, advisors, consultants and contractors.

We rely on continuing technological innovation to strengthen our proprietary position in the field of nucleic acid medicines. Therefore, we plan to continue to file patent applications in jurisdictions around the world as we discover and develops novel nucleic acid technology platforms and novel nucleic acid therapeutic candidates. We cannot guarantee that future applications will be issued.

Our Patent Portfolio

As of April 1, 2018, we are the sole owner of 140 patents and pending patent applications including 16 U.S. patents, 25 pending U.S. patent applications, 40 foreign patents and 59 pending foreign patent applications. The claims of these patents and pending applications include compositions of matter, methods of use and drug product formulations. These claims cover the use of our core platform technologies including the use of LUNAR and lipid components to deliver nucleic acid, the use of UNA oligomers for therapeutics and reagents, and the use of LNA oligomers for therapeutics. Claims also cover the composition of matter and use of our therapeutic candidates to treat target diseases including HBV and NASH. Our issued patents are expected to expire between 2028 and 2036, without taking into account any possible patent term extensions.

Our patent portfolio includes the following patents and pending patent applications for LUNAR, UNA and LNA:

- LUNAR – As of April 1, 2018, we own 8 U.S. patents, 12 U.S. pending patent applications and 25 foreign pending patent applications covering the composition of matter and use of our LUNAR technology for nucleic acid delivery and drug delivery.

- UNA, mRNA and LNA – As of April 1, 2018, we own 8 U.S. patents, 13 U.S. pending patent applications, 40 foreign patents and 34 foreign pending patent applications covering methods and uses of LNA, UNA oligomer and mRNA therapeutics, and compositions of UNA oligomers or mRNA to treat specific target diseases.

Patent Terms

The term of individual patents depends on the countries in which they are obtained. The patent term is 20 years from the earliest date of filing a non-provisional patent application in most of the countries in which we file.

Under the Drug Price Competition and Patent Term Restoration Act (also known as the Hatch-Waxman Act), U.S. patent holders can apply for a patent term extension to compensate for the patent term lost during the FDA regulatory review process. Patent extension is only available for patents covering FDA-approved drugs. The extension can be up to five years beyond the original expiration date of the patent and cannot extend a patent term for longer than 14 years from the date of product approval. Only one patent extension is granted per approved drug. Similar provisions may be available in foreign jurisdictions including Europe. Arcturus intends to apply for patent term extensions where possible.

We also rely on trade secrets to protect our product candidates. Our commercial success also depends in part on our non-infringement of the patents or proprietary rights of third parties. For a more comprehensive discussion of the risks related to our intellectual property, please see Item 3.D. “Risk Factors” – “Risks Related to Our Intellectual Property.”

The laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the United States. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions.

Our success depends in part on our ability to:

- preserve trade secrets;

- prevent third parties from infringing upon our proprietary rights; and

- operate our business without infringing the patents and proprietary rights of third parties, both in the United States and internationally.

We also protect our proprietary technology and processes, in part, by confidentiality and invention assignment agreements with our employees, consultants, scientific advisors and other contractors. These agreements may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our employees, consultants, scientific advisors or other contractors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

COMPETITION

We believe that our scientific knowledge and expertise in nucleic acid-based therapies provide us with competitive advantages over the various companies and other entities that are attempting to develop similar treatments. However, we face competition at the technology platform and therapeutic indication levels from both large and small biopharmaceutical companies, academic institutions, governmental agencies and public and private research institutions. Many of our competitors have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

Our success will be based in part upon our ability to identify, develop and manage a portfolio of drugs that are safer and more effective than competing products in the treatment of our targeted patients. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, are more convenient or are less expensive than any products we may develop.

We are aware of several other companies that are working to develop nucleic acid medicines, including gene therapy, gene editing, mRNA, siRNA, and antisense therapeutics. Many of these companies, such as the newly formed Genevant, are also developing nucleic acid delivery platforms which compete with LUNAR technology.

Companies currently developing mRNA therapeutics for prophylactic vaccines, cancer vaccines, or mRNA replacement therapy for rare genetic diseases include Moderna Therapeutics, Translate Bio, Ethris GmbH, CureVac GmbH, BioNTech, and eTheRNA. Translate Bio is developing mRNA replacement therapies for cystic fibrosis and OTC deficiency which are in preclinical or early clinical development, and which directly compete with our LUNAR-OTC and LUNAR-CF programs. Ethris is in preclinical development of ETH-CFTR, a mRNA replacement therapy for cystic fibrosis. A number of companies are developing viral vector or DNA-based approaches to gene delivery for rare liver diseases, including Ultragenyx Pharmaceutical, REGENXBIO, Inc., uniQure, Vivet Therapeutics, LogicBio Therapeutics, Touchlight Genetics Ltd., Generation Bio, and Audentes Therapeutics. Ultragenyx is developing a gene therapy product for OTC deficiency which is in early clinical trials.

Companies developing siRNA therapeutics include Arbutus Biopharma, Arrowhead Pharmaceuticals, Inc, Quark Pharmaceuticals, Inc., Silence Therapeutics plc, Nitto Denko, Dicerna Pharmaceuticals, Inc., and Alnylam Pharmaceuticals, Inc. Antisense therapeutics are also in development by Ionis Pharmaceuticals, Roche Pharma, WAVE Life Sciences, Celgene Corporation, Akcea Therapeutics, Inc., Antisense Therapeutics, Ltd., ProQR, and Sarepta Therapeutics, Inc. Both Ionis Pharmaceuticals and ProQR are developing antisense therapies for cystic fibrosis which compete with our LUNAR-CF program.

In addition, to the companies mentioned above, several companies are developing non-nucleic acid therapies for OTC deficiency which are competitors to our LUNAR-OTC program. For example, Synlogic's SYNB1020 product is treating urea cycle disorders, including OTC deficiency, by introducing engineered probiotic bacteria to the gut. Promethera's Heparesc product involves infusion of their HepaStem, liver-derived stem cells into urea cycle disorder patients to restore normal enzyme function. For cystic fibrosis, many companies are pursuing small molecule therapies designed to increase CFTR function, targeted to different patient populations, which could compete with our LUNAR-CF program. These include Vertex Pharmaceuticals, Proteostasis Therapeutics, Inc., Novartis and Galapagos.

The competitive landscape continues to expand and we expect that additional companies will initiate programs focused on the development of nucleic acid therapeutic products using the approaches described above as well as potentially new approaches that may result in the more rapid development of nucleic acid therapeutics or more effective technologies for nucleic acid drug development or delivery.

MANUFACTURING AND SUPPLY

To date, we have manufactured only limited quantities of drug substance for use in research activities. We have contracted with several third-party contract manufacturing organizations, or CMOs, for the supply of drug substance and finished product to meet our testing needs for preclinical toxicology and clinical testing. We expect to continue to rely on third-party CMOs for the supply of drug substance and drug product for our product candidates for at least the next several years, including to support the launch of our first commercial products.

PRODUCT APPROVAL AND GOVERNMENT REGULATION

Government authorities in the United States, at the federal, state and local level, and other countries extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of products such as those we are developing. Any product candidate that we develop must be approved by the FDA before it may be legally marketed in the United States and by the appropriate foreign regulatory agency before it may be legally marketed in foreign countries.

U.S. drug development process

In the United States, the FDA regulates drugs under the Federal Food, Drug and Cosmetic Act, or FDCA, and implementing regulations. Drugs are also subject to other federal, state and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to administrative or judicial civil or criminal sanctions. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, clinical hold, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, debarment, restitution, disgorgement or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us. The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of nonclinical laboratory tests, animal studies and formulation studies according to good laboratory practices, or GLP, or other applicable regulations;
- submission to the FDA of an application for an IND, which must become effective before human clinical trials may begin;
- performance of adequate and well-controlled human clinical trials according to the FDA's regulations commonly referred to as current good clinical practices, or GCPs, to establish the safety and efficacy of the proposed drug for its intended use;
- submission to the FDA of an NDA for a new drug;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the drug is produced to assess compliance with the FDA's current good manufacturing practice standards, or cGMP, to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;
- potential FDA audit of the nonclinical and clinical trial sites that generated the data in support of the NDA; and
- FDA review and approval of the NDA.

The lengthy process of seeking required approvals and the continuing need for compliance with applicable statutes and regulations require the expenditure of substantial resources and approvals are inherently uncertain.

Before testing any compounds with potential therapeutic value in humans, the drug candidate enters the preclinical study stage. Preclinical tests, also referred to as nonclinical studies, include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the drug candidate. The conduct of the preclinical tests must comply with federal regulations and requirements including GLP. The sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA imposes a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may also impose clinical holds on a drug candidate at any time before or during clinical trials due to safety concerns or non-compliance. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical trials to begin, or that, once begun, issues will not arise that suspend or terminate such trial.

Clinical trials involve the administration of the drug candidate to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's direct control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety. Each protocol must be submitted to the FDA as part of the IND. Clinical trials must be conducted in accordance with the FDA's regulations comprising the good clinical practices requirements. Further, each clinical

trial must be reviewed and approved by an independent institutional review board, or IRB, at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the form and content of the informed consent that must be signed by each clinical trial subject or his or her legal representative and provide oversight for the clinical trial until completed.

Human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1. The drug is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing may be conducted in patients.

- Phase 2. The drug is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule.

- Phase 3. Clinical trials are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for product labeling. Generally, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of an NDA.

Post-approval clinical trials, sometimes referred to as Phase 4 clinical trials, may be conducted after initial marketing approval. These clinical trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication.

Annual progress reports detailing the results of the clinical trials must be submitted to the FDA and written IND safety reports must be promptly submitted to the FDA and the investigators for serious and unexpected adverse events or any finding from tests in laboratory animals that suggests a significant risk for human subjects. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA or the sponsor or its data safety monitoring board may suspend a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

Concurrently with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, must develop methods for testing the identity, strength, quality and purity of the final drug. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

U.S. review and approval processes

The results of product development, nonclinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug, proposed labeling and other relevant information are submitted to the FDA as part of an NDA requesting approval to market the product. The submission of an NDA is subject to the payment of substantial user fees; a waiver of such fees may be obtained under certain limited circumstances.

In addition, under the Pediatric Research Equity Act, or PREA, an NDA or supplement to an NDA must contain data to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may grant deferrals for submission of data or full or partial waivers. Unless otherwise required by regulation, PREA does not apply to any drug for an indication for which orphan designation has been granted.

The FDA reviews all NDAs submitted to determine if they are substantially complete before it accepts them for filing. If the FDA determines that an NDA is incomplete or is found to be non-navigable, the filing may be refused and must be re-submitted for consideration. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA. Under the goals and policies agreed to by the FDA under the Prescription Drug User Fee Act, or PDUFA, the FDA has 10 months from acceptance of filing in which to complete its initial review of a standard NDA and respond to the applicant, and six months from acceptance of filing for a priority

NDA. The FDA does not always meet its PDUFA goal dates. The review process and the PDUFA goal date may be extended by three months or longer if the FDA requests or the NDA sponsor otherwise provides additional information or clarification regarding information already provided in the submission before the PDUFA goal date.

After the NDA submission is accepted for filing, the FDA reviews the NDA to determine, among other things, whether the proposed product is safe and effective for its intended use, and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, strength, quality and purity. The FDA may refer applications for novel drug or biological products or drug or biological products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. During the drug approval process, the FDA also will determine whether a risk evaluation and mitigation strategy, or REMS, is necessary to assure the safe use of the drug. If the FDA concludes a REMS is needed, the sponsor of the NDA must submit a proposed REMS; the FDA will not approve the NDA without a REMS, if required.

Before approving an NDA, the FDA will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, the FDA will typically inspect the sponsor and one or more clinical sites to assure that the clinical trials were conducted in compliance with IND study requirements. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable it will outline the deficiencies in the submission and often will request additional testing or information.

The NDA review and approval process is lengthy and difficult and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical data or other data and information. Even if such data and information is submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data. The FDA will issue a complete response letter if the agency decides not to approve the NDA. The complete response letter usually describes all of the specific deficiencies in the NDA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical trials. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either submit new information, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. In addition, the FDA may require post marketing clinical trials, sometimes referred to as Phase 4 clinical trials, which are designed to further assess a drug safety and effectiveness and may require testing and surveillance programs to monitor the safety of approved products that have been commercialized.

Orphan drug designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biological product intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making a drug or biological product available in the United States for this type of disease or condition will be recovered from sales of the product. Orphan product designation must be requested before submitting an NDA. After the FDA grants orphan product designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan product designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

If a product that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications to market the same drug or biological product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity. Competitors, however, may receive approval of different products for the indication for which the orphan product has exclusivity or obtain approval for the same product but for a different indication for which the orphan product has exclusivity. Orphan product exclusivity also could block the approval of one of our products for seven years if a competitor obtains approval of the same drug or biological product as defined by the FDA or if our drug candidate is determined to be contained within the competitor's product for the same indication or disease. If a drug or biological product designated as an orphan product receives marketing approval for an indication broader than what is designated, it may not be entitled to orphan product exclusivity. Orphan drug status has similar but not identical benefits in the European Union.

Expedited development and review programs

The FDA has several regulatory pathways for expedited development and/or review of products intended to treat serious conditions. These pathways are Fast Track designation, Breakthrough Therapy designation, accelerated approval, and priority review. These programs do not change the standards for approval but may expedite the development or approval process. Products may meet the standards for consideration under one or more of these pathways.

The Fast Track program is intended to expedite development or facilitate the process for reviewing new drugs and biological products that meet certain criteria. Specifically, new drugs and biological products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation applies to the combination of the product and the specific indication for which it is being studied. In addition to more frequent meetings with the FDA to discuss the drug's development plan and ensure collection of appropriate data needed to support drug approval, the FDA will consider for review sections of the NDA on a rolling basis as sections are completed, based on an agreed schedule, and the sponsor pays any required user fees upon submission of the first section of the NDA.

Breakthrough Therapy designation is a process designed to expedite the development and review of drugs that are intended to treat a serious condition and where preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over available therapy on or more clinically significant endpoint(s). A drug that receives Breakthrough Therapy designation from the FDA is eligible for all Fast Track designation features, plus intensive guidance on an efficient drug development program beginning as early as Phase 1 and organizational commitment involving senior managers.

Products may be eligible for accelerated approval. Drug or biological products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval, which means that they may be approved on the basis of adequate and well-controlled clinical trials establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity. As a condition of approval, the FDA may require that a sponsor of a drug or biological product receiving accelerated approval perform adequate and well-controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product. Accelerated Approval can be granted with restrictions to the marketing and distribution of the product, and the FDA can withdraw marketing approval if the required post-marketing studies fail to show a clinical benefit or if the sponsor fails to conduct required post-marketing studies.

Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug or biological product designated for priority review in an effort to facilitate the review.

Post-approval requirements

Any drug products for which we or our strategic alliance partners receive FDA approvals are subject to continuing regulation by the FDA, including, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information, product sampling and distribution requirements, complying with certain electronic records and signature requirements and complying with FDA promotion and advertising requirements, which include, among others, standards for direct-to-consumer advertising, promoting drugs for uses or in patient populations that are not described in the drug's approved labeling (known as "off-label use"), industry-sponsored scientific and educational activities, and promotional activities involving the internet. Failure to comply with FDA requirements can have negative consequences, including adverse publicity, enforcement letters from the FDA, mandated corrective advertising or communications with doctors, and civil or criminal penalties. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such off-label uses.

Manufacturers of our products are required to comply with applicable FDA manufacturing requirements contained in the FDA's cGMP regulations. cGMP regulations require among other things, quality control and quality assurance as well as the corresponding maintenance of records and documentation. Drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved NDA, including withdrawal of the product from the market. In addition, changes to the manufacturing process generally require prior FDA approval before being implemented and other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

U.S. patent term restoration and marketing exclusivity

Depending upon the timing, duration and specifics of the FDA approval of the use of our drug candidates, some of our United States patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA plus the time between the submission date of an NDA and the approval of that application. Only one patent applicable to an approved drug is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The United States Patent and Trademark Office, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may intend to apply for restoration of patent term for one of our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA.

Market exclusivity provisions under the FDCA can also delay the submission or the approval of certain applications of other companies seeking to reference another company's NDA. The FDCA provides a five-year period of non-patent marketing exclusivity within the United States to the first applicant to obtain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application, or ANDA, or a 505(b)(2) NDA submitted by another company for another version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement to one of the patents listed with the FDA by the innovator NDA holder. The FDCA also provides three years of marketing exclusivity for an NDA, or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the conditions associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness. Pediatric exclusivity is another type of regulatory market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric trial in accordance with an FDA-issued "Written Request" for such a trial.

U.S. Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act, or FCPA, prohibits certain individuals and entities, including us, from promising, paying, offering to pay, or authorizing the payment of anything of value to any foreign government official, directly or indirectly, to obtain or retain business or an improper advantage. The U.S. Department of Justice and the U.S. Securities and Exchange Commission, or SEC, have increased their enforcement efforts with respect to the FCPA. Violations of the FCPA may result in large civil and criminal penalties and could result in an adverse effect on a company's reputation, operations, and financial condition. A company may also face collateral consequences such as debarment and the loss of export privileges.

Federal and state healthcare laws and regulations

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal healthcare laws and regulations have been applied to restrict certain business practices in the biopharmaceutical industry in recent years. These laws include the following:

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting, or receiving remuneration to induce or in return for purchasing, leasing, ordering, or arranging for the purchase, lease, or order of any healthcare item or service reimbursable under Medicare, Medicaid, or other federally financed healthcare programs. The term "remuneration" has been broadly interpreted to include anything of value, including for example, gifts, discounts, the furnishing of supplies or equipment, credit arrangements, payments of cash, waivers of payment, ownership interests and providing anything at less than its fair market value. The Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, and formulary managers on the other. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly, and our practices may not in all cases meet all of the criteria for statutory exemptions or safe harbor protection. Practices that involve remuneration that may be alleged to be intended to induce prescribing, purchases, or recommendations may be subject to scrutiny if they do not qualify for

an exemption or safe harbor. Several courts have interpreted the statute's intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the statute has been violated. The reach of the Anti-Kickback Statute was also broadened by the Patient Protection and Affordable Health Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, which, among other things, amended the intent requirement of the federal Anti-Kickback Statute. Pursuant to the statutory amendment, a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it in order to have committed a violation. In addition, the ACA provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act (discussed below) or the civil monetary penalties statute, which imposes penalties against any person who is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent.

Federal false claims laws, including the federal civil False Claims Act, prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. Other companies have been prosecuted for causing false claims to be submitted because of the companies' marketing of the product for unapproved, and thus non-reimbursable, uses.

Many states also have statutes or regulations similar to the federal Anti-Kickback Statute and civil False Claims Act, which state laws apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. Also, the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, created additional federal criminal statutes that prohibit, among other things, knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services.

Because of the breadth of these laws and the narrowness of the federal Anti-Kickback Statute's safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of such laws. Such a challenge could have a material adverse effect on our business, financial condition and results of operations.

In addition, we may be subject to data privacy and security regulation by both the federal government and the states in which we conduct our business. HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, impose on certain types of individuals and entities certain requirements relating to the privacy, security and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA's security standards directly applicable to "business associates" – independent contractors or agents of covered entities that receive or obtain protected health information in connection with providing a service on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney's fees and costs associated with pursuing federal civil actions. State laws also govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. In addition, the European Union, or EU, has established its own data security and privacy legal framework, including but not limited to Directive 95/46/EC, or the Data Protection Directive. The Data Protection Directive will be replaced starting in May 2018 with the recently adopted European General Data Protection Regulation, or GDPR, which contains new provisions specifically directed at the processing of health information, higher sanctions and extra-territoriality measures intended to bring non-EU companies under the regulation. We anticipate that over time we may expand our business operations to include additional operations in the EU, including potentially conducting preclinical and clinical trials. With such expansion, we would be subject to increased governmental regulation in the EU countries in which we might operate, including the GDPR.

Further, the federal Physician Payments Sunshine Act, enacted as part of the ACA, requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians and teaching hospitals. Applicable manufacturers and applicable group purchasing organizations must also report annually to CMS ownership and investment interests held by the physicians and their immediate family members.

Other state laws and regulations may also apply, such as those that: require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; and/or state laws that require manufacturers to report information related to transfers of value to healthcare providers or marketing expenditures.

If our operations are found to be in violation of any of the federal and state healthcare laws or regulations described above or any other governmental regulations that apply to us, we may be subject to penalties, including criminal and significant civil monetary penalties, damages, fines, imprisonment, exclusion of products from reimbursement under government programs, disgorgement, additional reporting requirements and/or oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. To the extent that any of our product candidates are ultimately sold in a foreign country, we may be subject to similar foreign laws and regulations, which may include, for instance, applicable post-marketing requirements, including safety surveillance, anti-fraud and abuse laws, and implementation of corporate compliance programs and reporting of payments or transfers of value to healthcare professionals.

In the United States and foreign jurisdictions, there have been a number of legislative and regulatory changes to the healthcare system that could affect our future results of operations. In particular, there have been and continue to be a number of initiatives at the United States federal and state levels that seek to reduce healthcare costs.

For example, the ACA includes measures to significantly change the way healthcare is financed by both governmental and private insurers. Among the provisions of the ACA of greatest importance to the pharmaceutical and biotechnology industry are the following:

- an annual, nondeductible fee on any entity that manufactures or imports certain branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs, that began in 2011;
- an increase in the rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13% of the average manufacturer price for branded and generic drugs, respectively;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts to negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer’s outpatient drugs to be covered under Medicare Part D;
- an extension of manufacturers’ Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- an expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for certain individuals with income at or below 133% of the Federal Poverty Level, thereby potentially increasing manufacturers’ Medicaid rebate liability;
- an expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- a requirement to annually report drug samples that manufacturers and distributors provide to physicians;
- a licensure framework for follow-on biologic products;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research; and
- establishment of a Center for Medicare Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

Some of the provisions of the ACA have yet to be implemented, and there have been judicial and Congressional challenges to certain aspects of the ACA, as well as recent efforts by the Trump administration to repeal or replace certain aspects of the ACA. Since January 2017, President Trump has signed two Executive Orders designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. The Tax Cuts and Jobs Act of 2017 includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the “individual mandate”. Additionally, on January 23, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called “Cadillac” tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Congress may enact additional legislation to real or replace certain elements of the ACA. As a result, there is significant uncertainty regarding future healthcare reform and its impact on our operations.

Further, there has been heightened governmental scrutiny in the United States and abroad of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. In the United States, such scrutiny has resulted in several recent Congressional inquiries and proposed federal legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Outside of the United States, particularly in the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a product. To obtain coverage and reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed.

Pharmaceutical Coverage, Pricing, and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we obtain regulatory approval. In the United States and markets in other countries, sales of any products for which we or our collaborators receive regulatory approval for commercial sale will depend, in part, on the extent to which third-party payors provide coverage and establish adequate reimbursement levels for such drug products.

In the United States, third-party payors include federal and state healthcare programs, government authorities, private managed care providers, private health insurers and other organizations. Third-party payors are increasingly challenging the price, examining the medical necessity and reviewing the cost-effectiveness of medical drug products and medical services, in addition to questioning their safety and efficacy. Moreover, the process for determining whether a third-party payor will provide coverage for a drug product may be separate from the process for setting the price of a drug product or for establishing the reimbursement rate that such a payor will pay for the drug product. A payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Further, one payor's determination to provide coverage for a drug product does not assure that other payors will also provide coverage for the drug product. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

The marketability of any product candidates for which we receive regulatory approval for commercial sale may suffer if the government and third-party payors fail to provide adequate coverage and reimbursement. In addition, emphasis on managed care in the United States has increased and we expect will continue to increase the pressure on pharmaceutical pricing. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we or our collaborators receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Europe / rest of world government regulation

In addition to regulations in the United States, we and our strategic alliance partners are subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our products.

Whether or not we or our collaborators obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application much like the IND prior to the commencement of human clinical trials. In the European Union, for example, a clinical trial application, or CTA, must be submitted to each country's national health authority and an independent ethics committee, much like the FDA and IRB, respectively. Once the CTA is approved in accordance with a country's requirements, clinical trial development may proceed.

The requirements and process governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, the clinical trials are conducted in accordance with GCPs and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

To obtain regulatory approval of an investigational drug or biological product under European Union regulatory systems, we or our strategic alliance partners must submit a marketing authorization application. The application in the United States is similar to that required in the European Union, with the exception of, among other things, country-specific document requirements.

For other countries outside of the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical trials are conducted in accordance with GCPs and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

If we or our strategic alliance partners fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

4.C. Organizational structure

Our wholly-owned subsidiaries are Alcobra, Inc. and Arcturus Therapeutics, Inc. which are both Delaware corporations.

4.D. Property, plants and equipment

Our San Diego, California headquarters consists of approximately 24,700 square feet of leased office and laboratory space under a lease that extends through 2025. Our wholly owned subsidiary Alcobra Inc. also leases office space totaling approximately 3,500 square feet in the greater Philadelphia, Pennsylvania area under a lease that expires in 2018 which space is sublet through the remaining term of the lease. We believe that our existing facilities are adequate for our current needs and that suitable additional space will be available if and when needed.

ITEM 4A. UNRESOLVED STAFF COMMENTS

None.

ITEM 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

5.A Operating Results

Overview

We are an emerging biopharmaceutical company primarily focused on the development and commercialization of nucleic acid technologies and novel nucleic acid therapeutics for rare, infectious, fibrotic, and respiratory diseases with significant unmet medical needs. We have two proprietary technologies with the potential to address the major hurdles in nucleic acid medicine development such as nucleic acid delivery challenges, limited potency and narrow therapeutic index.

Our activities since inception have consisted principally of performing research and development activities and raising capital to fund those efforts. Our activities are subject to significant risks and uncertainties, including failing to secure additional funding before we achieve sustainable revenues and profit from operations. As of December 31, 2017, we had an accumulated deficit of $23.1 million.

Recent Developments

Merger with Arcturus Therapeutics, Inc. and Related Activities

On November 15, 2017, our company, Alcobra Ltd., acquired Arcturus Therapeutics, Inc. pursuant to a merger in which Arcturus Therapeutics, Inc. became our wholly owned subsidiary. In connection with and immediately preceding the merger, we effected a 1-for-7 reverse stock split of our Ordinary Shares and reduced our authorized number of Ordinary Shares to 30,000,000 shares. Also, we changed our name to “Arcturus Therapeutics Ltd.” and the business conducted by our company became primarily the pre-merger business conducted by Arcturus Therapeutics, Inc., which is that of a preclinical nucleic acid medicines company focused on developing nucleic acid technologies and novel nucleic acid therapeutics for rare, infectious, fibrotic, and respiratory diseases with significant unmet medical needs. While Alcobra Ltd. was the legal acquirer in the transaction, Arcturus Therapeutics, Inc. was deemed the accounting acquirer. The Ordinary Shares of Alcobra Ltd. which had been listed on the Nasdaq Global Market, ceased trading at the close of business on November 15, 2017 under the ticker symbol “ADHD,” and once again commenced trading, as the post-merger company, on the Nasdaq Global Market, under the ticker symbol “ARCT,” on November 16, 2017.

In connection with and following the merger, our Board of Directors and management team have undergone significant changes in connection with the appointment of Arcturus’ management team to similar roles with our company. After the merger, the combined company is headquartered in San Diego, California, and the members of the board of directors of the post-merger parent company (Arcturus Therapeutics Ltd.) are Stuart Collinson, PhD (Executive Chairman), Craig Willett, MACC, Daniel Geffken, MBA, David Shapiro, MD and Joseph Payne, MSc. Effective as of February 1, 2018, we are led by our Interim President, Mark R. Herbert, who was part of the Arcturus pre-merger team.

The annual consolidated financial statements of the Company reflect the operations of Arcturus Therapeutics, Inc. as the acquirer for accounting purposes and acquired the assets and assumed the liabilities of Alcobra Ltd., and the stockholders and management of Arcturus Therapeutics, Inc. gained control of the combined company after the merger. The annual consolidated financial statements include the accounts of the Company since the effective date of the merger and the accounts of Arcturus Therapeutics, Inc. since inception.

Mr. Payne's and Dr. Chivukula's Termination and Ongoing Proxy Contest

On February 1, 2018, Mr. Payne was terminated for cause as President and Chief Executive Officer of the Company. In connection with Mr. Payne's termination, the Company exercised its right to repurchase 366,274 ordinary shares held by Mr. Payne that were not vested when he was terminated for an aggregate amount of $2,500. Under Israeli law, any repurchase of outstanding shares by a company must be made out of retained earnings. Since we do not have retained earnings we have filed a motion for approval of distribution under Section 303(a) of the Companies Law in order to finalize the repurchase. On February 6, 2018, Mr. Payne filed a Schedule 13D to report his ownership of the Company's ordinary shares, in which he included the shares subject to repurchase, which he disputes. The effectuation of this repurchase is contingent upon approval of an Israeli court, which approval the Company is seeking. In that filing, Mr. Payne disputed the efficacy of his termination.

On February 11, 2018, Dr. Chivukula resigned as the Company's Chief Scientific Officer and Chief Operating Officer from the Company's board of directors. In connection with his resignation, Dr. Chivukula entered into a separation agreement which provided him with severance benefits, a consulting agreement and the Company agreeing to waive its right of repurchase with respect to 183,137 ordinary shares held by Dr. Chivukula. In addition, the separation agreement required that Dr. Chivukula place his 732,548 ordinary shares into a voting trust, to be voted as directed by the principal executive officer of the Company on all matters during the ensuing three years. Dr. Chivukula retained all financial benefit with regards to these shares.

On February 12, 2018, Mr. Payne wrote a letter to the Company's board of directors demanding that the Company hold an extraordinary general meeting of shareholders.

On February 25, 2018, Mr. Payne challenged Dr. Chivukula's voting trust in in the District Court at Tel Aviv – Yafo and, as interim relief, the court placed a temporary order on the Company, restricting the Company from implementing any action related to the voting of Dr. Chivukula's shares.

Because Mr. Payne's and Dr. Chivukula's affidavits filed in Israel claimed that the Company's agreement with Dr. Chivukula was invalid, on March 21, 2018, the Company filed a demand for arbitration with JAMS, because the Company's agreements with Dr. Chivukula are governed by U.S. law and subject to mandatory arbitration.

On February 26, 2018, the Company held an extraordinary meeting of our shareholders for the purpose of ratifying the appointment of Ernst & Young LLP, an affiliate of our prior auditor, as the Company's independent auditors for the audit of the Company's financial statements for the fiscal year ended December 31, 2017 and for such subsequent period prior to the Company's 2018 annual general meeting of shareholders. At that meeting, the proposal to ratify the appointment of Ernst & Young LLP failed to receive shareholder approval. Despite Mr. Payne's previous vote in support of the proposal in his fiduciary role as a member of the board of directors, the Company was informed that he had voted his shares against the shareholder proposal despite his knowledge of the serious potential consequences of a failure of shareholders to approve the proposal.

On March 11, 2018, the Company announced that it would hold an extraordinary general meeting of shareholders on May 7, 2018 as a result of Mr. Payne's demand. On April 8, 2018, upon the recommendation of the Executive Committee of the Company's board of directors in light of the uncertainty as to the agenda of the Extraordinary General Meeting created by Mr. Payne's March 28, 2018 motion challenging the meeting agenda as stated in the Company's notice published on March 11, 2018, the board of directors approved postponing the extraordinary general meeting.

On March 27, 2018, the Company filed an action against Mr. Payne in the Superior Court of the State of California, San Diego County. The lawsuit outlines Mr. Payne's misconduct, poor judgement and bad decisions during his tenure, details his self-dealing and inappropriate business conflicts of interests, and seeks damages and injunctive relief.

On April 19, 2018, the Company filed an action against Mr. Payne and others in the United States District Court, Southern District of California. The lawsuit alleges that the defendants violated and continue to violate Section 13(d) of the Exchange Act, 15 U.S.C. §, and Regulation 13D by failing to disclose in Schedule 13D filings the existence of group agreements to buy, sell, or vote shares of the Company and effect a change in the composition of the Company's board of directors. The lawsuit seeks injunctive relief.

On May 13, 2018, the District Court of Tel Aviv ruled on a number of issues, including regarding the motion to extend the temporary restraining order, and ordered the Company to convene a Board meeting within seven days, and to summon an extraordinary general meeting within 35 days from that date. See Item 8.A. “Legal Proceedings” and Item 5.A. “Recent Developments” for additional information.

The Company’s board of directors has recommended that shareholders vote against the removal of the current directors and against the election of Mr. Payne’s nominees, and the Company is soliciting proxies from shareholders on this basis.

See Item 8.A. “Legal Proceedings” for additional information.

5.A. Results of Operations

The following discussion of our results of operations should be read together with the consolidated financial statements included in this annual report. Our historical results of operations and the year-to-year comparisons of our results of operations that follow are not necessarily indicative of future results. As noted in the “Introduction” to this annual report, from an accounting perspective, the merger which closed on November 15, 2017 has been reflected in our financial statements as a recapitalization, whereby Arcturus Therapeutics, Inc. was the deemed accounting acquirer and our company was the deemed accounting acquiree. Accordingly, our results of operations described below reflect Arcturus Therapeutics, Inc.’s results, not Alcobra Ltd.’s results, for all periods preceding November 15, 2017.

Revenues

	Year Ended December 31,			2016 to 2017		2015 to 2016	
(Dollars in thousands)	**2017**	**2016**	**2015**	**$ change**	**% change**	**$ change**	**% change**
Revenue under strategic alliances and collaborations	$ 12,998	$ 20,382	$ 6,138	$ (7,384)	-36.2%	$ 14,244	*

**Greater than 100%*

We enter into arrangements with pharmaceutical and biotechnology partners that may contain upfront payments, license fees for research and development arrangements, research and development funding, milestone payments, option exercise fees and royalties on future sales. The following table summarizes our total revenues for the periods indicated (in thousands):

	Year Ended December 31,			2016 to 2017		2015 to 2016	
(Dollars in thousands)	**2017**	**2016**	**2015**	**$ change**	**% change**	**$ change**	**% change**
Collaboration Partner A	$ 4,862	$ 12,008	$ 5,123	$ (7,146)	-59.5%	$ 6,885	*
Collaboration Partner B	5,639	7,395	979	(1,756)	-23.7%	6,416	*
Collaboration Partner C	1,403	28	-	1,375	*	28	100.0%
Other	1,094	951	36	143	15.0%	915	*
Total	$ 12,998	$ 20,382	$ 6,138	$ (7,384)	-36.2%	$ 14,244	*

**Greater than 100%*

Revenue under strategic alliances and collaborations decreased by $7.4 million during fiscal year 2017 as compared to the prior fiscal year 2016. The decrease in revenue was primarily the result of the decrease in revenue of $7.1 million due the cancellation of a collaboration agreement during 2017, lower revenue of $1.8 million as a result of lower revenue recognition on upfront payments during 2017, offset by higher revenue of $1.5 million from a collaboration agreement signed during 2016.

Operating Expenses

Our operating expenses consist of research and development and general and administrative expenses.

	Year Ended December 31,			2016 to 2017		2015 to 2016	
(Dollars in thousands)	**2017**	**2016**	**2015**	**$ change**	**% change**	**$ change**	**% change**
Operating expenses:							
Research and development, net	$ 15,918	$ 17,934	$ 5,476	$ (2,016)	-11.2%	$ 12,458	*
General and administrative	7,572	3,448	2,574	4,124	*	874	34.0%
Total	$ 23,490	$ 21,382	$ 8,050	$ 2,108	9.9%	$ 13,332	*

**Greater than 100%*

Research and Development Expenses, net

Our research and development expenses consist primarily of payments for salaries and related personnel expenses, third-party clinical consultants, and laboratory supplies related to conducting research and development activities in conjunction with collaborative agreements and our internal research and development activities and are reflected net of any royalty bearing grants.

The decrease of $2.0 million in research and development expenses for the year ended December 31, 2017 as compared to the year ended December 31, 2016 resulted primarily from lower research and development expenses incurred of $3.7 million, $3.2 million which resulted from our termination of a collaboration agreement during 2017- a contract that was in place for the full year of 2016. The remaining decrease of $0.5 million was due to less consumption of materials for existing experiments. This decrease in expenses was offset by higher salary related costs of $1.3 million and general facility expenses and other costs of $0.4 million.

The increase of $12.5 million in research and development expenses for the year ended December 31, 2016 as compared to the year ended December 31, 2015 resulted from a $10.4 million increase in research and development expenses incurred primarily due to new collaboration agreements that were entered into during 2015, and incurred development costs during all of 2016. Additionally, we had an increase in salary related costs of $1.6 million and $0.5 million of other costs.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related benefits for our executive, administrative and accounting functions and professional service fees for legal and accounting services as well as other general and administrative expenses.

The increase in general and administrative expenses of $4.1 million for the year ended December 31, 2017 as compared to the year ended December 31, 2016 was due to an increase in stock based compensation of $2.0 million as a result of charges resulting from the acceleration of a restricted stock grant and certain stock option grants, $1.2 million increase in professional fees related to increased legal and accounting services associated with being a public company, $0.4 million increase in salary related costs for additional personnel costs related to the support of our publicly-traded company, and an increase of $0.5 million in other costs.

The increase in general and administrative expenses of $0.9 million for the year ended December 31, 2016 as compared to the year ended December 31, 2015 was due to increased personnel-related costs of $0.3 million, $0.2 million increase in professional fees related to legal and accounting services, and other costs of $0.4 million.

Finance (expense) income, net

(Dollars in thousands)	Year Ended December 31, 2017	2016	2015	2016 to 2017 $ change	2016 to 2017 % change	2015 to 2016 $ change	2015 to 2016 % change
Finance (expense) income, net:							
Interest income	$ 89	$ 9	$ 1	$ 80	*	$ 8	*
Interest expense	(150)	(295)	(251)	145	-49.2%	(44)	17.5%
Other (expense) income, net	(348)	(250)	261	(98)	39.2%	(511)	*
Total	$ (409)	$ (536)	$ 11	$ 127	-23.7%	$ (547)	*

**Greater than 100%*

Interest income is generated on cash and cash equivalents and our short-term investments. For the year ended December 31, 2017, the increase in interest income over prior years resulted from increased balances including cash and investments obtained in conjunction with our merger.

Interest expense was incurred primarily in conjunction with our convertible notes which were converted to Ordinary Shares in November 2017 in conjunction with our merger.

Other expense consisted of debt conversion expense of $348,000 related to the beneficial conversion feature of the convertible notes and $250,000 related to conversion of promissory notes to Ordinary Shares for the year ended December 31, 2017 and to Series A Preferred Stock for the year ended December 31, 2016. Other income during 2015 consisted primarily of a milestone payment received related to a patent assignment and license agreement that was originally entered into during 2013.

Income Tax Expense

(Dollars in thousands)	Year Ended December 31, 2017	2016	2015	2016 to 2017 $ change	2016 to 2017 % change	2015 to 2016 $ change	2015 to 2016 % change
Income tax expense	$ (1)	$ (35)	$ (1)	$ 34	-97.1%	$ (34)	*

**Greater than 100%*

Our income tax expense represents minimum required tax liabilities for the jurisdictions in which we are domiciled.

Unrealized loss on available-for-sale marketable securities

We recognized an immaterial unrealized loss on available-for-sale marketable securities for the year ended December 31, 2017 based upon changes in market prices for our marketable securities.

Critical Accounting Policies and Estimates

We prepare our consolidated financial statements in conformity with accounting principles generally accepted in the United States, or U.S. GAAP. As such, we make certain estimates, judgements and assumptions that we believe are reasonable, based upon information available to us. These judgements involve making estimates about the effect of matters that are inherently uncertain and may significantly impact our results of operations and financial condition. We describe our significant accounting policies more fully in Note 2 to our consolidated financial statements for the year ended December 31, 2017. In the following paragraphs, we describe the specific risks associated with these critical accounting policies and we caution that future events exactly as one may expect, and that best estimates may require adjustment,

The following are our significant accounting policies which we believe are the most critical to aid in fully understanding and evaluating our reported financial results.

Revenue Recognition

We enter into arrangements with pharmaceutical and biotechnology partners that may involve multiple deliverables. These arrangements may contain upfront payments, license fees for research and development arrangements, research and development funding, milestone payments, option exercise fees and royalties on future sales. Each deliverable in the arrangement is evaluated at the inception of the arrangement to determine whether it meets the criteria to be accounted for as a separate unit of accounting or whether it should be combined with other deliverables. When deliverables are separable, consideration received is allocated to the separate units of accounting based on the relative selling price method and the appropriate revenue recognition principles are applied to each unit. Revenue is recognized separately for each unit of accounting when all four of the following criteria are met: (i) persuasive evidence that an arrangement exists; (ii) delivery of the products and/or services has occurred; (iii) the selling price is fixed or determinable; and (iv) collectability is reasonably assured. Amounts received as compensation related to funded research and development efforts are recognized as revenue when the above criteria have been met. When management determines we have a single unit of accounting under our collaborative arrangements, upfront fees received for collaborative agreements are deferred and recognized on a straight-line basis, unless evidence suggests that the revenue is earned or obligations are fulfilled in a different pattern, over the expected performance period under each respective arrangement. As a result, we make our best estimate of the period over which we expect to fulfill its performance obligations under an arrangement. Any amounts received under the arrangement in advance of performance are recorded as deferred revenue and recognized as revenue as we complete the performance obligations. We apply the milestone method of accounting to recognize revenue from milestone payments when earned.

We describe our significant accounting policies more fully in Note 2 to our consolidated financial statements for the year ended December 31, 2017. We believe that the accounting policies below are critical in order to fully understand and evaluate our financial condition and results of operations.

We prepare our consolidated financial statements in accordance with accounting principles generally accepted in the United States, or U.S. GAAP which requires management to make estimates, judgments and assumptions. Our management believes that the estimates, judgments and assumptions used are reasonable based upon information available at the time they are made. These estimates, judgments and assumptions can affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the dates of the financial statements, and the reported amounts of expenses during the reporting period. Actual results could differ materially from those estimates.

Intangible Asset Held for Sale

We assess whether the carrying amount of our intangible assets are recoverable. In connection with the merger with Alcobra Ltd., we entered an Asset Purchase Agreement with Amiservice Development Ltd. (“Amiservice”), pursuant to which we agreed to transfer certain intellectual property related to the proprietary abuse-deterrent immediate release dextro-amphetamine drug called ADAIR that is intended for use to treat ADHD and narcolepsy (“ADAIR”). In exchange for ADAIR, we will receive a minority equity stake in a company to be formed by Amiservice for the purpose of acquiring the ADAIR assets. We utilized the market method with a high probability of success to value this transaction and recorded an intangible asset held for sale of $590,000. This method requires significant management judgment to forecast the occurrence of future equity events. If the subsequent actual results and updated projections of the underlying business activity change compared with the assumptions and projections used to develop these values, we could experience impairment charges.

Deferred Taxes

In accordance with ASC 740, *Income Taxes*, we recognize deferred tax assets and liabilities for the expected future tax consequences or events that have been included in our financial statements and/or tax returns. Deferred tax assets and liabilities are based upon the differences between the financial statement carrying amounts and the tax bases of existing assets and liabilities and for loss and credit carryforwards using enacted tax rates expected to be in effect in the years in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is more likely than not that some portion or all of the deferred tax asset will not be realized.

Ordinary Share Valuations

Since our inception date until May 2017, the estimated fair value of the ordinary shares underlying our share options was determined at the grant date of each option by our board of directors with input from management and with the assistance of independent third-party valuations. For awards granted after May 2017 until the merger date, the fair value as determined by the merger agreement was used in the Ordinary Share valuation. The valuations of our ordinary shares for these dates were determined in accordance with the guidelines outlined in the American Institute of Certified Public Accountants Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation (the "Practice Aid"). The methodology used by the third-party valuation specialists to assist in determining the fair value of our Ordinary Shares included estimating the fair value of the equity and then allocating this value to all of the equity interests using the option pricing method. The assumptions used in the valuation model to determine the estimated fair value of our ordinary shares as of the grant date of each option are based on numerous objective and subjective factors, combined with management judgment, including the following:

- Our operating and financial performance, including our levels of available capital resources;
- The valuation of publicly-traded companies in the life sciences and biotechnology sectors, as well as recently completed mergers and acquisitions of peer companies;
- Rights and preferences of our ordinary shares compared to the rights and preferences of its other outstanding equity securities;
- Equity market conditions affecting comparable public companies, as reflected in comparable companies' market multiples, initial public offering valuations and other metrics;
- The achievement of enterprise milestones, including our development, intellectual property and regulatory progress;
- The likelihood of achieving a liquidity event for our ordinary shares, such as an initial public offering or an acquisition of its company given prevailing market and biotechnology sector conditions;
- Sales of our preferred shares in arms-length transactions;
- The illiquidity of our securities while we were a private company;
- Business risks; and
- The fair value determined by our merger agreement.

Emerging Growth Company

Subject to certain conditions set forth in the JOBS Act, as an "emerging growth company," we elected to rely on other exemptions, including without limitation, (i) providing an auditor's attestation report on our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act and (ii) complying with any requirement that may be adopted by the PCAOB regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements (auditor discussion and analysis). These exemptions will apply for a period of five years following the completion of our initial public offering or until we are no longer an "emerging growth company," whichever is earlier.

Under the JOBS Act, an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This provision allows an emerging growth company to delay the adoption of new or revised accounting standards that have different transition dates for public and private companies until those standards would otherwise apply to private companies. We have elected to use this extended transition period. As a result of this election, our timeline to comply with these standards will in many cases be delayed as compared to other public companies that are not eligible to take advantage of this election or have not made this election. Therefore, our financial statements may not be comparable to those of companies that comply with the public company effective dates for these standards.

5. B. Liquidity and Capital Resources

Overview

Since our inception, we have funded our operations principally with proceeds from the sale of capital stock, convertible notes and revenues earned through collaborative agreements. During 2017, we obtained $36.4 million in cash and short-term investments from our merger with Alcobra Ltd. As of December 31, 2017, we had $48.6 million in unrestricted cash, cash equivalents and short-term investments.

If we are unable to maintain sufficient financial resources, our business, financial condition and results of operations will be materially and adversely affected. There can be no assurance that the Company will be able to obtain the needed financing on acceptable terms or at all. Additionally, equity or debt financings may have a dilutive effect on the holdings of the company's existing shareholders. Our future capital requirements are difficult to forecast and will depend on many factors, including:

- the achievement of milestones under our strategic alliance agreements;
- the terms and timing of any other strategic alliance, licensing and other arrangements that we may establish;
- the initiation, progress, timing and completion of preclinical studies and clinical trials for our product candidates;
- the number and characteristics of product candidates that we pursue;
- the outcome, timing and cost of regulatory approvals;
- delays that may be caused by changing regulatory requirements;
- the cost and timing of hiring new employees to support our continued growth;
- the costs involved in filing and prosecuting patent applications and enforcing and defending patent claims;
- the costs and timing of procuring clinical and commercial supplies of our product candidates;
- the costs and timing of establishing sales, marketing and distribution capabilities;
- the costs associated with legal proceedings, including our ongoing proxy contest; and
- the extent to which we acquire or invest in businesses, products or technologies.

The following table shows a summary of our cash flows for the years ended December 31, 2017, 2016 and 2015 (in thousands):

	Year Ended December 31,		
(Dollars in thousands)	**2017**	**2016**	**2015**
Cash provided by (used in):			
Operating activities	$ (460)	$ (2,861)	$ 8,290
Investing activities	10,355	(688)	(220)
Financing activities	6,998	-	1,902
Net increase (decrease) in cash and restricted cash	$ 16,893	$ (3,549)	$ 9,972

Operating Activities

Our primary use of cash is to fund operating expenses, which consist mainly of research and development expenditures. We have incurred significant losses which have been partially offset by cash collected through our collaboration agreements and acquired through our recent merger. Cash collections under the collaboration agreements can vary from year to year depending on the terms of agreement and work performed. These changes on cash flows primarily relate to the timing of cash receipts for upfront payments, reimbursable expenses and achievement of milestones under these collaborative agreements.

Net cash used in operating activities was $0.5 million on a net loss of $10.9 million for the year ended December 31, 2017, compared to net cash used of $2.9 million on a net loss of $1.6 million for the year ended December 31, 2016. Net cash provided by operating activities was $8.3 million on a net loss of $1.9 million for the year ended December 31, 2015 . Adjustments for non-cash charges, including stock-based compensation and expense related to our convertible notes payable and asset acquisition costs were $3.1 million, $1.1 million and $0.5 million for the years ended December 31, 2017, 2016 and 2015, respectively. Changes in working capital resulted in adjustments to operating net cash flows of $7.4 million, ($2.4) million and $9.7 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Investing Activities

Net cash provided by investing activities of $10.4 million for the year ended December 31, 2017 reflected proceeds of the maturities of our short-term investments of $10.6 million, offset by the purchase of property and equipment of $0.3 million. Net cash was used in investing activities of $0.7 million and $0.2 million for the years ended December 31, 2016 and 2015, respectively, which primarily reflected the purchase of property and equipment for research and development activities.

Financing Activities

Net cash provided by financing activities of $7.0 million for the year ended December 31, 2017 consisted of net proceeds of the issuance of convertible notes of $5.7 million, as well as and cash acquired in conjunction with our merger of $0.5 million and the proceeds from the exercise of warrants and stock options. There was no cash provided by (used in) financing activities for the year ended December 31, 2016. Net cash provided by financing activities of $1.9 million for the year ended December 31, 2015 consisted primarily of net proceeds from the issuance of convertible notes.

Capital Expenditures in Last Three Fiscal Years

In 2017, 2016 and 2015, our capital expenditures amounted to $0.1 million, $0.8 million and $0.3 million, respectively, which related to the purchase of property and equipment primarily for research and development activities, as described above under “Investing Activities.”

Funding Requirements

We anticipate that we will continue to generate annual net losses for the foreseeable future, and we expect the losses to increase as we continue the development of, and seek regulatory approvals for, our product candidates, and begin commercialization of our products. As a result, we will require additional capital to fund our operations, and funding may not be available to us on acceptable terms or at all.

Our future funding requirements will depend on many factors, including the following:

- the cost and timing of hiring new employees to support our continued growth;
- the scope, rate of progress, results and cost of our future clinical studies, nonclinical testing, and other related activities;
- the cost of manufacturing clinical supplies, and establishing commercial supplies, of our product candidates and any products that we may develop;
- the costs associated with legal proceedings, including our ongoing proxy contest;
- the cost, timing, and outcomes of regulatory approvals;
- the cost and timing of establishing our commercial infrastructure, and distribution capabilities;
- costs associated with filing requirements under Section 16 of the Exchange Act; and
- the terms and timing of any collaborative, licensing, and other arrangements that we may establish, including any required upfront payments, license fees for research and development arrangements, research and development funding, milestone payments, and royalties on future sales upfront milestone and royalty payments thereunder.

We expect to satisfy future cash needs through existing capital balances and through some combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements, and other marketing and distribution arrangements.

Our current investment policy has the following objectives: (i) preserve principal (capital); (ii) maintain liquidity in accordance with cash flow requirements; and (iii) maximize the rate of return within the stated guidelines in the policy. To achieve these goals, we invest available cash in bank deposits with banks that have a credit rating of at least Baa1/BBB+ and in tradable securities with high credit quality and trading liquidity, including U.S. Treasury bonds, money market funds, and corporate debt instruments that carry a rating of A2/A or better.

Our cash management is monitored by the Audit Committee.

Current Financing Outlook

We have financed our operations to date primarily through proceeds from sales of our Ordinary Shares and other equity and debt securities and payments received in conjunction with our collaboration efforts. We have incurred losses and generated negative cash flows from operations since inception. To date, we have not generated any revenue from the sale of products and we do not expect to generate revenues from sale of our products in the near term. We believe that our existing capital resources will be sufficient to fund our operations for at least twelve months from the filing of this Form 20-F, however, we believe that we will need to raise additional funds before we have positive cash flow from operations.

Recent Accounting Pronouncements

See footnote 2 to our consolidated financial statements.

5.C Research and Development, Patents and Licenses, etc.

For a discussion of our research and development policies, see Item 5.A. “Research and Development” above. For a discussion of our patents, see Item 4.B “Intellectual Property” above.

5.D Trend Information

For trend information, see Item 3.D. “Risk Factors” described above, Item 5 “Operating and Financial Review and Prospects – Overview” and “– Operating Results,” and Item 4 “Information on the Company” above.

5.E Off-Balance Sheet Arrangements

Except for standard operating leases, we have not engaged in any off-balance sheet arrangements, such as the use of unconsolidated subsidiaries, structured finance, special purpose entities or variable interest entities.

5.F Contractual Obligations

The following table summarizes our contractual obligations at December 31, 2017:

(Dollars in thousands)	Total	Less than 1 year	1-3 years	4-5 years	More than 5 years
Operating leases	$ 8,858	$ 556	$ 2,505	$ 2,659	$ 3,138
Purchase obligations	1,505	1,505	-	-	-
Total	$ 10,363	$ 2,061	$ 2,505	$ 2,659	$ 3,138

ITEM 6. DIRECTORS, SENIOR MANAGEMENT AND EMPLOYEES

6.A. Directors and senior management

Executive Officers and Directors

The following table sets forth information regarding our executive officers and directors as of March 1, 2018:

Name	Age	Position(s)
Executive Officers		
Mark R. Herbert	39	Interim President
Non-Employee Directors		
Stuart Collinson, Ph.D. [4]	58	Director and Executive Chairman of the Board
Joseph E Payne	46	Director
Craig Willett [1][2][3][4][5]	57	Director
David Shapiro, M.D. [1][2][3] [4]	63	Director
Daniel E. Geffken [1][2][3] [4][5]	61	Director

(1) Indicates independent director under Nasdaq rules.

(2) Member of the Audit Committee.

(3) Member of the Compensation Committee.

(4) Member of the Executive Committee.

(5) Member of the Nominating and Corporate Governance Committee.

Executive Officer

Mark Herbert has served as our Interim President since February 2018. Mr. Herbert joined Arcturus in 2015, and previously served as our Vice President of Business Development and Alliance Management. He previously was Head of U.S. Business Development and Sales at STA Pharmaceutical Co., Ltd., WuXi AppTec's small molecule development and manufacturing division, from 2013 to 2015, where he was responsible for all North American business development and marketing activities. Prior to WuXi AppTec, Mr. Herbert served as Director of Pharmaceutical Sciences at Aragon Pharmaceuticals, Inc. from 2009 to 2013, which was acquired by Johnson & Johnson in 2013. Mr. Herbert's background includes over 15 years of experience in business and technical development of large and small molecules working across a number of different platforms and therapeutic areas. Mr. Herbert received a B.S. in Chemistry from Kent State University and a Master of Science in Synthetic Organic Chemistry from Indiana University.

Non-Employee Directors

Stuart Collinson, Ph.D. has served on the board of directors and as Executive Chairman of the board of directors of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) since November 2017. Prior to the merger, Dr. Collinson served on Arcturus Therapeutics, Inc.'s board of directors since May 2014 and as Executive Chairman since January 2015, and also providing consulting services to Arcturus Therapeutics, Inc. Dr. Collinson is currently a partner at Forward Ventures, a position he has held since 2002, the Executive Chairman of Tioga Pharmaceuticals, Inc., a private clinical stage pharmaceutical company, a position he has held since 2005, a director of Soleno Therapeutics, Inc., a public pharmaceutical company, a position he has held since March 2017, and an advisor to ZoBio, B.V., a position he has held since 2001. Previously he was Chairman, Chief Executive Officer and President of Aurora Biosciences Corp. (acquired by Vertex Pharmaceuticals Inc.), a public biotechnology company, from 1999 to 2001. Before Aurora, Dr. Collinson was Chief Executive Officer of Andaris Limited (acquired by Quadrant, now part of Perrigo), a private biotechnology company, in 1998. He held senior management positions at GlaxoWellcome plc (now GlaxoSmithKline plc) from 1994 until 1998 and Baxter International Inc. from 1989 to 1994, and was a consultant with The Boston Consulting Group from 1985 to 1987. Dr. Collinson was previously a director of Essentialis Inc. (acquired by Capnia, Inc., now Soleno Therapeutics, Inc.) from 2005 to March 2017, Affinium Pharmaceuticals, Inc. (acquired by Debiopharma Group) from 2007 to February 2014, Cabrellis Pharmaceuticals Corp. (acquired by Pharmion Corp., now part of Celgene Corp.) in 2006, Conforma Therapeutics Corp. (acquired by BiogenIdec, Inc.) from 2002 to 2006, GeneOhm Sciences, Inc. (acquired by Becton, Dickinson and Company) from 2001 to 2006, NovaCardia, Inc. (acquired by Merck & Co, Inc.) from 2003 to 2007, Proprius Pharmaceuticals, Inc. (acquired by Cypress Bioscience, Inc.) from 2007 to 2008, and Vertex Pharmaceuticals Inc. from 2002 to 2011. Dr. Collinson received an M.B.A. from Harvard Business School and a D.Phil. (Ph.D.) in Physical Chemistry from the University of Oxford.

Craig Willett served on Arcturus Therapeutics, Inc.'s board of directors since March 2013, and on the board of directors of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) since November 2017. He is the President and CEO of Elizann, Inc., a company providing start-up coaching services to entrepreneurs and financial restructuring and improvement services to growth stage businesses, a position which he has held since September 1999. He is the past President and CEO of UTAZ Development Corporation, a real estate

development company, a position which he held from August 1994 until December 2013. In September 1997, Mr. Willett founded Willett and Richards, CPA, LLC (formerly known as Craig Willett, CPA), an accounting firm specializing in business and real estate tax issues. Craig was also a founding director of Capital Community Bank, where he served in that capacity from April 1995 until December 2002. Mr. Willett served as a delegate to the White House Conference on Small Business in 1994. Mr. Willett also served as a member of the board of directors of Wing Enterprises, Inc., creators of the Little Giant Ladder system, from January 1994 until January 2002. Mr. Willett is a real estate broker and CPA and holds bachelor's and master's degrees in accounting from Brigham Young University.

David Shapiro, M.D. has served on the board of directors of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) since November 2017, and currently serves as the chief medical officer of Intercept Pharmaceuticals, Inc., a public pharmaceutical company, a position he has held since 2008. He has over 30 years of clinical development experience in the pharmaceutical industry. Dr. Shapiro founded a consulting company, Integrated Quality Resources, that focused on development stage biopharmaceutical companies and was active in this role from 2005 to 2008. From 2000 to 2005, Dr. Shapiro was executive vice president, medical affairs and chief medical officer of Idun Pharmaceuticals, Inc., prior to its acquisition by Pfizer Inc. From 1995 to 1998, he was president of the Scripps Medical Research Center at Scripps Clinic. He also served as vice president, clinical research at Gensia Pharmaceuticals, Inc. and as director and group leader, hypertension clinical research at Merck Research Laboratories from 1985 to 1990. Dr. Shapiro has authored more than 25 peer-reviewed publications and organized and chaired several conferences aimed at improving product development. Dr. Shapiro served on the board of directors of Altair Therapeutics, Inc. from 2008 to 2010 and served for two terms on the Executive Committee of the Board of the American Academy of Pharmaceutical Physicians, from 1997 to 2000 and from 2004 to 2005. He is an elected Fellow of both the Royal College of Physicians of London and the Faculty of Pharmaceutical Physicians of the United Kingdom. He received his medical degree from Dundee University & Medical School, and undertook his postgraduate medical training in the university affiliated hospitals in Oxford, United Kingdom and the University of Vermont.

Daniel E. Geffken has served on Arcturus Therapeutics Ltd.'s (formerly Alcobra Ltd.'s board) since May 2013. Since October 2011, he has been Managing Director of Danforth Advisors, LLC, a management consulting firm that provides financial and strategic support to emerging life science companies. Mr. Geffken has also been the chief financial officer or chief operating officer of eight companies, four of which were U.S. public reporting companies and six of which were life science companies. He has a B.S. in Economics from The Wharton School, University of Pennsylvania, and an M.B.A. from Harvard Business School.

Joseph E. Payne previously served as President and Chief Executive Officer of Arcturus and on Arcturus Therapeutics, Inc.'s board of directors from March 2013 to February 2018. He serves on the board of directors of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) since November 2017. Prior to joining Arcturus, Mr. Payne served as Senior Manager of Nitto Denko Corporation, a life sciences research company, from June 2009 until February 2013. Mr. Payne's background includes over 20 years of drug discovery experience at Arcturus, Nitto Denko Corporation, Kalypsys Inc., Merck Research Labs, Bristol-Myers Squibb Co. and DuPont Pharmaceuticals Co. Mr. Payne received a Bachelor's Degree in Chemistry, magna cum laude from Brigham Young University, a Master of Science in Synthetic Organic Chemistry from the University of Calgary and an Executive Training Certificate from MIT Sloan School of Management.

6.B. Compensation

The table below reflects the compensation granted to the five most highly compensated officers assuming that the compensation that was paid during the period of January 1, 2017 through November 14, 2017 for the previous Alcobra Ltd. officers (not included in the Consolidated Statements of Operations and Comprehensive Loss in this Form 20-F) is combined with the compensation for the post-merger Arcturus Therapeutics Ltd. for the period November 15, 2017 through December 31, 2017. All amounts reported in the table reflect the cost based on this assumption, in U.S. Dollars. Amounts paid in NIS are translated into U.S. dollars at the rate of NIS 3.60 = U.S.$1.00, based on the average representative rate of exchange between the NIS and the U.S. dollar as reported by the Bank of Israel for the year ended December 31, 2017.

Name and Position	Salary	Benefit Cost (1)	Share-Based Payments (2)	Bonus (3)	Other (4)		Total
Irena Katsman, Former Vice President, Finance	$ 121,677	$ 54,727	$ 33,806	$ 30,419	$ 51,670	(3)	$ 292,299
Yaron Daniely, Former Chief Executive Officer, President and Director	$ 307,550	$ 50,198	$ 235,820	$ -	$ -		$ 593,568
Tomer Berkovitz, Former Chief Financial Officer and Chief Operating Officer	$ 300,803	$ 108,366	$ 164,193	$ 150,000	$ 300,000	(3)	$ 1,023,362
David Baker, Former Interim Executive Officer, Former Chief Commercial Officer	$ 413,578	$ 89,107	$ 115,902	$ -	$ 348,504	(3)	$ 967,091
Jonathan Rubin, Former Chief Medical Officer	$ 222,142	$ 70,798	$ 99,724	$ -	$ 309,000	(3)	$ 701,664

(1) Includes the social benefits paid by us on behalf of the employees, including convalescence pay, contributions made by the company to an insurance policy or a pension fund, work disability insurance, life insurance, medical insurance, severance benefits required under Israeli law, educational fund and payments for social security. It also includes leased vehicle cost for some of the employees.

(2) Represents the grant date fair value of options awarded in accordance with accounting guidance for equity-based compensation. All the following option share numbers and exercise prices per share give effect to the 1-for-7 reverse split implemented in connection with the merger. Ms. Katzman received a stock option for 6,250 shares with an exercise price of $8.33 per share which expired on April 30, 2018. Mr. Daniely received a stock option for 45,624 shares with an exercise price of $8.33 per share which expired on November 15, 2017. Mr. Berkovitz received a stock option for 30,358 shares with an exercise price of $8.33 per share which expired on January 15, 2018. Mr. Baker received a stock option for 21,429 shares with an exercise price of $8.33 per share which expired on November 15, 2017.

(3) Ms. Katsman and Mr. Berkovitz each earned special success bonuses upon the closing of the merger which were earned and payable contingent upon Alcobra Ltd.'s net cash at the closing of the merger exceeding $33,250,000.

(4) Represents compensation awarded in conjunction with separation agreements.

The aggregate amount of compensation paid or accrued to the five most highly compensated officers assuming that the compensation that was paid during the period of January 1, 2017 through November 14, 2017 for the previous Alcobra Ltd. officers (not included in the Consolidated Statements of Operations and Comprehensive Loss in this Form 20-F), combined with the officers and directors for the post-merger Arcturus Therapeutics Ltd. for the period November 15, 2017 through December 31, 2017 was approximately $3.2 million including bonuses of $0.2 million. In addition, share-based compensation in the amount of $0.6 million was awarded in 2017. This compensation includes salaries, consulting fees, directors' fees, car expenses and vacation, pension, severance, retirement or similar benefits or expenses, employer's taxes and bonuses. The amount does not include business travel, relocation, professional and business association due and expenses reimbursed to office holders, and other benefits commonly reimbursed or paid by companies in our industry. These amounts reflect amounts paid in NIS were translated into U.S. dollars at the rate of NIS 3.60 = U.S.$1.00, based on the average representative rate of exchange between the NIS and the U.S. dollar as reported by the Bank of Israel for the year ended December 31, 2017.

6.C. Board practices

Board of Directors and Executives – Term and Contracts

We have entered into written employment agreements with all of our executive officers. Each of these agreements contains provisions regarding non-competition, confidentiality of information and ownership of inventions. The non-competition provision applies for a period that is generally 12 months following termination of employment. The employment agreements also include severance for certain key employees subject to our compensation policy. The enforceability of covenants not to compete in Israel and the United States is subject to limitations. In addition, we are required to provide notice prior to terminating the employment of our executive officers, other than in the case of a termination for cause.

Other than with respect to our directors that are also executive officers, we do not have written agreements with any director providing for benefits upon the termination of his employment with our company.

Board of Directors – Israeli Law

Under the Israeli Companies Law, our Board of Directors is vested with the power to set corporate policy and oversee our business. Our Board of Directors may exercise all powers and may take all actions that are not specifically granted to our shareholders or to management. Our Board of Directors serves as the primary corporate body responsible for risk management for our company, including cybersecurity risks, and periodically consults with the management of our company to obtain updates concerning, and internally discusses, the most material risks currently facing our company, and how those risks are being mitigated. Our executive officers are responsible for our day-to-day management and have individual responsibilities established by our Board of Directors. Our principal executive officer is appointed by, and serves at the discretion of, our Board of Directors, subject to the employment agreement that we have entered into with him. All other executive officers are appointed by our principal executive officer, and are subject to the terms of any applicable employment agreements that we may enter into with them.

Under our amended and restated articles of association, our Board of Directors must consist of at least five and not more than eleven directors. Our Board of Directors currently consists of five directors. We have only one class of directors. In accordance with the Israeli Companies Law and our amended and restated articles of association, our Board of Directors is required to appoint one of its members to serve as Chairman of the Board of Directors. Our Board of Directors has appointed Dr. Collinson to serve as Chairman of the Board of Directors.

External Directors – Exemption

In June 2016, we elected to be governed by a newly-adopted exemption under the Israeli Companies Law regulations that exempts us from appointing external directors and from complying with the Israeli Companies Law requirements related to the composition of the audit committee and compensation committee of our Board of Directors. Our eligibility for that exemption is conditioned upon: (i) the continued listing of our Ordinary Shares on the Nasdaq Stock Market (or one of a few select other non-Israeli stock exchanges); (ii) there not being a controlling shareholder (generally understood to be a 25% or greater shareholder) of our company under the Israeli Companies Law; and (iii) our compliance with the Nasdaq Listing Rules requirements as to the composition of (a) our Board of Directors—which requires that we maintain a majority of independent directors (as defined under the Nasdaq Listing Rules) on our Board of Directors (subject to applicable cure periods under the Nasdaq Listing Rules) and (b) the audit and compensation committees of our Board of Directors, which rules require that such committees consist solely of independent directors (at least three and two members, respectively). At the time that it was determined to exempt our company from the external director requirement, our board affirmatively determined that we meet the conditions for exemption from the external director requirement.

As a result of our election to be exempt from the external director requirement under the Companies Law, each of our directors is elected annually, at our annual general meeting of shareholders. The vote required for the election of each director is a majority of the voting power represented at the meeting and voting on the election proposal.

Board Nominations and Removal

Our directors are each elected at the annual general meeting of our shareholders and serve until the next annual general meeting. Such election is subject to the nomination, and recommendation for the Board of Directors' nomination, by a majority of independent directors. Directors may nevertheless be removed prior to the end of their term by the majority of our shareholders at a general meeting of our shareholders or upon the occurrence of certain events, all in accordance with the Israeli Companies Law and our amended and restated articles of association.

In addition, our amended and restated articles of association allow our Board of Directors to appoint directors, to fill vacancies on our Board of Directors, for a term of office equal to the remaining period of the term of office of the directors whose offices have been vacated or appoint new additions to Board of Directors up to the maximum number of directors.

Under the Israeli Companies Law, nominations for directors may be made by any shareholder holding at least one percent (1%) of our outstanding voting power. However, any such shareholder may make such a nomination only if a written notice of such shareholder's intent to make such nomination has been given to our Board of Directors. Any such notice must include certain information which under the Israeli Companies Law requires to be provided to our shareholders, the consent of the proposed director nominee(s) to serve as our director(s) if elected and a declaration signed by the nominee(s) declaring that there is no limitation under the Israeli Companies Law preventing their election and that all of the information that is required under the Israeli Companies Law to be provided to us in connection with such election has been provided.

Board Member Qualifications

In addition to its role in making director nominations, under the Israeli Companies Law, our Board of Directors must determine the minimum number of directors who are required to have accounting and financial expertise. Under applicable regulations, a director with accounting and financial expertise is a director who, by reason of his or her education, professional experience and skill, has a high level of proficiency in and understanding of business accounting matters and financial statements, sufficient to be able to thoroughly comprehend the financial statements of the Company and initiate debate regarding the manner in which financial information is presented. In determining the number of directors required to have such expertise, our Board of Directors must consider, among other things, the type and size of our company and the scope and complexity of its operations. Our Board of Directors has determined that our company requires one director with such expertise. Mr. Craig Willett has such accounting and financial expertise.

Audit Committee

Israeli Law Requirements

Under the Israeli Companies Law, the board of directors of a public company must appoint an audit committee.

Our Audit Committee assists our Board of Directors in fulfilling its legal and fiduciary obligations in matters involving our accounting, auditing, financial reporting, internal control and legal compliance functions by pre-approving the services performed by our independent accountants and reviewing their reports regarding our accounting practices and systems of internal control over financial reporting. Our Audit Committee also oversees the audit efforts of our independent accountants and takes those actions that it deems necessary to satisfy itself that the accountants are independent of management.

Under the Israeli Companies Law, our Audit Committee is responsible for:

- determining whether there are deficiencies in the business management practices of our Company, and making recommendations to our Board of Directors to improve such practices;
- determining whether to approve certain related party transactions (including transactions in which an office holder has a personal interest and whether such transaction is extraordinary or material under the Companies Law) (see Item 16G. – “Corporate Governance – Approval of Related Party Transactions under Israeli Law”);
- examining our internal controls and internal auditor’s performance, including whether the internal auditor has sufficient resources and tools to dispose of its responsibilities;
- examining the scope of our auditor’s work and compensation and submitting a recommendation with respect thereto to our Board of Directors or shareholders, depending on which of them is considering the appointment of our auditor;
- establishing procedures for the handling of employees’ complaints as to the management of our business and the protection to be provided to such employees;
- determining whether certain acts of an office holder not in accordance with his or her fiduciary duty owed to the Company are extraordinary or material and to approve such acts and certain related party transactions (including transactions in which an office holder has a personal interest) and whether such transaction is extraordinary or material under the Companies Law (see Item 16G. – “Corporate Governance – Approval of Related Party Transactions under Israeli Law”);

- deciding whether to approve and to establish the approval process (including by tender or other competitive proceedings) for certain transactions with a controlling shareholder or in which a controlling shareholder has a personal interest; and

- determining the process of approval of transactions that are not negligible, including determining the types of transactions that will be subject to the approval of our Audit Committee.

Nasdaq Requirements

Under the Nasdaq Listing Rules, we are required to maintain an audit committee consisting of at least three independent directors, all of whom are financially literate and one of whom has accounting or related financial management expertise. Under the Nasdaq Listing Rules, the audit committee is responsible for, among other things: the oversight of our independent registered public accounting firm; the receipt, retention, and treatment of complaints received by our company regarding accounting, internal accounting controls, or auditing matters; and **t**he confidential, anonymous submission by our employees of concerns regarding questionable accounting or auditing matters.

Our Audit Committee consists of Mr. Willett, who serves as the chairperson of the Audit Committee, Mr. Geffken and Dr. Shapiro, all of whom are independent under the listing standards of the Nasdaq Listing Rules. The existing Board of Directors has determined that Mr. Willett is an audit committee financial expert as defined by the SEC rules and has the requisite financial sophistication as defined by the Nasdaq Listing Rules. All of the members of our Audit Committee meet the requirements for financial literacy under the applicable Nasdaq Listing Rules. Each member of the Audit Committee is required to be (and each of the foregoing members of our Audit Committee actually is) "independent" as such term is defined in Rule 10A-3(b)(1) under the Exchange Act.

Charter

Our Board of Directors has adopted an audit committee charter setting forth the responsibilities of our Audit Committee consistent with the rules of the SEC and the Nasdaq Listing Rules, as well as the requirements for such committee under the Israeli Companies Law. The audit committee charter is posted on our website.

Compensation Committee and Compensation Policy

Compensation Committee – Israeli Law Requirements

Under the Israeli Companies Law, the board of directors of a public company must appoint a compensation committee, which must be responsible for (i) approving, and proposing for approval by the board of directors and shareholders, a compensation policy, (ii) proposing necessary revisions to the compensation policy and examining its implementation, (iii) determining whether to approve transactions with respect to the terms of office and employment of office holders, and (iv) determining, in accordance with the compensation policy, whether to exempt an engagement with an unaffiliated nominee for the position of principal executive officer from requiring shareholders' approval. The term "office holder," as defined in the Israeli Companies Law, includes directors, executive officers and any manager directly subordinate to the chief executive officer. Under the regulations promulgated under the Israeli Companies Law, certain exemptions and reliefs with respect to the compensation committee are granted to companies such as ours whose securities are traded outside of Israel.

Compensation Policy Requirements

The Companies Law provides that a compensation policy must serve as the basis for the decisions concerning the financial terms of employment or engagement of the office holders, including exculpation, insurance, indemnification or any monetary payment or obligation of payment in respect of employment or engagement. The compensation policy must be approved (or reapproved) not less frequently than every three years, and relate to certain factors, including advancement of the company's objective, business plan and its long-term strategy and creation of appropriate incentives for office holders. It must also consider, among other things, the company's risk management, size and nature of its operations. The compensation policy must furthermore consider the following additional factors:

- the knowledge, skills, expertise and accomplishments of the relevant office holder;

- the office holder's roles and responsibilities and prior compensation agreements with him or her;

- the relationship between the terms offered and the average compensation of the other employees of the company, including those employed through manpower companies;

- the impact of disparities in salary upon work relationships in the company;

- the possibility of reducing variable compensation at the discretion of the board of directors or the possibility of setting a limit on the exercise value of non-cash variable equity-based compensation; and

- as to severance compensation, the period of service of the office holder, the terms of his or her compensation during such service period, the company's performance during that period of service, the person's contributions towards the company's achievement of its goals and the maximization of its profits and the circumstances under which the person is leaving the company.

The compensation policy must also include the following principles:

- the link between variable compensation and long-term performance and measurable criteria;

- the relationship between variable and fixed compensation, and the ceiling for the value of variable compensation;

- the conditions under which a director or executive would be required to repay compensation paid to him or her if it was later shown that the data upon which such compensation was based was inaccurate and was required to be restated in the company's financial statements;

- the minimum holding or vesting period for variable, equity-based compensation; and

- maximum limits for severance compensation.

The compensation policy must be approved by the board of directors, after considering the recommendations of the compensation committee. The compensation policy must also be approved by a majority of the company's shareholders, provided that (i) such majority includes at least a majority of the shareholders who are not controlling shareholders and who do not have a personal interest in the matter, present and voting (abstentions are disregarded), or (ii) the non-controlling shareholders and shareholders who do not have a personal interest in the matter who were present and voted against the policy hold two percent or less of the outstanding voting power of the company. Other than for a newly public company, for which the regulations provide for a five-year period, for all other public companies, the compensation policy must be approved by the board of directors and the shareholders every three years. If the compensation policy is not approved by the shareholders, the compensation committee and the board of directors may nonetheless approve the policy, following further discussion of the matter and for specified reasons.

Our shareholders approved a compensation policy that meets the above requirements in February 2014, which was subsequently amended in July 2015 and again in July 2016.

Israeli Law Office Holder Compensation Approvals

Under the Israeli Companies Law, the terms of office and employment of office holders require the approval of the compensation committee and the board of directors. The terms of office and employment of directors and the principal executive officer must also be approved by shareholders. Changes to existing terms of office and employment of office holders (other than directors) can be made with the approval of the compensation committee only, if the committee determines that the change is not substantially different from the existing terms.

Under certain circumstances, the compensation committee and the board of directors may approve an arrangement that deviates from the compensation policy, provided that such arrangement is approved by the special majority of the company's shareholders mentioned above. Such shareholder approval will also be required with respect to determining the terms of office and employment of a director or the principal executive officer during the transition period until a company adopts a compensation policy (or during any period between the three-year anniversary (or in the case of a newly public company, the initial five-year anniversary) of the last adoption of a compensation policy and the actual adoption of an updated compensation policy). Notwithstanding the foregoing, a company may be exempted from receiving shareholder approval with respect to the terms of office and employment of a candidate for principal executive officer if such candidate meets certain independence criteria, the terms are in line with the compensation policy and the compensation committee has determined for specified reasons that shareholder approval would prevent the engagement.

Compensation Committee – Nasdaq Requirements

Under the Nasdaq Listing Rules, we are required to maintain a compensation committee, consisting entirely of independent directors, which is authorized to determine the compensation of our executive officers (or, the determination of that compensation of our executive officers must be made solely by the independent members of the board of directors).

Our Compensation Committee consists of Mr. Geffken, who serves as the chairperson of the committee, Mr. Willett and Dr. Shapiro, all of whom are independent under the listing standards of the Nasdaq Listing Rules.

Compensation Committee – Charter

Our Board of Directors has adopted a compensation committee charter setting forth the responsibilities of our Compensation Committee consistent with the Nasdaq Listing Rules and the requirements under the Companies Law, as described above. The compensation committee charter requires that our Compensation Committee be comprised of at least three members. The compensation committee charter is posted on our website.

Nominating and Corporate Governance Committee

Our Nominating and Corporate Governance Committee consists of Mr. Willett, who serves as the chairperson of the committee, and Mr. Geffken, each of whom are independent under the listing standards of the Nasdaq Listing Rules. No committee member may be an employee of the Company and each member must be free from any relationship that would interfere with the exercise of his or her independent judgment, as determined by the Board of Directors, in accordance with the applicable independence requirements under the Nasdaq Listing Rules. The members of the committee and the committee chairperson are appointed by the Board of Directors. To the extent that the Board of Directors is then required to include external directors under the Companies Law, at least one such external director will serve on the Nominating and Corporate Governance Committee.

The purpose of the Nominating and Corporate Governance Committee is to: (i) oversee all aspects of the Company's corporate governance functions on behalf of the Board of Directors; (ii) make recommendations to the Board of Directors regarding corporate governance issues; (iii) identify, review and evaluate candidates to serve as directors of the Company and review and evaluate incumbent directors; (iv) serve as a focal point for communication between such candidates, non-committee directors and the Company's management; (v) recommend for nomination by the Board of Directors and election by the shareholders candidates to serve on the Board of Directors; and (vi) make other recommendations to the Board of Directors regarding affairs relating to the directors of the Company, including director compensation (subject to approval by the compensation committee of the Board of Directors to the extent required under Israeli law).

The Nominating and Corporate Governance Committee has the following primary responsibilities:

- *Director Nominations* – The committee has the responsibility of identifying, reviewing and evaluating candidates to serve on the Company's Board of Directors, including consideration of any potential conflicts of interest as well as applicable independence and experience requirements. The committee will also have the primary responsibility for reviewing, evaluating and considering the recommendation for nomination of incumbent directors for re-election to the Board, as well as monitoring the size of the Board of Directors. The committee will also recommend to the Board of Directors for selection candidates to the Board of Directors. The committee will also have the power and authority to consider recommendations for Board of Directors nominees and proposals submitted by the Company's shareholders and to establish any policies, requirements, criteria and procedures, including policies and procedures to facilitate shareholder communications with the Board of Directors, to recommend to the Board of Directors appropriate action on any such proposal or recommendation and to make any disclosures required by applicable law in the course of exercising its authority.

- *Management and Board Assessment* – The committee will periodically review, discuss and assess the performance of management and the Board of Directors, including Board of Directors committees, seeking input from senior management, the full Board of Directors and others. The assessment will include evaluation of the Board of Director's contribution as a whole and effectiveness in serving the best interests of the Company and its shareholders, specific areas in which the Board of Directors and/or management believe contributions could be improved, and overall Board of Directors composition and makeup, including the reelection of current board members. The factors to be considered will include whether the directors, both individually and collectively, can and do provide the integrity, experience, judgment, commitment, skills and expertise appropriate for the Company. The committee will also consider and assess the independence of directors, including whether a majority of the Board of Directors continue to be independent from management in both fact and appearance, as well as within the meaning prescribed by the Nasdaq Listing Rules. The results of these reviews will be provided to the Board of Directors for further discussion as appropriate.

- *Board Committee Nominations* – The committee, after due consideration of the interests, independence and experience of the individual directors and the independence and experience requirements of the Nasdaq Listing Rules, the rules and regulations of the SEC and applicable law, will recommend to the entire Board of Directors annually the chairmanship and membership of each committee. The committee will conduct an annual self-evaluation.

- *Continuing Education* – The committee will consider instituting a plan or program for the continuing education of directors.

- *Corporate Governance Principles* – The committee has the authority to develop a set of corporate governance principles to be applicable to the Company, may periodically review and assess these principles and their application, and may recommend any changes deemed appropriate to the Board of Directors for its consideration. Further, the committee will periodically review Company policy statements to determine their adherence to the Company's code of conduct.

- *Procedures for Information Dissemination* – The committee will oversee and review the processes and procedures used by the Company to provide information to the Board of Directors and its committees. The committee should consider, among other factors, the reporting channels through which the Board of Directors and its committees receive information and the level of access to outside advisors where necessary or appropriate, as well as the procedures for providing accurate, relevant and appropriately detailed information to the Board of Directors and its committees on a timely basis.

- *Director Compensation* – The committee will periodically review the compensation paid to non-employee directors for their service on the Board of Directors and its committees and recommend any changes considered appropriate to the compensation committee, which in turn can recommend to the full Board of Directors for its approval.

- *Management Succession* – The committee will periodically review with the Chief Executive Officer the plans for succession to the offices of the Company's executive officers and make recommendations to the Board of Directors with respect to the selection of appropriate individuals to succeed to these positions.

- *Self-Assessment* – The committee will review, discuss and assess its own performance at least annually. The committee will also periodically review and assess the adequacy of the committee charter, including the committee's role and responsibilities as outlined in the committee charter, and will recommend any proposed changes to the Board of Directors for its consideration.

- *Reporting to the Board* – The committee, through the committee chairperson, will report all material activities of the committee to the Board of Directors from time to time or whenever so requested by the Board of Directors.

Nominating and Corporate Governance Committee – Nasdaq Requirements

We maintain a Nominating and Corporate Governance Committee, consisting entirely of independent directors, which is authorized to oversee our corporate governance functions on behalf of the Board of Directors and identify, review and evaluate candidates to serve as directors of the company (including coordinating communication between candidates, non-committee directors and the company's management, making nomination recommendations and other recommendations regarding director-related affairs).

Our Nominating and Corporate Governance Committee consists of Mr. Willett, who serves as the chairperson of the committee, and Mr. Geffken, both of whom are independent under the listing standards of the Nasdaq Listing Rules.

Nominating and Corporate Governance Committee – Charter

Our Board of Directors has adopted a Nominating and Corporate Governance Committee Charter setting forth the responsibilities of the Nominating and Corporate Governance Committee consistent with the Nasdaq Listing Rules and the requirements under the Companies Law, as described above. The Nominating and Corporate Governance Committee Charter requires that our Nominating and Corporate Governance Committee be comprised of at least two members. The Nominating and Corporate Governance Committee Charter is posted on our website. The Nominating and Corporate Governance Committee holds at least one regular meeting per year and additional meetings, as the committee deems appropriate.

Executive Committee

In February 2018, our Board of Directors appointed an executive committee. The roles of this committee are (i) to assist in the implementation of the business strategy of our company, subject to board approval for matters outside of the ordinary course of business (and for other matters for which board approval is required under the Israeli Companies Law), and (ii) to exercise such other duties as the board may resolve from time to time. The members of our Executive Committee consist of Dr. Collinson, who serves as chairman of the executive committee, Mr. Geffken, Mr. Willett and Dr. Shapiro.

Internal auditor

Under the Israeli Companies Law, the board of directors of an Israeli public company must appoint an internal auditor recommended by the audit committee and nominated by the board of directors. An internal auditor may not be:

- a person (or a relative of a person) who holds more than 5% of the company's outstanding shares or voting rights;
- a person (or a relative of a person) who has the power to appoint a director or the general manager of the company;
- an office holder (including a director) of the company (or a relative thereof); or
- a member of the company's independent accounting firm, or anyone on his or her behalf.

Guy Sapir, CPA, a partner at PWC Israel, was appointed as our internal auditor. The role of the internal auditor is to examine, among other things, our compliance with applicable law and orderly business procedures.

6.D. Employees

Our executive management consists of our Interim President. We further have service agreements with U.S.-based regulatory consultants as well as additional U.S.-based clinical consultants who are members of our clinical advisory board. We believe that we maintain good relations with all of them. Note that December 31, 2017 reflects post-merger Arcturus Therapeutics Ltd. while December 31, 2016 and 2015 reflect combined employees for both Alcobra Ltd. and Arcturus Therapeutics, Inc.

Over the past three years (as of the end of each such year), the number of our employees by function was as follows:

	As of December 31,		
Function	**2017**	**2016**	**2015**
Research, development and quality assurance	49	36	20
Administration, finance and operations	11	20	18
Total	60	56	38

As of the end of each of the past three years, the number of our employees by geographic area was as follows:

	As of December 31,		
Geographic area	**2017**	**2016**	**2015**
Israel	2	14	15
United States	58	42	23
Total	60	56	38

The significant shift in the geographic area in which our employees are situated as of December 31, 2017 relative to the prior year-ends resulted from the merger. Upon consummation of the merger, we essentially discontinued our pre-merger Israeli operations and shifted our operations to San Diego, California, where Arcturus' operations have historically been based.

6.E. Share ownership

As of March 1, 2018, for those officers and directors listed in the compensation table in Item 6.B., such executive officers and directors beneficially owned less than 1% of our issued and outstanding Ordinary Shares.

2010 Incentive Option Plan

We maintain one equity incentive plan - our 2010 Incentive Option Plan, or our 2010 Plan. As of March 1, 2018, a total of 465,558 shares were reserved for issuance under our 2010 Plan, of which options to purchase 21,448 Ordinary Shares were issued and outstanding thereunder. Of such outstanding options, all the options were vested as of March 1, 2018 with a weighted average exercise price of $3.99 per share.

Our 2010 Plan, which was adopted by our Board of Directors in February 2010, and approved by our shareholders in July 2015, provides for the grant of options to our and our affiliates' respective directors, employees, office holders, service providers and consultants. On December 16, 2014, our Board of Directors adopted an appendix to the 2010 Plan for U.S. residents, which was later approved by our shareholders. The initial reserved pool under our 2010 plan has been increased by our Board of Directors a number of times, and most recently on March 13, 2017.

The 2010 Plan is administered by our Board of Directors or by a committee thereof, which shall determine, subject to Israeli and U.S. law, the grantees of awards and various terms of the grant. The 2010 Plan provides for granting options in compliance with Section 102 of the Israeli Income Tax Ordinance, 1961, or the Ordinance, and under the U.S. Revenue Code of 1986, as amended.

Options granted under the 2010 Plan to Israeli employees have been granted under the capital gains track of Section 102 of the Ordinance.

Section 102 of the Ordinance allows employees, directors and officers, who are not controlling shareholders and are considered Israeli residents, to receive favorable tax treatment for compensation in the form of shares or options. Our Israeli non-employee service providers and controlling shareholders may only be granted options under Section 3(9) of the Ordinance, which does not provide for similar tax benefits. Section 102 of the Ordinance includes two alternatives for tax treatment involving the issuance of options or shares to a trustee for the benefit of the grantees and also includes an additional alternative for the issuance of options or shares directly to the grantee. Section 102(b)(2) of the Ordinance, the most favorable tax treatment for grantees, permits the issuance to a trustee under the "capital gains track." However, under this track we are not allowed to deduct an expense with respect to the issuance of the options or shares. In order to comply with the terms of the capital gains track, all options granted under the 2010 Plan pursuant and subject to the provisions of Section 102 of the Ordinance, as well as the Ordinary Shares issued upon exercise of these options and other shares received subsequently following any realization of rights with respect to such options, such as share dividends and share splits, must be granted to a trustee for the benefit of the relevant employee, director or officer and should be held by the trustee for at least two years after the date of the grant.

Options granted under the 2010 Plan will generally vest over four years commencing on the date of grant such that 25% vest after one year and an additional 6.25% vest at the end of each subsequent three-month period thereafter for 36 months, or pursuant to a vesting schedule that is determined according to pre-specified performance milestones in accordance with company's objectives. Options that are not exercised within the pre-specified option term (generally five or ten years from the grant date) expire, unless otherwise determined by the Board or its designated committee, as applicable. In case of termination for reasons of disability or death, the grantee or his legal successor may exercise options that have vested prior to termination within a period of six months from the date of disability or death. If we terminate a grantee's employment or service for cause, all of the grantee's vested and unvested options will expire on the date of termination. If a grantee's employment or service is terminated for any other reason, the grantee may exercise his or her vested options within 30 days of the date of termination. Any expired or unvested options return to the pool for reissuance.

In the event of a merger or consolidation of our company subsequent to which we shall no longer exist as a legal entity, or a sale of all, or substantially all, of our shares or assets or other transaction having a similar effect on us, then outstanding options under the 2010 Plan shall be assumed, or an equivalent option shall be substituted, by such successor corporation or an affiliate thereof or, in case the successor corporation refuses to assume or substitute the option, our Board of Directors or its designated committee may (a) provide the grantee with the opportunity to exercise the option as to all or part of the shares, vested or otherwise, and (b) specify a period of time, no less than seven days, following which all outstanding options shall terminate.

Arcturus Therapeutics Ltd. Incentive Plan

The Company assumed the 2013 Arcturus Therapeutics Inc. Equity Incentive Plan, or the 2013 Plan, in conjunction with the merger. Arcturus options outstanding on the merger date were replaced with the Company's options under the Company's 2010 Incentive Option Plan ("2010 Plan") with the same terms and equivalent value. No future grants will be awarded from the 2013 Plan which has been extinguished. As of March 1, 2018, options to purchase 232,513 Ordinary Shares were issued and outstanding under the 2013 Plan. Of such outstanding options, options to purchase 165,949 Ordinary Shares were vested as of March 1, 2018 with a weighted average exercise price of $2.89 per share.

ITEM 7. MAJOR SHAREHOLDERS AND RELATED PARTY TRANSACTIONS

7.A. Major shareholders

The following table sets forth information with respect to the beneficial ownership of our Ordinary Shares as of March 1, 2018 by:

- each person or entity known by us to own beneficially 5% or more of our outstanding shares;
- each of our directors and executive officers individually; and
- all of our executive officers and directors as a group.

The beneficial ownership of Ordinary Shares is determined in accordance with the rules of the SEC and generally includes any Ordinary Shares over which a person exercises sole or shared voting or investment power, or the right to receive the economic benefit of ownership. For purposes of the table below, we deem shares subject to options or warrants that are currently exercisable or exercisable within 60 days of March 1, 2018, to be outstanding and to be beneficially owned by the person holding the options or warrants for the purposes of computing the percentage ownership of that person, but we do not treat them as outstanding for the purpose of computing the percentage ownership of any other person. The percentage of shares beneficially owned is based on 10,324,435 Ordinary Shares outstanding as of March 1, 2018 (excluding the shares repurchased by the Company as set forth herein). Prior to March 1, 2018, the Company has exercised its right to repurchase 366,274 Ordinary Shares (subject to Israeli court approval, which we are seeking) pursuant to a Common Stock Purchase Agreement, dated March 4, 2013, as amended on September 27, 2017, by and between Mr. Payne and the Company. Mr. Payne contests this repurchase. See Item 8.A. "Consolidated statements and other financial information – Legal Proceedings" for more information.

The following table sets forth information regarding the beneficial ownership by each person or entity known to beneficially own more than 5% of our Ordinary Shares as of March 1, 2018, or a different date, if so provided in the table below or footnotes thereof.

According to our transfer agent, as of March 1, 2018, there were 82 record holders of our Ordinary Shares, one of which (Cede & Co., the nominee of the Depositary Trust Company) is a U.S. holder holding 39% of our outstanding Ordinary Shares. The number of record holders in the United States is not representative of the number of beneficial holders nor is it representative of where such beneficial holders are resident since many of these Ordinary Shares are held by beneficially brokers or other nominees on behalf of their clients. None of our shareholders has different voting rights from other shareholders.

We are not owned or controlled, directly or indirectly, by another corporation or by any foreign government. We are not aware of any arrangement that may, at a subsequent date, result in a change of control of our company.

Except as indicated in footnotes to this table, we believe that the shareholders named in this table have sole voting and investment power with respect to all shares shown to be beneficially owned by them, based on information provided to us by such shareholders. Unless otherwise noted below, each beneficial owner's address is: c/o Arcturus Therapeutics Ltd., 10628 Science Center Drive, Suite 250, San Diego, California, 92121.

	Ordinary Shares Beneficially Owned	
5% or Greater Shareholders	**Number**	**Percentage**
Padmanabh Chivukula (1)	732,548	7.1%
Franklin Resources, Inc., Charles B. Johnson, Rupert H. Johnson, Jr., Franklin Advisers, Inc. (2)	639,642	6.2%
Bradley Sorenson(3)	587,918	5.7%
Directors and Executive Officers		
Joseph E. Payne(4)	1,098,823	10.6%
Craig Willett(5)	866,342	8.4%
Mark R. Herbert (6)	736,515	7.1%
Stuart Collinson(7)	164,887	1.6%
Daniel Geffen(8)	6,966	*
David Shapiro	-	*
All directors and executive officers as a group (6 persons)	2,873,533	27.8%

* Represents beneficial ownership of less than 1% of our outstanding ordinary shares

(1) Consists of 732,548 Ordinary Shares subject to a Voting Trust Agreement, dated as of February 11, 2018, by and among the Company, Padmanabh Chivukula, and Mark Herbert (the "Voting Trust Agreement"). Dr. Chivukula does not hold voting power over such shares, and such shares are subject to certain transfer restrictions pursuant to the Voting Trust Agreement. Mark Herbert is the trustee under the Voting Trust Agreement with sole voting power over the 732,548 Ordinary Shares subject to such Voting Trust Agreement.

(2) Based solely on an Amendment 2 to Schedule 13G filed with the SEC on December 11, 2017, and which reflects holdings as of November 30, 2017. The address of these shareholders is One Franklin Parkway, San Mateo, CA 94403-1906.

(3) Based on a Schedule 13D filed with the SEC on January 19, 2018. Consists of: (i) 577,392 Ordinary Shares, (ii) presently-exercisable options to purchase 4,669 Ordinary Shares and (iii) call options to purchase an aggregate of an additional 5,857 Ordinary Shares.

(4) Based on a Schedule 13D filed with the SEC on February 6, 2018, which reflected ownership of 1,465,097 Ordinary Shares by Mr. Payne, which number has been reduced to 1,098,823 Ordinary Shares following the purchase from Mr. Payne by the Company of 366,274 of those Ordinary Shares (subject to Israeli court approval, which we are seeking), which were unvested and were available for repurchase by the Company pursuant to a Common Stock Purchase Agreement, dated March 4, 2013, as amended on September 27, 2017, by and between Mr. Payne and the Company. Mr. Payne contests this repurchase. See Item 8.A "Consolidated statements and other financial information – Legal Proceedings" for more information.

(5) Based on a Schedule 13D filed with the SEC on February 7, 2018. Consists of (i) 108,282 Ordinary Shares held directly by Mr. Willett, (ii) 280,810 Ordinary Shares held by DUR Holdings, LC, (iii) 294,113 Ordinary Shares held by Phoenician Enterprises, Ltd., and (iv) 183,137 Ordinary Shares held by 6-W Discretionary Trust. Mr. Willett is the president of Elizann, Inc., which is the manager of DUR Holdings, LC, and therefore Mr. Willett may be deemed to have voting and investment power with respect to the securities held by DUR Holdings, LC. Mr. Willett is the general partner of Phoenician Enterprises, Ltd. and therefore may be deemed to have voting and investment power with respect to the securities held by Phoenician Enterprises, Ltd. Mr. Willett is the trustee of 6-W Discretionary Trust and therefore may be deemed to have voting and investment power with respect to the securities held by 6-W Discretionary Trust.

(6) Based on a Schedule 13D filed with the SEC on February 22, 2018, which reflects ownership by Mr. Herbert of sole voting power of 732,548 Ordinary Shares subject to the Voting Trust Agreement and presently-exercisable options to purchase 3,967 Ordinary Shares within 60 days of March 1, 2018. Dr. Chivukula contests Mr. Herbert's authority to vote such shares. See Item 8.A. "Consolidated statements and other financial information – Legal Proceedings" for more information.

(7) Consists of (i) 154,001 Ordinary Shares and (ii) 10,886 Ordinary Shares issuable upon the exercise of an option within 60 days of March 1, 2018.

(8) Consists of Ordinary Shares issuable upon the exercise of an option within 60 days of March 1, 2018.

7.B. Related party transactions

See Item 10.B. “Memorandum and Articles of Association – Approval of Related Party Transactions” for a discussion of the requirements of Israeli law regarding special approvals for transactions involving directors, officers or controlling shareholders.

Providence Agreement

During 2016, we entered into a Research Collaboration and License Agreement with a related party, Providence Therapeutics, Inc. (“Providence”) whose CEO and President is also one of our stockholders, to identify and optimize microRNA modulators and/or mimetics for the treatment of neoplastic diseases. In April 2017, the Providence Agreement was amended to include mRNA for the treatment of neoplastic disease. As part of the agreement, we granted Providence the exclusive rights to research, develop, manufacture and commercialize such products and Providence made an upfront payment of $500,000 which is being amortized over the research term. Each party is responsible for their own research costs under the agreement, and Providence is responsible for all of the development costs through the completion of Phase 2 clinical trials. We are entitled to share in future product revenue of each product provided that we share in the product’s post Phase 2 costs. Separately, Providence has agreed to pay a specified rate for the use of our employees. For the years ended December 31, 2017 and 2016, we have recognized $1.0 million and $0.5 million, respectively, in revenue related to the amortization of the upfront payment and revenue related to the use of our employees and expense reimbursements. As of December 31, 2017, amounts owed from Providence to us totaled to $0.1 million and were not recognized as revenues nor account receivable in our financial statements as it collectability is not reasonably assured. Further, the December 31, 2017 amount outstanding and all future billable costs through the date of this 20-F filing have not been paid and certain amounts are now past due. During 2017, our stock issuance agreement with the President and CEO of Providence was modified to remove the vesting conditions of the original grant and we recognized $1.5 million in related stock compensation expense. As of December 31, 2017 and 2016, the President and CEO of Providence held a 5.7% and 10% ownership interest in our Company. In May 2018, we sent a letter to Providence requesting payment for past due invoices and requesting evidence that Providence had satisfied a funding requirement under the parties’ agreement.

Employment Agreements

We have entered into written employment agreements with each of our executive officers. These agreements provide for notice periods of varying duration for termination of the agreement by us or by the relevant executive officer, during which time the executive officer will continue to receive base salary and benefits. We have also entered into customary non-competition, confidentiality of information and ownership of inventions arrangements with our executive officers. However, the enforceability of the noncompetition provisions may be limited under applicable law.

Options

Since our inception we have granted options to purchase our Ordinary Shares to our officers and certain of our directors. Such option agreements may contain acceleration provisions upon certain merger, acquisition, or change of control transactions. We describe our option plans under Item 6.E. “Share Ownership” above. If the relationship between us and an executive officer or a director is terminated, except for cause (as defined in the various option plan agreements), options that are vested will generally remain exercisable for ninety days after such termination.

Indemnification Agreements and Insurance Coverage

Our amended and restated articles of association permit us to exculpate, indemnify and insure each of our directors and office holders to the fullest extent permitted by the Israeli Companies Law. We have entered into indemnification agreements with each of our directors and other office holders, undertaking to indemnify them to the fullest extent permitted by Israeli law. We have also obtained Directors’ & Officers’ insurance for each of our officers and directors.

Merger Agreement and Lock-Up Agreements

Merger Agreement

As described in the "Introduction" to this annual report, on November 15, 2017, our company, Arcturus Therapeutics Ltd. (formerly known as Alcobra Ltd.), an Israeli company through its wholly-owned subsidiary, Aleph MergerSub, Inc., a Delaware corporation (or Merger Sub), completed the merger with Arcturus Therapeutics, Inc., a Delaware corporation, in accordance with the terms of the merger agreement. Pursuant to the merger agreement, Merger Sub merged with and into Arcturus Therapeutics, Inc., with Arcturus Therapeutics, Inc. surviving as our wholly-owned subsidiary. In connection with, and prior to the completion of, the merger, we effected a 1-for-7 reverse stock split of our Ordinary Shares. The transactions contemplated by the merger agreement (including the merger and the reverse stock split) were approved by our shareholders at the extraordinary general meeting of shareholders held on November 12, 2017.

In connection with the merger, we changed our name to "Arcturus Therapeutics Ltd." and our business became primarily the business conducted by Arcturus Therapeutics, Inc., i.e., that of a preclinical nucleic acid medicines company focused on developing therapeutics for rare, infectious, fibrotic, and respiratory diseases with significant unmet medical needs.

Immediately prior to and in connection with the merger, each outstanding share of Arcturus Therapeutics, Inc.'s capital stock (other than common stock), whether in the form of preferred stock, warrants and convertible notes, was converted into one share of Arcturus Therapeutics, Inc.'s common stock at ratios determined in accordance with Arcturus Therapeutics, Inc.'s certificate of incorporation then in effect. Under the terms of the merger agreement, at the effective time of the merger, we issued Ordinary Shares to Arcturus Therapeutics, Inc.'s stockholders, at an exchange ratio of 0.293 Ordinary Shares per share of Arcturus Therapeutics, Inc.'s common stock outstanding immediately prior to the merger. The exchange ratio was determined through arms-length negotiations between our company and Arcturus Therapeutics, Inc. An aggregate of approximately 6,631,712 Ordinary Shares were issued to the Arcturus Therapeutics, Inc.'s stockholders in the merger. Our company also assumed all of the stock options issued and outstanding under Arcturus Therapeutics, Inc.'s 2013 Equity Incentive Plan with such stock options henceforth representing the right to purchase .293 Ordinary Shares for which they were entitled prior to the merger.

Immediately after the merger, there were approximately 10,568,901 Ordinary Shares outstanding with the former Arcturus Therapeutics, Inc. stockholders, warrantholders and noteholders owning approximately 62.5% of our Ordinary Shares, and our preexisting shareholders' constituting approximately 37.5% of our Ordinary Shares.

The Ordinary Shares of Alcobra Ltd, which had been listed on the Nasdaq Global Market prior to the merger, and were traded, through the close of business on November 15, 2017 under the ticker symbol "ADHD," commenced trading on the Nasdaq Global Market, under the ticker symbol "ARCT" on November 16, 2017. The Ordinary Shares were given a new CUSIP number following the merger: M1492T 105.

Lock-Up Agreements

In connection with the Merger, David Shapiro, Padmanabh Chivukula, Stuart Collinson, Joseph Payne, Craig Willett, Orli Tori and Daniel Geffken (each, a "Shareholder") entered into lock-up agreements. Each Shareholder agreed that the Shareholder will not, subject to the exceptions set forth in the applicable lock-up agreement, for 180 days after November 15, 2017 (i.e., until May 14, 2018), directly or indirectly (a) offer, pledge, sell, contract to sell or otherwise transfer or dispose of any merger shares, or any securities convertible into or exercisable or exchangeable for merger shares, or (b) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the merger shares. The foregoing restrictions are subject to exceptions for transfers: as charitable gifts and donations, to a trust for the direct or indirect benefit of the Shareholder or immediate family member, as testamentary dispositions, to certain affiliates of the Shareholder, by operation of law in connection with qualified domestic order or divorce settlement, not involving a change in beneficial ownership, and if held in trust, from the trust to beneficiaries or their estates. Transferees who acquire merger shares pursuant to any of the foregoing exceptions must agree in writing to be bound by the terms and conditions of the applicable Shareholder's lock-up agreement. Further, a Shareholder may (a) exercise an option to purchase merger shares and transfer such shares to Arcturus to cover tax withholding obligations (but the underlying shares will continue to be subject to the lock-up restrictions and any applicable Exchange Act filing will contain a disclosure explaining the exercise and reason for the sale); (b) establish a 10b5-1 trading plan under the Exchange Act provided such plan does not provide for any transfers of merger shares during the lock-up period; and (c) transfer or dispose of merger shares acquired on the open market following close of the Merger. Any attempted transfers in violation of the lock-up agreements will be of no effect and null and void, regardless of whether the purported transferee has any actual or constructive knowledge of the transfer restrictions in the applicable lock-up agreement, and will not be recorded on the stock transfer books of the Company.

7.C. Interests of experts and counsel

Not applicable.

ITEM 8. FINANCIAL INFORMATION

8.A. Consolidated statements and other financial information

Our financial statements are included in this annual report pursuant to Item 18. As described in Item 3.A. above, since November 15, 2017, the merger has been reflected in our financial statements as a recapitalization whereby Arcturus is the deemed accounting acquirer and Alcobra Ltd. is the deemed accounting acquiree. Our financial statements reflect Arcturus', not Alcobra Ltd.'s, results of operations and financial condition for all periods prior to November 15, 2017.

Legal Proceedings

Israel Litigation

On February 25, 2018, Joseph Payne, a current Director and former CEO of the Company, filed an action in the District Court at Tel Aviv – Yafo against the Company, its board of directors, Dr. Chivukula, and certain officers alleging that the separation agreement the Company entered into with a resigning officer, Dr. Chivukula, was unlawful and void, and seeking a restraining order and temporary remedies against the Company. Later that same day, in response to the plaintiff's ex parte request, the court issued a temporary restraining order, ordering the Company to preserve the status quo until the court could consider the matter further. On March 1, 2018, the Company filed a request for clarification of and partial relief from this order. On March 5, 2018, the court ruled on the Company's request, clarifying its temporary restraining order was limited to the remedies sought in the February 25, 2018 motion. On March 12, 2018, the Company filed an opposition to plaintiff's motion for a restraining order. On March 28, 2018, plaintiff filed a motion seeking to extend the temporary restraining order and asking for various remedies related to a then-scheduled May 7, 2018 Extraordinary General Meeting of the Company's shareholders that the Company noticed on March 11, 2018, including remedies that might affect the agenda of the Extraordinary General Meeting and therefore the language of the proxy, and seeking to restrain certain conduct, including any changes in the Company's share capital, until such Extraordinary General Meeting. The court ordered the Company to file its answer to this motion by April 15, 2018. On April 8, 2018, the Company filed a notice with the court informing it that, inter alia, due to the fact that Mr. Payne chose to delay his submission of the motion to 'expand' the temporary remedies and to question the agenda of the Extraordinary General Meeting – on Friday, April 6, 2018, the Company's Board convened and approved the postponement of the date of the Extraordinary General Meeting, until the court issues a decision on Mr. Payne's motion to "expand" the temporary remedies. Later that day (April 8, 2018), Mr. Payne moved for another temporary restraining order seeking to prevent the board from delaying the Extraordinary General Meeting. The Company responded to the motion to extend the temporary restraining order on April 15, 2018. On May 13, 2018, the court issued its ruling on the motion to expand the temporary remedies. The court set the agenda of the Extraordinary General Meeting, and ordered the Company to convene a Board meeting within seven days, and to summon an Extraordinary General Meeting within 35 days from that date. In addition, the court ruled that the motion regarding changes in the Company's share capital will be decided in a hearing scheduled for May 23, 2018.

On April 18, 2018, the Company sent notice of a board meeting scheduled for April 20, 2018 to approve a private placement transaction. On April 20, 2018, Mr. Payne obtained a temporary restraining order stating that any such approval by the board may be vacated by the court. On April 22, 2018, the Company filed an opposition to the temporary restraining order, on April 25, 2018 the court held an emergency hearing on the temporary restraining order. On April 26, 2018 Mr. Payne and Dr. Chivukula filed a reply to the Company's opposition, and on April 27, 2018 certain other shareholders filed position statements with the court supporting Mr. Payne. On April 27, 2018, the Company filed a notice. On April 29, 2018, the court ruled that the temporary restraining order would stay in place. On May 2, 2018, the Company submitted a motion to amend the protocol of the hearing that took place on April 25, 2018 and to reconsider the decision of April 29, 2018. The Company therefore asked the court to direct that cross- examinations will be held on the hearing scheduled for May 9, 2018, and afterwards the court will reconsider the decision of April 29, 2018. The court ordered Mr. Payne to answer the Company's motions from May 2, 2018 by May 6, 2018. On May 6, 2018, the court ordered the Company to respond to Mr. Payne's answer to the Company's motions from May 2, 2018 to May 8, 2018. Because of the proximity to the day set for hearing, the Company asked the court to schedule another hearing for the cross-examinations. On May 13, 2018, the court denied the Company's motion to amend the protocol of the hearing that took place on April 25, 2018, but granted the Company's motion to reconsider the decision of April 29, 2018 and ordered that cross- examinations will be held on May 23, 2018.

Chivukula Arbitration

On March 21, 2018, the Company filed an arbitration demand before JAMS in San Diego, CA, seeking to arbitrate the validity of the separation agreement and related claims between the Company and Dr. Chivukula. On or about April 10, 2018, Dr. Chivukula filed an objection to the arbitration. On or about April 12, 2018, the Company responded to his objection. On April 20, 2018 JAMS preliminarily rejected the basis for Dr. Chivukula's objection to the arbitration and appointed Mr. Charles H. Dick, Jr. as the arbitrator. No arbitration date has been scheduled.

California State Court Litigation

On March 27, 2018, the Company and Arcturus Therapeutics, Inc. filed an action in the Superior Court of the State of California, San Diego County captioned *Arcturus Therapeutics Ltd.; Arcturus Therapeutics, Inc. v. Joseph E. Payne*, Case No. 37-2018-00015271-CU-BC-CTL alleging that Mr. Payne (1) breached his confidentiality and employment agreements, (2) breached his fiduciary duties to the plaintiffs during his service as President and CEO of the plaintiffs and as a director of the plaintiffs' respective boards of directors, (3) interfered with contractual relations by encouraging Dr. Chivukula, a resigning officer, to breach the consulting agreement entered into by and between Dr. Chivukula and Arcturus Therapeutics, Inc. and the voting trust agreement entered into by and between Dr. Chivukula and the Company, and (4) interfered with prospective business advantage by encouraging Company shareholders to vote against the ratification of the appointment of Ernst & Young LLP in the United States as the Company's independent auditor. The lawsuit seeks injunctive and monetary relief. Discovery requests have been served on Mr. Payne. The deadline for Mr. Payne to respond to the complaint and the discovery requests is May 15, 2018. A civil case management conference has been set for August 31, 2018.

California Federal Court Litigation

On April 19, 2018, the Company filed an action in the United States District Court, Southern District of California captioned *Arcturus Therapeutics, Inc. v. Joseph E. Payne; Peter Farrell; Andrew Sassine; Bradley Sorenson; James Barlow; and Does 1 through 100*, Case No. 18cv766-MMA(NLS) alleging that the Defendants have violated and continue to violate Section 13(d) of the Exchange Act, 15 U.S.C. §78m(d), and Regulation 13D by failing to disclose in Schedule 13D filings the existence of group agreements to buy, sell, or vote shares of the Company and effect a change in the composition of the Company's board of directors. The lawsuit seeks injunctive relief. On April 24, 2018, the Company filed a motion seeking a Temporary Restraining Order, Preliminary Injunction, and Expedited Discovery. On April 25, 2018, the court denied the Company's request for a Temporary Restraining Order but scheduled a hearing for the Company's motion for a Preliminary Injunction and Expedited Discovery for May 21, 2018.

Dividends

We have never declared or paid any cash dividends on our Ordinary Shares and do not anticipate paying any cash dividends in the foreseeable future. Payment of cash dividends, if any, in the future will be at the discretion of our Board of Directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our Board of Directors may deem relevant.

The Israeli Companies Law imposes further restrictions on our ability to declare and pay dividends. See Item 10.B. "Articles of Association – Rights, Preferences and Restrictions of Shares" for additional information.

Payment of dividends may be subject to Israeli and U.S. withholding taxes. See Item 10.E. "Taxation" for additional information.

8.B. Significant changes

There have been no other significant changes from December 31, 2017 until the date of the filing of this annual report.

ITEM 9. THE OFFER AND LISTING

9.A. Offer and listing details

Our Ordinary Shares were listed on the Nasdaq Capital Market from May 22, 2013 to March 28, 2014, and have been listed on the Nasdaq Global Market since March 28, 2014. Prior to May 22, 2013 there was no public trading market for our Ordinary Shares. Our trading symbol on Nasdaq is "ARCT" (since November 16, 2017) and was previously "ADHD" (through the close of business on November 15, 2017). The following table sets forth for the periods indicated the high and low sales prices per Ordinary Share as reported on the Nasdaq Global Market (and for periods prior to March 28, 2014, on the Nasdaq Capital Market), as adjusted for our 1-for-7 reverse stock split effected on November 15, 2017:

Annual Information:	**Low**	**High**
2017	$ 5.81	$ 18.04
2016	$ 12.39	$ 45.50
2015	$ 25.76	$ 66.50
2014	$ 21.84	$ 178.08
2013	$ 45.50	$ 188.72
Quarterly Information:		
First Quarter 2017	$ 5.81	$ 18.04
Second Quarter 2017	$ 7.07	$ 9.31
Third Quarter 2017	$ 6.52	$ 8.75
Fourth Quarter 2017	$ 6.72	$ 15.19
First Quarter 2016	$ 22.06	$ 45.50
Second Quarter 2016	$ 22.05	$ 40.25
Third Quarter 2016	$ 13.65	$ 37.52
Fourth Quarter 2016	$ 12.39	$ 20.30
Monthly Information:		
May 2018 (through May 9, 2018)	$ 4.94	$ 5.97
April 2018	$ 4.90	$ 5.82
March 2018	$ 5.06	$ 6.54
February 2018	$ 4.78	$ 7.69
January 2018	$ 7.55	$ 10.45
December 2017	$ 7.94	$ 9.26
November 2017	$ 8.41	$ 11.48

9.B. Plan of distribution

Not applicable.

9.C. Market for Ordinary Shares

Our Ordinary Shares are listed on the Nasdaq Global Market.

9.D. Selling shareholders

Not applicable.

9.E. Dilution

Not applicable.

9.F. Expenses of the issue

Not applicable.

ITEM 10. ADDITIONAL INFORMATION

10.A. Share capital

Not applicable.

10.B. Memorandum and Articles of Association

Securities Register

We are registered with the Israeli Registrar of Companies. Our registration number is 51-409899-5. Section 1.2 of our amended and restated articles of association provides that we may engage in any type of lawful business.

Authorized Share Capital

On November 12, 2017, our shareholders approved amendments to our articles of association increasing our authorized share capital to NIS 2,100,000, divided into 30,000,000 Ordinary Shares of par value NIS 0.07 per share.

Approval of Related Party Transactions Under Israeli Law

The Israeli Companies Law requires that certain transactions, actions and arrangements be approved as provided for in a company's articles of association and in certain circumstances by the audit committee or the compensation committee, by the board of directors itself and/or by the shareholders. The vote required by the audit committee, compensation committee and the board of directors for approval of such matters, in each case, is a majority of the non-conflicted (referred to under the Israeli Companies Law as "disinterested") directors participating in a duly convened meeting. If, however, a majority of the members participating in any such committee or board meeting have a conflict of interest (a "personal interest," under the Israeli Companies Law) in the approval of such matter, then all directors may participate in the discussions and in the voting on such matter, and in such case the matter shall also be subject to shareholder approval.

Approval of Transactions with Office Holders

The Israeli Companies Law requires that an office holder promptly disclose to the board of directors any personal interest that he or she may have concerning any existing or proposed transaction with the company, as well as any substantial information or document with respect thereof. An interested office holder's disclosure must be made promptly and in any event no later than the first meeting of the board of directors at which the transaction is considered. A personal interest includes an interest of any person in an act or transaction of a company, including a personal interest of one's relative or of a corporate body in which such person or a relative of such person is a 5% or greater shareholder, director or chief executive officer or in which he or she has the right to appoint at least one director or the chief executive officer, but excluding a personal interest stemming from one's ownership of shares in the company. A personal interest furthermore includes the personal interest of a person for whom the office holder holds a voting proxy or the interest of the office holder with respect to his or her vote on behalf of the shareholder for whom he or she holds a proxy even if such shareholder itself has no personal interest in the approval of the matter. An office holder is not, however, obliged to disclose a personal interest if it derives solely from the personal interest of a relative of such office holder in a transaction that is not considered an extraordinary transaction. Under the Israeli Companies Law, an extraordinary transaction is defined as any of the following:

- a transaction other than in the ordinary course of business;
- a transaction that is not on market terms; or
- a transaction that may have a material impact on a company's profitability, assets or liabilities.

If it is determined that an office holder has a personal interest in a transaction, approval by the board of directors is required for the transaction, unless the company's articles of association provide for a different method of approval. Further, so long as an office holder has disclosed his or her personal interest in a transaction, the board of directors may approve an action by the office holder that would otherwise be deemed a breach of duty of loyalty. However, a company may not approve a transaction or action that is adverse to the company's interest or that is not performed by the office holder in good faith. Approval first by the company's audit committee and subsequently by the board of directors is required for an extraordinary transaction in which an office holder has a personal interest.

Arrangements regarding the terms of engagement and compensation of directors generally require the approval of the compensation committee, the board of directors and the shareholders. Arrangements concerning the terms of engagement and compensation of all other office holders generally require the approval of the compensation committee and the board of directors, and, generally, in the case of the engagement and compensation of the chief executive officer, by the shareholders as well pursuant to an ordinary majority that also constitutes a special, disinterested, majority, as described below under "Approval of Transactions with Controlling Shareholders" (and which excludes controlling shareholders from being counted toward that special, disinterested, majority).

Pursuant to the Israeli Companies Law, generally a director who has a personal interest in an extraordinary transaction which is brought for discussion before the board of directors or its committees shall neither vote in nor attend discussions concerning the approval of such transaction. If the director did vote or attend as aforesaid, the approval given to the aforesaid activity or arrangement will generally be invalid.

Approval of Transactions with Controlling Shareholders

Pursuant to Israeli law, the disclosure requirements regarding personal interests that apply to directors and executive officers also apply to a controlling shareholder of a public company. In the context of a transaction involving a controlling shareholder or an officer who is a controlling shareholder of the Company, a controlling shareholder also includes any shareholder who holds 25% or more of the voting rights if no other shareholder holds more than 50% of the voting rights. Two or more shareholders with a personal interest in the approval of the same transaction are deemed to be a single shareholder and may be deemed a controlling shareholder for the purpose of approving such transaction. Extraordinary transactions, including private placement transactions, with a controlling shareholder or in which a controlling shareholder has a personal interest, and engagements with a controlling shareholder or his or her relative, directly or indirectly, including through a corporation in his or her control, require the approval of the audit committee (or, in the case of a compensatory matter, by the compensation committee), the board of directors and the shareholders of the Company, in that order. Such shareholder approval must be by an ordinary majority that also fulfills one of the following, additional requirements (we refer to this below as a special, disinterested majority):

- approval by a majority of the votes of shareholders who have no conflict of interest (referred to under the Israeli Companies Law as a personal interest) in the approval of the proposal and who are present and voting, in person or by proxy, at the meeting; or

- the votes of disinterested shareholders (as described in the previous bullet point) who vote against the proposal may not represent more than two percent (2%) of the outstanding voting rights in the company.

To the extent that any such transaction with a controlling shareholder is for a period extending beyond three years, approval is required once every three years, unless the audit committee determines that the duration of the transaction is reasonable given the circumstances related thereto.

Arrangements regarding the terms of engagement and compensation of a controlling shareholder who is an office holder, and the terms of employment of a controlling shareholder who is an employee of the Company, require the approval of the compensation committee, board of directors and, generally, the shareholders, in that order.

Shareholder Duties

Pursuant to the Companies Law, a shareholder has a duty to act in good faith and in a customary manner toward the company and other shareholders and to refrain from abusing his or her power in the company, including, among other things, in voting at the general meeting of shareholders and at class shareholder meetings with respect to the following matters:

- an amendment to the company's articles of association;

- an increase of the company's authorized share capital;

- a merger; or

- the approval of interested party transactions and acts of office holders that require shareholder approval.

A shareholder also has a general duty to refrain from discriminating against other shareholders.

In addition, certain shareholders have a duty of fairness toward the company. These shareholders include any controlling shareholder, any shareholder who knows that it has the power to determine the outcome of a shareholder vote or a shareholder class vote and any shareholder who has the power to appoint or to prevent the appointment of an office holder of the company or other power towards the company. The Israeli Companies Law does not define the substance of this duty of fairness, except to state that the remedies generally available upon a breach of contract will also apply in the event of a breach of the duty to act with fairness.

Borrowing Powers

Pursuant to the Israeli Companies Law and our amended and restated articles of association, our Board of Directors may exercise all powers and take all actions that are not required under law or under our amended and restated articles of association to be exercised or taken by our shareholders or other corporate bodies, including the power to borrow money for company purposes.

Rights, Preferences and Restrictions of Shares

- General. Our share capital is NIS 2,100,000, divided into 30,000,000 Ordinary Shares, par value NIS 0.07 per share. The Ordinary Shares do not have cumulative voting rights in the election of directors. As a result, the holders of Ordinary Shares that represent more than 50% of the voting power have the power to elect all of the directors.

- Dividend and liquidation rights. Our Board of Directors may declare a dividend to be paid to the holders of our Ordinary Shares according to their rights and interests in our profits and may fix the record date for eligibility and the time for payment. The directors may from time to time pay to the shareholders on account of the next forthcoming dividend such interim dividends as, in their judgment, our position justifies. All dividends unclaimed for one year after having been declared may be invested or otherwise used by the directors for our benefit until claimed. No unpaid dividend or interest shall bear interest as against us. Our Board of Directors may determine that a dividend may be paid, wholly or partially, by the distribution of certain of our assets or by a distribution of paid up shares, debentures or debenture stock or any of our securities or of any other companies or in any one or more of such ways in the manner and to the extent permitted by the Israeli Companies Law.

  Under Israeli law, dividends may only be paid out of our profits and other surplus funds, as defined in the Israeli Companies Law, as of the end of the most recent year or as accrued over a period of the most recent two years, whichever amount is greater, provided that there is no reasonable concern that payment of a dividend will prevent us from satisfying our existing and foreseeable obligations as they become due

- Transfer of shares; record dates. Fully paid up Ordinary Shares may be freely transferred pursuant to our amended and restated articles of association unless such transfer is restricted or prohibited by another instrument or securities laws. Each shareholder who would be entitled to attend and vote at a general meeting of shareholders is entitled to receive notice of any such meeting. For purposes of determining the shareholders entitled to notice and to vote at such meeting, the board of directors will fix a record date.

- Voting; annual general and extraordinary meetings. Subject to any rights or restrictions for the time being attached to any class or classes of shares, each shareholder shall have one vote for each share of which he or she is the holder, whether on a show of hands or on a poll. Our amended and restated articles of association do not permit cumulative voting and it is not mandated by Israeli law. Votes may be given either personally or by proxy. A proxy need not be a shareholder. If any shareholder is without legal capacity, he may vote by means of a trustee or a legal custodian, who may vote either personally or by proxy. If two or more persons are jointly registered as owners of a share, the vote of the senior person who tenders a vote, whether in person or by proxy, shall be accepted to the exclusion of the vote(s) of the other registered holder(s) of the share and, for this purpose seniority shall be determined by the order in which the names stand in the shareholder register.

- Quorum for general meetings. The quorum required for our general meetings of shareholders consists of at least two shareholders present in person, by proxy or written ballot who hold or represent between them at least one-third of the total outstanding voting rights. A meeting adjourned for lack of a quorum is generally adjourned to the same day in the following week at the same time and place or to a later time/date if so specified in the notice of the meeting. At the reconvened meeting, any two or more shareholders present in person or by proxy shall constitute a lawful quorum.

- Notice of general meetings. Under the Israeli Companies Law, in certain cases at least 21 days', and for other agenda items at least 35 days', notice of any general meeting, specifying the place, the day and the hour of the meeting and, in the case of special business, the nature of such business, shall be given in the manner hereinafter mentioned, to such shareholders as are under the provisions of our amended and restated articles of association, entitled to receive notices from us. Only shareholders of record as reflected on our share register at the close of business on the date fixed by the board of directors as the record date determining the shareholders who will be entitled to vote, shall be entitled to vote, in person or by proxy, at a general meeting and any postponement or adjournment thereof.

- Annual meeting; agenda; extraordinary meeting. Annual general meetings are held at least once in every calendar year at such time (within a period of 15 months after the holding of the last preceding General Meeting), and at such time and place as may be determined by the Board of Directors. At a general meeting, decisions shall be adopted only on matters that were specified on the agenda. Our Board of Directors is obligated to call an extraordinary general meeting of the shareholders upon a written request in accordance with the Israeli Companies Law. The Israeli Companies Law provides that an extraordinary general meeting of shareholders shall be called based on (i) a decision of the board of directors, (ii) a request by two directors or 25% of the directors in office, or (iii) a request by shareholders holding at least 5% of the issued share capital of the company and at least 1% of the voting rights, or of shareholders holding at least 5% of the voting rights of the company.

- Majority vote. Except as otherwise provided in our amended and restated articles of association or for matters requiring a special majority under the Israeli Companies Law, any resolution at a general meeting shall be deemed adopted if approved by the holders of a majority of our voting rights represented at the meeting in person or by proxy and voting thereon. In the case of an equality of votes, the chairman of the meeting shall not be entitled to a further vote.

- Discrimination against shareholders. According to our amended and restated articles of association, there are no discriminating provisions against any existing or prospective holders of our shares as a result of a shareholder holding a substantial number of shares.

Modification of Class Rights

If, at any time, the share capital is divided into different classes of shares, the rights attached to any class (unless otherwise provided by the terms of issuance of the shares of that class) may be varied with the consent in writing of the holders of all the issued shares of that class, or with the sanction of a majority vote at a meeting of the shareholders passed at a separate meeting of the holders of the shares of the class. The provisions of our amended and restated articles of association relating to general meetings shall apply, mutatis mutandis, to every such separate general meeting. Any holder of shares of the class present in person or by proxy may demand a secret poll.

Unless otherwise provided by the conditions of issuance, the enlargement of an existing class of shares, or the issuance of additional shares thereof, shall not be deemed to modify or abrogate the rights attached to the previously issued shares of such class or of any other class. These conditions provide for the minimum shareholder approvals permitted by the Israeli Companies Law.

Restrictions on Shareholders Rights to Own Securities

Our amended and restated articles of association and the laws of the State of Israel do not restrict in any way the ownership or voting or our shares by non-residents of Israel, except with respect to subjects of countries that are in a state of war with Israel.

Acquisitions under Israeli Law

Full tender offer

A person wishing to acquire shares of an Israeli public company and who would as a result hold over 90% of the target company's issued and outstanding share capital or of a class of shares is required by the Israeli Companies Law to make a tender offer to all of the company's shareholders for the purchase of all of the issued and outstanding shares of the company or of the class (as applicable).

If the shareholders who do not respond to or accept the offer hold less than 5% of the issued and outstanding share capital of the company or of the applicable class of the shares, and more than half of the shareholders who do not have a personal interest in the offer accept the offer, all of the shares that the acquirer offered to purchase will be transferred to the acquirer by operation of law. However, a tender offer will be accepted if the shareholders who do not accept it hold less than 2% of the issued and outstanding share capital of the company or of the applicable class of the shares (regardless of the percentage of shareholders who do not have a personal interest in the offer accept the offer).

Upon a successful completion of such a full tender offer, any shareholder that was an offeree in such tender offer, whether such shareholder accepted the tender offer or not, may, within six months from the date of acceptance of the tender offer, petition the Israeli court to determine whether the tender offer was for less than fair value and that the fair value should be paid as determined by the court. However, under certain conditions, the offeror may stipulate in the terms of the tender offer that an offeree who accepted the offer will not be entitled to petition the Israeli court as described above.

If the shareholders who did not respond or accept the tender offer hold at least 5% of the issued and outstanding share capital of the company or of the applicable class, the acquirer may not acquire from shareholders who accepted the tender offer shares of the company that will increase its holdings to more than 90% of the company's issued and outstanding share capital or of the applicable.

Special tender offer

The Israeli Companies Law provides that an acquisition of shares of an Israeli public company must be made by means of a special tender offer if as a result of the acquisition the purchaser would become a holder of at least 25%, or more than 45%, of the voting rights in the company. This rule does not apply if there is already another holder of at least 25% or more than 45% (as applicable) of the voting rights in the company.

These requirements do not apply if the acquisition (i) occurs in the context of a private offering, on the condition that the shareholders meeting approved the acquisition as a private offering whose purpose is to give the acquirer at least 25% , or more than 45%, of the voting rights in the company if there is no person who holds at least 25%, or more than 45%, of the voting rights in the company, as applicable; or (ii) was from a shareholder holding at least 25%, or more than 45%, of the voting rights in the company and resulted in the acquirer becoming a holder of at least 25%, or more than 45%, of the voting rights in the company.

The special tender offer may be consummated only if (i) at least 5% of the voting power attached to the company's outstanding shares will be acquired by the offeror and (ii) the special tender offer is accepted by a majority of the votes of those offerees who gave notice of their position in respect of the offer. In counting the votes of offerees, the votes of a holder of control in the offeror, a person who has personal interest in acceptance of the special tender offer, a holder of at least 25% of the voting rights in the company, or any person acting on their or on the offeror's behalf, including their relatives or companies under their control, are not taken into account.

In the event that a special tender offer is accepted, then the purchaser or any person or entity controlling it and any corporation controlled by them shall refrain from making a subsequent tender offer for the purchase of shares of the target company and may not execute a merger with the target company for a period of one year from the date of the offer, unless the purchaser or such person or entity undertook to effect such an offer or merger in the initial special tender offer.

Merger

The Israeli Companies Law permits merger transactions if approved by each party's board of directors and, unless certain requirements described under the Israeli Companies Law are met, a majority of each party's shareholders, by a majority of each party's shares that are voted on the proposed merger at a shareholders' meeting.

The board of directors of a merging company is required pursuant to the Israeli Companies Law to discuss and determine whether in its opinion there exists a reasonable concern that as a result of a proposed merger, the surviving company will not be able to satisfy its obligations towards its creditors, taking into account the financial condition of the merging companies. If the board of directors has determined that such a concern exists, it may not approve a proposed merger. Following the approval of the board of directors of each of the merging companies, the boards of directors must jointly prepare a merger proposal for submission to the Israeli Registrar of Companies.

For purposes of the shareholder vote, unless a court rules otherwise, the merger will not be deemed approved if a majority of the shares voting at the shareholders meeting (excluding abstentions) that are held by parties other than the other party to the merger, any person who holds 25% or more of the means of control of the other party to the merger or any one on their behalf (including their relatives or corporations controlled by any of them), vote against the merger.

If the transaction would have been approved but for the separate approval of each class of shares or the exclusion of the votes of certain shareholders as provided above, a court may still rule that the company has approved the merger upon the request of holders of at least 25% of the voting rights of a company, if the court holds that the merger is fair and reasonable, taking into account the appraisal of the merging companies' value and the consideration offered to the shareholders.

Under the Israeli Companies Law, each merging company must send a copy of the proposed merger plan to its secured creditors. Unsecured creditors are entitled to receive notice of the merger, as provided by the regulations promulgated under the Israeli Companies Law. Upon the request of a creditor of either party to the proposed merger, the court may delay or prevent the merger if it concludes that there exists a reasonable concern that, as a result of the merger, the surviving company will be unable to satisfy the obligations of the target company. The court may also give instructions in order to secure the rights of creditors.

In addition, a merger may not be completed unless at least 50 days have passed from the date that a proposal for approval of the merger was filed with the Israeli Registrar of Companies and 30 days from the date that shareholder approval of both merging companies was obtained.

Potential Issues that Could Delay a Merger

Certain provisions of Israeli corporate and tax law may have the effect of delaying, preventing or making more difficult any merger or acquisition of us. Any merger or acquisition of us may require the prior consent of the Israel Innovation Authority (formerly known as the Office of the Chief Scientist), as well as the Investment Center See Item 3.D. “Risk Factors – Risks Related to Israeli Law and Our Operations in Israel.”

Requirement of Disclosure of Shareholder Ownership

There are no provisions of our amended and restated articles of association governing the ownership threshold above which shareholder ownership must be disclosed. We are subject, however, to U.S. securities rules that require beneficial owners of more than 5% of our Ordinary Shares to make certain filings with the SEC.

Changes in Capital

Our amended and restated articles of association do not impose any conditions governing changes in capital that are more stringent than required by the Israeli Companies Law.

10.C. Material contracts

We have not entered into any material contracts other than in the ordinary course of business and other than those described in Item 4 “Information on the Company,” Item 5 “Operating and Financial Review and Prospects” or elsewhere in this annual report.

10.D. Exchange controls

There are currently no Israeli currency control restrictions on payments of dividends or other distributions with respect to our Ordinary Shares or the proceeds from the sale of shares, except for the obligation of Israeli residents to file reports with the Bank of Israel regarding certain transactions. However, legislation remains in effect pursuant to which currency controls can be imposed by administrative action at any time.

Non-residents of Israel who purchase our securities with non-Israeli currency will be able to repatriate dividends (if any), liquidation distributions and the proceeds of any sale of such securities, into non-Israeli currencies at the rate of exchange prevailing at the time of repatriation, provided that any applicable Israeli taxes have been paid (or withheld) on such amounts.

Neither our amended and restated articles of association nor the laws of the State of Israel restrict in any way the ownership or voting of Ordinary Shares by non-residents of Israel, except with respect to citizens of countries that are in a state of war with Israel.

10.E. Taxation

The following is a summary of the current tax structure, which is applicable to companies in Israel, with special reference to its effect on us. The following also contains a discussion of material Israeli and U.S. tax consequences to persons purchasing our Ordinary Shares and government programs from which we and some of our group companies benefit. To the extent that the discussion is based on new tax legislation, which has yet to be subject to judicial or administrative interpretation, there can be no assurance that the views expressed in the discussion will accord with any such interpretation in the future. The discussion is not intended and should not be construed as legal or professional tax advice and is not exhaustive of all possible tax considerations. An Israeli company that is subject to Israeli taxes on the income of its non-Israeli subsidiaries should receive a credit for income taxes paid/withheld or that will be paid/withheld by the subsidiary in its country of residence, according to the terms and conditions determined in the Israeli Tax Ordinance.

The following summary is included herein as general information only and is not intended as a substitute for careful tax planning. Accordingly, each investor should consult his or her own tax advisor as to the particular tax consequences to such investor of the purchase, ownership or sale of an ordinary share, including the effect of applicable state, local, foreign or other tax laws and possible changes in tax laws.

Israeli Taxation Considerations

The following is a summary of the material Israeli income tax laws applicable to us. This section also contains a discussion of material Israeli income tax consequences concerning the ownership and disposition of our Ordinary Shares. This summary does not discuss all the aspects of Israeli income tax law that may be relevant to a particular investor in light of his or her personal investment circumstances or to some types of investors subject to special treatment under Israeli law. Examples of this kind of investor include residents of Israel or traders in securities who are subject to special tax regimes not covered in this discussion. To the extent that the discussion is based on new tax legislation that has not yet been subject to judicial or administrative interpretation, we cannot assure you that the appropriate tax authorities or the courts will accept the views expressed in this discussion. This summary is based on laws and regulations in effect as of the date of this annual report and does not take into account possible future amendments which may be under consideration.

General corporate tax structure in Israel

As of January 1, 2018, Israeli resident companies, such as us, are generally subject to corporate tax at the rate of 23% on their taxable income. For the years ended December 31, 2017 and 2016, the corporate tax rate was 24% and 25%, respectively.

Capital gains derived by an Israeli resident company are generally subject to tax at the same rate as the corporate tax rate. Under Israeli tax legislation, a corporation will be considered as an "Israeli Resident" if it meets one of the following: (a) it was incorporated in Israel; or (b) its business is managed and controlled from Israel.

Taxation of our Israeli shareholders on receipt of dividends

Israeli residents who are individuals are generally subject to Israeli income tax for dividends paid on our Ordinary Shares (other than bonus shares or share dividends) at a rate of 25%, or 30% if the recipient of such dividend is a "substantial shareholder" (as defined below) at the time of distribution or at any time during the preceding 12-month period.

A "substantial shareholder" is generally a person who alone, or together with his relative or another person who collaborates with him on a regular basis, holds, directly or indirectly, at least 10% of any of the "means of control" of the corporation. "Means of control" generally include the right to vote in a general meeting of shareholders, receive profits, nominate a director or an officer, receive assets upon liquidation, or instruct someone who holds any of the aforesaid rights regarding the manner in which he or she is to exercise such right(s), and whether by virtue of shares, rights to shares or other rights, or in any other manner, including by means of voting or trusteeship agreements.

The term "Israeli Resident" for individuals is generally defined under the Israeli Income Tax Ordinance [New Version], 1961, or the Israeli Tax Ordinance, as an individual whose center of life is in Israel. According to the Israeli Tax Ordinance, in order to determine the center of life of an individual, account will be taken of the individual's family, economic and social connections, including: (a) the place of the individual's permanent home; (b) the place of residence of the individual and his family; (c) the place of the individual's regular or permanent place of business or the place of his permanent employment; (d) place of the individual's active and substantial economic interests; (e) place of the individual's activities in organizations, associations and other institutions. The center of life of an individual will be presumed to be in Israel if: (a) the individual was present in Israel for 183 days or more in the tax year; or (b) the individual was present in Israel for 30 days or more in the tax year, and the total period of the individual's presence in Israel in that tax year and the two previous tax years is 425 days or more. The presumption in this paragraph may be rebutted either by the individual or by the assessing officer.

Israeli resident corporations are generally exempt from Israeli corporate income tax with respect to dividends paid on our Ordinary Shares so long as the profits out of which the dividends were paid, were derived in Israel.

Capital Gains Taxes Applicable to Israeli Resident Shareholders

The income tax rate applicable to Real Capital Gain derived by an Israeli individual from the sale of shares which had been purchased after January 1, 2012, whether listed on a stock exchange or not, is 25%. However, if such shareholder is considered a "substantial shareholder" (as defined above) at the time of sale or at any time during the preceding 12-month period and/or claims a deduction for interest and linkage differences expenses in connection with the purchase and holding of such shares, such gain will be taxed at the rate of 30%.

Moreover, capital gains derived by an individual shareholder who is a dealer or trader in securities, or to whom such income is otherwise taxable as ordinary business income, are taxed in Israel at his/her marginal ordinary income tax rates (up to 50% in 2017, including excess tax as detailed below).

Israeli resident corporations are generally subject to regular corporate tax rate (24% in 2017 and 23% as of 2018) with respect to capital gains generated from the sale of our Ordinary Shares.

Taxation of Non-Israeli Shareholders on Receipt of Dividends

Non-Israeli residents are generally subject to Israeli income tax on the receipt of dividends paid on our Shares at the rate of 25% (or 30% for individuals, if such individual is a "substantial shareholder" at the time receiving the dividend or on any date in the 12 months preceding such date), unless a tax certificate is obtained in advance from the Israeli Tax Authority authorizing withholding-exempt remittances or a reduced rate of tax pursuant to an applicable tax treaty between Israel and the shareholder's country of residence.

A non-Israeli resident who receives dividends from which tax was fully withheld is generally exempt from the duty to file tax returns in Israel in respect of such income; provided that (i) such income was not derived from a business conducted in Israel by the taxpayer, (ii) the taxpayer has no other taxable sources of income in Israel with respect to which a tax return is required to be filed and (iii) the taxpayer is not obliged to pay excess tax (as further explained below).

For example, under the Convention Between the Government of the United States of America and the Government of Israel with Respect to Taxes on Income, as amended (the "U.S.-Israel Tax Treaty"), Israeli withholding tax on dividends paid to a U.S. resident for treaty purposes may not, in general, exceed 25%, subject to certain conditions. Where the recipient is a U.S. corporation owning 10% or more of the outstanding shares of the voting stock of the paying corporation during the part of the paying corporation's taxable year which precedes the date of payment of the dividend and during the whole of its prior taxable year (if any) and not more than 25% of the gross income of the paying corporation for such prior taxable year (if any) consists certain interest or dividends, the Israeli tax withheld may not exceed 12.5%, subject to certain conditions.

Payers of dividends on our Ordinary Shares, including the Israeli stockbroker effectuating the transaction, or the financial institution through which the securities are held, are generally required, subject to any of the foregoing exemptions, reduced tax rates and the demonstration of a shareholder regarding his, her or its foreign residency, to withhold tax upon the distribution of dividend at the rate of 25% (whether the recipient is a substantial shareholder or not), so long as the shares are registered with a nominee company.

Capital gains income taxes applicable to non-Israeli shareholders.

Non-Israeli resident shareholders are generally exempt from Israeli capital gains tax on any gains derived from the sale, exchange or disposition of our Ordinary Shares, provided that such shareholders did not acquire their shares prior to January 1, 2009 or acquired their shares after the Company was listed for trading on a stock exchange and such gains were not derived from a permanent establishment or business activity of such shareholders in Israel. However, non-Israeli corporations' shareholders will not be entitled to the foregoing exemptions if an Israeli resident (i) has a controlling interest of more than 25% in such non-Israeli corporation or (ii) is the beneficiary of or is entitled to 25% or more of the revenues or profits of such non-Israeli corporation, whether directly or indirectly.

In addition, a sale of securities by a non-Israeli resident may be exempt from Israeli capital gains tax under the provisions of an applicable tax treaty. For example, under the U.S.-Israel Tax Treaty, the sale, exchange or disposition of our Ordinary Shares by a shareholder who is a U.S. resident (for purposes of the U.S.-Israel Tax Treaty) holding the Ordinary Shares as a capital asset and is entitled to claim the benefits afforded to such a resident by the U.S.-Israel Tax Treaty (such shareholder is referred to herein as a Treaty U.S. Resident), is generally exempt from Israeli capital gains tax unless: (i) such Treaty U.S. Resident is an individual and was present in Israel for 183 days or more in the aggregate during the relevant taxable year; (ii) such Treaty U.S. Resident holds, directly or indirectly, shares representing 10% or more of our voting power of the Company during any part of the 12 month period preceding such sale, exchange or disposition, subject to certain conditions; (iii) the capital gains arising from such sale, exchange or disposition are attributable to a permanent establishment of the Treaty U.S. Resident located maintained in Israel, subject to certain conditions; (iv) the capital gains arising from such sale, exchange or disposition is attributed to real estate located in Israel; or (v) the capital gains arising from such sale, exchange or disposition is attributed to royalties. In any such case, the sale, exchange or disposition of our Ordinary Shares would be subject to Israeli tax, to the extent applicable. However, under the U.S.-Israel Tax Treaty, such Treaty U.S. Resident would be permitted to claim a credit for such taxes against U.S. federal income tax imposed on any gain from such sale, exchange or disposition, under the circumstances and subject to the limitations specified in the U.S.-Israel Income Tax Treaty.

Regardless of whether shareholders may be liable for Israeli income tax on the sale of our Ordinary Shares, the payment of the consideration may be subject to withholding of Israeli tax at the source. Accordingly, shareholders may be required to demonstrate that they are exempt from tax on their capital gains in order to avoid withholding at source at the time of sale. Specifically, in transactions involving a sale of all of the shares of an Israeli resident company, in the form of a merger or otherwise, the Israel Tax Authority may require from shareholders who are not liable for Israeli tax to sign declarations in forms specified by this authority or obtain a specific exemption from the Israel Tax Authority to confirm their status as non-Israeli resident, and, in the absence of such declarations or exemptions, may require the purchaser of the shares to withhold taxes at source.

Excess Tax

Individuals who are subject to tax in Israel are also subject to an additional income tax at a rate of 2% (increased to 3% beginning in 2017 and thereafter) on annual taxable income or gain exceeding a certain threshold (NIS 803,520 for 2016 and NIS 640,000 for 2017 and thereafter, which amount is linked to the annual change in the Israeli consumer price index), including, but not limited to, dividends, interest and capital gain.

Estate and gift tax

Currently, Israeli law does not impose estate or gift taxes.

Material United States Federal Income Tax Considerations

The following discussion is a summary of U.S. federal income tax considerations of the purchase, ownership and disposition of our Ordinary Shares. This discussion applies only to holders that hold our Ordinary Shares as capital assets (generally, property held for investment) for U.S. federal income tax purposes. This discussion is based on current provisions of the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, and current administrative rulings and judicial decisions, all as in effect as of the date of this Annual Report on Form 20-F, and all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any change could alter the tax consequences to our shareholders described in this Annual Report on Form 20-F. There can be no assurance that the IRS will not challenge one or more of the tax consequences described in this Annual Report on Form 20-F.

U.S. Federal Income Taxation

This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular shareholder in light of that shareholder's individual circumstances nor does it address any aspects of U.S. state, local or non-U.S. taxes, the alternative minimum tax, the estate or gift taxes, or the Medicare tax on net investment income. This discussion also does not consider any specific facts or circumstances that may apply to a shareholder and does not address the special tax rules applicable to particular shareholders, such as:

- financial institutions;
- brokers or dealers in securities;
- tax-exempt organizations;
- pension plans;
- owners that hold our Ordinary Shares as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- traders in securities that have elected the mark-to-market method of accounting for their securities holdings;
- insurance companies;
- controlled foreign corporations;
- passive foreign investment companies;
- persons that have a functional currency other than the U.S. dollar;
- persons who have acquired our Ordinary Shares pursuant to the exercise of an option or otherwise in a compensatory transaction;
- persons that own, or are deemed to own, more than five percent of our Ordinary Shares (except to the extent specifically set forth below);
- accrual-method taxpayers subject to special tax accounting rules under Section 451(b) of the Code;

- non-U.S. governments; and
- certain U.S. expatriates.

This discussion does not address the tax treatment of partnerships or other entities that are pass-through (or disregarded) entities for U.S. federal income tax purposes or persons who hold their Ordinary Shares through partnerships or such other pass-through or disregarded entities. The tax treatment of a partner in an entity or arrangement that is treated as a partnership for U.S. federal income tax purposes generally will depend upon the status of the partner and the activities of the partnership. A partner in a partnership or other pass-through entity that will hold our Ordinary Shares should consult his, her or its own tax advisor regarding the tax consequences of acquiring, holding and disposing of our Ordinary Shares through a partnership or other pass-through entity, as applicable.

For purposes of this discussion, the term "Non-U.S. Holder" means an applicable beneficial owner of our Ordinary Shares that is not a U.S. Holder. As used in this discussion, the term "U.S. Holder" means:

- an individual who is a citizen or resident of the United States;
- a corporation, or other entity treated as a corporation for U.S. federal income tax purposes, created or organized in or under the laws of the United States or of any state thereof or the District of Columbia;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust if (1) a U.S. court is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have authority to control all substantial decisions of the trust or (2) the trust has a valid election in effect under applicable U.S. Treasury Regulations to be treated as a U.S. person.

THIS DISCUSSION IS FOR GENERAL INFORMATION ONLY AND IS NOT, AND IS NOT INTENDED TO BE, LEGAL OR TAX ADVICE. SHAREHOLDERS SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE U.S. FEDERAL, STATE, LOCAL AND NON-U.S. INCOME AND OTHER TAX CONSIDERATIONS OF ACQUIRING, HOLDING AND DISPOSING OF OUR ORDINARY SHARES. IN ADDITION, SIGNIFICANT CHANGES IN U.S. FEDERAL INCOME TAX LAWS WERE RECENTLY ENACTED. SHAREHOLDERS SHOULD ALSO CONSULT WITH THEIR TAX ADVISORS WITH RESPECT TO SUCH CHANGES IN U.S. TAX LAW AS WELL AS POTENTIAL CONFORMING CHANGES IN STATE TAX LAWS.

Treatment of the Company as a U.S. Corporation for U.S. Federal Income Tax Purposes

We believe that we are treated as a U.S. domestic corporation for U.S. federal income tax purposes under Section 7874 of the Code and therefore we are subject to U.S. federal income tax. We have not sought or obtained an opinion of legal counsel or a ruling from the U.S. Internal Revenue Service, which we refer to as the IRS, regarding our treatment as a U.S. domestic corporation. Accordingly, there can be no assurance that the IRS will not challenge our treatment as a U.S. domestic corporation or that the U.S. courts will uphold our status as a U.S. domestic corporation in the event of an IRS challenge. This summary assumes that we will be treated as a U.S. domestic corporation for U.S. federal income tax purposes.

U.S. Holders

Distributions on Our Ordinary Shares to U.S. Holders

As discussed under "Dividends" in Item 8.A. above, we do not expect to make cash dividends to holders of our Ordinary Shares in the foreseeable future. Distributions, if any, on our Ordinary Shares generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the U.S. Holder's investment, up to such shareholder's tax basis in the Ordinary Shares. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "Sale, Exchange or Other Taxable Disposition of Our Ordinary Shares by U.S. Holders." Subject to applicable limitations and requirements, dividends received on our Ordinary Shares generally should be eligible for the "dividends received deduction" available to corporate shareholders. Dividends paid by us to a non-corporate U.S. Holder generally will be eligible for taxation at preferential rates if certain holding period requirements are met.

Any dividends paid by us to U.S. Holders are expected to be treated as U.S.-source for U.S. federal income tax purposes. As described in Item 10.E. “Taxation—Israeli Taxation Considerations,” dividends paid with respect to our Ordinary Shares might be subject to Israeli withholding taxes. For U.S. federal income tax purposes, the amount of a dividend would include any amounts withheld by us in respect of Israeli taxes. U.S. Holders should consult their tax advisers as to whether the rate of any such Israeli taxes may be reduced under the provisions of the U.S.-Israeli income tax treaty and the creditability of such Israeli taxes in their particular circumstances.

The US dollar value of any distribution made by us in foreign currency will be calculated by reference to the exchange rate in effect on the date of the U.S. Holder’s actual or constructive receipt of such distribution, regardless of whether the foreign currency is in fact converted into U.S. dollars. If the foreign currency is converted into U.S. dollars on such date of receipt, the U.S. Holder generally will not recognize foreign currency gain or loss on such conversion. If the foreign currency is not converted into U.S. dollars on the date of receipt, such U.S. Holder will have a basis in the foreign currency equal to its U.S. dollar value on the date of receipt. Any gain or loss on a subsequent conversion or other taxable disposition of the foreign currency generally will be U.S.-source ordinary income or loss to such U.S. Holder.

Sale, Exchange or Other Taxable Disposition of Our Ordinary Shares by U.S. Holders

A U.S. Holder will recognize gain or loss for U.S. federal income tax purposes upon a sale or other taxable disposition of our Ordinary Shares in an amount equal to the difference between the amount realized from such sale or disposition and the U.S. Holder's adjusted tax basis in such Ordinary Shares. A U.S. Holder's adjusted tax basis in our Ordinary Shares generally will be the U.S. Holder's cost for such Ordinary Shares. Any such gain or loss generally will be U.S.-source capital gain or loss and will be long-term capital gain or loss if, on the date of sale or disposition, such U.S. Holder held such Ordinary Shares for more than one year. Long-term capital gains derived by non-corporate U.S. Holders are eligible for taxation at reduced rates. The deductibility of capital losses is subject to significant limitations.

Information Reporting and Backup Withholding for U.S. Holders

We must report annually to the IRS and to each U.S. Holder the gross amount of the distributions on our Ordinary Shares paid to such holder and the tax withheld, if any, with respect to such distributions. Payments of dividends on or proceeds arising from the sale or other taxable disposition of our Ordinary Shares by U.S. Holders generally will be subject to information reporting and backup withholding if a U.S. Holder (i) fails to furnish such U.S. Holder's correct U.S. taxpayer identification number (generally on IRS Form W-9), (ii) furnishes an incorrect U.S. taxpayer identification number, (iii) is notified by the IRS that such U.S. Holder has previously failed to properly report items subject to backup withholding, or (iv) fails to certify under penalty of perjury that such U.S. Holder has furnished its correct U.S. taxpayer identification number and that the IRS has not notified such U.S. Holder that it is subject to backup withholding. Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules generally will be allowed as a credit against a U.S. Holder’s U.S. federal income tax liability or will be refunded, if the U.S. Holder furnishes the required information to the IRS in a timely manner.

Non-U.S. Holders

Distributions on Our Ordinary Shares to Non-U.S. Holders

As discussed under “*Dividends*” in Item 8.A. above, we do not expect to make cash dividends to holders of our Ordinary Shares in the foreseeable future. Distributions, if any, on our Ordinary Shares generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the Non-U.S. Holder’s investment, up to such shareholder’s tax basis in the Ordinary Shares. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading “*Sale, Exchange or Other Taxable Disposition of Our Ordinary Shares by Non-U.S. Holders*.” Any such distributions will also be subject to the discussion below under the headings “*Information Reporting and Backup Withholding for Non-U.S. Holders*” and “*FATCA for Non-U.S. Holders*.”

Dividends paid to a Non-U.S. Holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder’s country of residence.

Dividends that are treated as effectively connected with a trade or business conducted by a Non-U.S. Holder within the United States, and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the Non-U.S. Holder within the United States, are generally exempt from the 30% withholding tax if the Non-U.S. Holder satisfies applicable certification and disclosure requirements (generally including provision of a valid IRS Form W-8ECI (or applicable successor form) certifying that the dividends are effectively connected with the Non-U.S. Holder’s conduct of a trade or business within the United

States). However, such U.S. effectively connected income, net of specified deductions and credits, is taxed in the hands of the Non-U.S. Holder at the same corporate or graduated individual U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a Non-U.S. Holder that is classified as a corporation for U.S. federal income tax purposes may also be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

A Non-U.S. Holder of our Ordinary Shares who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) and satisfy applicable certification and other requirements. Non-U.S. Holders are urged to consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty and the specific methods available to them to satisfy these requirements.

A Non-U.S. Holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS.

Sale, Exchange or Other Taxable Disposition of Our Ordinary Shares by Non-U.S. Holders

Subject to the discussion below under the headings "*Information Reporting and Backup Withholding for Non-U.S. Holders*" and "*FATCA for Non-U.S. Holders*," a Non-U.S. Holder generally will not be subject to U.S. federal income tax or withholding tax on any gain realized upon such Non-U.S. Holder's sale, exchange or other taxable disposition of our Ordinary Shares unless:

- the gain is effectively connected with the Non-U.S. Holder's conduct of a U.S. trade or business and, if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the Non-U.S. Holder in the United States, in which case the Non-U.S. Holder generally will be taxed on a net income basis at the corporate or graduated individual U.S. federal income tax rates applicable to United States persons (as defined in the Code) and, if the Non-U.S. Holder is a foreign corporation, the branch profits tax described above in "*Distributions on Our Ordinary Shares to Non-U.S. Holders*" also may apply;

- the Non-U.S. Holder is a non-resident alien individual present in the United States for a period or periods aggregating 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the Non-U.S. Holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence) on the net gain derived from the disposition, which may be offset by certain U.S.-source capital losses of the non- U.S. Holder recognized in the taxable year of the disposition, if any; or

- we are, or have been, at any time during the five-year period preceding such disposition (or the Non-U.S. Holder's holding period, if shorter) a "U.S. real property holding corporation" unless our Ordinary Shares are regularly traded on an established securities market and the Non-U.S. Holder holds no more than 5% of our outstanding Ordinary Shares, directly or indirectly, at any time during the shorter of the five-year period ending on the date of the disposition or the period that the Non-U.S. Holder held our Ordinary Shares. Generally, a corporation is a "U.S. real property holding corporation" if the fair market value of its "U.S. real property interests" (as defined in the Code and applicable Treasury Regulations) equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we believe that we are not currently, and we do not anticipate becoming, a "U.S. real property holding corporation" for U.S. federal income tax purposes. If we are a U.S. real property holding corporation and either our Ordinary Shares are not regularly traded on an established securities market or a Non-U.S. Holder holds more than 5% of our outstanding Ordinary Shares, directly or indirectly, during the applicable testing period, such Non-U.S. Holder's gain on the disposition of our Ordinary Shares generally will be taxed in the same manner as gain that is effectively connected with the conduct of a U.S. trade or business, except that the branch profits tax generally will not apply. If we are a U.S. real property holding corporation and our Ordinary Shares are not regularly traded on an established securities market, a Non-U.S. Holder's proceeds received on the disposition of Ordinary Shares will also generally be subject to withholding at a rate of 15%. Non-U.S. Holders are encouraged to consult their own tax advisors regarding the possible consequences to them if we are, or were to become, a U.S. real property holding corporation.

Information Reporting and Backup Withholding for Non-U.S. Holders

We must report annually to the IRS and to each Non-U.S. Holder the gross amount of the distributions on our Ordinary Shares paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. Holders generally will have to comply with specific certification procedures to establish that the holder is not a United States person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our Ordinary Shares. Generally, a Non-U.S. Holder will comply

with such procedures if it provides a properly executed IRS Form W-8BEN or W-8BEN-E (or other applicable Form W-8), or otherwise meets the documentary evidence requirements for establishing that it is a Non-U.S. Holder, or otherwise establishes an exemption (and the payor does not have actual knowledge or reason to know that such holder is a United States person). Dividends paid to Non-U.S. Holders subject to withholding of U.S. federal income tax, as described above under "*Distributions on Our Ordinary Shares*," will generally be exempt from U.S. backup withholding.

Information reporting and backup withholding, currently at a rate of 24%, generally will apply to the proceeds of a disposition of our Ordinary Shares by a Non-U.S. Holder effected by or through the U.S. office of any broker, whether U.S. or non-U.S., unless the holder certifies its status as a Non-U.S. Holder and satisfies certain other requirements, or otherwise establishes an exemption from backup withholding. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a Non-U.S. Holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. Holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the Non-U.S. Holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a Non-U.S. Holder can be refunded or credited against the Non-U.S. Holder's U.S. federal income tax liability, if any, provided that an appropriate claim is timely filed with the IRS.

FATCA for Non-U.S. Holders

The Foreign Account Tax Compliance Act, or FATCA, generally imposes a 30% withholding tax on dividends on, and gross proceeds from the sale or disposition of, our Ordinary Shares paid to a foreign entity unless (i) if the foreign entity is a "foreign financial institution," the foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a "foreign financial institution," the foreign entity identifies certain of its U.S. investors, if any, or (iii) the foreign entity is otherwise exempt from FATCA.

Withholding under FATCA generally applies (1) to payments of dividends on our Ordinary Shares, and (2) to payments of gross proceeds from a sale or other disposition of our Ordinary Shares made after December 31, 2018. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this section. Under certain circumstances, a Non-U.S. Holder may be eligible for refunds or credits of the tax. Non-U.S. Holders should consult their own tax advisors regarding the possible implications of FATCA on their investment in our Ordinary Shares and the entities through which they hold our Ordinary Shares, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.

THE PRECEDING DISCUSSION OF MATERIAL U.S. FEDERAL TAX CONSIDERATIONS IS FOR GENERAL INFORMATION ONLY. IT IS NOT LEGAL OR TAX ADVICE. SHAREHOLDERS SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE PARTICULAR U.S. FEDERAL, STATE, LOCAL AND NON-U.S. TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR ORDINARY SHARES, INCLUDING THE CONSEQUENCES OF ANY PROPOSED OR RECENTLY ENACTED CHANGES IN APPLICABLE LAWS.

10.F. Dividends and paying agents

Not applicable.

10.G. Statement by experts

Not applicable.

10.H. Documents on display

We are subject to certain of the information reporting requirements of the Exchange Act. As a foreign private issuer, we are exempt from the rules and regulations under the Exchange Act prescribing the furnishing and content of proxy statements, and our officers, directors and principal shareholders are exempt from the reporting and "short-swing" profit recovery provisions contained in Section 16 of the Exchange Act, with respect to their purchase and sale of our shares. In addition, we are not required to file reports and financial statements with the SEC as frequently or as promptly as U.S. companies whose securities are registered under the Exchange Act. However, we are required to file with the SEC, within four months after the end of each fiscal year, an annual report on Form 20-F containing financial statements audited by an independent accounting firm. We publish unaudited interim financial information after the end of each quarter. We furnish this quarterly financial information to the SEC under cover of a Form 6-K. We expect that we will be an emerging growth company until January 1, 2019.

You may read and copy any document we file with the SEC at its public reference facilities at 100 F Street, NE, Washington, D.C. 20549. You may also obtain copies of the documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street, NE, Washington, D.C. 20549. The SEC also maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC. The address of this website is http://www.sec.gov. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

10.I. Subsidiary information

Not applicable.

ITEM 11. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

In the ordinary course of our operations, we are exposed to certain market risks, primarily changes interest rates.

Quantitative and Qualitative Disclosure About Market Risk

Interest Rates

We are exposed to market risks in the ordinary course of our business. Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our current investment policy was drafted to: (i) preserve principal (capital); (ii) maintain liquidity in accordance with cash flow requirements; and (iii) maximize the rate of return within the stated guidelines in the policy. Accordingly, a majority of our cash and cash equivalents is held in deposits that bear interest. Given the current low rates of interest we receive, we will not be adversely affected if such rates are reduced. Our investment policy is monitored by the Company's Audit Committee.

As of December 31, 2017, our unrestricted cash and cash equivalents and short-term investments totaled $48.6 million. Our current investment policy has the following objectives: (i) preserve principal (capital); (ii) maintain liquidity in accordance with cash flow requirements; and (iii) maximize the rate of return within the stated guidelines in the policy. To achieve these goals, we invest available cash in bank deposits with banks that have a credit rating of at least Baa1/BBB+ and in tradable securities with high credit quality and trading liquidity, including U.S. Treasury bonds, money market funds, and corporate debt instruments that carry a rating of A2/A or better. A portion of our investments may be subject to interest rate risk and could fall in value if market interest rates increase. Our interest rate exposure is mitigated by the short-term duration of our investments. If market interest rates were to decrease immediately and uniformly by 50 basis points, or one-half of a percentage point, from levels at December 31, 2017, the net fair value of our interest-sensitive financial instruments would not have a significant effect on our results of operations. We do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate risk exposure. We have not been exposed nor do we anticipate being exposed to material risks due to changes in interest rates.

Foreign Currency Exchange Risk

Our results of operations and cash flow are subject to fluctuations due to changes in foreign currency exchange rates. The vast majority of our liquid assets is held in U.S. dollars, and a certain portion of our expenses is denominated in NIS. We do not hedge our foreign currency exchange risk. In the future, we may enter into formal currency hedging transactions to decrease the risk of financial exposure from fluctuations in the exchange rates of our principal operating currencies. These measures, however, may not adequately protect us from the material adverse effects of such fluctuations.

ITEM 12. DESCRIPTION OF SECURITIES OTHER THAN EQUITY SECURITIES

The Company does not have any outstanding American Depositary Shares or American Depositary Receipts.

PART II

ITEM 13. DEFAULTS, DIVIDEND ARREARAGES AND DELINQUENCIES

None.

ITEM 14. MATERIAL MODIFICATIONS TO THE RIGHTS OF SECURITY HOLDERS AND USE OF PROCEEDS

None.

ITEM 15. CONTROLS AND PROCEDURES

(a) Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and our principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of December 31, 2017, or the Evaluation Date. Based on such evaluation, those officers have concluded that, as of the Evaluation Date, our disclosure controls and procedures are effective in recording, processing, summarizing and reporting, on a timely basis, information required to be included in periodic filings under the Exchange Act and that such information is accumulated and communicated to management, including our principal executive and financial officer, as appropriate to allow timely decisions regarding required disclosure.

(b) Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) under the Exchange Act. Under the supervision and with the participation of our management, we conducted an evaluation of the effectiveness of our internal control over financial reporting based principally on the framework and criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission as of the end of the period covered by this report. Based on that evaluation, our management has concluded that our internal control over financial reporting was effective as of December 31, 2017 at providing reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

(c) Attestation Report of the Registered Public Accounting Firm

This annual report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting due to an exemption for emerging growth companies provided in the JOBS Act.

(d) Changes in Internal Control over Financial Reporting

We completed the merger on November 15, 2017. As part of our ongoing activities after the merger, we are continuing to integrate our financial reporting functions and our controls and procedures between our legacy Arcturus and Alcobra Ltd. businesses. We have also been augmenting our company-wide controls to reflect the risks inherent in a business combination of the magnitude and complexity of the merger.

Other than as described in the foregoing paragraph, there were no other changes in our internal controls over financial reporting that occurred during the year ended December 31, 2017 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 16A. Audit Committee Financial Expert

Our Board of Directors has determined that Mr. Willett, a member of our audit committee, is an audit committee financial expert, as defined under the rules under the Exchange Act, and is independent in accordance with applicable Exchange Act rules and Nasdaq rules.

ITEM 16B. Code of Ethics

We have adopted a written code of ethics that applies to our executive officers and employees and persons performing similar functions as well as our directors. Our Code of Business Conduct and Ethics is posted on our website at www.arcturusrx.com the content of which website is not incorporated herein.

ITEM 16C. Principal Accountant Fees and Services

The following table sets forth the fees billed to us and our subsidiaries by our principal accountants Kost, Forer, Gabbay and Kasierer, a member of Ernst & Young Global, an independent registered public accounting firm, which served as our principal accountant for the year ended December 31, 2017 and Ernst & Young LLP, an independent registered public accounting firm, which served as the principal accountant for Arcturus Therapeutics, Inc., the accounting acquirer in the merger for the years ended December 31, 2016 and 2015.

(US Dollars in thousands)	2017	2016
Audit fees (1)	$ 326	$ 252
Audit-related fees (2)	171	-
Tax fees (3)	210	-
All other fees	-	-
Total	$ 707	$ 252

(1) Includes fees for professional services rendered by our principal accountant in connection with the audit of our consolidated annual financial statements and services that would normally be provided by our principal accountant in connection with statutory and regulatory filings or engagements.

(2) Audit-related fees are fees for assurance and related services rendered by our respective principal accountants that are reasonably related to the performance of their audit of our financial statements and that are not reported under “Audit-fees” above.

(3) Tax fees are fees for services rendered by our respective principal accountants in connection with tax compliance, tax planning and tax advice.

Pre-Approval of Auditors' Compensation

Our audit committee has a pre-approval policy for the engagement of our independent registered public accounting firm to perform certain audit and non-audit services. Pursuant to this policy, which is designed to assure that such engagements do not impair the independence of our auditors, the audit committee pre-approves annually a catalog of specific audit and non-audit services in the categories of audit services, audit-related services and tax services that may be performed by our independent registered public accounting firm. If a type of service, that is to be provided by our auditors, has not received such general pre-approval, it will require specific pre-approval by our audit committee. The policy prohibits retention of the independent registered public accounting firm to perform the prohibited non-audit functions defined in applicable SEC rules.

ITEM 16D. Exemptions from the Listing Standards for Audit Committees

Not applicable.

ITEM 16E. Purchases of Equity Securities by the Issuer and Affiliated Purchasers

Not applicable.

ITEM 16F. Change in Registrant's Certifying Accountant

(a)(1)(i) Ernst & Young LLP, which served prior to the merger as the principal accountant of Arcturus Therapeutics, Inc., the accounting acquirer in the merger, has been dismissed as the independent auditor of the registrant in regard to the audit of the December 31, 2017 financial statements. The client-auditor relationship between Arcturus Therapeutics Ltd. and Ernst & Young LLP has ceased upon the issuance of their audit report on the December 31, 2016 and 2015 financial statements included in this Form 20-F.

The existing auditor of the legal acquirer in the merger (Arcturus Therapeutics Ltd., formerly known as Alcobra Ltd.), Kost Forer Gabbay & Kasierer, a member of Ernst & Young Global (“Kost Forer Gabbay & Kasierer”) was asked to remain the principal accountant of our company following the merger.

(ii) The reports of Ernst & Young LLP issued on May 14, 2018 on the financial statements of Arcturus Therapeutics, Inc. for each of the two fiscal years ended December 31, 2016 and 2015 did not contain an adverse opinion or a disclaimer of opinion and were not qualified or modified as to uncertainty, audit scope, or accounting principles.

(iii) Prior to consummation of the merger, we retained Kost Forer Gabbay & Kasierer as our principal accountant, and it continued to serve in that role following the merger. Consequently, we did not retain Ernst & Young LLP to serve as our principal accountant for the year ended December 31, 2017. In accordance with the requirements of the Israeli Companies Law, our decision to retain Kost Forer Gabbay & Kasierer was recommended and/or approved by each of (a) the audit committee of our board of directors, (b) our board of directors and (c) our shareholders. Under the Israeli Companies Law, we were not deemed to have changed our principal accountant after the merger, since our company as a legal entity continued to retain Kost Forer Gabbay & Kasierer to perform services as our principal accountant after the merger. Therefore, no affirmative action was required for our not retaining Kost Forer Gabbay & Kasierer. Our shareholders approved Kost Forer Gabbay & Kasierer as our principal accountant for fiscal year 2017 at our 2017 annual general meeting of shareholders, which was held in October 2017.

(iv) During each of the two fiscal years ended December 31, 2016 and 2015 and through the interim period preceding the non-continuation of Ernst & Young LLP's services, there were no disagreements with Ernst & Young LLP on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which, if not resolved to the satisfaction of Ernst & Young LLP, would have caused Ernst & Young LLP to make reference to the matter in connection with its reports on Arcturus Therapeutics, Inc.'s financial statements.

(v) During each of the two fiscal years ended December 31, 2016 and 2015 and through the interim period preceding the non-continuation of Ernst & Young LLP's services, none of the reportable events listed in paragraphs (a)(1)(v)(A) through (D) of Item 16F of the SEC's Form 20-F occurred.

(2) Based on the recommendation and/or approval by each of (a) the audit committee of our board of directors, (b) our board of directors and (c) our shareholders (at our 2017 annual general meeting of shareholders held in October 2017), Kost Forer Gabbay & Kasierer was engaged as our principal accountant for the fiscal year ending December 31, 2017. Prior to its engagement, we did not consult with Kost Forer Gabbay & Kasierer regarding matters or events set forth in paragraphs (a)(2)(i) or (a)(2)(ii) of Item 16F of the SEC's Form 20-F related to Arcturus Therapeutics, Inc.

(3) We have provided Ernst &Young LLP with a copy of the disclosures that we have made in response to this Item 16F(a) and requested that Ernst &Young LLP furnish us with a letter addressed to the SEC stating whether it agrees with the above statements made by us in response to this Item 16F(a) and, if not, stating the respects in which it does not agree with such statements. Ernst &Young LLP's response letter is filed as Exhibit 15.3 to this annual report on Form 20-F.

ITEM 16G. Corporate Governance

The Sarbanes-Oxley Act, as well as related rules subsequently implemented by the SEC, requires foreign private issuers, such as us, to comply with various corporate governance practices. In addition, we are required to comply with the Nasdaq Listing Rules. Under those Nasdaq Listing Rules, we may elect to follow certain corporate governance practices permitted under the Israeli Companies Law in lieu of compliance with corresponding corporate governance requirements otherwise imposed by the Nasdaq Listing Rules for U.S. domestic issuers.

In accordance with Israeli law and practice and subject to the exemption set forth in Rule 5615 of the Nasdaq Listing Rules, we have elected to follow the provisions of the Israeli Companies Law, rather than the Nasdaq Listing Rules, with respect to the following requirements:

- *Distribution of periodic reports to shareholders; proxy solicitation.* As opposed to the Nasdaq Listing Rules, which require listed issuers to make such reports available to shareholders in one of a number of specific manners, Israeli law does not require us to distribute periodic reports directly to shareholders, and the generally accepted business practice in Israel is not to distribute such reports to shareholders but to make such reports available through a public website. In addition to making such reports available on a public website, we currently make our audited financial statements available to our shareholders at our offices and will only mail such reports to shareholders upon request. As a foreign private issuer, we are generally exempt from the SEC's proxy solicitation rules.

- *Compensation of officers.* Israeli law and our amended and restated articles of association do not require that the independent members of our Board of Directors (or a compensation committee composed solely of independent members of our Board of Directors) determine an executive officer's compensation, as is generally required under the Nasdaq Listing Rules with respect to the Chief Executive Officer and all other executive officers. Instead, compensation of executive officers is determined and approved by our Compensation Committee and our Board of Directors, and in certain circumstances by our shareholders, either consistently with our Compensation Policy or, in special circumstances in deviation therefrom, taking into account certain considerations stated in the Israeli Companies Law.

- *Shareholder approval.* We will seek shareholder approval for all corporate actions requiring such approval under the requirements of the Israeli Companies Law, rather than seeking shareholder approval for certain corporate actions in accordance with Nasdaq Listing Rule 5635. In particular, under this Nasdaq rule, shareholder approval is generally required for: (i) an acquisition of shares/assets of another company that involves the issuance of 20% or more of the acquirer's shares or voting rights or if a director, officer or 5% shareholder has greater than a 5% interest in the target company or the consideration to be received; (ii) the issuance of shares leading to a change of control; (iii) adoption/amendment of equity compensation arrangements; and (iv) issuances of 20% or more of the shares or voting rights (including securities convertible into, or exercisable for, equity) of a listed company via a private placement (and/or via sales by directors/officers/5% shareholders) if such equity is issued (or sold) at below the greater of the book or market value of shares. By contrast, under the Israeli Companies Law, shareholder approval is required for, among other things: (a) transactions with directors concerning the terms of their service or indemnification, exemption and insurance for their service (or for any other position that they may hold at a company), for which approvals of the compensation committee, board of directors and shareholders are all required; (b) extraordinary transactions with controlling shareholders of publicly held companies, which require approval by a special, disinterested majority of shareholders (as described above in this annual report) and (c) terms of employment or other engagement of the controlling shareholder of a company or such controlling shareholder's relative, which also require approval by a special, disinterested majority of shareholders. In addition, under the Israeli Companies Law, a merger requires approval of the shareholders of each of the merging companies.

ITEM 16H. Mine Safety Disclosure

Not applicable.

PART III

ITEM 17. FINANCIAL STATEMENTS

We have elected to provide financial statements and related information pursuant to Item 18.

ITEM 18. FINANCIAL STATEMENTS

The following consolidated financial statements, and the related notes thereto, and the Reports of Independent Public Accountants are filed as a part of this annual report.

ITEM 19. EXHIBITS

EXHIBIT INDEX

EXHIBIT NUMBER	DESCRIPTION OF DOCUMENT
1.1	Amended and Restated Articles of Association of the Company, filed as Exhibit 4.1 to Form S-8 filed November 30, 2017 (File No. 333-221830) and incorporated herein by reference.
3.1	Voting Trust Agreement, dated February 11, 2018, by and among the Company, Padmanabh Chivukula, and Mark Herbert.
4.1	Form of Indemnification Agreement, filed as Exhibit 10.4 to Form F-1/A filed February 19, 2013 (File No. 333-186003) and incorporated herein by reference.
4.2	Alcobra Ltd. Amended and Restated 2010 Incentive Option Plan, filed as Exhibit 4.3 to Form 20-F filed April 28, 2017 (File No. 001-35932) and incorporated herein by reference.
4.3	2013 Equity Incentive Plan of Arcturus Therapeutics, Inc., filed as Exhibit 5.1 to Form S-8 filed November 30, 2017 (File No. 333-221830) and incorporated herein by reference.
4.4	Amended and Restated Compensation Policy for Company Office Holders, as adopted on July 19, 2016, attached as Exhibit 99.2 to the Company's Report of Foreign Private Issuer on Form 6-K furnished to the SEC on June 8, 2016 (File No. 001-35932) and incorporated herein by reference.
4.5	Agreement and Plan of Merger and Reorganization among Alcobra Ltd., Aleph MergerSub, Inc. and Arcturus Therapeutics, Inc., dated as of September 27, 2017, annexed as Exhibit 99.2 to the Company's Report of Foreign Private Issuer on Form 6-K furnished to the SEC on September 28, 2017 (File No. 001-35932) and incorporated herein by reference.
4.6	Lease Agreement, by and between Arcturus Therapeutics, Inc. and ARE-SD Region No. 44, LLC, dated October 4, 2017.
4.7†	Research Collaboration and License Agreement, by and between Arcturus Therapeutics, Inc. and Janssen Pharmaceuticals, Inc., dated October 18, 2017.
4.8†	Research and Exclusive License Agreement, by and between Arcturus Therapeutics, Inc. and Synthetic Genomics, Inc., effective October 24, 2017.
4.9†	Research Agreement, by and between Arcturus Therapeutics, Inc. and Millennium Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited, effective December 6, 2016, as amended December 21, 2017.
4.10†	Research Collaboration and License Agreement, by and between Arcturus Therapeutics, Inc. and Ultragenyx Pharmaceutical Inc., entered into as of October 26, 2015, as amended October 17, 2017 and April 20, 2018.
4.11†	Letter Agreement, by and between Arcturus Therapeutics, Inc. and Cystic Fibrosis Foundation Therapeutics, Inc., dated May 16, 2017.
4.12†	Development and Option Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated January 1, 2018, as amended May 3, 2018.
4.13†	Co-Development and Co-Commercialization Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated January 1, 2018.
4.14†	License Agreement, by and between Arcturus Therapeutics, Inc., as successor-in-interest to Marina Biotech, Inc., and Protiva Biotherapeutics Inc., dated as of November 28, 2012.
4.15†	Patent Assignment and License Agreement, by and between Arcturus Therapeutics, Inc. and Marina Biotech, Inc., dated as of August 9, 2013.
8.1	List of Subsidiaries.
12.1	Certification of the Principal Executive Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934.
12.2	Certification of the Principal Financial Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934.

13.1	Certification of the Principal Executive Officer pursuant to 18 U.S.C. 1350.
13.2	Certification of the Principal Financial Officer pursuant to 18 U.S.C. 1350.
15.1	Consent of Ernst & Young LLP.
15.2	Consent of Kost, Forer, Gabbay & Kasierer.
15.3	Letter dated May14, 2018 of Ernst & Young LLP, as required by Item 16F of Form 20-F.
101	The following materials from our Annual Report on Form 20-F for the year ended December 31, 2017 formatted in XBRL (eXtensible Business Reporting Language): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations and Comprehensive Loss, (iii) the Consolidated Statements of Changes in Shareholders' Equity (Deficit), (iv) the Consolidated Statements of Cash Flows and (v) the Notes to Consolidated Financial Statements, tagged as blocks of text and in detail

† Confidential treatment has been granted for certain information contained in this Exhibit. Such information has been omitted and filed separately with the SEC.

SIGNATURES

Arcturus Therapeutics Ltd. hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

ARCTURUS THERAPEUTICS LTD.

By: /s/ Mark R. Herbert
Mark R. Herbert
Interim President

Date: May 14, 2018

ARCTURUS THERAPEUTICS LTD. AND ITS SUBSIDIARIES
CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2017

INDEX

Kost Forer Gabbay & Kasierer
144 Menachem Begin Road, Building A
Tel-Aviv 6492102, Israel

Tel: +972-3-6232525
Fax: +972-3-5622555
ey.com

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of

ARCTURUS THERAPEUTICS LTD. (FORMERLY ALCOBRA LTD.)

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) and its subsidiaries (the "Company") as of December 31, 2017 and the related consolidated statements of operations and comprehensive loss, shareholders' equity and cash flows for the year ended December 31, 2017, and the related notes (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2017, and the results of its operations and its cash flows for the year ended December 31, 2017, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company’s financial statements based on our audit. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audit we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

/s/ KOST FORER GABBAY & KASIERER
A Member of Ernst & Young Global

We have served as the Company‘s auditor since 2018
Tel-Aviv, Israel
May 14, 2018

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders
Arcturus Therapeutics Ltd.

We have audited the accompanying consolidated balance sheet of Arcturus Therapeutics Ltd. and its subsidiaries (formerly Arcturus Therapeutics, Inc.) as of December 31, 2016, and the related consolidated statements of operations and comprehensive loss, changes in shareholders' equity (deficit) and cash flows for each of the two years in the period ended December 31, 2016. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. We were not engaged to perform an audit of the Company's internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of Arcturus Therapeutics Ltd. and its subsidiaries at December 31, 2016, and the consolidated results of their operations and their cash flows for each of the two years in the period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles**.**

/s/Ernst & Young LLP
San Diego, California
May 14, 2018

ARCTURUS THERAPEUTICS LTD. AND ITS SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(In U.S. dollars in thousands, except par value information)

	As of December 31,	
	2017	**2016**
Assets		
Current assets:		
Cash and cash equivalents	$ 24,965	$ 8,345
Restricted cash	166	—
Short-term investments	23,608	—
Accounts receivable	480	3,633
Prepaid expenses and other current assets	1,059	353
Intangible asset held for sale	590	—
Total current assets	50,868	12,331
Property and equipment, net	1,049	1,335
Other assets	107	70
Total assets	$ 52,024	$ 13,736
Liabilities and shareholders' equity		
Current liabilities:		
Accounts payable	$ 1,790	$ 3,357
Accrued liabilities	2,793	1,061
Deferred revenue	6,457	4,183
Convertible promissory notes and accrued interest	—	133
Total current liabilities	11,040	8,734
Deferred revenue, net of current portion	7,190	3,410
Other liabilities	—	15
Total liabilities	18,230	12,159
Commitments and contingencies (Note 13)		
Shareholders' equity:		
Series seed preferred shares, $0.0001 par value, none authorized, issued or outstanding at December 31, 2017, 1,284 shares authorized, issued, and outstanding at December 31, 2016	—	—
Series A preferred shares, $0.0001 par value, none authorized, issued or outstanding at December 31, 2017, 2,564 authorized, 1,481 issued and outstanding at December 31, 2016	—	—
Ordinary shares: NIS 0.07 par value; 30,000 shares authorized, 10,699 issued, 10,656 outstanding and 43 held in treasury at December 31, 2017; $0.0001 par value, 2,801 issued and outstanding at December 31, 2016	212	—
Additional paid-in capital	56,674	13,764
Accumulated other comprehensive loss	(3)	—
Accumulated deficit	(23,089)	(12,187)
Total shareholders' equity	33,794	1,577
Total liabilities and shareholders' equity	$ 52,024	$ 13,736

See notes to the consolidated financial statements.

ARCTURUS THERAPEUTICS LTD. AND ITS SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

U.S. dollars in thousands (except per share data)

	Year Ended December 31,		
	2017	**2016**	**2015**
Revenue in conjunction with strategic alliances and collaborations	$ 12,998	$ 20,382	$ 6,138
Operating expenses:			
Research and development, net	15,918	17,934	5,476
General and administrative	7,572	3,448	2,574
Total operating expenses	23,490	21,382	8,050
Net loss from operations	(10,492)	(1,000)	(1,912)
Finance (expense) income, net	(409)	(536)	11
Net loss before taxes	(10,901)	(1,536)	(1,901)
Income tax expense	(1)	(35)	(1)
Net loss	$ (10,902)	$ (1,571)	$ (1,902)
Net loss per share, basic and diluted	$ (3.53)	$ (0.77)	$ (0.94)
Weighted-average shares outstanding, basic and diluted	3,087	2,032	2,016
Comprehensive loss:			
Net loss	$ (10,902)	$ (1,571)	$ (1,902)
Unrealized loss on short-term investments	(3)	—	—
Comprehensive loss	$ (10,905)	$ (1,571)	$ (1,902)

See notes to the consolidated financial statements.

ARCTURUS THERAPEUTICS LTD. AND ITS SUBSIDIARIES
STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY (DEFICIT)

U.S. dollars in thousands

	Series Seed Preferred Stock		Series A Preferred Stock		Ordinary Shares		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount	Shares	Amount	Shares	Amount				
BALANCE - December 31, 2014	**1,284**	**$ -**	**960**	**$ -**	**2,784**	**$ -**	**$ 6,869**	**$ -**	**$ (8,714)**	**$ (1,845)**
Net loss	—	—	—	—	—	—	—	—	(1,902)	(1,902)
Shares issued in conjunction with share option exercise	—	—	—	—	17	—	17	—	—	17
Share-based compensation	—	—	—	—	—	—	99	—	—	99
BALANCE - December 31, 2015	**1,284**	**$ -**	**960**	**$ -**	**2,801**	**$ -**	**$ 6,985**	**$ -**	**$ (10,616)**	**$ (3,631)**
Net loss	—	—	—	—	—	—	—	—	(1,571)	(1,571)
Share-based compensation	—	—	—	—	—	—	300	—	—	300
Issuance of preferred shares upon convertible promissory note maturity including debt conversion expense	—	—	521	—	—	—	6,479	—	—	6,479
BALANCE - December 31, 2016	**1,284**	**$ -**	**1,481**	**$ -**	**2,801**	**$ -**	**$ 13,764**	**$ -**	**$ (12,187)**	**$ 1,577**
Net loss	—	—	—	—	—	—	—	—	(10,902)	(10,902)
Unrealized loss on short-term investments	—	—	—	—	—	—	—	(3)	—	(3)
Share-based compensation	—	—	—	—	—	—	2,170	—	—	2,170
Shares issued in conjunction with share option exercise	—	—	—	—	348	—	675	—	—	675
Issuance of shares upon exercise of warrants	—	—	—	—	189	—	160	—	—	160
Issuance of shares upon conversion of notes	—	—	—	—	617	—	5,957	—	—	5,957
Conversion of Preferred Shares to Ordinary Shares	(1,284)	—	(1,481)	—	2,765	—	—	—	—	—
Beneficial conversion expense from notes	—	—	—	—	—	—	348	—	—	348
Issuance of shares in connection with merger, net	—	—	—	—	3,979	212	33,600	—	—	33,812
BALANCE - December 31, 2017	**-**	**$ -**	**-**	**$ -**	**10,699**	**$ 212**	**$ 56,674**	**$ (3)**	**$ (23,089)**	**$ 33,794**

See notes to the consolidated financial statements.

ARCTURUS THERAPEUTICS LTD. AND ITS SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

U.S. dollars in thousands

	Year Ended December 31,		
	2017	**2016**	**2015**
OPERATING ACTIVITIES:			
Net loss	$ (10,902)	$ (1,571)	$ (1,902)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:			
Depreciation and amortization	410	294	192
Share-based compensation expense	2,170	300	99
Gain on sale of equipment	—	—	(11)
Interest expense on convertible promissory notes	150	295	251
Beneficial conversion expense from notes	348	250	—
Changes in operating assets and liabilities			
Accounts receivable	3,153	(1,556)	(2,077)
Prepaid expenses and other assets	(202)	(314)	23
Accounts payable	(1,537)	2,536	240
Accrued liabilities	(104)	303	484
Deferred revenue	6,054	(3,398)	10,991
Net cash (used in) provided by operating activities	(460)	(2,861)	8,290
INVESTING ACTIVITIES:			
Proceeds from maturities of short-term investments	10,577	—	—
Acquisition of property and equipment	(251)	(688)	(247)
Proceeds from sale of equipment	29	—	27
Net cash provided by (used in) investing activities	10,355	(688)	(220)
FINANCING ACTIVITIES:			
Proceeds from issuance of convertible promissory notes	5,650	—	1,885
Proceeds from exercise of share options	711	—	17
Proceeds from exercise of warrants	160	—	—
Net cash received in the issuance of shares for the net assets of Alcobra Ltd.	477	—	—
Net cash provided by financing activities	6,998	—	1,902
NET INCREASE (DECREASE) IN CASH, CASH EQUIVALENTS AND RESTRICTED CASH	16,893	(3,549)	9,972
Cash, cash equivalents and restricted cash at beginning of year	8,345	11,894	1,922
Cash, cash equivalents and restricted cash at end of year	$ 25,238	$ 8,345	$ 11,894
Supplemental cash flow information			
Cash paid for taxes	$ 35	$ 12	$ 1
Purchase of property and equipment included in accounts payable and accrued liabilities	$ —	$ 127	$ 53
Issuance of Series A preferred shares upon note maturity	$ —	$ 6,229	$ —
Convertible notes and accrued interest reclassified to accounts payable at maturity	$ —	$ 151	$ —
Fair value of assets acquired, excluding cash, cash equivalents and restricted cash	$ 35,241	$ —	$ —
Less liabilities assumed	$ (1,906)	$ —	$ —
Net assets acquired, excluding cash, cash equivalents and restricted cash	$ 33,335	$ —	$ —
Conversion of notes to Ordinary Shares	$ 5,957	$ —	$ —

See notes to the consolidated financial statements.

NOTE 1. Organization

Description of Business

Arcturus Therapeutics Ltd. and subsidiaries (referred to as the "Company") is a nucleic acid medicines company with enabling technologies – UNA Oligomer chemistry and LUNAR® lipid-mediated delivery. The company remains domiciled in Israel subsequent to the merger described herein.

Reverse Merger

On November 15, 2017, Alcobra Ltd. acquired Arcturus Therapeutics, Inc. pursuant to a merger between the companies (the "merger"). Prior to the merger, Alcobra Ltd.'s net assets consisted of cash, investments and nominal non-operating assets. Upon consummation of the merger, Alcobra Ltd. adopted the business plan of Arcturus Therapeutics, Inc. In connection with the merger, Alcobra Ltd. agreed to acquire all of the outstanding common stock of Arcturus Therapeutics, Inc. in exchange for the issuance of an aggregate 6,631,712 of Alcobra Ltd.'s Ordinary Shares, par value 0.07 NIS per share (the "Ordinary Shares"), after giving effect to a 1-for-7 reverse split effected immediately prior to the merger. As a result of the merger, Arcturus Therapeutics, Inc. became a wholly-owned subsidiary of Alcobra Ltd. While Alcobra Ltd. was the legal acquirer in the transaction, Arcturus Therapeutics, Inc. was deemed the accounting acquirer. Immediately after giving effect to the merger, on November 15, 2017, Alcobra Ltd. changed its name to Arcturus Therapeutics Ltd. ("Arcturus" or the "Company"). On November 16, 2017, the Company commenced trading under the symbol "ARCT." The Company's principal executive offices are located in San Diego, California.

In accordance with the authoritative literature, a transaction where a private company merges into a public company with no operations and nominal net assets should be accounted for as a capital transaction rather than a business combination. Consequently, the reverse merger was accounted for as an issuance of shares by the Company for the net assets of Alcobra Ltd., accompanied by a recapitalization. Excess of considerations paid over net assets acquired and other merger-related costs were recorded as a charge to additional paid-in capital as discussed in Note 6. While Alcobra Ltd. was the legal acquirer in the merger, Arcturus was deemed the accounting acquirer. As a result, the financial statements of the Company prior to the merger date are the historical financial statements of Arcturus whereas the financial statements of the Company after the merger date reflect the results of the operations of Arcturus and Alcobra Ltd. on a combined basis. All historical information presented herein has been retroactively restated to reflect the effect of the merger shares exchange ratio, reverse stock split and change to the authorized number of Ordinary Shares in accordance with Accounting Standards Codification Topic 260, *"Earnings Per Share"*.

Liquidity

The Company's activities since inception have consisted principally of performing research and development activities and raising capital. The Company's activities are subject to significant risks and uncertainties, including failing to secure additional funding before the Company achieves sustainable revenues and profit from operations.

Historically, the Company's primary source of financing has been through the sale of its securities, through issuance of convertible promissory notes and through collaboration agreements. Research and development activities have required significant capital investment since the Company's inception. We expect our operations to continue to require cash investment to pursue the Company's research and development activities, including preclinical studies, formulation development, clinical trials and related drug manufacturing. The Company has a limited operating history, and is preclinical with no revenues from sales of its products, and the sales and income potential of the Company's business and market are unproven. The Company has experienced net losses since its inception and as of December 31, 2017 has an accumulated deficit of $23.1 million . The Company acquired $36.4 million in cash, cash equivalents and short-term investments in conjunction with the merger, however, the Company expects to continue to incur additional losses for the next several years, and over that period the Company may need to raise additional debt or equity financing or enter into additional partnerships to fund its development. The ability of the Company to transition to profitability is dependent on developing products and product revenues to support the level of expenses. If the Company is not able to achieve its planned revenue growth or incurs costs in excess of its forecasts, it may be required to reduce discretionary spending, may not be able to continue the development of all of its products or may be required to delay part of its development programs, which could have a material adverse effect on the Company's ability to achieve its intended business objectives. There can be no assurances that additional financing will be secured or, if secured, will be on favorable terms. The Company's management and board of directors are of the opinion that its current financial resources will be sufficient to continue the development of the Company's products for at least twelve months from the filing of this Annual Report.

In order to support our long-term plans, we intend to seek additional capital through equity and/or debt financings, collaborative or other funding arrangements with partners or through other sources of financing. Should we seek additional financing from outside sources, we may not be able to raise such financing on terms acceptable to us or at all. If we are unable to raise additional capital when required or on acceptable terms, we may be required to scale back or discontinue the advancement of product candidates, reduce headcount, liquidate our assets, file for bankruptcy, reorganize, merge with another entity, or cease operations. If we are unable to maintain sufficient financial resources, our business, financial condition and results of operations will be materially and adversely affected. There can be no assurance that the Company will be able to obtain the needed financing on acceptable terms or at all.

NOTE 2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Arcturus Therapeutics Ltd. and its subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation. These financial statements are prepared in conformity with accounting principles generally accepted in the United States (U.S. GAAP), which requires management to make estimates and assumptions regarding the valuation of certain debt and equity instruments, the intangible asset, share-based compensation, accruals for liabilities, income taxes, revenue and deferred revenue, expense accruals, and other matters that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In the opinion of management, all adjustments, consisting of normal recurring accruals and other adjustments related to our merger, considered necessary for a fair presentation have been included. Actual results could materially differ from those estimates.

Segment Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker in making decisions regarding resource allocation and assessing performance. The Company and its chief operating decision-maker view the Company's operations and manage its business in one operating segment which is the research and development of medical applications for our nucleic acid-focused technology.

Reclassification of Prior Year's Presentation

Certain prior year amounts have been reclassified for consistency with the current period presentation. This reclassification had no effect on the reported results of operations.

Foreign Currency Translation

The functional currency of the Company is the U.S. dollar. Monetary accounts maintained in currencies other than the dollar are remeasured into U.S. dollars in accordance with Accounting Standards Codification ("ASC") Topic 830, "*Foreign Currency Matters*". Translation gains or losses were immaterial for the years ended December 31, 2017, 2016 and 2015.

Cash and Cash Equivalents

Cash equivalents are short-term highly liquid investments that are readily convertible to cash with original maturities of three months or less at the date of purchase to be cash equivalents.

Restricted cash

Restricted cash represents cash required to be set aside as security for lease payments and to maintain a letter of credit for the benefit of the landlord for the Company's offices. At December 31, 2017, the Company had restricted cash of $166,000 and $107,000 in conjunction with property leases in Israel and San Diego, California, respectively. The restricted cash related to the Israel facility is classified as current as it expected to be received by the Company within 12 months. The restricted cash related to the San Diego facility is included in the balance of other assets and classified as a non-current asset as it is expected to be received at the end of the lease term in 2025. There was no restricted cash at December 31, 2016.

Short-term Bank Deposits

Short-term bank deposits are deposits with maturities of more than three months and up to one year when acquired. Short-term bank deposits are presented at their cost, including accrued interest and are included in the balance of short-term investments in the consolidated balance sheet.

Short-term Investments

The Company accounts for short-term investments in accordance with ASC No. 320, *Investments- Debt and Equity Securities*. Management determines the appropriate classification of its investments at the time of purchase and reevaluates such determinations at each balance sheet date.

The Company has classified all of its debt securities and certificates of deposit as available-for-sale securities. Available-for-sale securities are carried at fair value, with the unrealized gains and losses reported in accumulated other comprehensive (gain)loss in shareholders' equity (deficit). Realized gains and losses on sales of investments are included in interest income and are derived using the specific identification method for determining the cost of securities.

The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity. Such amortization together with interest and dividends on securities are included in interest income.

The Company recognizes an impairment charge when a decline in the fair value of its investments in securities below the amortized cost basis of such securities is judged to be other-than-temporarily impaired. Factors considered in making such a determination include the duration and severity of the impairment, the reason for the decline in value, the potential recovery period and if the entity has the intent to sell the security, or if it is more likely than not that it will be required to sell the security before recovery of its amortized cost basis. The Company did not recognize any other-than-temporary impairment charges on its marketable securities during the years ended December 31, 2017, 2016 or 2015.

Fair Value Measurements

Fair value is defined as the exit price, or the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants as of the measurement date. A hierarchy has been established for inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the most observable inputs be used when available.

Observable inputs are inputs market participants would use in valuing the asset or liability developed based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company’s assumptions about the factors market participants would use in valuing the asset or liability developed based upon the best information available under the circumstances. The hierarchy is broken down into three levels. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities. Level 2 inputs include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and inputs (other than quoted prices) that are observable for the asset or liability, either directly or indirectly. Level 3 inputs are unobservable inputs for the asset or liability. Categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

Accounts Receivable

Accounts receivable are recorded at the net invoice value and are non-interest bearing. The Company considers receivables past due based on the contractual payment terms. The Company reserves specific receivables if collectability is no longer reasonably assured. Estimates for allowances for doubtful accounts are determined based on existing contractual obligations, historical payment patterns, and individual customer circumstances. The Company reevaluates such reserves on a regular basis and adjusts its reserves as needed. Once a receivable is deemed to be uncollectible, such balance is charged against the reserve. No reserves have been recorded as of December 31, 2017 or 2016.

Concentration of Credit Risk and Significant Customers

The Company is exposed to credit risk from cash and investment balances at banks in excess of amounts insured by the Federal Deposit Insurance Corporation, including deposits held in two large banks located in Israel and by a U.S. based brokerage. The Company mitigates its exposure by investing in certificates of deposit in banks that have a credit rating of at least Baa1/BBB+ and corporate debentures that carry a rating of at least A2/A. The Company's investment policy is approved by the Board of Directors and limits the amount that the Company may invest in any one type of investment or issuer, thereby reducing credit risk concentrations. The Company has not experienced any losses on deposits since inception.

There was one customer that comprised the total accounts receivable balance at December 31, 2017. One customer individually represented 88% of the Company's accounts receivable balance at December 31, 2016.

For the year ended December 31, 2017, there were three customers that collectively represented 92% of the Company's total revenue. For the years ended December 31, 2016 and 2015, there were two customers that represented 95% and 99% of the Company's total revenue, respectively.

Intangible asset held for sale

The Company's intangible asset represents capitalized in-process research and development (IPR&D) acquired in conjunction with the merger in 2017 (see Note 6 to the consolidated financial statements).

Property and Equipment, net

Property and equipment are stated at cost, net of accumulated depreciation and amortization. The cost of property and equipment is depreciated or amortized using the straight-line method over the respective useful lives of the assets, ranging from three to five years. Leasehold improvements are amortized using the straight-line method over the shorter of the estimated useful life of the asset or the lease term. Long-lived assets, including property and equipment are reviewed for impairment whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable. The determinants used for this evaluation include management's estimate of the asset's ability to generate positive income from operations and positive cash flow in future periods, as well as the strategic significance of the assets to the Company's business objectives. The Company did not recognize any impairment losses for the years ended December 31, 2017, 2016 or 2015.

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and circumstances from non-owner sources. Comprehensive loss represents unrealized losses on the Company's marketable securities. The income tax effect related to unrealized losses was immaterial for December 31, 2017.

Revenue Recognition

The Company enters into arrangements with pharmaceutical and biotechnology partners that may involve multiple deliverables. The Company's arrangements may contain upfront payments, license fees for research and development arrangements, research and development funding or reimbursement, milestone payments, option fees, exclusivity fees and royalties on future sales of our products. Each deliverable in the arrangement is evaluated at the inception of the arrangement to determine whether it meets the criteria to be accounted for as a separate unit of accounting or whether it should be combined with other deliverables. When deliverables are separable, consideration received is allocated to the separate units of accounting based on the relative selling price method and the appropriate revenue recognition principles are applied to each unit. Revenue is recognized separately for each unit of accounting when all four of the following criteria are met: (i) persuasive evidence that an arrangement exists; (ii) delivery of the products and/or services has occurred; (iii) the selling price is fixed or determinable; and (iv) collectability is reasonably assured. Deliverables in an arrangement that do not meet this separation criteria are treated as a single unit of accounting, generally applying applicable revenue recognition guidance for the final deliverable to the combined unit of accounting. In the instances in which the Company has received payment from customers in advance of recognizing revenue, the Company records the amounts as deferred revenue on the consolidated balance sheet. Amounts not expected to be recognized within the next 12 months are classified as non-current deferred revenue. As discussed further under Note 3, Strategic Alliances and Collaboration Agreements, total deferred revenue for the year ended December 31, 2017 and 2016 was comprised of $7.6 million and $0.4 million for Collaboration Partner A, respectively; $5.8 million and $6.2 million for Collaboration Partner B, respectively; negligible amount and $0.2 million for Collaboration Partner C, respectively; and $0.2 million and $0.8 million for Other, respectively. Deferred revenue includes unamortized upfront fees under these collaboration agreements.

Funded Research. Some of the Company's research and development costs are funded or reimbursed by partners in accordance with collaboration agreements. Amounts received as compensation related to the Company's research and development efforts are recognized as revenue when the above criteria have been met.

Upfront Fees. When the Company determines that deliverables in an arrangement do not meet the separation criteria discussed above, the deliverables are treated as a single unit of accounting. In such cases, upfront fees received for collaborative agreements are recognized on a straight-line basis, unless evidence suggests that the revenue is earned or obligations are fulfilled in a different pattern, over the expected performance period under each respective arrangement. When the performance period is not specified, the Company makes its best estimate of the period over which the Company expects to fulfill its performance obligations under an arrangement. Any amounts received under the arrangement in advance of performance are recorded as deferred revenue and recognized as revenue as the Company completes its performance obligations.

Milestones. The Company applies the milestone method of accounting to recognize revenue from milestone payments when earned, as evidenced by written acknowledgement from the collaborator or other persuasive evidence that the milestone has been achieved and the payment is non-refundable, provided that the milestone event is substantive. A milestone event is defined as an event (i) that can only be achieved based in whole or in part on either our performance or on the occurrence of a specific outcome resulting from our performance; (ii) for which there is substantive uncertainty at the inception of the arrangement that the event will be achieved; and (iii) that would result in additional payments being due to the Company. Events for which the occurrence is either contingent solely upon the passage of time or the result of a counterparty's performance are not considered to be milestone events. A milestone event is substantive if all of the following conditions are met: (i) the consideration is commensurate with either the Company's performance to achieve the milestone, or the enhancement of the value to the delivered item(s) as a result of a specific outcome resulting from the Company's performance to achieve the milestone; (ii) the consideration relates solely to past performance; and (iii) the consideration is reasonable relative to all the deliverables and payment terms (including other potential milestone consideration) within the arrangement.

The Company assesses whether a milestone is substantive at the inception of each arrangement. If a milestone is deemed non-substantive, the Company will account for that milestone payment using a method consistent with the related units of accounting for the arrangement over the estimated performance period.

Research and Development Costs, net

Research and development costs are expensed as incurred. Non-refundable advance payments are expensed when services are initiated. These expenses result from the Company's independent research and development efforts as well as efforts associated with collaboration arrangements. Research and development costs include salaries and personnel-related costs, consulting fees, fees paid for contract research and manufacturing services, the costs of laboratory supplies, equipment and facilities and other external costs are shown net of any royalty bearing grants.

Royalty Bearing Grant

Royalty-bearing grants from Cystic Fibrosis Foundation Therapeutics, Inc. (CFFT) amounted to $0.3 million and $0.2 million during the years ended December 31, 2017 and 2016, respectively. Royalty-bearing grants from CFFT for certain research and development projects are recognized on the basis of related costs incurred, and are included as a deduction from research and development expenses.

Share-Based Compensation

The Company recognizes share-based compensation for equity awards granted to employees, officers, and directors as an expense on the statements of operations. Share-based compensation is recognized over the requisite service period of the individual awards, which generally equals the vesting period. Share options have a ten-year life and generally vest 25% on the first anniversary of the grant and in 1/48th equal installments on each monthly anniversary thereafter, such that options are fully vested on the four-year anniversary of the date of grant.

The fair value of share options is estimated using a Black-Scholes valuation model on the date of grant. This method requires certain assumptions be used as inputs, such as the fair value of the underlying common shares, expected term of the option before exercise, expected volatility of the Company's Ordinary Shares, expected dividend yield, and a risk-free interest rate. The Company has limited historical share option activity and therefore estimates the expected term of share options granted using the simplified method, which represents the average of the contractual term of the share option and its weighted-average vesting period. The expected volatility of share options is based upon the historical volatility of a number of publicly traded companies in similar stages of clinical development. We have not declared or paid any dividends and do not currently expect to do so in the foreseeable future. The risk-free interest rates used are based on the implied yield currently available in United States Treasury securities at maturity with a term equivalent to the expected term of the share options. The effect of forfeited awards is recorded when the forfeiture occurs.

Share-based awards to non-employees are remeasured at each reporting date and compensation costs are recognized as services are rendered, generally on a straight-line basis. The Company believes that the fair value of these awards is more reliably measurable than the fair value of the services rendered.

Ordinary Shares Valuation

Prior to the merger and due to the absence of an active market for the Company's ordinary shares, the Company utilized third-party valuations which utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants Technical Practice Aid, Valuation of Privately-Held Company Equity Securities Issued as Compensation, to estimate the fair value of its Ordinary Shares.

Prior to 2017, the income and market approach and the Option-Pricing-Method, as appropriate, were used to value the Ordinary Shares of the Company at the option grant dates. A discount for lack of marketability was also incorporated in determining the value of the Ordinary Shares.

During 2017, the Company relied on the Guideline Transaction Method (Return on Invested Capital) to estimate the value the Ordinary Shares of the Company at the option grant dates. The Company conducted a search for development stage and preclinical trials stage biotechnology therapeutics companies which initially received capital and later were acquired in merger and acquisitions transactions. Under this method, the Company estimated its range of business enterprise value ("BEV").

1. Similar Transactions: The Company conducted a search for development stage and preclinical trials stage biotechnology therapeutics companies using the Dow Jones VentureSource™ database of private venture-backed companies and selected private target companies similar to the Company.

2. Range of Multiple Observed: Using the total deal consideration and the total capital raised prior to the acquisition, the Company estimated the total deal consideration/capital raised multiple;

3. Multiples Selection: The Company selected multiples of 1.00x and 1.50x for the low and high estimates, respectively. The Company selected multiples between the minimum and lower (first) quartile of the dataset due to the Company's stage of product development and the inherent survivorship bias of the dataset. These multiplies were applied to the Company's total productive invested capital as of the Valuation Date.

4. Discount for Lack of Control ("DLOC"): The BEV range estimated from the Guideline Transaction Method reflects a controlling interest. In order to estimate a BEV on a minority interest basis, the Company applied a discount for lack of control to the indicated equity value after accounting for any debt.

After estimating a range of BEV, the Company added cash and cash equivalents to derive an estimated range of the Market Value of Invested Capital ("MVIC"). The Company than adjusted this value for debt and estimated the value of the Company's equity.

After estimating the Company's equity value, the Company allocated the value to the various equity classes and debt comprising the Company's capitalization table using the Option-Pricing Method. Under the OPM, each equity class was modeled as having a call option with a distinct claim on the total value of the Company. Each option's exercise price was based on the Company's total value available for each participating security holder. The characteristics of each class of ownership determined the claim on the total value for that class of ownership. By constructing a series of options in which the exercise prices were set at incremental levels of value corresponding to the values necessary for each level of equity to participate, we determined the incremental option value of each series. When multiplied by the percentage of ownership of each equity class participating under that series, the result was the incremental value allocated to each class under that series. The Company used the Black Scholes option-pricing model within the equity allocation.

In making the final determination, the Company determined a discount for lack of marketability.

For awards issued near the merger date, a market approach was utilized based upon publicly available prices for Alcobra Ltd. Significant changes to the key assumptions underlying the factors used could have resulted in different fair values of ordinary shares at each valuation date.

Statement of cash flows

The following table provides a reconciliation of cash and cash equivalents and restricted cash reported within the balance sheet to the total of the same such amounts shown in the statement of cash flows:

	As of December 31,		
(in thousands)	**2017**	**2016**	**2015**
Cash and cash equivalents	$ 24,965	$ 8,345	$ 11,894
Restricted cash	166	-	-
Restricted cash (included in other assets)	107	-	-
Total cash, cash equivalents and restricted cash shown in the statement of cash flows	$ 25,238	$ 8,345	$ 11,894

Income Tax Expense

The Company records deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the Company's financial statement carrying amounts and the tax basis of assets and liabilities using enacted tax rates expected to be in effect in the years in which the differences are expected to reverse. A valuation allowance is provided to reduce the net deferred tax assets to the amount that will more likely than not be realized. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in the provision for income taxes in the period that includes the enactment date.

The Company also assesses the probability that the positions taken or expected to be taken in its income tax returns will be sustained by taxing authorities. A "more likely than not" (more than 50 percent) recognition threshold must be met before a tax benefit can be recognized. Tax positions that are more likely than not to be sustained are reflected in the Company's financial statements. Tax positions are measured as the largest amount of tax benefit that is greater than 50 percent likely of being realized upon settlement with a taxing authority that has full knowledge of all relevant information. The difference between the benefit recognized for a position and the tax benefit claimed on a tax return is referred to as an unrecognized tax benefit. Potential interest and penalties associated with such uncertain tax positions are recorded as a component of income tax expense.

Net Loss per Share

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of Ordinary Shares outstanding for the period, without consideration for ordinary share equivalents. Diluted net loss per share is calculated by dividing the net loss by the weighted-average number of Ordinary Shares and dilutive ordinary share equivalents outstanding for the period determined using the treasury-stock method. Dilutive Ordinary Shares are comprised of convertible preferred stock, convertible notes, share options and warrants. Dilutive securities that were not included in the calculation of diluted net loss per share because they were anti-dilutive totaled 3,057,000, 2,800,000 and 3,843,000 potential shares at December 31, 2017, 2016 and 2015, respectively.

The calculation of the weighted-average number of shares outstanding excludes shares which have been issued upon the early exercise of share options and are subject to future vesting and unvested restricted stock totaling 702,000, 769,000 and 769,000 shares as of December 31, 2017, 2016 and 2015, respectively, and shares held in treasury totaling 43,000 at December 31, 2017. There were no treasury shares at December 31, 2016 or 2015.

The Company applies the two-class method as required by ASC Topic 260-10, "*Earnings Per Share*" ("ASC 260-10"), which requires the income or loss per share for each class of shares (ordinary and preferred shares) to be calculated assuming 100% of the Company's earnings are distributed as dividends to each class of shares based on their contractual rights.

No dividends were declared or paid during the reported periods. According to the provisions of ASC 260-10, the Company's preferred shares are not participating securities in losses and, therefore, are not included in the computation of net loss per share.

Recently Issued Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) amended the existing Accounting Standards Update (ASU) for revenue recognition No. 2014-09, *Revenue from Contracts with Customers*, which outlines a comprehensive revenue recognition model and supersedes most current revenue recognition guidance. ASU 2014-09 outlines a five-step process for revenue recognition that focuses on transfer of control, as opposed to transfer of risk and rewards, and also requires enhanced disclosures regarding the nature, amount, timing and uncertainty of revenues and cash flows from contracts with customers. Major provisions include determining which goods and services are distinct and require separate accounting (performance obligations), how variable consideration (which may include change orders and claims) is recognized, whether revenue should be recognized at a point in time or over time and ensuring the time value of money is considered in the transaction price.

The FASB subsequently issued amendments to ASU No. 2014-09 that have the same effective date and transition date. Due to the Company's emerging growth company status, these new standards will become effective for the Company on January 1, 2019. This ongoing evaluation is dependent upon the resolution of certain questions relating to the application of the new revenue recognition guidance for collaboration agreements which will ultimately determine the impact, if any, the adoption of this standard may have on our financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases*, which outlines a comprehensive lease accounting model and supersedes the current lease guidance. The new accounting standard requires lessees to recognize lease liabilities and corresponding right-of-use assets for all leases with lease terms of greater than twelve months. It also changes the definition of a lease and expands the disclosure requirements of lease arrangements. The new accounting standard must be adopted using the modified retrospective approach and is effective for entities for annual reporting periods beginning after December 15, 2018, with early adoption permitted. Since the Company's emerging growth company status will cease at December 31, 2018, this standard will become effective for the Company on January 1, 2019. The Company is currently evaluating the impact that the adoption of ASU 2016-02 will have on its consolidated financial statements and related disclosures.

Recently Adopted Accounting Pronouncements

Effective January 1, 2017, the Company adopted ASU No. 2017-09 *Compensation – Stock Compensation (Topic 718): Scope of Modification Accounting* (ASU No. 2017-09). ASU No. 2017-09 provides guidance about which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting. The Company's adoption of ASU No. 2017-09 had no impact on the Company's statements of financial position or results of operations and comprehensive loss.

In November 2016, the FASB issued ASU 2016-18, *Restricted Cash*, which requires entities to show the changes in the total of cash, cash equivalents, restricted cash and restricted cash equivalents in the statement of cash flows. As a result, entities will no longer present transfers between cash and cash equivalents and restricted cash and restricted cash equivalents in the statement of cash flows. This update is effective for annual periods beginning after December 15, 2017, and interim periods within those fiscal years with early adoption permitted. The Company adopted this pronouncement retrospectively effective in the December 31, 2017 consolidated financial statements. There was no effect on previously reported balances as a result of adoption of the standard.

In January 2017, the FASB issued ASU 2017-01, *Business Combinations* (Topic 805): "Clarifying the Definition of a Business" which clarifies the definition of a business and affects all companies and other reporting organizations that must determine whether they have acquired or sold a business. The amendments are intended to assist with the evaluation of whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The guidance is effective for the Company for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years and should be applied prospectively as of the beginning of the period of adoption. Early adoption is permitted under certain circumstances. The Company adopted ASU 2017-01 as of January 1, 2017 and the adoption did not have an impact on the Company's accounting and disclosures.

NOTE 3. Strategic Alliances and Collaboration Agreements

The Company has entered into license agreements and collaborative research and development arrangements with pharmaceutical and biotechnology companies. Under these arrangements, the Company is entitled to receive license fees, upfront payments, milestone payments when and if certain research or technology transfer milestones are achieved, development milestones and reimbursement for research and development activities. The Company's costs of performing these services are included within research and development expense. The Company's milestone payments are typically defined by achievement of certain preclinical, clinical, and commercial success criteria. Preclinical milestones may include in vivo proof of concept in disease animal model(s), lead candidate identification, and completion of IND-enabling studies. Clinical milestones may include successful enrollment of the first patient in or completion of Phase I, II, and III clinical trials, and commercial revenue is often tiered based on net or aggregate sale amounts. The Company cannot

guarantee the achievement of these milestones due to risks associated with preclinical and clinical activities required for development of nucleic acid medicine-based therapeutics.

The following table summarizes our revenues under strategic alliances and collaborations for the periods indicated (in thousands):

	Year Ended December 31,		
(Dollars in thousands)	**2017**	**2016**	**2015**
Collaboration Partner A	$ 4,862	$ 12,008	$ 5,123
Collaboration Partner B	5,639	7,395	979
Collaboration Partner C	1,403	28	-
Other	1,094	951	36
Total	$ 12,998	$ 20,382	$ 6,138

The following paragraphs provide information on the nature and purpose of these collaboration arrangements.

Collaboration Partner A

In 2015 the Company entered into two agreements with Collaboration Partner A. The Company analyzed the form and substance of both of the agreements and concluded they should be evaluated as a single arrangement for accounting purposes.

The Company concluded that the license, research and development activities, exclusivity, and joint steering committed obligations under this collaboration should be considered a single unit of accounting in the arrangement and the up-front fee was deferred and was initially being recognized as revenue ratably over the expected 23-month period of the research activities. In 2016, the parties agreed to extend the period of performance of the research term by an additional 6 weeks and the Company correspondingly updated the amortization period of the remaining deferred revenue. The Company also reached certain milestones in 2015 and in 2016 that were determined, as of the inception of the agreement, to be substantive and the revenue related to these milestones was recognized when they were achieved.

As a result of the mid-2017 termination of the 2015 collaboration, the remaining deferred revenue associated with the upfront, non-refundable payment was recognized as revenue since all performance obligations associated with the 2015 agreement had been completed by the Company. Further, the Company recognized revenue of $4.9 million, $12.0 million, and $5.1 million during the years ended December 31, 2017, 2016 and 2015, respectively, primarily under the 2015 agreement. The revenue recognized included labor and expense reimbursements of $4.4 million, $9.5 million and $3.0 million, December 31, 2017, 2016 and 2015, respectively, with the remaining revenue representing the amortized portion of the upfront fee and milestone payment on the arrangement.

In late-2017, the Company and Collaboration Partner A entered into a new agreement. The Company reviewed the timing and nature of the arrangement upon the signing of the new agreement and determined that it was not linked to the prior agreements and should be considered as a standalone agreement.

The 2017 collaboration allocated discovery, development, funding obligations, and ownership of related intellectual property among the Company and Collaboration Partner A, with Collaboration Partner A making an upfront payment, and potential milestone payments and royalty payments to the Company. The Company received an upfront payment and may receive preclinical, development and sales milestone payments, as well as royalty payments on any future licensed product sales. Collaboration Partner A will reimburse the Company for development costs at a future defined period upon the achievement of the first research and development milestone and all commercialization costs associated with the program upon selection of a drug target. The 2017 collaboration agreement includes potential milestone payments from the Collaboration Partner A to the Company of $56.5 million. Collaboration Partner A may also pay option exercise fees within the $1.0 million to $5.0 million range per target. Collaboration Partner A will pay royalties on annual net sales of licensed products in the low to mid-single digits range, subject to reduction on a country-by-country and licensed-product-by-licensed-product basis and subject to certain events, such as expiration of program patents. In addition, the collaboration includes an exclusivity period.

As the license component of the contract has no stand-alone value, the license and the research and development activities, exclusivity, and joint steering committee obligations under this agreement should be considered as a single unit of accounting in the arrangement. The upfront fee will be deferred and recognized as revenue using the Proportional Performance Method as the Company determined that the performance obligations are fulfilled in a pattern other than straight-line due to the structure and nature of the

collaborative arrangement. During the year-end December 31, 2017 the Company recognized an negligible amount related to the 2017 agreement for Collaboration Partner A.

Collaboration Partner B

In 2015 the Company entered into an agreement with Collaboration Partner B. During the initial phase of the collaboration, the Company will design and optimize therapeutics for certain rare disease targets. Collaboration Partner B has the option to add additional rare disease targets during the collaborative development period. Additionally, during the collaborative development period, the Company will participate with Collaboration Partner B in a joint steering committee. In addition, the collaboration includes an initial exclusivity period and an option to extend this period.

For each program, Collaboration Partner B will reimburse the Company for all internal and external development costs incurred and if Collaboration Partner B achieves certain, clinical, regulatory and sales milestones, then the Company is eligible to receive additional payments.

As part of the agreement, Collaboration Partner B paid an upfront fee and agreed to certain research and development funding obligations. The Company is also entitled to certain additional payments upon exercise of the Collaboration Partner B expansion option and/or exclusivity extension (if any), and for costs incurred by us in conducting the activities assigned to us under each collaboration development plan. In addition, on a development target-by-development target basis during the two-year period from the effective date of contract, Collaboration B will pay the Company a one-time milestone payment after the first optimized lead designation for the first product with respect of such development target. For each development target for which the Collaboration Partner B exercises its option, Collaboration Partner B will pay the Company a one-time option exercise fee based upon on the total number of development targets for which option exercises have been made by Collaboration Partner B. Subsequent to year end December 31, 2017, the Company signed an amendment with Collaboration Partner B, that may reduce milestone payments dependent on whether the Company does not incorporate a predefined chemistry methodology.

The agreement included total potential milestone payments for the initially selected targets from the Collaboration Partner B to the Company of $133.0 million. Collaboration Partner B will pay royalties as a percentage of net sales on a product-by-product and country-by-country basis during the applicable royalty term up to 10%. As of December 31, 2017, the Company has not yet reached the clinical phase of the contract.

The Company concluded that the license, research and development activities, exclusivity, and joint steering committed obligations under this agreement should be considered a single unit of accounting in the arrangement, the up-front fee will be deferred and recognized as revenue over the same period as the research activities. As a result, the upfront fee has been deferred and was initially being recognized as revenue ratably over the expected 29-month period of the research activities and was adjusted by an additional 11 months and 19 months during 2016 and 2017, respectively. As such, the Company updated the amortization period of the remaining deferred revenue.

The Company also determined that the milestone payments as defined in the agreement were not substantive as it will not have any outstanding performance obligations under the agreement when such payments may become due, and, therefore, do not meet the requirements for application of the Milestone Method of revenue recognition. Instead, revenue from the contingent milestone payments will be recognized if and when such payments become due, subject to satisfaction of all of the criteria necessary to recognize revenue at that time.

During 2017, the Company entered into an amendment with Collaboration Partner B to add one year to the exclusivity period for the two initial targets, in consideration for a one-time payment of $2.0 million. The extension of the exclusivity period did not change the length of the research and development period. Further, the amendment added language to allow Collaboration Partner B the opportunity to review and comment on its filings and prosecution efforts of pending Company Patents that relate to Collaboration Partner B Chemistry. Since the Company's performance obligations under the agreement are considered a single unit of accounting, the payment consideration was added to the unamortized portion of the upfront signing fee and recognized systematically, on a straight-line basis, over the remainder of the period that the research and development services are expected to occur.

The Company recognized revenue for Collaboration Partner B of $5.6 million, $7.4 million, and $1.0 million during the years ended December 31, 2017, 2016 and 2015, respectively. The revenue recognized included labor and expense reimbursements of $3.7

million, $3.8 million and $0.3 million, December 31, 2017, 2016 and 2015, respectively, with the remaining revenue representing the amortized portion of the upfront fee on the arrangement.

Collaboration Partner C

In 2016 the Company entered into a contract with Collaboration Partner C to perform certain discovery and development of RNA medicines for treatment of a disease. The agreement provides a non-exclusive license of the Company's technology to Collaboration Partner C for the 18 month research program term, and the Company will not engage in similar research or development activities for two years after the end of the research term. In 2017 the Company and Collaboration Partner C amended the agreement to extend the agreement research program scope and term of 18 months from the Original Agreement effective date to 12 months from the Amendment Date (through September 2018.) Under the Agreement, the results specifically related to improvements to the Company products are owned by the Company, while all other Research Program results are owned by Collaboration Partner C.

The Collaboration Partner C Agreement remains in effect until Collaboration Partner C no longer has payment obligations. Collaboration Partner C may terminate the Agreement upon sixty days written notice. As part of the agreement, Collaboration Partner C paid an upfront fee of $0.1 million upon contract execution and agreed to provide the Company with funding for the discovery and development costs. The agreement included immaterial milestone payments that were met during 2017. The agreement provides for $3.7 million in regularly scheduled research funding payments through 2018. In addition, Collaboration Partner C has an option to negotiate with the Company to obtain a non-exclusive, sub-licensable worldwide license to use the Company's background technology and its owned collaboration results. The Option may be exercised by Collaboration Partner C with written notice to the Company any time for a period commencing on the Effective Date and ending on one hundred and eighty (180) days after the date of Collaboration C receipt of the Final Report. The terms and conditions of any such license shall be negotiated in good faith and agreed upon in writing between the parties within twelve 12 months after the exercise of the option by Collaboration Partner C.

The Company concluded that the research funding, exclusivity and license fees were to be accounted for as a single unit of accounting and the upfront license fees were deferred and recognized as revenue over the same period as the research activities. The Company recognized revenue from Collaboration Partner C of $1.4 million and a negligible amount for the years ended December 31, 2017 and 2016, respectively. The revenue recognized includes expense reimbursements that are recognized as revenue when incurred as per the terms of the agreement and milestone payments.

Other Collaboration Agreements

In 2016 the Company entered into several other smaller agreements and recorded revenue and deferred revenue consistent with the revenue recognition practices described in the significant accounting policies footnote. Additionally, see Note 14 Related Party for the related party collaboration agreement.

NOTE 4. Short-term Investments

The Company's short-term investments consist of short-term bank deposits and marketable securities. Bank deposits with maturities of more than three months but less than one year are included in short-term bank deposits. Short-term deposits are stated at cost which approximates market values. As of December 31, 2017, the Company's bank deposits totaled $15.0 million, are in U.S. dollars and bear interest at a weighted average annual interest rate of 1.6%. There were no short-term bank deposits held by the Company at December 31, 2016.

The following is a summary of short-term investments at December 31, 2017:

	December 31, 2017			
(Dollars in thousands)	**Amortized cost**	**Gross unrealized gains**	**Gross unrealized losses**	**Fair value**
Certificates of deposit	$ 1,462	$ -	$ -	$ 1,462
Corporate debt securities	7,149	-	(3)	7,146
Total	$ 8,611	$ -	$ (3)	$ 8,608

All short-term investments are held as available-for-sale and mature within twelve months of December 31, 2017. Management reviews unrealized losses individually and in the aggregate at each reporting period and has determined that none the balances are other

than temporarily impaired based upon the brief duration of time that the investments have been at a loss position as of December 31, 2017. The Company had no short-term investments at December 31, 2016.

NOTE 5. Fair Value Measurements

The Company establishes the fair value of our assets and liabilities using the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company established a fair value hierarchy based on the inputs used to measure fair value.

The three levels of the fair value hierarchy are as follows:

Level 1: Quoted prices in active markets for identical assets or liabilities.

Level 2: Inputs, other than the quoted prices in active markets, that are observable either directly or indirectly.

Level 3: Unobservable inputs in which little or no market data exists, and are therefore determined using estimates and assumptions developed by the Company, which reflect those that a market participant would use.

The carrying value of cash, restricted cash, short-term bank deposits, accounts receivable, accounts payable, and accrued liabilities approximate their respective fair values due to their relative short maturities.

The following table presents our fair value hierarchy for assets measured at fair value on a recurring basis as of December 31, 2017 (in thousands):

	December 31, 2017			
	Fair value measurements using input type			
	Level 1	Level 2	Level 3	Total
Cash equivalents	$ 2,024	$ -	$ -	$ 2,024
Certificates of deposit	-	1,462	-	1,462
Corporate debt securities	-	7,146	-	7,146
Total financial assets	$ 2,024	$ 8,608	$ -	$ 10,632

There were no assets measured at fair value on a recurring basis at December 31, 2016.

The fair value of certain financial instruments was measured and classified within Level 1 of the fair value hierarchy based on quoted prices. Certain financial instruments classified within Level 2 of the fair value hierarchy include the types of instruments that trade in markets that are not considered to be active, but are valued based on quoted market prices, broker or dealer quotations, or alternative pricing sources with reasonable levels of price transparency.

Certain non-financial assets are measured at fair value, usually with Level 3 inputs including the discounted cash flow method or cost method, on a nonrecurring basis in accordance with authoritative guidance. These represent nonfinancial assets initially measured at fair value in connection with our merger. The Company utilized significant management judgment to forecast the occurrence of future equity events with a high probability of success using the market valuation method. In general, non-financial assets, including our intangible asset and property and equipment, are remeasured at fair value when there is an indication of impairment and are recorded at fair value only when any impairment is recognized.

NOTE 6. Reverse Merger with Alcobra Ltd.

As described in Note 1 “Organization”, the reverse merger completed between Arcturus and Alcobra Ltd. was accounted for as a issuance of shares by the Company for the net assets of Alcobra Ltd., accompanied by a recapitalization. Arcturus was considered the acquirer for accounting and financial reporting purposes and acquired the assets and assumed the liabilities of Alcobra Ltd., and Arcturus gained control of the combined company after the merger. The annual consolidated financial statements of the Company reflect the operations of the acquirer for accounting purposes together with a deemed issuance of shares, equivalent to the shares held by the former stockholders of the legal acquirer and a recapitalization of the equity of the accounting acquirer. The annual consolidated financial statements include the accounts of the Company since the effective date of the reverse capitalization and the accounts of Arcturus Therapeutics, Inc. since inception.

The following summarizes the estimated fair value of the assets and liabilities acquired at the date of the merger:

(in thousands)	
Cash and cash equivalents	$ 2,032
Restricted cash	179
Short-term investments	34,188
Prepaid and other assets	434
Property, plant and equipment – held for sale	29
Intangible asset-held for sale	590
Total assets acquired	37,452
Accounts payable and accrued expenses	(1,906)
Net assets acquired	$ 35,546

The estimated fair value of total considerations paid was $40,841,000 based on the shares and options of Alcobra Ltd. outstanding on the merger date as adjusted per the merger agreement of 3,997,000 multiplied by the closing price of $10.22 on the date of the merger. The excess of the fair value of the consideration paid over the fair value of the net assets acquired as detailed above was $5,295,000, which was recorded as a charge to additional paid in capital in the equity section of the balance sheet. The Company also incurred direct merger-related costs totaling $1,734,000, which offset proceeds received from the transaction and were recorded as a reduction to additional paid in capital in the Company's consolidated balance sheet.

Assets acquired in the merger included an intangible asset consisting of in-process research and development for proprietary drug technology called ADAIR. At the closing date of the reverse merger, we entered into an agreement with Amiservice to which we agreed to transfer certain intellectual property related to ADAIR in exchange for a minority equity stake in a company to be formed by Amiservice for the purpose of acquiring the ADAIR assets. The agreement is subject to certain closing conditions that have not been met. The Company determined that the asset met the classification criteria as held for sale in accordance with related accounting guidance when acquired and remained held for sale at December 31, 2017. There was also property, plant and equipment acquired in the merger which has been sold as of December 31, 2017. To determine the fair value of the ADAIR asset, the Company utilized an independent valuation consultant who valued the asset using a market approach valuation method. In conjunction with this valuation, management judgment was required to forecast the occurrence of future events that would trigger the closing of the ADAIR sale agreement. The asset will be evaluated at each future reporting date to evaluate whether it continues to be held for sale and for any potential impairment of its carrying value.

NOTE 7. Balance sheet details

Prepaid expenses and other current assets consisted of the following as of December 31, 2017 and December 31, 2016:

	December 31,	
(in thousands)	**2017**	**2016**
Prepaid expenses	$ 704	$ 242
Other current assets	355	111
Total	$ 1,059	$ 353

Accrued liabilities consisted of the following as of December 31, 2017 and December 31, 2016:

	December 31,	
(in thousands)	**2017**	**2016**
Accrued compensation	$ 1,812	$ 369
Other accrued liabilities	981	692
Total	$ 2,793	$ 1,061

NOTE 8. Property and Equipment, Net

Property and equipment, net consisted of the following:

	December 31,	
(in thousands)	**2017**	**2016**
Research equipment	$ 1,620	$ 1,495
Computers and software	97	98
Office equipment and furniture	255	255
Leasehold improvements	44	44
Total	2,016	1,892
Less accumulated depreciation and amortization	(967)	(557)
Property and equipment, net	$ 1,049	$ 1,335

Depreciation and amortization expense was $410,000, $294,000 and $192,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

NOTE 9. Convertible Promissory Notes

In 2014 and 2015, the Company sold unsecured convertible promissory notes to investors, including members of the Board of Directors and beneficial owners of more than 5% of our capital stock, in the aggregate principal amount of $5.9 million. The notes were amended to extend the maturity date to December 31, 2016 and gave the holders the option to elect repayment or conversion upon maturity. The notes carried interest at a rate of 5% per annum, with interest payments deferred until conversion or maturity.

In December 2016, the Company and the holders of a majority of the outstanding principal amount of the notes, modified the conversion price upon maturity of the notes which was deemed to represent an induced conversion for accounting purposes. On December 31, 2016, the notes matured and holders of $5,670,000 in outstanding principal and $560,000 of accrued interest elected to convert their outstanding balance into 521,415 shares of Series A Preferred Stock. Upon conversion of the notes, the Company recorded debt conversion expense of $250,000 within other expense in the consolidated statement of operations and comprehensive loss. The holders of $135,000 in outstanding principal elected repayment. The holders of $120,000 in outstanding principal remained outstanding as of December 31, 2016. In March 2017, the maturity date of the notes that remained outstanding was extended to December 31, 2017.

During 2017, the Company sold unsecured convertible promissory notes in the aggregate principal amount of $5,675,000. The notes were scheduled to mature on February 28, 2019 and contained conversion provisions upon specified events. The notes carried interest at a rate of 5% per annum, with interest payments deferred until conversion or maturity.

In September 2017, the convertible note agreements were amended in order to include an automatic conversion and beneficial conversion feature upon the closing of the merger agreement.

On November 15, 2017 and in connection with the merger, holders of all of the Company's convertible promissory notes converted $5,795,000 of principal value and $162,000 of accrued interest of into 616,824 Ordinary Shares at an average conversion rate of $10.19 per share. Additionally, the Company recognized additional expense of $348,000 as a result of the beneficial conversion feature received by the noteholders upon settlement per terms of the amended note agreements, which was charged to other expense included in the consolidated statements of operations and comprehensive loss.

The Company recognized interest expense related to the notes of $150,000, $295,000 and $251,000 during the years ended December 31, 2017, 2016 and 2015, respectively.

NOTE 10. Shareholders' Equity

Preferred stock

Series Seed Preferred Stock

In April 2013, the Company sold and issued in a private placement 1,284,402 shares of Series Seed Preferred ("SSP") stock at $1.02 per share. Each share of SSP stock granted the investor 0.15 fully vested warrants to purchase shares of ordinary shares at a strike price of $1.02 per share over a term no longer than ten years from the date of issue .

Series A Preferred Stock

In December 2013 and January 2014, the Company sold and issued 959,641 shares of Series A Preferred stock at $5.46 per share in a private placement. Upon the December 2016 maturity of the Notes, holders of $6,228,989 in outstanding principal and accrued interest elected conversion of their Notes into 521,449 shares of Series A Preferred stock at prices per share ranging from $11.60 to $12.97.

Conversion of Series Seed and Series A Preferred Stock

On November 15, 2017, the 2,765,492 outstanding shares of Series Seed and Series A preferred stock converted into the same number of Ordinary Shares immediately prior to the closing of the merger.

Warrants

Warrants were issued in connection with the issuance of the SSP stock. As of December 31, 2016, there were 192,647 warrants outstanding to purchase shares of our Ordinary Shares at $1.02 per share. In 2017 and in conjunction with the merger, all outstanding warrants were exercised for 188,980 Ordinary Shares (after subtraction of shares for net exercise, when selected). The Company received proceeds of $160,000 in conjunction with the warrant exercises in 2017.

Ordinary Shares

Merger and reverse stock split

The Company completed the merger with Alcobra Ltd. on November 15, 2017 as described in footnote 6 to the consolidated financial statements. In connection with the merger, all outstanding shares of Arcturus Therapeutics, Inc. were exchanged for the Company's Ordinary Shares at a rate of .293 Ordinary Shares of the Company's stock for each share of Arcturus Therapeutics, Inc. common stock.

Also on November 15, 2017 and prior to and in connection with the merger, Alcobra Ltd. effected a 1-for-7 reverse stock split of Ordinary Shares and changed Ordinary Shares authorized to 30,000,000 shares. All historical information presented herein has been retroactively restated to reflect the effect of the merger exchange ratio, reverse stock split and change to the authorized number of Ordinary Shares in accordance with Accounting Standards Codification Topic 260, *"Earnings Per Share"*.

Restricted Ordinary Shares

In March 2013, the founders of the Company purchased 2,783,686 Ordinary Shares of stock for $0.0068 per share. Of the shares purchased, 1,538,353 were subject to a repurchase option whereby the Company has an option for two months after date of termination of service as to repurchase any or all of the unvested shares at the original purchase price per share. The repurchase option shall be deemed to be automatically exercised by the Company as of the end of the two-month period unless the Company notifies the purchaser that it does not intend to exercise its option. The shares will be vested (1) 25% after obtaining suitable siRNA license; (2) 25% after *in vivo* proof-of-concept achieved; (3) 25% after a regulatory agency new drug application (such as an Investigational New Drug application) is filed and accepted by the applicable regulatory agency; and (4) 25% after human biological proof-of-concept is achieved. The Company met the first two milestones during 2013 and 2014. In 2017, the ordinary shares purchase agreements were amended to clarify vesting conditions resulting in a modification expense being recorded related to one of the awards totaling $1,495,000. As of December 31, 2017 and 2016 there were 622,667 and 769,176 Ordinary Shares which unvested and were subject to the repurchase option, respectively.

NOTE 11. Share-Based Compensation

Arcturus Therapeutics, Inc. had one stock compensation plan prior to the merger, the 2013 Equity Incentive Plan (the “2013” Plan) which provides for the granting of options, warrants, restricted stock awards, restricted stock units, and other equity-based compensation to the Company’s directors, employees and consultants. In connection with the merger and as required in the 2013 Plan, all outstanding options in the 2013 Plan converted into options to purchase shares of Alcobra Ltd.’s Ordinary Shares, as renamed Arcturus Therapeutics Ltd., and the applicable share amounts and exercise prices were adjusted to reflect the exchange ratio. The 2013 Plan has been extinguished and no additional grants shall be made from the 2013 Plan. Options granted under the 2013 Plan generally expire ten years from the date of grant. There are no shares available for future issuance under the 2013 Plan at December 31, 2017.

Prior to the merger, Alcobra Ltd. granted options to officers, directors, advisors, management and other key employees through the 2010 Incentive Option Plan (the “2010 Plan"). Substantially all options that were outstanding under the 2010 Plan became fully vested upon the closing of the merger. The value of these options was included as a component of the purchase price recorded in conjunction with the merger. The number of shares subject to and the exercise prices applicable to these outstanding options were adjusted in connection with the 1- for- 7 reverse stock-split. Options granted under the 2010 Plan generally expire ten years from the date of grant. Upon merger, the 2013 Plan was assumed by the 2010 Plan and the Company intends for the 2010 Plan to be its primary stock compensation plan for future awards. The Company generally issues new shares upon option exercise. There are 465,558 shares available for future issuance under the 2010 Plan as of December 31, 2017.

Share Options

The following table presents the weighted-average assumptions used in the Black-Scholes valuation model by the Company in calculating the fair value of share options granted:

	For the Year Ended December 31,		
	2017	2016	2015
Expected life (in years)	7.3	5.8	6.1
Expected volatility	76.4%	83.4%	76.1%
Expected dividend yield	—%	—%	—%
Risk-free interest rate	1.87%	1.51%	1.64%
Grant date weighted average fair value	$ 7.94	$ 1.23	$ 3.65

The following table summarizes the Company’s share option activity for the year ended December 31, 2017:

	Number of Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in thousands)
Outstanding – December 31, 2016	413,752	$ 2.15		
Granted	91,562	$ 1.02		
Acquired in conjunction with merger with Alcobra Ltd.	418,667	$ 26.37		
Exercised	(378,343)	$ 2.61		$ 504
Forfeited/cancelled	(201,583)	$ 39.90		
Outstanding – December 31, 2017	344,055	$ 8.70	6.1	$ 1,181
Exercisable – December 31, 2017	268,888	$ 3.25	5.4	$ 709
Exercisable and expected to vest – December 31, 2017	344,055	$ 8.70	6.1	$ 1,181

At December 31, 2017, the total unrecognized compensation cost of $217,000 will be recognized over the weighted-average remaining service period of approximately 2.8 years. The fair value of the options vested during the years ended December 31, 2017, 2016 and 2015 was $669,000, $171,000 and $177,000, respectively.

During 2017, the Company granted options for 58,600 shares to two board of directors members at an exercise price below fair value at the grant date. The awards were subject to performance conditions based on closing the reverse merger with Alcobra Ltd. and execution of a facility lease. All of the options vested during 2017, and related expense of $568,000 is included in general and administrative expense for the year ended December 31, 2017 related to the awards. There were no options granted that were subject to performance conditions for the years ended December 31, 2016 and 2015.

Options granted that were exercised prior to vesting are subject to repurchase by the Company at the lower of the original issue price or fair value and will vest according to the respective option agreement. A portion of the Company's share options have been exercised prior to vesting and are not outstanding. As of December 31, 2017, exercisable and expected to vest included 35,595 options which were still subject to future vesting (and which may be repurchased by the Company in the event the option holder ceases to provide services to the Company).

Share-based compensation expenses included in the Company's statements of operations and comprehensive loss for the years ended December 31, 2017, 2016 and 2015 were:

	For the Year Ended December 31,		
(in thousands)	**2017**	**2016**	**2015**
Research and development	$ 38	$ 217	$ 62
General and administrative	2,132	83	37
Total	$ 2,170	$ 300	$ 99

Stock-based compensation expense for the year ended December 31, 2017 includes $1,495,000 of expense related to a modification of a restricted Ordinary Shares agreement as discussed in Note 10.

NOTE 12. Income Taxes

A reconciliation of income (loss) before income taxes for domestic and foreign locations for the years ended December 31, 2017, 2016 and 2015 is as follows:

	For the Year Ended December 31,		
(In thousands)	**2017**	**2016**	**2015**
United States	$ (10,820)	$ (1,536)	$ (1,901)
Foreign	(81)	-	-
Total current tax expense	$ (10,901)	$ (1,536)	$ (1,901)

The company accounts for income taxes in accordance with ASC 740-10, *Accounting for Uncertainty in Income Taxes*. The impact of an uncertain income tax position on the income tax return must be recognized at the largest amount that is more likely than not to be sustained upon audit by the relevant taxing authority. An uncertain tax position will not be recognized if it has less than 50% likelihood of being sustained.

The following table summarizes our gross unrecognized tax benefits (in millions):

	December 31,		
	2017	**2016**	**2015**
Beginning balance of unrecognized tax benefits	$ 0.4	$ 0.4	$ 0.4
Settlement of prior period tax positions	—	—	—
Increase for prior period tax positions	—	—	—
Increase for current period tax positions	—	—	—
Ending balance of unrecognized tax benefits	$ 0.4	$ 0.4	$ 0.4

Included in the balance of unrecognized tax benefits at December 31, 2017, 2016 and 2015 is $0.4 million, $0.4 million and $0.4 million respectively that could impact our effective tax rate, if recognized. None of the unrecognized tax benefits currently impact our effective tax rate due to the full valuation allowance we have recorded against our deferred tax assets.

The company is subject to taxation and files income tax returns in the United States, California and Israel. Currently, no historical years are under examination. The Company's tax years from 2013 to date are subject to examination by the Israeli, U.S. and state taxing authorities due to the carryforward of unutilized net operating losses and research and development credits. The Company's policy is to recognize interest expense and penalties related to income tax matters as income tax expense. As of December 31, 2017, there are unrecognized tax benefits of $0.2 million and $0.2 million for the United States and California. There was no tax related interest or penalties recognized for the years ended December 31, 2017, 2016 or 2015.

We do not anticipate any material changes to our unrecognized tax benefits within the next twelve months.

The significant components of deferred income taxes at December 31, 2017, 2016 and 2015 are as follows:

	December 31,		
(in thousands)	**2017**	**2016**	**2015**
Deferred tax assets:			
Net operating loss (1)	$ 25,101	$ 1,752	$ 3,774
Tax credits	35	30	6
Accrued liabilities	227	187	98
Deferred revenue	1,162	2,430	—
Depreciation and amortization	—	—	106
Share-based compensation	90	221	100
Total gross deferred tax assets	26,615	4,620	4,084
Deferred tax liabilities:			
Depreciation and amortization	(96)	(15)	—
Valuation allowance	(26,519)	(4,605)	(4,084)
Net deferred tax asset	$ —	$ —	$ —

(1) Included in the deferred tax assets for net operating losses are pre-acquisition Alcobra, Inc. and Alcobra Ltd. federal, state and foreign losses of $0.2 million, $0.1 million and $20.8 million respectively, that the Company is uncertain that the net operating losses will be available for use in the future.

The Company has established a valuation allowance against net deferred tax assets due to the uncertainty that such assets will be realized. Due primarily to the acquisition of Alcobra Ltd. net operating losses, the valuation allowance has increased by $21.9 million between December 31, 2016 and December 31, 2017. The Company periodically evaluates the recoverability of the deferred tax assets. At such time as it is determined that it is more likely than not that deferred tax assets will be realizable, the valuation allowance will be reduced.

At December 31, 2017, the Company had federal and state net operating losses, or NOL, carryforwards of approximately $15.6 million and $15.4 million, respectively. The federal NOL carryforwards begin to expire in 2034, and the state NOL carryforwards begin to expire in 2034. The Company has foreign NOL carryforwards of approximately $90.2 million that do not expire and can be carried forward indefinitely.

At December 31, 2017, the Company had federal and state research and development credit carryforwards of approximately $0.2 million and $0.2 million, respectively. The federal credit carryforwards begin to expire in 2033, and the state credits carry forward indefinitely.

The Company has also incurred research and development expenses of $15.9 million and $17.9 million for the years ended December 31, 2017 and 2016, respectively. The Company believes that a portion of these expenditures will yield additional federal and California tax credits; however, the potential credits under the tax laws have not yet been calculated.

Pursuant to Internal Revenue Code of 1986, as amended (the Code) Sections 382 and 383, annual use of the Company’s federal and California net operating loss and research and development credit carryforwards may be limited in the event a cumulative change in ownership of more than 50% occurs within a three-year period. The Company has not completed a Code Section 382 analysis regarding the limitation of net operating loss carryforwards and other tax attributes. There is a risk that changes in ownership have occurred since Company's formation. If a change in ownership were to have occurred, the NOL carryforwards and other tax attributes could be limited or restricted. If limited, the related asset would be removed from the deferred tax asset schedule with a corresponding reduction in the valuation allowance. Due to the existence of the valuation allowance, limitations created by future ownership changes, if any, related to the Company’s operations in the U.S. will not impact the Company’s effective tax rate.

A reconciliation of the federal statutory income tax rate to the Company's effective income tax rate is as follows:

	For the Year Ended December 31,		
	2017	2016	2015
Federal statutory income tax rate	34.0%	34.0%	34.0%
State income taxes, net of federal benefit	4.4%	3.1%	5.0%
Tax credits	—%	1.5%	—%
Tax Cuts and JOBS Act	(22.0%)	—%	—%
Change in tax rate	(8.3%)	—%	—%
Change in valuation allowance	1.8%	(33.8%)	(34.4%)
Other	(1.6%)	—%	—%
Permanent differences	(8.3%)	(7.1%)	(4.6%)
Provision for income taxes	—%	(2.3%)	—%

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (the "Act"). The Act amends the Internal Revenue Code to reduce tax rates and modify policies, credits, and deductions for individuals and businesses. For businesses, the Act reduces the corporate tax rate from a maximum of 35% to a flat 21% rate. The rate reduction is effective on January 1, 2018. As a result of the rate reduction, the company has reduced the deferred tax asset balance as of December 31, 2017 by $2.4 million. Due to the company's full valuation allowance position, the company has also reduced the valuation allowance by the same amount.

On December 22, 2017, Staff Accounting Bulletin No. 118 ("SAB 118") was issued to address the application of US GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Act. In accordance with SAB 118, the Company has recognized the provisional tax impacts of the revaluation of the deferred tax assets and liabilities as of December 31, 2017. There was no deferred tax benefit of expense with respect to the remeasurement of certain deferred tax assets and liabilities due to the full valuation allowance against net deferred tax assets. Additional analysis of the law and the impact to the company will be performed and any impact will be recorded in the respective quarter in 2018.

NOTE 13. Commitments and Contingencies

CFFT Funding agreement

The Company has received royalty bearing grants sponsored by CFFT. Should the awards result in a successful product, the Company will pay CFFT a specified payment amount in installments following commercialization based on a formula that is six times the total award amount, plus a payment equal to the awarded payments, within sixty days after aggregate net sales of the product exceed certain thresholds. Further, in the event of a license, sale or other transfer of the product or the Company's development program technology (including a change of control transaction), the Company will pay CFFT a percentage of such transfer payments actually received by the Company or the Company's shareholders (subject to a royalty cap). As of December 31, 2017, the Company has received $0.5 million in grants and has not had a successful product utilizing CFFT grants.

Operating Leases

The Company leases approximately 10,335 square feet of office and lab space for its corporate headquarters in San Diego, California under a non-cancelable operating lease. The lease term was from November 2014 to February 2018 and included an option to extend for one additional term of three years. Monthly rental payments were due under the lease and there were escalating rent payments during the term of the lease. In October 2017, the lease was amended in conjunction with the lease of an adjacent office space and extended the lease through five days after the date of occupancy of the adjacent office space, which occurred in March 2018.

In October 2017, the Company entered into a new lease for approximately 24,705 square feet in office space adjacent to its previously occupied headquarters, whose terms provide that the lease will begin on the "Commencement Date" commensurate with delivery of the premises by the landlord (which occurred in March 2018) and will extend for approximately 84 months from the commencement date. Monthly rental payments are due under the lease and there are escalating rent payments during the term of the lease. The Company is also responsible for its proportional share of operating expenses of the building and common areas. In conjunction with the new lease, the Company will receive free rent for four months and received a tenant improvement allowance of $74,000. The lease may be extended for one five year period at then current market rate with annual escalations. The Company entered into an irrevocable standby letter of credit with the landlord for the security deposit of $96,000 upon executing the lease which is included (along with additional funds required to secure the letter of credit) in the balance of other assets as of December 31, 2017.

The Company also leases office space in Pennsylvania under a non-cancelable operating lease which expires in October 2018. This space was subleased beginning in October 2017 through the remaining term of the lease. Sublease income was immaterial for the year ended December 31, 2017, and there was no sublease income in 2016 or 2015.

For operating leases, minimum lease payments, including minimum scheduled rent increases, are recognized as rent expense on a straight-line basis over the lease term. Leasehold improvement incentives paid to the Company by the landlord are recorded as a deferred rent and amortized as a reduction of rent expense over the lease term. Rent expense totaled $334,000, $330,000 and $330,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

Future minimum payments under leases and lease commitments with initial terms greater than one year were as follows at December 31, 2017 *(in thousands)*:

2018	$ 556
2019	1,234
2020	1,271
2021	1,310
2022	1,349
Thereafter	3,138
Total	$ 8,858

The Company has purchase commitments of $1.5 million related to non-cancellable purchase orders at December 31, 2017.

Note 14. Related Party Transactions

During 2016, the Company entered into a Research Collaboration and License Agreement with a related party, Providence Therapeutics, Inc. ("Providence") whose CEO and President is also a stockholder of the Company, to identify and optimize microRNA modulators and/or mimetics for the treatment of neoplastic diseases. In April 2017, the Providence Agreement was amended to include mRNA for the treatment of neoplastic disease. As part of the agreement, the Company granted Providence the exclusive rights to research, develop, manufacture and commercialize such products and Providence made an upfront payment of $500,000 which is being amortized over the research term. Each party is responsible for their own research costs under the agreement, and Providence is responsible for all of the development costs through the completion of Phase 2 clinical trials. The Company is entitled to share in future product revenue of each product provided the Company shares in the product's post Phase 2 costs. Separately, Providence has agreed to pay a specified rate for the use of the Company's employees. For the years ended December 31, 2017 and 2016, the Company has recognized $1.0 million and $0.5 million, respectively, in revenue related to the amortization of the upfront payment and revenue related to the use of Company employees and expense reimbursements. There were no outstanding accounts receivable related to this agreement as of December 31, 2017 and 2016. During 2017, the Company stock agreement for the President and CEO of Providence was modified to remove the vesting conditions of the original grant and the Company recognized $1.5 million in related stock compensation expense. As of December 31, 2017 and 2016, the President and CEO of Providence held a 5.7% and 10% ownership interest in the Company.

Note 15. Litigation

Israel Litigation

On or about February 25, 2018, Joseph Payne, a current Director and former CEO of the Company, filed an action in the District Court at Tel Aviv – Yafo against the Company, its board of directors, Dr. Chivukula, and certain officers alleging that the separation agreement the Company entered into with a resigning officer, Dr. Chivukula, was unlawful and void, and seeking a restraining order and temporary remedies against the Company. Later that same day, in response to the plaintiff's ex parte request, the court issued a

temporary restraining order, ordering the Company to preserve the status quo until the court could consider the matter further. On March 1, 2018, the Company filed a request for clarification of and partial relief from this order. On March 5, 2018, the court ruled on the Company's request, clarifying its temporary restraining order was limited to the remedies sought in the February 25, 2018 motion. On March 12, 2018, the Company filed an opposition to plaintiff's motion for a restraining order. On March 28, 2018, plaintiff filed a motion seeking to extend the temporary restraining order and asking for various remedies related to a then-scheduled May 7, 2018 Extraordinary General Meeting of the Company's shareholders that the Company noticed on March 11, 2018, including remedies that might affect the agenda of the Extraordinary General Meeting and therefore the language of the proxy, and seeking to restrain certain conduct, including any changes in the Company's share capital, until such Extraordinary General Meeting. The court ordered the Company to file its answer to this motion by April 15, 2018. On April 8, 2018, the Company filed a notice with the court informing it that, inter alia, due to the fact that Mr. Payne chose to delay his submission of the motion to "expand" the temporary remedies and to question the agenda of the Extraordinary General Meeting – on Friday, April 6, 2018, the Company's Board convened and approved the postponement of the date of the Extraordinary General Meeting, until the court issues a decision on Mr. Payne's motion to 'expand' the temporary remedies. Later that day (April 8, 2018), Mr. Payne moved for another temporary restraining order seeking to prevent the board from delaying the Extraordinary General Meeting. The Company responded to the motion to extend the temporary restraining on April 15, 2018. On May 13, 2018, the court issued its ruling in the motion to expand the temporary remedies. The court set the agenda of the Extraordinary General Meeting, and ordered the Company to convene a Board meeting within seven days, and to summon an Extraordinary General Meeting within 35 days from that date. In addition, the court ruled that the motion regarding the changes in the Company's share capital will be decided in a hearing scheduled for May 23, 2018.

On April 18, 2018, the Company sent notice of a board meeting scheduled for April 20, 2018 to approve a private placement transaction. On April 20, 2018, Mr. Payne obtained a temporary restraining order stating that any such approval by the board may be vacated by the court. On April 22, 2018, the Company filed an opposition to the temporary restraining order, on April 25, 2018 the court held an emergency hearing on the temporary restraining order. On April 26, 2018 Mr. Payne and Dr. Chivukula filed a reply to the Company's opposition, and on April 27, 2018 certain other shareholders filed position statements with the court supporting Mr. Payne. On April 27, 2018, the Company filed a notice. On April 29, 2018, the court ruled that the temporary restraining order would stay in place. On May 2, 2018, the Company submitted a motion to amend the protocol of the hearing that took place on April 25, 2018 and to reconsider the decision of April 29, 2018. The Company therefore asked the court to direct that cross- examinations will be held on the hearing scheduled for May 9, 2018, and afterwards the court will reconsider the decision of April 29, 2018. The court ordered Mr. Payne to answer the Company's motions from May 2, 2018 by May 6, 2018. On May 6, 2018, the court ordered the Company to respond to Mr. Payne's answer to the Company's motions from May 2, 2018 by May 8, 2018. Because of the proximity to the day set for hearing, the Company asked the court to schedule another hearing for the cross- examinations. On May 13, 2018, the court denied the Company's motion to amend the protocol of the hearing that took place on April 25, 2018, but granted the Company's motion to reconsider the decision of April 29, 2018 and ordered that cross- examinations will be held on May 23, 2018.

Chivukula Arbitration

On March 21, 2018, the Company filed an arbitration demand before JAMS in San Diego, CA, seeking to arbitrate the validity of the separation agreement and related claims between the Company and Dr. Chivukula. On or about April 10, 2018, Dr. Chivukula filed an objection to the arbitration. On or about April 12, 2018, the Company responded to his objection. On April 20, 2018 JAMS preliminarily rejected the basis for Dr. Chivukula's objection to the arbitration and appointed Mr. Charles H. Dick, Jr. as the arbitrator. No arbitration date has been scheduled.

California State Court Litigation

On March 27, 2018, the Company and Arcturus Therapeutics, Inc. filed an action in the Superior Court of the State of California, San Diego County captioned *Arcturus Therapeutics Ltd.; Arcturus Therapeutics, Inc. v. Joseph E. Payne*, Case No. 37-2018-00015271-CU-BC-CTL alleging that Mr. Payne (1) breached his confidentiality and employment agreements, (2) breached his fiduciary duties to the plaintiffs during his service as President and CEO of the plaintiffs and as a director of the plaintiffs' respective boards of directors, (3) interfered with contractual relations by encouraging Dr. Chivukula, a resigning officer, to breach the consulting agreement entered into by and between Dr. Chivukula and Arcturus Therapeutics, Inc. and the voting trust agreement entered into by and between Dr. Chivukula and the Company, and (4) interfered with prospective business advantage by encouraging Company shareholders to vote against the ratification of the appointment of Ernst & Young LLP in the United States as the Company's independent auditor. The lawsuit seeks injunctive and monetary relief. Discovery requests have been served on Mr. Payne. The deadline for Mr. Payne to respond to the complaint and the discovery requests is May 15, 2018. A civil case management conference has been set for August 31, 2018.

California Federal Court Litigation

On April 19, 2018, the Company filed an action in the United States District Court, Southern District of California captioned *Arcturus Therapeutics, Inc. v. Joseph E. Payne; Peter Farrell; Andrew Sassine; Bradley Sorenson; James Barlow; and Does 1 through 100*, Case No. 18cv766-MMA(NLS) alleging that the Defendants have violated and continue to violate Section 13(d) of the Exchange Act, 15 U.S.C. §78m(d), and Regulation 13D by failing to disclose in Schedule 13D filings the existence of group agreements to buy, sell, or vote shares of the Company and effect a change in the composition of the Company's board of directors. The lawsuit seeks injunctive relief. On April 24, 2018, the Company filed a motion seeking a Temporary Restraining Order, Preliminary Injunction, and Expedited Discovery. On April 25, 2018, the court denied the Company's request for a Temporary Restraining Order but scheduled a hearing for the Company's motion for a Preliminary Injunction and Expedited Discovery for May 21, 2018.

Note 16. Subsequent Events

In preparing the financial statements as of December 31, 2016 and for the year then ended, the Company has evaluated subsequent events for recognition and measurement purposes through June 26, 2017, the date the independent auditors' report was originally issued and the audited annual financial statements were available for issuance. After the original issuance of the financial statements and through May 14, 2018, the Company has evaluated subsequent events or transactions that have occurred that may require disclosure in the accompanying financial statements. The Company has concluded that no events or transactions have occurred subsequent to December 31, 2016 that require disclosure.

In January 2018, the Company entered into a collaboration agreement with CureVac AG, to jointly discover, develop and commercialize mRNA therapeutics.

In February 2018, the Company appointed Mark Herbert as Interim President upon the termination of Joseph E. Payne as President and Chief Executive Officer (See Note 15 Litigation). Additionally, the Company appointed Dr. Christine Esau as Vice President of Research and Development, while announcing the stepping down of Dr. Chivukula as Chief Scientific Officer and Chief Operating Officer and will serve as a Scientific Advisor of the Company. In connection with Dr. Chivukula's resignation, the Company entered into an agreement providing for cash payment of $335,000 and accelerated vesting of 183,137 Ordinary Shares. The agreement also provided for an additional $100,000 payment to be made for scientific advisory services to be provided for a period of six months following the separation date.

Exhibit 3.1

VOTING TRUST AGREEMENT

This Voting Trust Agreement (this "***Agreement***") is made and entered into effective for all purposes and in all respects as of February 11, 2018 by and among (i) Arcturus Therapeutics Ltd., an Israeli company, or its successors and assigns (the "***Company***"), (ii) Padmanabh Chivukula (the "***Shareholder***"), and (iii) the then-acting Principal Executive Officer (defined below) of the Company (the "***Trustee***"), who shall initially be Mark Herbert.

Whereas, Shareholder is the legal and beneficial owner of 732,548 ordinary shares of the Company (in each case inclusive without limitation of all shares held beneficially or of record by the Shareholder's spouse) (collectively and inclusive of the definition below, the "***Shares***") as of the date hereof;

Whereas, the Shareholder desires to transfer and assign to Trustee, and Trustee desires to accept such transfer and assignment of, the right to vote or otherwise act for the Shareholder in connection with all of his rights and responsibilities as a shareholder of the Company in respect of the Shares as set forth herein; and

Whereas, the parties hereto desire to set forth in writing their understandings and agreements.

Now, Therefore, in consideration of the foregoing, of the mutual promises hereinafter set forth and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties, intending legally and equitably to be bound, hereby agree as follows:

1. Creation of Voting Trust. The Shareholder hereby transfers and assigns to Trustee, and Trustee hereby accepts the transfer and assignment of, the right to vote or otherwise act for the Shareholder in connection with all of his rights and responsibilities as a shareholder of the Company in respect of the Shares; and, in order to effectuate such transfer and assignment, the Shareholder hereby transfers to Trustee the certificates evidencing his Shares (or competent evidence thereof in the case of book-entry shares) which certificate(s) (or competent evidence thereof) shall bear a legend that said Shares are subject to the terms and provisions of this Agreement (or equivalent thereof in the case of book-entry shares). Any other shares of the Company's share capital legally or beneficially owned by the Shareholder as of the effective date of this Agreement, and any and all other shares of the Company's share capital that may be issued to Shareholder after the effective date of this Agreement upon exercise of options or other rights of the Shareholder to acquire the Company's share capital existing as of the effective date of this Agreement, shall also be subject to the terms of this Agreement and upon receiving such shares, the Shareholder shall immediately deliver or cause to be delivered all such shares to the Trustee (or competent evidence thereof in the case of book-entry shares). The term "***Shares***" as used in this Agreement shall include the Shares as first defined above as well as all such other shares issued or issuable upon exercise of options or other rights to acquire the Company's share capital by the Shareholder existing as of the effective date of this Agreement. Trustee shall hold such certificates of the Shareholder, or competent evidence thereof in the case of book-entry Shares, as trustee, subject to the terms and conditions of this Agreement.

2. Restriction on Transfer.

(a) Applicable Law; Preexisting Agreements. The Shareholder may sell, transfer, hypothecate, pledge or otherwise transfer the Shareholder's Shares in each case subject to (i) the provisions of this Agreement; (ii) the requirements of applicable securities laws and regulations; (iii) any restrictions on transfer contained in the Articles of Association or Certificate of Incorporation of the Company, as applicable, or other restrictions set forth in the organizational documents of the Company, as may be amended or restated from time to time (including policies and charters the Company applicable to the Shares as may be approved by the Board of Directors of the Company from time to time (the "***Board***")), and (iv) the applicable provisions of any other applicable agreement binding upon the Company and the Shareholder, all of which applicable agreements, laws and organizational documents are incorporated herein by reference.

(b) Transferees. Subject to Section 2(c), any transferee, other than the Company, of the Shares shall become a party to this Agreement and be subject to all the obligations of the Shareholder herein, by executing a counterpart signature page hereto, and any purported transfer, other than to the Company, of the Shares to a person or entity that has not become a party hereto shall be null and void. Any transferee, other than the Company, of the Shareholder's Shares that are subject to this Agreement shall have all the rights and shall be subject to all obligations and limitations of the transferor Shareholder set forth in this Agreement.

(c) Exempted Transferees. Notwithstanding the foregoing or anything to the contrary herein, the provisions of Section 2(b) shall not apply to the sale by the Shareholder of up to 25,000 Shares per month in open market transactions, provided that the Shareholder shall deliver prior written notice to the Company of such sale(s); provided, however, that the exempted sales pursuant to this Section 2(c) shall not exceed 250,000 Shares in any 12 month period.

3. Trustee.

(a) Rights and Powers of Trustee. So long as a Trustee shall be deemed to hold the Shares in trust in accordance with the terms hereof, the Trustee shall possess, and in the Trustee's discretion shall be entitled to exercise in person or by nominees, agents, attorneys-in-fact, or proxies, all rights and powers to vote, assent, or consent with respect to the Shares, and to take part in and consent to any corporate or shareholder action of any kind whatsoever, as well as with respect to any other securities with voting rights received in respect of the Shares by way of a stock dividend. The rights of the Trustee herein to vote, assent or consent shall include, without limitation, the right to vote at any election of the directors and in favor of or in opposition to any resolution for a proposed dissolution and liquidation, merger, or consolidation of the Company, or a sale of all or substantially all of its assets, or the issuance or creation of additional classes of its securities, or any action which may properly be presented at any shareholders' meeting or which requires the consent of the shareholders of the Company. The Shareholder shall not have any voting rights in respect of the Shares as long as this Agreement and the voting trust created hereby is in effect with respect to such Shares. Shareholder shall remain the beneficial owner of the Shares, subject to the Trustee's rights and interests hereunder.

For clarity, Trustee shall have no authority to sell, pledge, hypothecate or otherwise dispose of the Shares or any interest therein. In the event dividends are declared on the Shares, such funds shall be the exclusive property of Shareholder, and if received by the Trustee shall be remitted to Shareholder. Trustee hereby accepts his or her appointment as Trustee pursuant to the terms and conditions of this Agreement, and agrees to administer the voting trust created hereby in accordance with the terms and conditions of this Agreement, until his or her earlier resignation, removal, death or incapacitation as set forth herein.

(b) Liability of Trustee. The Trustee, including any successor Trustee, shall not be liable by reason of any matter or thing in any way arising out of or in relation to this Agreement, except for such loss or damage as the Shareholder may suffer by reason of the Trustee's gross negligence or willful misconduct. In no event shall the Trustee be liable for incidental, punitive or consequential damages. The Trustee shall not be required to give any bond or other security for the discharge of his or her duties. The Trustee is hereby expressly authorized to comply with and obey orders, judgments or decrees of any court. In case the Trustee obeys or complies with any such order, judgment or decree, it shall not be liable to the Shareholder or to any other person, firm or corporation by reason of such compliance, notwithstanding any such order, judgment or decree being subsequently reversed, modified, annulled, set aside, vacated or found to have been entered without jurisdiction.

(c) Expenses. The Company shall pay all reasonable expenses of the Trustee, including attorney fees, and shall discharge all liabilities incurred by the Trustee in connection with the exercise of his or her powers and the performance of his or her duties under this Agreement. Any action or omission undertaken by a Trustee in good faith in accordance with the advice of legal counsel and the Board shall be binding and conclusive on the Shareholder.

(d) Resignation; Successor Trustee. The Trustee shall remain Trustee for so long as Trustee is the acting "***Principal Executive Officer***" of the Company, as such term is used in Item 402 of Regulation S-K or any successor provision thereof, and may only resign or shall cease to perform his or her duties hereunder as Trustee upon resignation from, or termination by the Company of, his or her position as Principal Executive Officer of the Company, subject to the removal of a Trustee pursuant to Section 3(e). Upon such resignation or termination, the Company shall nominate a successor Trustee who shall be the successive Principal Executive Officer of the Company, who shall have all rights, powers and obligations of Trustee as set forth in this Agreement, and all rights, powers and obligations of the resigning Trustee hereunder shall immediately terminate upon such resignation and/or termination, evidenced by the execution and delivery of a counterpart signature page to this Agreement by the successor Trustee as "Trustee" hereunder. The fact that a Trustee has resigned such Trustee's position as a Trustee shall not act, or be construed to act, as a release of any Shares from the terms and provisions of this Agreement or the voting trust created hereby.

(e) Removal. In case of the Trustee cannot perform his or her duties, obligations, covenants or agreements under this Agreement, the Board shall in good faith select, nominate, and appoint an interim Trustee as quickly as is reasonably possible, who shall be an "executive officer" of the Company, as defined in as defined in Rule 3b-7 of the Exchange Act or any successor provision thereof, and who shall serve in such capacity and in accordance with the terms of this Agreement, until a successor Trustee is nominated and appointed by the

Company and duly executes a counterpart signature page to this Agreement as "Trustee" hereunder.

4. **Standstill**. From the date hereof until termination of this Agreement, without the prior written consent of the Company, Shareholder shall not directly or indirectly:

(a) (A) nominate, give notice of an intent to nominate, or recommend for nomination a person for election at any shareholder meeting at which members of the Board are to be elected; (B) initiate, encourage or participate in any solicitation of proxies in respect of any election contest with respect to the Company's directors; (C) submit any shareholder proposal for consideration at, or bring any other business before, any shareholder meeting of the Company; (D) initiate, encourage or participate in any solicitation of proxies in respect of any shareholder proposal for consideration at, or bring any other business before, any shareholder meeting of the Company; (E) initiate, encourage or participate in any "withhold" or similar campaign with respect to any shareholder meeting or any solicitation of written consents of shareholders; or (F) request, or initiate, encourage or participate in any request to call, a special meeting of the Company's shareholders;

(b) acquire, offer or propose to acquire, or agree to acquire, directly or indirectly, whether by purchase, tender or exchange offer, through the acquisition of control of another person, by joining a partnership, limited partnership, syndicate or other group (including any group of persons that would be treated as a single "person" under Section 13(d) of the Exchange Act), through swap or hedging transactions or otherwise, any voting securities of the Company or any voting rights decoupled from the underlying voting securities of the Company;

(c) form, join or in any way participate in any group with respect to any voting securities of the Company in connection with any election or removal contest with respect to the Company's directors or any shareholder proposal or other business brought before any shareholder meeting of the Company;

(d) other than as expressly set forth herein with regards to the Shares, deposit any Company voting securities in any voting trust or subject any Company voting securities to any arrangement or agreement with respect to the voting thereof;

(e) seek, alone or in concert with others, to amend any provision of the Company's articles of association or certificate of incorporation, as applicable, or other organizational documents;

(f) demand an inspection of the Company's books and records;

(g) (A) make any offer or proposal (with or without conditions) with respect to any merger, acquisition, recapitalization, restructuring, disposition or other business combination involving the Shareholder and the Company, (B) solicit any officer or director of the Company or any other person who is not a party to this Agreement (a "***Third Party***") to make an offer or proposal (with or without conditions) with respect to any merger, acquisition, recapitalization, restructuring, disposition or other business combination involving the Company, or publicly encourage, initiate or support any Third Party in making such an offer or proposal, or (C) publicly comment on any Third Party proposal regarding any merger, acquisition,

recapitalization, restructuring, disposition, or other business combination with respect to the Company by such Third Party prior to such proposal becoming public;

(h) publicly disparage or criticize (or make any other public statement or communication that might reasonably be construed to be derogatory or critical of, or negative toward) the Company, its business or any current or former directors, officers or employees of the Company, or make any other public announcement or public statement regarding the Company, its business or any current or former director, officer or employee of the Company; *provided* that this provision shall not apply to compelled testimony, either by legal process, subpoena or otherwise, or to communications that are required by an applicable legal obligation and are subject to contractual provisions providing for confidential disclosure;

(i) encourage, pursue, or assist any Third Party to threaten, initiate or pursue, any lawsuit, claim or proceeding before any court against the Company or its Representatives, or otherwise make any claims for losses, damages, or costs against the Company or its Representatives, excluding, however, any such actions initiated solely to remedy a breach of this Agreement or a breach by Company of the Resignation Agreement entered into on or about February 11, 2018; or

(j) enter into any negotiations, agreements or understandings with any Third Party with respect to the foregoing, or encourage or seek to persuade any Third Party to take any action with respect to any of the foregoing, or otherwise take or cause any action materially inconsistent with any of the foregoing.

5. Dissolution. In the event of the dissolution or total or partial liquidation of the Company, whether voluntary or involuntary, Shareholder shall receive the money, securities, rights or property to which the Shareholder is entitled (including any certificates deposited with the Trustee hereunder), and Trustee and the Company, as applicable, shall distribute such money, securities, rights or property directly to the Shareholder. Notwithstanding anything to the contrary herein, any transaction or series of transactions that are effected solely in connection with a reincorporation, redomestication, reorganization or recapitalization of the Company and its subsidiaries (as now or hereafter may exist or cease to exist) shall not result be deemed a dissolution or total or partial liquidation of the Company for purposes of this Section 5.

6. Termination of Agreement.

(a) This Agreement and the voting trust created hereby shall terminate with respect to the Shareholder's Shares upon the earliest to occur of (i) the effectiveness of a consolidation or merger of the Company with or into any other corporation or other entity, or any other corporate reorganization, in which the holders of the Company's outstanding voting shares immediately before such consolidation, merger or reorganization do not, immediately after such consolidation, merger or reorganization, retain shares representing a majority of the voting power of the surviving entity of such consolidation, merger or reorganization, (ii) a sale, lease or other disposition of all or substantially all of the assets of the Company, (iii) the date specified in a written notice of termination from Trustee to the Shareholder, (iv) the date that is three (3) years from the date of this Agreement or (v) the date upon which the number of shares legally and/or beneficially owned (not taking into account the existence of this Agreement) by the Shareholder

is less than 1.75% of the total outstanding shares of the Company. Notwithstanding anything to the contrary herein, any transaction or series of transactions that are effected solely in connection with a reincorporation, redomestication, reorganization or recapitalization of the Company and its subsidiaries (as now or hereafter may exist or cease to exist) shall not result in a termination of this Agreement or the voting trust created hereby.

(b) Upon termination of this Agreement with respect to the Shareholder's Shares, the voting trust created pursuant to Section 1 hereof shall cease to have any effect with respect to such Shares, and the parties hereto shall have no further rights or obligations under this Agreement with respect to such Shares, except that Trustee shall, within sixty (60) days after the termination of this Agreement with respect to such Shares, return the Shareholder's certificate(s) evidencing such Shares (or other evidence thereof in the case of book-entry shares if returnable) and any other property distributable under the terms hereof with respect to such Shares.

7. Trustee's Compensation. Trustee shall serve as trustee without compensation; *provided however*, that such service as Trustee shall not affect the right of the Trustee to compensation from the Company for services performed by him or her in any other capacity (*e.g.*, as an officer, director, employee or otherwise).

8. Notice to Shareholder. Any notice required hereunder to be given to the Shareholder shall be deemed effectively given: (a) upon personal delivery to the Shareholder, (b) when sent by confirmed electronic mail or facsimile, if sent during normal business hours of the Company, if not, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. For purposes of such notice, the address for the Shareholder shall be that which appears on the books of the Company at the time such notice is deemed to have been given. Any notice to be given to the Trustee shall be deemed effectively given: (a) upon personal delivery to the Trustee, (b) when sent by confirmed electronic mail or facsimile if sent during normal business hours of the Company, if not, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. For purposes of such notice, the address for the Trustee shall be that of the Company at the time such notice is deemed to have been given.

9. Modification; Waiver. No amendment or modification of this Agreement shall be effective unless in writing and signed by each of the parties hereto. Neither the failure nor any delay by a party in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof, nor shall any single or partial exercise thereof preclude any other or further exercise thereof or the exercise of any right, power or privilege hereunder.

10. Benefit and Burden. Except as otherwise provided in this Agreement, this Agreement shall inure to the benefit of, and shall be binding upon, the parties hereto and their legatees, distributees, estates, executors or administrators, personal and legal representatives, successors and assigns. For the avoidance of doubt, this Agreement may be assigned by the Company in connection with any transaction or series of transactions that are effected solely in

connection with a reincorporation, redomestication, reorganization or recapitalization of the Company and its subsidiaries (as now or hereafter may exist or cease to exist).

11. Severability. The invalidity of any particular provision of this Agreement shall not affect the validity of the remainder hereof, and in the event any provision in this Agreement is found by a court of competent jurisdiction to be invalided, this Agreement shall be construed in all respects as if such invalid or unenforceable provision were omitted. If any one or more of the provisions of this Agreement shall, for any reason, be held to be unenforceable as to duration, scope, activity or subject, such provision shall be construed by limiting and reducing it so as to make such provision enforceable to the extent compatible with the then existing applicable law. Without limiting the generality of the foregoing, it is the express intent of the parties to cause the Shares to be voted by the Trustee as provided herein. Accordingly, in the event that this Agreement is rescinded or otherwise terminated other than pursuant to its terms for any reason, the parties agree promptly to negotiate a successor voting agreement to accomplish this objective and to otherwise replicate the provisions hereof to the extent possible.

12. Applicable Law; Venue. This Agreement, and any disputes arising out of or related to this Agreement (whether for breach of contract, tortious conduct or otherwise), shall be governed by and construed and enforced in accordance with the laws of the State of Delaware without reference to the conflict of laws principles thereof that would result in the application of the law of another jurisdiction. Each party hereto irrevocably agrees that any legal action or proceeding with respect to this Agreement and the rights and obligations arising hereunder, or for recognition and enforcement of any judgment in respect of this Agreement and the rights and obligations arising hereunder brought by the other party hereto or its successors or assigns, shall be brought and determined exclusively in the Superior Court of the State of California, County of San Diego. Each party hereto hereby irrevocably submits with regard to any such action or proceeding for itself and in respect of its property, generally and unconditionally, to the personal jurisdiction of the aforesaid courts and agrees that it will not bring any action relating to this Agreement in any court other than the aforesaid courts. EACH PARTY HEREBY IRREVOCABLY WAIVES ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATED TO THIS AGREEMENT.

13. Counterparts. This Agreement may be executed in any number of separate counterparts, each of which shall be deemed to be an original, and all of which taken together shall be deemed to constitute one and the same instrument. Signatures to this Agreement transmitted by facsimile transmission, by electronic mail in “portable document format” (“.pdf”) form, or by any other electronic means intended to preserve the original graphic and pictorial appearance of a document, shall have the same effect as physical delivery of the paper document bearing the original signature.

14. Remedies; Attorney Fees. Each of the parties hereto acknowledge that a breach or default by any party hereto of the terms and provisions hereof shall cause the non-defaulting party to suffer such damage as cannot be adequately remedied by an award of monetary damages; and, in this regard, the parties hereto agree that, upon a breach or default of any of the terms or provisions hereof, the non-defaulting party shall be entitled to seek equitable remedies for such default including, without limitation, specific performance. In the event any action or proceeding is brought as a result of any alleged breach, default or dispute under the terms or

provisions hereof or for the purpose of enforcing or interpreting any of the terms or provisions hereof, the prevailing party in any such action or proceeding shall be entitled to recover from the other, in addition to such other relief as the prevailing party may be entitled, the prevailing party's reasonable attorney's fees and legal costs incurred in that action or proceeding.

15. Shareholder Acknowledgement. Shareholder acknowledges that Shareholder has read and understands this Agreement, that Shareholder is fully aware of its legal effect and that Shareholder has entered into this Agreement freely based on Shareholder's own judgment and not on any representations or promises other than those contained in this Agreement.

16. Entire Agreement. This Agreement constitutes the final, complete and exclusive agreement between the parties with respect to the subject matter hereof, and supersedes all prior and contemporaneous agreements, representations and understandings of the parties with respect to such subject matter other than as expressly set forth herein.

IN WITNESS WHEREOF, the Company, Shareholders and Trustee have executed this Agreement as of the date first set forth above.

COMPANY:

ARCTURUS THERAPEUTICS LTD.

By: /s/ Mark Herbert
Name: Mark Herbert
Its: Interim President

TRUSTEE:

/s/ Mark Herbert
Mark Herbert, Interim President

SHAREHOLDER:

PADMANABH CHIVUKULA

/s/ Padmanabh Chivukula

Acknowledged and agreed:

/s/ [Illegible]
Spouse of Shareholder

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "**Lease**") is made this 4th day of October, 2017, between **ARE-SD REGION NO. 44, LLC**, a Delaware limited liability company ("**Landlord**"), and **ARCTURUS THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**").

Building: 10628 Science Center Drive, San Diego, California

Premises: That portion of the Project, containing approximately 24,705 rentable square feet, as determined by Landlord, as shown on **Exhibit A**.

Project: The real property on which the Building in which the Premises are located, together with all improvements thereon and appurtenances thereto as described on **Exhibit B**.

Base Rent: $4.07 per rentable square foot of the Premises per month, subject to adjustment pursuant to Section 4 hereof.

Rentable Area of Premises: 24,705 sq. ft.

Rentable Area of Building: 90,469 sq. ft.

Rentable Area of Project: 294,992 sq. ft.

Tenant's Share of Operating Expenses of Building: 27.31%

Building's Share of Project: 30.67%

Security Deposit: $96,349.50

Rent Adjustment Percentage: 3%

Target Commencement Date: March 19, 2018

Base Term: Beginning on the Commencement Date and ending 84 months from the first day of the first full month after the Commencement Date (as defined in Section 2) hereof. For clarity, if the Commencement Date occurs on the first day of a month, the Base Term shall be measured from that date. If the Commencement Date occurs on a day other than the first day of a month, the Base Term shall be measured from the first day of the following month.

Permitted Use: Research and development laboratory, related office and other related uses consistent with the character of the Project and otherwise in compliance with the provisions of Section 7 hereof.

Address for Rent Payment:
Alexandria Real Estate Equities, Inc.
Dept. LA 23447
Pasadena, CA 91185-3447

Landlord's Notice Address:
385 E. Colorado Boulevard, Suite 299
Pasadena, CA 91101
Attention: Corporate Secretary

Tenant's Notice Address:
10628 Science Center Drive
San Diego, California 92121
Attention: Lease Administrator

The following Exhibits and Addenda are attached hereto and incorporated herein by this reference:

[X] **EXHIBIT A** - PREMISES DESCRIPTION
[X] **EXHIBIT B** - DESCRIPTION OF PROJECT
[X] **EXHIBIT C** - WORK LETTER
[X] **EXHIBIT D** - COMMENCEMENT DATE
[X] **EXHIBIT E** - RULES AND REGULATIONS
[X] **EXHIBIT F** - TENANT'S PERSONAL PROPERTY
[X] **EXHIBIT G** - LANDLORD'S FURNITURE
[X] **EXHIBIT H** - TENANT MAINTENANCE OBLIGATIONS

1. **Lease of Premises**. Upon and subject to all of the terms and conditions hereof, Landlord hereby leases the Premises to Tenant and Tenant hereby leases the Premises from Landlord. The portions of the Project which are for the non-exclusive use of tenants of the Project are collectively referred to herein as the "**Common Areas**." Landlord reserves the right to modify Common Areas, provided that such modifications do not materially adversely affect Tenant's use of the Premises for the Permitted Use. From and after the Commencement Date through the expiration of the Term, Tenant shall have access to the Building and the Premises 24 hours a day, 7 days a week, 365 days per year, except in the case of emergencies, as the result of Legal Requirements, the performance by Landlord of any installation, maintenance or repairs, or any other temporary interruptions, and otherwise subject to the terms of this Lease.

2. **Delivery; Acceptance of Premises; Commencement Date**. Landlord shall use reasonable efforts to deliver the Premises to Tenant on or before the Target Commencement Date, with Landlord's Work Substantially Completed ("**Delivery**" or "**Deliver**"). If Landlord fails to timely Deliver the Premises, Landlord shall not be liable to Tenant for any loss or damage resulting therefrom, and this Lease shall not be void or voidable except as provided herein. If Landlord does not Deliver the Premises within 90 days of the Target Commencement Date for any reason other than Force Majeure delays and Tenant Delays, this Lease may be terminated by Tenant by written notice to the Landlord, and if so terminated by Tenant: (a) the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant, and (b) neither Landlord nor Tenant shall have any further rights, duties or obligations under this Lease, except with respect to provisions which expressly survive termination of this Lease. As used herein, the terms "**Landlord's Work**," "**Tenant Delays**" and "**Substantially Completed**" shall have the meanings set forth for such terms in the Work Letter. If Tenant does not elect to terminate this Lease within 10 business days of the lapse of such 90 day period, such right to void this Lease shall be waived and this Lease shall remain in full force and effect.

The "**Commencement Date**" shall be the earlier of: (i) the date Landlord Delivers the Premises to Tenant; or (ii) the date Landlord could have Delivered the Premises but for Tenant Delays. Upon request of Landlord, Tenant shall execute and deliver a written acknowledgment of the Commencement Date and the expiration date of the Term when such are established in the form of the "Acknowledgement of Commencement Date" attached to this Lease as **Exhibit D**; provided, however, Tenant's failure to execute and deliver such acknowledgment shall neither affect Landlord's rights hereunder nor constitute a default under this Lease by Tenant. The "**Term**" of this Lease shall be the Base Term, as defined above on the first page of this Lease and the Extension Term which Tenant may elect pursuant to Section 40 hereof.

Subject to the provisions of Section 6 of the Work Letter, Landlord shall permit Tenant access to the Premises for a period of 30 days prior to the Commencement Date for Tenant's installation and setup of cabling, furniture, fixtures and equipment ("**FF&E Installation**"), provided that such FF&E Installation is coordinated with Landlord, and Tenant complies with the Lease and all other reasonable restrictions and conditions Landlord may impose. All such access shall be during normal business hours. Any access to the Premises by Tenant before the Commencement Date shall be subject to all of the terms and conditions of this Lease, excluding the obligation to pay Base Rent or Operating Expenses.

During the Term, Tenant shall have the right to use the furniture, fixtures and equipment belonging to Landlord described on **Exhibit G** attached to this Lease and located within the Premises on the Commencement Date ("**Landlord's Furniture**"). Notwithstanding the foregoing, Landlord and Tenant agree that **Exhibit G** may be amended prior to the Commencement Date if Landlord agrees, in its sole and absolute discretion to provide any additional furniture, fixtures or equipment for Tenant's use in the Premises or if Tenant elects, in its sole and absolute discretion, not to use any of the items listed on

Exhibit G as of the date of this Lease. Tenant shall have no right to remove any of Landlord's Furniture from the Premises without Landlord's prior written consent and Landlord's Furniture shall be returned to Landlord at the expiration or earlier termination of the Term in substantially the same condition as received by Tenant, except for ordinary wear and tear and casualty. Landlord represents to Tenant that Landlord owns the Landlord's Furniture reflected on **Exhibit G** as of date of this Lease free and clear of any third party liens or claims.

Except as set forth in the Work Letter: (i) Tenant shall accept the Premises and Landlord's Furniture in their condition as of the Commencement Date, subject to applicable Legal Requirements (as defined in Section 7 hereof); (ii) Landlord shall have no obligation for any defects in the Premises or Landlord's Furniture; and (iii) Tenant's taking possession of the Premises and Landlord's Furniture shall be conclusive evidence that Tenant accepts the Premises and Landlord's Furniture and that the Premises and Landlord's Furniture, respectively, were in good condition at the time possession was taken. Notwithstanding anything to the contrary contained herein, nothing in this paragraph shall limit Landlord's maintenance obligations under Section 13.

Except as otherwise expressly set forth in this Lease, Tenant agrees and acknowledges that neither Landlord nor any agent of Landlord has made any representation or warranty with respect to the condition of all or any portion of the Premises or the Project, and/or the suitability of the Premises or the Project for the conduct of Tenant's business, and Tenant waives any implied warranty that the Premises or the Project are suitable for the Permitted Use. This Lease constitutes the complete agreement of Landlord and Tenant with respect to the subject matter hereof and supersedes any and all prior representations, inducements, promises, agreements, understandings and negotiations which are not contained herein. Landlord in executing this Lease does so in reliance upon Tenant's representations, warranties, acknowledgments and agreements contained herein.

3. **Rent**.

(a) **Base Rent**. The first month's Base Rent shall be due and payable on the Commencment Date. The Security Deposit shall be due on the date that is 10 business days after the mutual execution and delivery of this Lease by the parties. Tenant shall pay to Landlord in advance, without demand, abatement, deduction or set-off, monthly installments of Base Rent on or before the first day of each calendar month during the Term hereof, in lawful money of the United States of America, at the office of Landlord for payment of Rent set forth above, or to such other person or at such other place as Landlord may from time to time designate in writing. Payments of Base Rent for any fractional calendar month shall be prorated. The obligation of Tenant to pay Base Rent and other sums to Landlord and the obligations of Landlord under this Lease are independent obligations. Tenant shall have no right at any time to abate, reduce, or set-off any Rent (as defined in Section 5) due hereunder except for any abatement as may be expressly provided in this Lease.

Notwithstanding anything to the contrary contained herein, so long as no Default (as defined in Section 20 below) has occurred and is outstanding under this Lease, Tenant shall not be required to pay Base Rent for the period commencing on the first day of the 2nd month after the Commencement Date through the last day of the 6th month after the Commencement Date (the "**Abatement Period**"). Tenant shall commence paying full Base Rent on the first day of the 7th month after the Commencement Date. Tenant shall be required to pay Operating Expenses and any and all other amounts payable under this Lease through the Abatement Period.

(b) **Additional Rent**. In addition to Base Rent, Tenant agrees to pay to Landlord as additional rent ("**Additional Rent**"): (i) commencing on the Commencement Date, Tenant's Share of "Operating Expenses" (as defined in Section 5), and (ii) any and all other amounts Tenant assumes or agrees to pay under the provisions of this Lease, including, without limitation, any and all other sums that may become due by reason of any default of Tenant or failure to comply with the agreements, terms, covenants and conditions of this Lease to be performed by Tenant, after any applicable notice and cure period.

4. **Base Rent Adjustments**.

(a) **Annual Adjustments**. Base Rent shall be increased on each annual anniversary of the Commencement Date during the Base Term (each an "**Adjustment Date**") by multiplying the Base Rent payable immediately before such Adjustment Date by the Rent Adjustment Percentage and adding the resulting amount to the Base Rent payable immediately before such Adjustment Date. Base Rent, as so adjusted, shall thereafter be due as provided herein. Base Rent adjustments for any fractional calendar month shall be prorated.

(b) **Excess TI Costs Allowance**. Landlord shall, subject to the terms of the Work Letter, make available to Tenant the Excess TI Costs Allowance (as defined in the Work Letter). Commencing on the Commencement Date and continuing thereafter on the first day of each month during the Base Term, Tenant shall pay the amount necessary to fully amortize the portion of the Excess TI Costs Allowance actually funded by Landlord, if any, in equal monthly payments with interest at a rate of 8% per annum over the Base Term, which interest shall begin to accrue on the date that Landlord first disburses such Excess TI Costs Allowance or any portion(s) thereof. Any of the Excess TI Costs Allowance and applicable interest remaining unpaid as of the expiration or earlier termination of this Lease shall be paid to Landlord, except as otherwise provided in Section 41, in a lump sum at the expiration or earlier termination of this Lease.

5. **Operating Expense Payments**. Landlord shall deliver to Tenant a written estimate of Operating Expenses for each calendar year during the Term (the "**Annual Estimate**"), which may be revised by Landlord from time to time (but not more than twice) during such calendar year. Commencing on the Commencement Date and continuing thereafter on the first day of each month during the Term, Tenant shall pay Landlord an amount equal to 1/12th of Tenant's Share of the Annual Estimate. Payments for any fractional calendar month shall be prorated.

The term "**Operating Expenses**" means all costs and expenses of any kind or description whatsoever incurred or accrued each calendar year by Landlord with respect to the Building (including the Building's Share of all costs and expenses of any kind or description incurred or accrued by Landlord with respect to the Project which are not specific to the Building or any other building located in the Project) (including, without duplication, Taxes (as defined in Section 9), capital repairs and improvements amortized over the useful life of such capital items (as reasonably determined by Landlord taking into account all relevant factors), the cost (including, without limitation, any subsidies which Landlord may provide in connection with the Amenities) of the common area amenities (the "**Amenities**") now or hereafter located at the Project which Amenities may include, without limitation, the Common Area fitness center, cafe, conference center, bocce ball court, barbeque pits and ping pong, and the costs of Landlord's third party property manager or, if there is no third party property manager, administration rent in the amount of 3% of Base Rent (provided that during the Abatement Period, Tenant shall nonetheless be required to pay administration rent each month equal to the amount of the administration rent that Tenant would have been required to pay in the absence of there being an Abatement Period)), excluding only:

(a) the original design and/or construction costs of the Project and renovation prior to the date of the Lease and costs of correcting defects in such original construction or renovation;

(b) capital expenditures for expansion of the Project;

(c) interest, principal payments of Mortgage (as defined in Section 27) debts of Landlord, financing costs and amortization of funds borrowed by Landlord, whether secured or unsecured;

(d) depreciation of the Project (except for capital improvements, the properly amortized portion of such cost of which is includable in Operating Expenses);

(e) advertising, legal and space planning expenses and leasing commissions and other costs and expenses incurred in procuring and leasing space to tenants for the Project, including any leasing office maintained in the Project, free rent, construction allowances and signage costs for tenants;

(f) legal and other expenses incurred in the negotiation or enforcement of leases;

(g) completing, fixturing, improving, renovating, painting, redecorating or other work, which Landlord pays for or performs for other tenants within their premises, and costs of correcting defects in such work;

(h) costs to be reimbursed by other tenants of the Project or Taxes to be paid directly by Tenant or other tenants of the Project, whether or not actually paid;

(i) salaries, wages, benefits and other compensation paid to officers and employees of Landlord who are not assigned in whole or in part to the operation, management, maintenance or repair of the Project;

(j) general organizational, administrative and overhead costs relating to maintaining Landlord's existence, either as a corporation, partnership, or other entity, including general corporate, legal and accounting expenses;

(k) costs (including attorneys' fees and costs of settlement, judgments and payments in lieu thereof) incurred in connection with disputes with tenants, other occupants, or prospective tenants, and costs and expenses, including legal fees, incurred in connection with negotiations or disputes with employees, consultants, management agents, leasing agents, purchasers or mortgagees of the Building;

(l) costs (including attorney's fees and costs of settlement, judgments and payments in lieu thereof) incurred by Landlord due to the violation by Landlord, its employees, agents or contractors or any tenant of the terms and conditions of any lease of space in the Project or any Legal Requirement (as defined in Section 7);

(m) penalties, fines or interest incurred as a result of Landlord's inability or failure to make payment of Taxes and/or to file any tax or informational returns when due, or from Landlord's failure to make any payment of Taxes required to be made by Landlord hereunder before delinquency;

(n) overhead and profit increment paid to Landlord or to subsidiaries or affiliates of Landlord for goods and/or services in or to the Project to the extent the same exceeds the costs of such goods and/or services rendered by unaffiliated third parties on a competitive basis;

(o) costs of Landlord's charitable or political contributions, or of fine art maintained at the Project;

(p) costs in connection with services (including electricity), items or other benefits of a type which are not standard for the Project and which are not available to Tenant without specific charges therefor, but which are provided to another tenant or occupant of the Project, whether or not such other tenant or occupant is specifically charged therefor by Landlord;

(q) costs incurred in the sale or refinancing of the Project;

(r) net income taxes of Landlord or the owner of any interest in the Project, franchise, capital stock, gift, estate or inheritance taxes or any federal, state or local documentary taxes imposed against the Project or any portion thereof or interest therein;

(s) any costs incurred to remove, study, test or remediate Hazardous Materials in or about the Premises, the Building or the Project for which Tenant is not responsible under Section 30 hereof;

(t) any expenses otherwise includable as Operating Expenses to the extent actually reimbursed by insurance (or, if Landlord fails to maintain the insurance required to be carried by Landlord pursuant to Section 17, would have been reimbursed by insurance required to be carried by Landlord pursuant to Section 17); and

(u) any expenses otherwise includable within Operating Expenses to the extent actually reimbursed by persons other than tenants of the Project under leases for space in the Project.

Within 90 days after the end of each calendar year (or such longer period as may be reasonably required), Landlord shall furnish to Tenant a statement (an "**Annual Statement**") showing in reasonable detail: (a) the total and Tenant's Share of actual Operating Expenses for the previous calendar year, and (b) the total of Tenant's payments in respect of Operating Expenses for such year. If Tenant's Share of actual Operating Expenses for such year exceeds Tenant's payments of Operating Expenses for such year, the excess shall be due and payable by Tenant as Rent within 30 days after delivery of such Annual Statement to Tenant. If Tenant's payments of Operating Expenses for such year exceed Tenant's Share of actual Operating Expenses for such year Landlord shall pay the excess to Tenant within 30 days after delivery of such Annual Statement, except that after the expiration, or earlier termination of the Term or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. Landlord's and Tenant's obligations to pay any overpayments or deficiencies due pursuant to this paragraph shall survive the expiration or earlier termination of this Lease.

The Annual Statement shall be final and binding upon Tenant unless Tenant, within 60 days after Tenant's receipt thereof, shall contest any item therein by giving written notice to Landlord, specifying each item contested and the reason therefor. If, during such 60 day period, Tenant reasonably and in good faith questions or contests the accuracy of Landlord's statement of Tenant's Share of Operating Expenses, Landlord will provide Tenant with access to Landlord's books and records relating to the operation of the Project and such information as Landlord reasonably determines to be responsive to Tenant's questions (the "**Expense Information**"). If after Tenant's review of such Expense Information, Landlord and Tenant cannot agree upon the amount of Tenant's Share of Operating Expenses, then Tenant shall have the right to have an independent public accounting firm selected by Tenant from among the 4 largest in the United States, working pursuant to a fee arrangement other than a contingent fee (at Tenant's sole cost and expense) and approved by Landlord (which approval shall not be unreasonably withheld or delayed), audit and/or review the Expense Information for the year in question (the "**Independent Review**"). The results of any such Independent Review shall be binding on Landlord and Tenant. If the Independent Review shows that the payments actually made by Tenant with respect to Operating Expenses for the calendar year in question exceeded Tenant's Share of Operating Expenses for such calendar year, Landlord shall at Landlord's option either (i) credit the excess amount to the next succeeding installments of estimated Operating Expenses or (ii) pay the excess to Tenant within 30 days after delivery of such statement, except that after the expiration or earlier termination of this Lease or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. If the Independent Review shows that Tenant's payments with respect to Operating Expenses for such calendar year were less than Tenant's Share of Operating Expenses for the calendar year, Tenant shall pay the deficiency to Landlord within 30 days after delivery of such statement. If the Independent Review shows that Tenant has overpaid with respect to Operating Expenses by more than 5% then Landlord shall reimburse Tenant for all costs incurred by Tenant for the Independent Review. Operating Expenses for the calendar years in which Tenant's obligation to share therein begins and ends shall be prorated. Notwithstanding anything set forth herein to the contrary, if the Building is not at least 95% occupied on average during any year of the Term, Tenant's Share of Operating Expenses for such year shall be computed as though the Building had been 95% occupied on average during such year.

"**Tenant's Share**" shall be the percentage set forth on the first page of this Lease as Tenant's Share as reasonably adjusted by Landlord for changes in the physical size of the Premises or the Project occurring thereafter. Landlord may equitably increase Tenant's Share for any item of expense or cost reimbursable by Tenant that relates to a repair, replacement, or service that benefits only the Premises or

only a portion of the Project that includes the Premises or that varies with occupancy or use. Base Rent, Tenant's Share of Operating Expenses and all other amounts payable by Tenant to Landlord hereunder are collectively referred to herein as "**Rent**."

6. **Security Deposit**. Tenant shall deposit with Landlord, within 10 business days after the mutual execution and delivery of this Lease by the parties, a security deposit (the "**Security Deposit**") for the performance of all of Tenant's obligations hereunder in the amount set forth on page 1 of this Lease, which Security Deposit shall be in the form of an unconditional and irrevocable letter of credit (the "**Letter of Credit**"): (i) in form and substance reasonably satisfactory to Landlord, (ii) naming Landlord as beneficiary, (iii) expressly allowing Landlord to draw upon it at any time from time to time by delivering to the issuer notice that Landlord is entitled to draw thereunder, (iv) issued by Silvergate Bank or another FDIC-insured financial institution reasonably satisfactory to Landlord, and (v) redeemable by presentation of a sight draft in the state of Landlord's choice. If Tenant does not provide Landlord with a substitute Letter of Credit complying with all of the requirements hereof at least 10 days before the stated expiration date of any then current Letter of Credit, Landlord shall have the right to draw the full amount of the current Letter of Credit and hold the funds drawn in cash without obligation for interest thereon as the Security Deposit. The Security Deposit shall be held by Landlord as security for the performance of Tenant's obligations under this Lease. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Upon each occurrence of a Default (as defined in Section 20), Landlord may use all or any part of the Security Deposit to pay delinquent payments due under this Lease, future rent damages under California Civil Code Section 1951.2, and the cost of any damage, injury, expense or liability caused by such Default, without prejudice to any other remedy provided herein or provided by law. Landlord's right to use the Security Deposit under this Section 6 includes the right to use the Security Deposit to pay future rent damages following the termination of this Lease pursuant to Section 21(c) below. Upon any use of all or any portion of the Security Deposit, Tenant shall pay Landlord within 5 business days of written demand from Landlord the amount that will restore the Security Deposit to the amount set forth on Page 1 of this Lease. Tenant hereby waives the provisions of any law, now or hereafter in force, including, without limitation, California Civil Code Section 1950.7, which provide that Landlord may claim from a security deposit only those sums reasonably necessary to remedy defaults in the payment of Rent, to repair damage caused by Tenant or to clean the Premises, it being agreed that Landlord may, in addition, claim those sums reasonably necessary to compensate Landlord for any other loss or damage, foreseeable or unforeseeable, caused by the act or omission of Tenant or any officer, employee, agent or invitee of Tenant. Upon bankruptcy or other debtor-creditor proceedings against Tenant, the Security Deposit shall be deemed to be applied first to the payment of Rent and other charges due Landlord for periods prior to the filing of such proceedings. If Tenant shall fully perform every provision of this Lease to be performed by Tenant, the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) within 60 days after the expiration or earlier termination of this Lease.

If Landlord transfers its interest in the Project or this Lease, Landlord shall either (a) transfer any Security Deposit then held by Landlord to a person or entity assuming Landlord's obligations under this Section 6, or (b) return to Tenant any Security Deposit then held by Landlord and remaining after the deductions permitted herein. Upon such transfer to such transferee and the assumption of Landlord's obligations thereafter arising under this Lease by the transferee, or the return of the Security Deposit to Tenant, Landlord shall have no further obligation with respect to the Security Deposit, and Tenant's right to the return of the Security Deposit shall apply solely against Landlord's transferee. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Landlord's obligation respecting the Security Deposit is that of a debtor, not a trustee, and no interest shall accrue thereon.

7. **Use**. The Premises shall be used solely for the Permitted Use set forth in the basic lease provisions on page 1 of this Lease, and in compliance with all laws, orders, judgments, ordinances, regulations, codes, directives, permits, licenses, covenants and restrictions now or hereafter applicable to the Premises, and to the use and occupancy thereof, including, without limitation, the Americans With

Disabilities Act, 42 U.S.C. § 12101, et seq. (together with the regulations promulgated pursuant thereto, "**ADA**") (collectively, "**Legal Requirements**" and each, a "**Legal Requirement**"). Tenant shall, upon 5 days' written notice from Landlord, discontinue any use of the Premises which is declared by any Governmental Authority (as defined in Section 9) having jurisdiction to be a violation of a Legal Requirement. Tenant will not use or permit the Premises to be used for any purpose or in any manner that would void Tenant's or Landlord's insurance, increase the insurance risk, or cause the disallowance of any sprinkler or other credits. Tenant shall not permit any part of the Premises to be used as a "place of public accommodation", as defined in the ADA or any similar legal requirement. Tenant shall reimburse Landlord upon 5 business days of written demand from Landlord for any additional premium charged for any such insurance policy by reason of Tenant's failure to comply with the provisions of this Section or otherwise caused by Tenant's use and/or occupancy of the Premises. Tenant will use the Premises in a careful, safe and proper manner and will not commit or permit waste, overload the floor or structure of the Premises, subject the Premises to use that would damage the Premises or obstruct or interfere with the rights of Landlord or other tenants or occupants of the Project, including conducting or giving notice of any auction, liquidation, or going out of business sale on the Premises, or using or allowing the Premises to be used for any unlawful purpose. Tenant shall cause any equipment or machinery to be installed in the Premises so as to reasonably prevent sounds or vibrations from the Premises from extending into Common Areas, or other space in the Project. Tenant shall not place any machinery or equipment weighing 500 pounds or more in or upon the Premises or transport or move such items through the Common Areas of the Project or in the Project elevators without the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned or delayed. Except as may be provided under the Work Letter, Tenant shall not, without the prior written consent of Landlord, use the Premises in any manner which will require ventilation, air exchange, heating, gas, steam, electricity or water beyond the existing capacity of the Project as proportionately allocated to the Premises based upon Tenant's Share as usually furnished for the Permitted Use.

Landlord shall be responsible for the compliance of the Premises with Legal Requirements as of the Commencement Date. Thereafter, Tenant, at its sole expense, shall make any alterations or modifications to the interior or the exterior of the Premises or the Project that are required by Legal Requirements (including, without limitation, compliance of the Premises with the ADA) to the extent related to Tenant's particular use or occupancy of the Premises or Tenant's Alterations. Notwithstanding any other provision herein to the contrary, Tenant shall be responsible for any and all demands, claims, liabilities, losses, costs, expenses, actions, causes of action, damages or judgments, and all reasonable expenses incurred in investigating or resisting the same (including, without limitation, reasonable attorneys' fees, charges and disbursements and costs of suit) (collectively, "**Claims**") arising out of or in connection with Legal Requirements related to Tenant's use or occupancy of the Premises or Tenant's Alterations, and Tenant shall indemnify, defend, hold and save Landlord harmless from and against any and all Claims arising out of or in connection with any failure of the Premises to comply with any Legal Requirement related to Tenant's use or occupancy of the Premises or Tenant's Alterations.

8. **Holding Over**. If, with Landlord's express written consent, Tenant retains possession of the Premises after the termination of the Term, (i) unless otherwise agreed in such written consent, such possession shall be subject to termination by Landlord at any time upon 5 days notice, (ii) all of the other terms and provisions of this Lease (including, without limitation, the adjustment of Base Rent pursuant to Section 4 hereof) shall remain in full force and effect (excluding any expansion or renewal option or other similar right or option) during such holdover period, (iii) Tenant shall continue to pay Base Rent in the amount payable upon the date of the expiration or earlier termination of this Lease or such other amount as Landlord may indicate, in Landlord's sole and absolute discretion, in such written consent, and (iv) all other payments shall continue under the terms of this Lease. If Tenant remains in possession of the Premises after the expiration or earlier termination of the Term without the express written consent of Landlord, (A) Tenant shall become a tenant at sufferance upon the terms of this Lease except that the monthly Base Rent amount shall be equal to 150% of Base Rent in effect during the last 30 days of the Term, and (B) Tenant shall be responsible for all damages suffered by Landlord resulting from or occasioned by Tenant's holding over, including consequential damages. No holding over by Tenant, whether with or without consent of Landlord, shall operate to extend this Lease except as otherwise expressly provided, and this Section 8 shall not be construed as consent for Tenant to retain possession

of the Premises. Acceptance by Landlord of Rent after the expiration of the Term or earlier termination of this Lease shall not result in a renewal or reinstatement of this Lease.

9. **Taxes**. Landlord shall pay, as part of Operating Expenses, all taxes, levies, fees, assessments and governmental charges of any kind, existing as of the Commencement Date or thereafter enacted (collectively referred to as "**Taxes**"), imposed by any federal, state, regional, municipal, local or other governmental authority or agency, including, without limitation, quasi-public agencies (collectively, "**Governmental Authority**") during the Term, including, without limitation, all Taxes: (i) imposed on or measured by or based, in whole or in part, on rent payable to (or gross receipts received by) Landlord under this Lease and/or from the rental by Landlord of the Project or any portion thereof, or (ii) based on the square footage, assessed value or other measure or evaluation of any kind of the Premises or the Project, or (iii) assessed or imposed by or on the operation or maintenance of any portion of the Premises or the Project, including parking, or (iv) assessed or imposed by, or at the direction of, or resulting from Legal Requirements, or interpretations thereof, promulgated by any Governmental Authority, or (v) imposed as a license or other fee, charge, tax, or assessment on Landlord's business or occupation of leasing space in the Project. Landlord may contest by appropriate legal proceedings the amount, validity, or application of any Taxes or liens securing Taxes. Taxes shall not include any net income taxes imposed on Landlord except to the extent such net income taxes are in substitution for any Taxes payable hereunder. If any such Tax is levied or assessed directly against Tenant, then Tenant shall be responsible for and shall pay the same at such times and in such manner as the taxing authority shall require. Tenant shall pay, prior to delinquency, any and all Taxes levied or assessed against any personal property or trade fixtures placed by Tenant in the Premises, whether levied or assessed against Landlord or Tenant. If any Taxes on Tenant's personal property or trade fixtures are levied against Landlord or Landlord's property, or if the assessed valuation of the Project is increased by a value attributable to improvements in or alterations to the Premises, whether owned by Landlord or Tenant and whether or not affixed to the real property so as to become a part thereof, higher than the base valuation on which Landlord from time-to-time allocates Taxes to all tenants in the Project, Landlord shall have the right, but not the obligation, to pay such Taxes. Landlord's reasonable determination of any excess assessed valuation shall be binding and conclusive, absent manifest error. The amount of any such payment by Landlord shall constitute Additional Rent due from Tenant to Landlord within 10 business days after written demand from Landlord.

10. **Parking**. Subject to all matters of record, Force Majeure, a Taking (as defined in Section 19 below) and the exercise by Landlord of its rights hereunder, Tenant shall have the right, to use 62 parking spaces in those areas of the subterranean parking facility and the surface parking lot serving the Building designated for non-reserved parking, subject in each case to Landlord's rules and regulations. Five (5) of the parking spaces allocated to Tenant pursuant to this Section 10 may be marked by Landlord, at Tenant's cost, as designated spaces for Tenant and/or Tenant's guests, which designated spaces shall be located near the main entrance of the Building and otherwise in a location reasonably acceptable to Landlord and Tenant. Landlord shall not be responsible for enforcing Tenant's parking rights against any third parties, including other tenants of the Project or for enforcing any such reservation of parking spaces.

11. **Utilities, Services**. Landlord shall provide, subject to the terms of this Section 11, water, electricity, HVAC, light, power, sewer, and other utilities (including gas and fire sprinklers to the extent the Project is plumbed for such services), and, with respect to the Common Areas, refuse and trash collection and janitorial services (collectively, "**Utilities**"). Landlord shall pay, as Operating Expenses or subject to Tenant's reimbursement obligation, for all Utilities used on the Premises, all maintenance charges for Utilities, and any storm sewer charges or other similar charges for Utilities imposed by any Governmental Authority or Utility provider, and any taxes, penalties, surcharges or similar charges thereon. Landlord may cause, at Landlord's expense, any Utilities to be separately metered or charged directly to Tenant by the provider. Tenant shall pay directly to the Utility provider, prior to delinquency, any separately metered Utilities and services which may be furnished to Tenant or the Premises during the Term. Tenant shall pay, as part of Operating Expenses, its share of all charges for jointly metered Utilities based upon consumption, as reasonably determined by Landlord. No interruption or failure of Utilities, from any cause whatsoever other than Landlord's willful misconduct, shall result in eviction or constructive eviction

of Tenant, termination of this Lease or, except as otherwise provided in the immediately following paragraph, the abatement of Rent. Tenant agrees to limit use of water and sewer with respect to Common Areas to normal restroom use. Utilities shall be available to the Premises 24 hours per day, 7 days per week, except in the case of emergencies, as the result of Legal Requirements, the failure of any Utility provider to provide such Utilities, the performance by Landlord or any Utility provider of any installation, maintenance or repairs, or any other temporary interruptions. Tenant shall be responsible for obtaining (from vendors reasonably acceptable to Landlord) and paying for its own janitorial services for the Premises.

Notwithstanding anything to the contrary set forth herein, if (i) a stoppage of an Essential Service (as defined below) to the Premises shall occur and such stoppage is due solely to the gross negligence or willful misconduct of Landlord and not due in any part to any act or omission on the part of Tenant or any Tenant Party or any matter beyond Landlord's reasonable control (any such stoppage of an Essential Service being hereinafter referred to as a "**Service Interruption**"), and (ii) such Service Interruption continues for more than 5 consecutive days after Landlord shall have received written notice thereof from Tenant, and (iii) as a result of such Service Interruption, the conduct of Tenant's normal operations in the Premises are materially and adversely affected, then, there shall be an abatement of one day's Base Rent for each day during which such Service Interruption continues after such 5 day period; provided, however, that if any part of the Premises is reasonably useable for Tenant's normal business operations or if Tenant conducts all or any part of its operations in any portion of the Premises notwithstanding such Service Interruption, then the amount of each daily abatement of Base Rent shall only be proportionate to the nature and extent of the interruption of Tenant's normal operations or ability to use the Premises. The rights granted to Tenant under this paragraph shall be Tenant's sole and exclusive remedy resulting from a failure of Landlord to provide services, and Landlord shall not otherwise be liable for any loss or damage suffered or sustained by Tenant resulting from any failure or cessation of services. For purposes hereof, the term "**Essential Services**" shall mean the following services: HVAC service, water, sewer and electricity, but in each case only to the extent that Landlord has an obligation to provide same to Tenant under this Lease. The provisions of this paragraph shall only apply as long as the original Tenant is the tenant occupying the Premises under this Lease and shall not apply to any assignee or sublessee.

Landlord's sole obligation for either providing emergency generators or providing emergency back-up power to Tenant shall be: (i) to provide emergency generators with not less than the capacity of the emergency generators serving the Building as of the Commencement Date, and (ii) to contract with a third party to maintain the emergency generators as per the manufacturer's standard maintenance guidelines. Landlord shall have no obligation to provide Tenant with operational emergency generators or back-up power or to supervise, oversee or confirm that the third party maintaining the emergency generators is maintaining the generators as per the manufacturer's standard guidelines or otherwise. During any period of replacement, repair or maintenance of the emergency generators when the emergency generators are not operational, including any delays thereto due to the inability to obtain parts or replacement equipment, Landlord shall have no obligation to provide Tenant with an alternative back-up generator or generators or alternative sources of back-up power. Tenant expressly acknowledges and agrees that Landlord does not guaranty that such emergency generators will be operational at all times or that emergency power will be available to the Premises when needed.

12. **Alterations and Tenant's Property**. Any alterations, additions, or improvements made to the Premises by or on behalf of Tenant, including additional locks or bolts of any kind or nature upon any doors or windows in the Premises, but excluding installation, removal or realignment of furniture systems (other than removal of furniture systems owned or paid for by Landlord) not involving any modifications to the structure or connections (other than by ordinary plugs or jacks) to Building Systems (as defined in Section 13) ("**Alterations**") shall be subject to Landlord's prior written consent, which may be given or withheld in Landlord's sole discretion if any such Alteration affects the structure or Building Systems and shall not be otherwise unreasonably withheld, conditioned or delayed. Tenant may construct nonstructural, cosmetic Alterations in the Premises without Landlord's prior approval if the aggregate cost of all such work in any 12 month period does not exceed $25,000 (a "**Notice-Only Alteration**"), provided Tenant notifies Landlord in writing of such intended Notice-Only Alteration, and such notice shall be accompanied by plans, specifications, work contracts and such other information concerning the

nature and cost of the Notice-Only Alteration as may be reasonably requested by Landlord, which notice and accompanying materials shall be delivered to Landlord not less than 15 business days in advance of any proposed construction. If Landlord approves any Alterations, Landlord may impose such conditions on Tenant in connection with the commencement, performance and completion of such Alterations as Landlord may deem appropriate in Landlord's reasonable discretion. Any request for approval shall be in writing, delivered not less than 15 business days in advance of any proposed construction, and accompanied by plans, specifications, bid proposals, work contracts and such other information concerning the nature and cost of the alterations as may be reasonably requested by Landlord, including the identities and mailing addresses of all contractors and first tier subcontractors performing work or supplying materials. Landlord's right to review plans and specifications and to monitor construction shall be solely for its own benefit, and Landlord shall have no duty to ensure that such plans and specifications or construction comply with applicable Legal Requirements. Tenant shall cause, at its sole cost and expense, all Alterations to comply with insurance requirements and with Legal Requirements and shall implement at its sole cost and expense any alteration or modification required by Legal Requirements as a result of any Alterations. Tenant shall pay to Landlord, as Additional Rent, on demand an amount equal to 3% of all charges incurred by Tenant or its contractors or agents in connection with any Alteration to cover Landlord's overhead and expenses for plan review, coordination, scheduling and supervision; provided, however, that no fee shall be charged by Landlord in connection with a Notice-Only Alteration and/or if Landlord's involvement is limited to the review and approval of Tenant's plans. Before Tenant begins any Alteration, Landlord may post on and about the Premises notices of non-responsibility pursuant to applicable law. Tenant shall reimburse Landlord for, and indemnify and hold Landlord harmless from, any expense incurred by Landlord by reason of faulty work done by Tenant or its contractors, delays caused by such work, or inadequate cleanup.

Tenant shall furnish security or make other arrangements reasonably satisfactory to Landlord to assure payment for the completion of all Alterations work free and clear of liens, and shall provide (and cause each contractor or subcontractor to provide) certificates of insurance for workers' compensation and other coverage in amounts and from an insurance company satisfactory to Landlord, in its reasonable discretion, protecting Landlord against liability for personal injury or property damage during construction. Upon completion of any Alterations, Tenant shall deliver to Landlord: (i) sworn statements setting forth the names of all contractors and subcontractors who did the work and final lien waivers from all such contractors and subcontractors; and (ii) "as built" plans for any such Alteration, if the nature of such Alteration required such plans.

Except for Removable Installations (as hereinafter defined), all Installations (as hereinafter defined) shall be and shall remain the property of Landlord during the Term and following the expiration or earlier termination of the Term, shall not be removed by Tenant at any time during the Term, and shall remain upon and be surrendered with the Premises as a part thereof. Notwithstanding the foregoing, Landlord shall, if requested in writing by Tenant at the time Landlord's approval of any such Installation is requested, or at the time it receives notice of a Notice-Only Alteration, notify Tenant whether Landlord requires that Tenant remove such Installation upon the expiration or earlier termination of the Term, in which event Tenant shall remove such Installation in accordance with the immediately succeeding sentence. Upon the expiration or earlier termination of the Term, Tenant shall remove (i) all wires, cables or similar equipment which Tenant has installed in the Premises or in the risers or plenums of the Building, (ii) any Installations for which Landlord has given Tenant notice of removal in accordance with the immediately preceding sentence, and (iii) all of Tenant's Property (as hereinafter defined), and Tenant shall restore and repair any damage caused by or occasioned as a result of such removal, including, without limitation, capping off all such connections behind the walls of the Premises and repairing any holes. During any restoration period beyond the expiration or earlier termination of the Term, Tenant shall pay Rent to Landlord as provided herein as if said space were otherwise occupied by Tenant.

For purposes of this Lease, (x) "**Removable Installations**" means any items listed on **Exhibit F** attached hereto and any items agreed by Landlord in writing to be included on **Exhibit F** in the future, (y) "**Tenant's Property**" means Removable Installations and, other than Installations, any personal property or equipment of Tenant that may be removed without material damage to the Premises, and (z) "**Installations**" means all property of any kind paid for as part of TI Costs or Excess TI Costs, all

Alterations, all fixtures, and all partitions, hardware, built-in machinery, built-in casework and cabinets and other similar additions, equipment, property and improvements built into the Premises so as to become an integral part of the Premises, including, without limitation, fume hoods which penetrate the roof or plenum area, built-in cold rooms, built-in warm rooms, walk-in cold rooms, walk-in warm rooms, deionized water systems, glass washing equipment, autoclaves, chillers, built-in plumbing, electrical and mechanical equipment and systems, and any power generator and transfer switch.

13. **Landlord's Repairs**. Landlord, as an Operating Expense, shall (except to the extent expressly excluded from Operating Expenses pursuant to Section 5) maintain all of the structural, exterior, parking and other Common Areas of the Project, and all Building systems serving the Premises and other portions of the Project including HVAC, electrical, mechanical, plumbing, elevators and life safety systems including fire sprinklers (collectively, "**Building Systems**"), in good repair, reasonable wear and tear and uninsured losses and damages caused by Tenant, or by any of Tenant's agents, servants, employees, invitees and contractors (collectively, "**Tenant Parties**") excluded. Losses and damages caused by Tenant or any Tenant Party shall be repaired by Landlord, to the extent not covered by insurance, at Tenant's sole cost and expense. Landlord reserves the right to stop Building Systems services when necessary (i) by reason of accident or emergency, or (ii) for planned repairs, alterations or improvements, which are, in the reasonable judgment of Landlord, desirable or necessary to be made, until said repairs, alterations or improvements shall have been completed. Landlord shall have no responsibility or liability for failure to supply Building Systems services during any such period of interruption; provided, however, that Landlord shall, except in case of emergency, give Tenant 24 hours advance notice of any planned stoppage of Building Systems services for routine maintenance, repairs, alterations or improvements. Tenant shall promptly give Landlord written notice of any repair of which Tenant becomes aware required by Landlord pursuant to this Section, after which Landlord shall make a commercially reasonable effort to effect such repair within a reasonable period. Landlord shall not be liable for any failure to make any repairs or to perform any maintenance unless such failure shall persist for an unreasonable time after Tenant's written notice of the need for such repairs or maintenance. Tenant waives its rights under any state or local law to terminate this Lease or to make such repairs at Landlord's expense and agrees that the parties' respective rights with respect to such matters shall be solely as set forth herein. Repairs required as the result of fire, earthquake, flood, vandalism, war, or similar cause of damage or destruction shall be controlled by Section 18.

Notwithstanding anything to the contrary contained in this Lease, as of the Commencement Date, the maintenance and repair obligations for the Premises shall be allocated between Landlord and Tenant as set forth on **Exhibit H** attached hereto. The maintenance obligations allocated to Tenant pursuant to **Exhibit H** (the "**Tenant Maintenance Obligations**") shall be performed by Tenant at Tenant's sole cost and expense. The Tenant Maintenance Obligations shall include the procurement and maintenance of contracts, in form and substance reasonably satisfactory to Landlord, with copies to Landlord upon Landlord's written request, for and with contractors reasonably acceptable to Landlord specializing and experienced in the respective Tenant Maintenance Obligations. Notwithstanding anything to the contrary contained herein, the scope of work of any such contracts entered into by Tenant pursuant to this paragraph shall, at a minimum, comply with manufacturer's recommended maintenance procedures for the optimal performance of the applicable equipment. Landlord shall, notwithstanding anything to the contrary contained in this Lease, have no obligation to perform any Tenant Maintenance Obligations. The Tenant Maintenance Obligations shall not include the right or obligation on the part of Tenant to make any structural and/or capital repairs or improvements to the Premises, and Landlord shall, during any period that Tenant is responsible for the Tenant Maintenance Obligations, continue, as part of Operating Expenses, to be responsible, as provided in the immediately preceding paragraph, for capital repairs and replacements required to be made to the Project. If Tenant fails to maintain any portion of the Premises for which Tenant is responsible as part of the Tenant Maintenance Obligations in a manner reasonably acceptable to Landlord within the requirements of this Lease, Landlord shall have the right, but not the obligation, to provide Tenant with written notice thereof and to assume the Tenant Maintenance Obligations if Tenant does not cure Tenant's failure within 15 days after receipt of such notice.

14. **Tenant's Repairs**. Subject to Section 13 hereof, Tenant, at its expense, shall repair, replace and maintain in good condition all interior portions of the Premises, including, without limitation,

entries, doors, ceilings, interior windows, interior walls, and the interior side of demising walls. Should Tenant fail to make any such repair or replacement or fail to maintain the interior of the Premises, Landlord shall give Tenant written notice of such failure. If Tenant fails to commence cure of such failure within 10 days of Landlord's notice, and thereafter diligently prosecute such cure to completion, Landlord may perform such work and shall be reimbursed by Tenant within 10 days after demand therefor; provided, however, that if such failure by Tenant creates or could create an emergency, Landlord may immediately commence cure of such failure and shall thereafter be entitled to recover the costs of such cure from Tenant. Subject to Sections 17 and 18, Tenant shall bear the full uninsured cost of any repair or replacement to any part of the Project that results from damage caused by Tenant or any Tenant Party and any repair that benefits only the Premises.

15. **Mechanic's Liens**. Tenant shall discharge, by bond or otherwise, any mechanic's lien filed against the Premises or against the Project for work claimed to have been done for, or materials claimed to have been furnished to, Tenant within 15 days after Tenant receives notice of the filing thereof, at Tenant's sole cost and shall otherwise keep the Premises and the Project free from any liens arising out of work performed, materials furnished or obligations incurred by Tenant. Should Tenant fail to discharge any lien described herein within the time period set forth above, Landlord shall have the right, but not the obligation, to pay such claim or post a bond or otherwise provide security to eliminate the lien as a claim against title to the Project and the cost thereof shall be immediately due from Tenant as Additional Rent. If Tenant shall lease or finance the acquisition of office equipment, furnishings, or other personal property of a removable nature utilized by Tenant in the operation of Tenant's business, Tenant warrants that any Uniform Commercial Code Financing Statement filed as a matter of public record by any lessor or creditor of Tenant will upon its face or by exhibit thereto indicate that such Financing Statement is applicable only to removable personal property of Tenant located within the Premises. In no event shall the address of the Project be furnished on the statement without qualifying language as to applicability of the lien only to removable personal property, located in an identified suite held by Tenant.

16. **Indemnification**. Tenant hereby indemnifies and agrees to defend, save and hold Landlord, its officers, directors, employees, managers, agents, sub-agents, constituent entities and lease signators (collectively, "**Landlord Indemnified Parties**") harmless from and against any and all Claims for injury or death to persons or damage to property occurring within or about the Premises or the Project arising directly or indirectly out of use or occupancy of the Premises or the Project (including, without limitation, any act, omission or neglect by Tenant or any Tenant's Parties in or about the Premises or at the Project) or the a breach or default by Tenant in the performance of any of its obligations hereunder, except to the extent caused by the willful misconduct or gross negligence of Landlord Indemnified Parties. Landlord shall not be liable to Tenant for, and Tenant assumes all risk of damage to, personal property (including, without limitation, loss of records kept within the Premises). Tenant further waives any and all Claims for injury to Tenant's business or loss of income relating to any such damage or destruction of personal property (including, without limitation, any loss of records). Landlord Indemnified Parties shall not be liable for any damages arising from any act, omission or neglect of any tenant in the Project or of any other third party or Tenant Parties.

17. **Insurance**. Landlord shall maintain all risk property and, if applicable, sprinkler damage insurance covering the full replacement cost of the Project. Landlord shall further procure and maintain commercial general liability insurance with a single loss limit of not less than $2,000,000 for bodily injury and property damage with respect to the Project. Landlord may, but is not obligated to, maintain such other insurance and additional coverages as it may deem necessary, including, but not limited to, flood, environmental hazard and earthquake, loss or failure of building equipment, errors and omissions, rental loss during the period of repair or rebuilding, workers' compensation insurance and fidelity bonds for employees employed to perform services and insurance for any improvements installed by Tenant or which are in addition to the standard improvements customarily furnished by Landlord without regard to whether or not such are made a part of the Project. All such insurance shall be included as part of the Operating Expenses. The Project may be included in a blanket policy (in which case the cost of such insurance allocable to the Project will be determined by Landlord based upon the insurer's cost calculations). Tenant shall also reimburse Landlord for any increased premiums or additional insurance which Landlord reasonably deems necessary as a result of Tenant's use of the Premises.

Tenant, at its sole cost and expense, shall maintain during the Term: all risk property insurance with business interruption and extra expense coverage, covering the full replacement cost of all property and improvements installed or placed in the Premises by Tenant at Tenant's expense; workers' compensation insurance with no less than the minimum limits required by law; employer's liability insurance with employers liability limits of $1,000,000 bodily injury by accident – each accident, $1,000,000 bodily injury by disease – policy limit, and $1,000,000 bodily injury by disease – each employee; and commercial general liability insurance, with a minimum limit of not less than $2,000,000 per occurrence for bodily injury and property damage with respect to the Premises. The commercial general liability insurance maintained by Tenant shall name Alexandria Real Estate Equities, Inc., and Landlord, its officers, directors, employees, managers, agents, sub-agents, constituent entities and lease signators (collectively, "**Landlord Insured Parties**"), as additional insureds; insure on an occurrence and not a claims-made basis; be issued by insurance companies which have a rating of not less than policyholder rating of A and financial category rating of at least Class X in "Best's Insurance Guide"; shall not be cancelable for nonpayment of premium unless 30 days prior written notice shall have been given to Landlord from the insurer; not contain a hostile fire exclusion; contain a contractual liability endorsement; and provide primary coverage to Landlord Insured Parties (any policy issued to Landlord Insured Parties providing duplicate or similar coverage shall be deemed excess over Tenant's policies, regardless of limits). Copies of such policies (if requested by Landlord), or certificates of insurance showing the limits of coverage required hereunder and showing Landlord as an additional insured, along with reasonable evidence of the payment of premiums for the applicable period, shall be delivered to Landlord by Tenant prior to (i) the earlier to occur of (x) the Commencement Date, or (y) the date that Tenant accesses the Premises under this Lease, and (ii) each renewal of said insurance. Tenant's policy may be a "blanket policy" with an aggregate per location endorsement which specifically provides that the amount of insurance shall not be prejudiced by other losses covered by the policy. Tenant shall, at least 5 days prior to the expiration of such policies, furnish Landlord with renewal certificates.

In each instance where insurance is to name Landlord as an additional insured, Tenant shall upon written request of Landlord also designate and furnish certificates so evidencing Landlord as additional insured to: (i) any lender of Landlord holding a security interest in the Project or any portion thereof, (ii) the landlord under any lease wherein Landlord is tenant of the real property on which the Project is located, if the interest of Landlord is or shall become that of a tenant under a ground or other underlying lease rather than that of a fee owner, and/or (iii) any management company retained by Landlord to manage the Project.

The property insurance obtained by Landlord and Tenant shall include a waiver of subrogation by the insurers and all rights based upon an assignment from its insured, against Landlord or Tenant, and their respective officers, directors, employees, managers, agents, invitees and contractors ("**Related Parties**"), in connection with any loss or damage thereby insured against. Neither party nor its respective Related Parties shall be liable to the other for loss or damage caused by any risk insured against under property insurance required to be maintained hereunder, and each party waives any claims against the other party, and its respective Related Parties, for such loss or damage. The failure of a party to insure its property shall not void this waiver. Landlord and its respective Related Parties shall not be liable for, and Tenant hereby waives all claims against such parties for, business interruption and losses occasioned thereby sustained by Tenant or any person claiming through Tenant resulting from any accident or occurrence in or upon the Premises or the Project from any cause whatsoever. If the foregoing waivers shall contravene any law with respect to exculpatory agreements, the liability of Landlord or Tenant shall be deemed not released but shall be secondary to the other's insurer.

Landlord may require insurance policy limits to be raised to conform with requirements of Landlord's lender and/or to bring coverage limits to levels then being generally required of new tenants within the Project; provided, however, that the increased amount of coverage is consistent with coverage amounts then being required by institutional owners of similar projects with tenants occupying similar size premises in the geographical area in which the Project is located.

18. **Restoration**. If, at any time during the Term, the Project or the Premises are damaged or destroyed by a fire or other insured casualty, Landlord shall notify Tenant within 60 days after

discovery of such damage as to the amount of time Landlord reasonably estimates it will take to restore the Project or the Premises, as applicable (the "**Restoration Period**"). If the Restoration Period is estimated to exceed 12 months (the "**Maximum Restoration Period**"), Landlord may, in such notice, elect to terminate this Lease as of the date that is 75 days after the date of discovery of such damage or destruction; provided, however, that notwithstanding Landlord's election to restore, Tenant may elect to terminate this Lease by written notice to Landlord delivered within 5 business days of receipt of a notice from Landlord estimating a Restoration Period for the Premises longer than the Maximum Restoration Period. Unless either Landlord or Tenant so elects to terminate this Lease, Landlord shall, subject to receipt of sufficient insurance proceeds (with any deductible to be treated as a current Operating Expense), promptly restore the Premises (excluding the improvements installed by Tenant or by Landlord and paid for by Tenant), subject to delays arising from the collection of insurance proceeds, from Force Majeure events or as needed to obtain any license, clearance or other authorization of any kind required to enter into and restore the Premises issued by any Governmental Authority having jurisdiction over the use, storage, handling, treatment, generation, release, disposal, removal or remediation of Hazardous Materials (as defined in Section 30) in, on or about the Premises (collectively referred to herein as "**Hazardous Materials Clearances**"); provided, however, that if repair or restoration of the Premises is not substantially complete as of the end of the Maximum Restoration Period or, if longer, the Restoration Period, Landlord may, in its sole and absolute discretion, elect not to proceed with such repair and restoration, or Tenant may by written notice to Landlord delivered within 5 business days of the expiration of the Maximum Restoration Period or, if longer, the Restoration Period, elect to terminate this Lease, in which event Landlord shall be relieved of its obligation to make such repairs or restoration and this Lease shall terminate as of the date that is 75 days after the later of: (i) discovery of such damage or destruction, or (ii) the date all required Hazardous Materials Clearances are obtained, but Landlord shall retain any Rent paid and the right to any Rent payable by Tenant prior to such election by Landlord or Tenant.

Tenant, at its expense, shall promptly perform, subject to delays arising from the collection of insurance proceeds, from Force Majeure (as defined in Section 34) events or to obtain Hazardous Material Clearances, all repairs or restoration not required to be done by Landlord. Notwithstanding the foregoing, either Landlord or Tenant may terminate this Lease upon written notice to the other if the Premises are damaged during the last year of the Term and Landlord reasonably estimates that it will take more than 2 months to repair such damage; provided, however, that such notice is delivered within 10 business days after the date that Landlord provides Tenant with written notice of the estimated Restoration Period. Notwithstanding anything to the contrary contained herein, Landlord shall also have the right to terminate this Lease if insurance proceeds are not available for such restoration (for any reason other than Landlord's failure to maintain the insurance required to be maintained by Landlord pursuant to Section 17). Rent shall be abated from the date all required Hazardous Material Clearances are obtained until the Premises are repaired and restored, in the proportion which the area of the Premises, if any, which is not usable by Tenant bears to the total area of the Premises, unless Landlord provides Tenant with other space during the period of repair that is suitable, in Tenant's reasonable discretion, for the temporary conduct of Tenant's business. Such abatement shall be the sole remedy of Tenant, and except as provided in this Section 18, Tenant waives any right to terminate the Lease by reason of damage or casualty loss.

The provisions of this Lease, including this Section 18, constitute an express agreement between Landlord and Tenant with respect to any and all damage to, or destruction of, all or any part of the Premises, or any other portion of the Project, and any statute or regulation which is now or may hereafter be in effect shall have no application to this Lease or any damage or destruction to all or any part of the Premises or any other portion of the Project, the parties hereto expressly agreeing that this Section 18 sets forth their entire understanding and agreement with respect to such matters.

19. **Condemnation**. If the whole or any material part of the Premises or the Project is taken for any public or quasi-public use under governmental law, ordinance, or regulation, or by right of eminent domain, or by private purchase in lieu thereof (a "**Taking**" or "**Taken**"), and the Taking would in Landlord's reasonable judgment, either prevent or materially interfere with Tenant's use of the Premises or materially interfere with or impair Landlord's ownership or operation of the Project, then upon written notice by

Landlord this Lease shall terminate and Rent shall be apportioned as of said date. If part of the Premises shall be Taken, and this Lease is not terminated as provided above, Landlord shall promptly restore the Premises and the Project as nearly as is commercially reasonable under the circumstances to their condition prior to such partial Taking and the rentable square footage of the Building, the rentable square footage of the Premises, Tenant's Share of Operating Expenses and the Rent payable hereunder during the unexpired Term shall be reduced to such extent as may be fair and reasonable under the circumstances. Upon any such Taking, Landlord shall be entitled to receive the entire price or award from any such Taking without any payment to Tenant, and Tenant hereby assigns to Landlord Tenant's interest, if any, in such award. Tenant shall have the right, to the extent that same shall not diminish Landlord's award, to make a separate claim against the condemning authority (but not Landlord) for such compensation as may be separately awarded or recoverable by Tenant for moving expenses and damage to Tenant's trade fixtures, if a separate award for such items is made to Tenant. Tenant hereby waives any and all rights it might otherwise have pursuant to any provision of state law to terminate this Lease upon a partial Taking of the Premises or the Project.

20. **Events of Default**. Each of the following events shall be a default ("**Default**") by Tenant under this Lease:

(a) **Payment Defaults**. Tenant shall fail to pay any installment of Rent or any other payment hereunder when due; provided, however, that Landlord will give Tenant notice and an opportunity to cure any failure to pay Rent within 5 days of any such notice not more than once in any 12 month period and Tenant agrees that such notice shall be in lieu of and not in addition to, or shall be deemed to be, any notice required by law.

(b) **Insurance**. Any insurance required to be maintained by Tenant pursuant to this Lease shall be canceled or terminated or shall expire or shall be reduced or materially changed, or Landlord shall receive a notice of nonrenewal of any such insurance and Tenant shall fail to obtain replacement insurance at least 20 days before the expiration of the current coverage.

(c) **Abandonment**. Tenant shall abandon the Premises. Tenant shall not be deemed to have abandoned the Premises if (i) Tenant provides Landlord with reasonable advance notice prior to vacating and, at the time of vacating the Premises, Tenant completes Tenant's obligations with respect to the Surrender Plan in compliance with Section 28, (ii) Tenant has made reasonable arrangements with Landlord for the security of the Premises for the balance of the Term, and (iii) Tenant continues during the balance of the Term to satisfy all of its obligations under the Lease as they come due.

(d) **Improper Transfer**. Tenant shall assign, sublease or otherwise transfer or attempt to transfer all or any portion of Tenant's interest in this Lease or the Premises except as expressly permitted herein, or Tenant's interest in this Lease shall be attached, executed upon, or otherwise judicially seized and such action is not released within 90 days of the action.

(e) **Liens**. Tenant shall fail to discharge or otherwise obtain the release of any lien placed upon the Premises in violation of this Lease within 10 days after any such lien is filed against the Premises.

(f) **Insolvency Events**. Tenant or any guarantor or surety of Tenant's obligations hereunder shall: (A) make a general assignment for the benefit of creditors; (B) commence any case, proceeding or other action seeking to have an order for relief entered on its behalf as a debtor or to adjudicate it a bankrupt or insolvent, or seeking reorganization, arrangement, adjustment, liquidation, dissolution or composition of it or its debts or seeking appointment of a receiver, trustee, custodian or other similar official for it or for all or of any substantial part of its property (collectively a "**Proceeding for Relief**"); (C) become the subject of any Proceeding for Relief which is not dismissed within 90 days of its filing or entry; or (D) die or suffer a legal disability (if Tenant, guarantor, or surety is an individual) or be dissolved or otherwise fail to maintain its legal existence (if Tenant, guarantor or surety is a corporation, partnership or other entity).

(g) **Estoppel Certificate or Subordination Agreement**. Tenant fails to execute any document required from Tenant under Sections 23 or 27 within 5 days after a second notice requesting such document.

(h) **Other Defaults**. Tenant shall fail to comply with any provision of this Lease other than those specifically referred to in this Section 20, and, except as otherwise expressly provided herein, such failure shall continue for a period of 30 days after written notice thereof from Landlord to Tenant.

Any notice given under Section 20(h) hereof shall: (i) specify the alleged default, (ii) demand that Tenant cure such default, (iii) be in lieu of, and not in addition to, or shall be deemed to be, any notice required under any provision of applicable law, and (iv) not be deemed a forfeiture or a termination of this Lease unless Landlord elects otherwise in such notice; provided that if the nature of Tenant's default pursuant to Section 20(h) is such that it cannot be cured by the payment of money and reasonably requires more than 30 days to cure, then Tenant shall not be deemed to be in default if Tenant commences such cure within said 30 day period and thereafter diligently prosecutes the same to completion; provided, however, that such cure shall be completed no later than 45 days from the date of Landlord's notice.

21. **Landlord's Remedies**.

(a) **Payment By Landlord; Interest**. Upon a Default by Tenant hereunder, Landlord may, without waiving or releasing any obligation of Tenant hereunder, make such payment or perform such act. All sums so paid or incurred by Landlord, together with interest thereon, from the date such sums were paid or incurred, at the annual rate equal to 12% per annum or the highest rate permitted by law (the "**Default Rate**"), whichever is less, shall be payable to Landlord on demand as Additional Rent. Nothing herein shall be construed to create or impose a duty on Landlord to mitigate any damages resulting from Tenant's Default hereunder.

(b) **Late Payment Rent**. Late payment by Tenant to Landlord of Rent and other sums due will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult and impracticable to ascertain. Such costs include, but are not limited to, processing and accounting charges and late charges which may be imposed on Landlord under any Mortgage covering the Premises. Therefore, if any installment of Rent due from Tenant is not received by Landlord within 5 days after the date such payment is due, Tenant shall pay to Landlord an additional sum equal to 6% of the overdue Rent as a late charge. Notwithstanding the foregoing, before assessing a late charge the first time in any calendar year, Landlord shall provide Tenant written notice of the delinquency and will waive the right if Tenant pays such delinquency within 5 days thereafter. Notwithstanding the foregoing, before assessing a late charge the first time in any calendar year, Landlord shall provide Tenant written notice of the delinquency and will waive the right if Tenant pays such delinquency within 5 days thereafter. The parties agree that this late charge represents a fair and reasonable estimate of the costs Landlord will incur by reason of late payment by Tenant. In addition to the late charge, Rent not paid when due shall bear interest at the Default Rate from the 5th day after the date due until paid.

(c) **Remedies**. Upon the occurrence of a Default, Landlord, at its option, without further notice or demand to Tenant, shall have in addition to all other rights and remedies provided in this Lease, at law or in equity, the option to pursue any one or more of the following remedies, each and all of which shall be cumulative and nonexclusive, without any notice or demand whatsoever.

(i) Terminate this Lease, or at Landlord's option, Tenant's right to possession only, in which event Tenant shall immediately surrender the Premises to Landlord, and if Tenant fails to do so, Landlord may, without prejudice to any other remedy which it may have for possession or arrearages in rent, enter upon and take possession of the Premises and expel or remove Tenant and any other person who may be occupying the Premises or any part thereof, without being liable for prosecution or any claim or damages therefor;

(ii) Upon any termination of this Lease, whether pursuant to the foregoing Section 21(c)(i) or otherwise, Landlord may recover from Tenant the following:

(A) The worth at the time of award of any unpaid rent which has been earned at the time of such termination; plus

(B) The worth at the time of award of the amount by which the unpaid rent which would have been earned after termination until the time of award exceeds the amount of such rental loss that Tenant proves could have been reasonably avoided; plus

(C) The worth at the time of award of the amount by which the unpaid rent for the balance of the Term after the time of award exceeds the amount of such rental loss that Tenant proves could have been reasonably avoided; plus

(D) Any other amount necessary to compensate Landlord for all the detriment proximately caused by Tenant's failure to perform its obligations under this Lease or which in the ordinary course of things would be likely to result therefrom, specifically including, but not limited to, brokerage commissions and advertising expenses incurred, expenses of remodeling the Premises or any portion thereof for a new tenant, whether for the same or a different use, and any special concessions made to obtain a new tenant; and

(E) At Landlord's election, such other amounts in addition to or in lieu of the foregoing as may be permitted from time to time by applicable law.

The term "**rent**" as used in this Section 21 shall be deemed to be and to mean all sums of every nature required to be paid by Tenant pursuant to the terms of this Lease, whether to Landlord or to others. As used in Sections 21(c)(ii)(A) and (B), above, the "**worth at the time of award**" shall be computed by allowing interest at the Default Rate. As used in Section 21(c)(ii)(C) above, the "**worth at the time of award**" shall be computed by discounting such amount at the discount rate of the Federal Reserve Bank of San Francisco at the time of award plus 1%.

(iii) Landlord may continue this Lease in effect after Tenant's Default and recover rent as it becomes due (Landlord and Tenant hereby agreeing that Tenant has the right to sublet or assign hereunder, subject only to reasonable limitations). Accordingly, if Landlord does not elect to terminate this Lease following a Default by Tenant, Landlord may, from time to time, without terminating this Lease, enforce all of its rights and remedies hereunder, including the right to recover all Rent as it becomes due.

(iv) Whether or not Landlord elects to terminate this Lease following a Default by Tenant, Landlord shall have the right to terminate any and all subleases, licenses, concessions or other consensual arrangements for possession entered into by Tenant and affecting the Premises or may, in Landlord's sole discretion, succeed to Tenant's interest in such subleases, licenses, concessions or arrangements. Upon Landlord's election to succeed to Tenant's interest in any such subleases, licenses, concessions or arrangements, Tenant shall, as of the date of notice by Landlord of such election, have no further right to or interest in the rent or other consideration receivable thereunder.

(v) Independent of the exercise of any other remedy of Landlord hereunder or under applicable law, Landlord may conduct an environmental test of the Premises as generally described in Section 30(d) hereof, at Tenant's expense.

(d) **Effect of Exercise**. Exercise by Landlord of any remedies hereunder or otherwise available shall not be deemed to be an acceptance of surrender of the Premises and/or a termination of this Lease by Landlord, it being understood that such surrender and/or termination can be effected only by the express written agreement of Landlord and Tenant. Any law, usage, or custom to the contrary notwithstanding, Landlord shall have the right at all times to enforce the provisions of this Lease in strict accordance with the terms hereof; and the failure of Landlord at any time to enforce its rights under this

Lease strictly in accordance with same shall not be construed as having created a custom in any way or manner contrary to the specific terms, provisions, and covenants of this Lease or as having modified the same and shall not be deemed a waiver of Landlord's right to enforce one or more of its rights in connection with any subsequent default. A receipt by Landlord of Rent or other payment with knowledge of the breach of any covenant hereof shall not be deemed a waiver of such breach, and no waiver by Landlord of any provision of this Lease shall be deemed to have been made unless expressed in writing and signed by Landlord. To the greatest extent permitted by law, Tenant waives the service of notice of Landlord's intention to re-enter, re-take or otherwise obtain possession of the Premises as provided in any statute, or to institute legal proceedings to that end, and also waives all right of redemption in case Tenant shall be dispossessed by a judgment or by warrant of any court or judge. Any reletting of the Premises or any portion thereof shall be on such terms and conditions as Landlord in its sole discretion may determine. Landlord shall not be liable for, nor shall Tenant's obligations hereunder be diminished because of, Landlord's failure to relet the Premises or collect rent due in respect of such reletting or otherwise to mitigate any damages arising by reason of Tenant's Default.

22. **Assignment and Subletting**.

(a) **General Prohibition**. Without Landlord's prior written consent subject to and on the conditions described in this Section 22, Tenant shall not, directly or indirectly, voluntarily or by operation of law, assign this Lease or sublease the Premises or any part thereof or mortgage, pledge, or hypothecate its leasehold interest or grant any concession or license within the Premises, and any attempt to do any of the foregoing shall be void and of no effect. If Tenant is a corporation, partnership or limited liability company, the shares or other ownership interests thereof which are not actively traded upon a stock exchange or in the over-the-counter market, a transfer or series of transfers whereby 50% or more of the issued and outstanding shares or other ownership interests of such corporation are, or voting control is, transferred (but excepting transfers upon deaths of individual owners) from a person or persons or entity or entities which were owners thereof at time of execution of this Lease to persons or entities who were not owners of shares or other ownership interests of the corporation, partnership or limited liability company at time of execution of this Lease, shall be deemed an assignment of this Lease requiring the consent of Landlord as provided in this Section 22.

(b) **Permitted Transfers**. If Tenant desires to assign, sublease, hypothecate or otherwise transfer this Lease or sublet the Premises other than pursuant to a Permitted Assignment (as defined below), then at least 15 days, but not more than 45 days, before the date Tenant desires the assignment or sublease to be effective (the "**Assignment Date**"), Tenant shall give Landlord a notice (the "**Assignment Notice**") containing such information about the proposed assignee or sublessee, including the proposed use of the Premises and any Hazardous Materials proposed to be used, stored handled, treated, generated in or released or disposed of from the Premises, the Assignment Date, any relationship between Tenant and the proposed assignee or sublessee, and all material terms and conditions of the proposed assignment or sublease, including a copy of any proposed assignment or sublease in its final form, and such other information as Landlord may deem reasonably necessary or appropriate to its consideration whether to grant its consent. Landlord may, by giving written notice to Tenant within 15 business days after receipt of the Assignment Notice: (i) grant such consent (provided that Landlord shall further have the right to review and approve or disapprove the proposed form of sublease prior to the effective date of any such subletting), (ii) refuse such consent, in its reasonable discretion; or (iii) if the proposed sublease or assignment is for the remainder of the Term, terminate this Lease with respect to the space described in the Assignment Notice as of the Assignment Date (an "**Assignment Termination**"). Among other reasons, it shall be reasonable for Landlord to withhold its consent in any of these instances: (1) the proposed assignee or subtenant is a governmental agency; (2) in Landlord's reasonable judgment, the use of the Premises by the proposed assignee or subtenant would entail any alterations that would lessen the value of the leasehold improvements in the Premises, or would require increased services by Landlord; (3) in Landlord's reasonable judgment, the proposed assignee or subtenant is engaged in areas of scientific research or other business concerns that are controversial; (4) in Landlord's reasonable judgment, the proposed assignee or subtenant lacks the creditworthiness to support the financial obligations it will incur under the proposed assignment or sublease; (5) in Landlord's reasonable judgment, the character, reputation, or business of the proposed

assignee or subtenant is inconsistent with the desired tenant-mix or the quality of other tenancies in the Project or is inconsistent with the type and quality of the nature of the Building; (6) Landlord has received from any prior landlord to the proposed assignee or subtenant a negative report concerning such prior landlord's experience with the proposed assignee or subtenant; (7) Landlord has experienced previous defaults by or is in litigation with the proposed assignee or subtenant; (8) the use of the Premises by the proposed assignee or subtenant will violate any applicable Legal Requirement; (9) the proposed assignee or subtenant, or any entity that, directly or indirectly, controls, is controlled by, or is under common control with the proposed assignee or subtenant, is then an occupant of the Project; (10) the proposed assignee or subtenant is an entity with whom Landlord is negotiating to lease space in the Project; or (11) the assignment or sublease is prohibited by Landlord's lender. If Landlord delivers notice of its election to exercise an Assignment Termination, Tenant shall have the right to withdraw such Assignment Notice by written notice to Landlord of such election within 5 business days after Landlord's notice electing to exercise the Assignment Termination. If Tenant withdraws such Assignment Notice, this Lease shall continue in full force and effect. If Tenant does not withdraw such Assignment Notice, this Lease, and the term and estate herein granted, shall terminate as of the Assignment Date with respect to the space described in such Assignment Notice. No failure of Landlord to exercise any such option to terminate this Lease, or to deliver a timely notice in response to the Assignment Notice, shall be deemed to be Landlord's consent to the proposed assignment, sublease or other transfer. Tenant shall pay to Landlord a fee equal to One Thousand Five Hundred Dollars ($1,500) in connection with its consideration of any Assignment Notice and/or its preparation or review of any consent documents. Notwithstanding the foregoing, Landlord's consent to an assignment of this Lease or a subletting of any portion of the Premises to any entity controlling, controlled by or under common control with Tenant (a "**Control Permitted Assignment**") shall not be required, provided that Landlord shall have the right to approve the form of any such sublease or assignment, which approval shall not be unreasonably withheld, conditioned or delayed. In addition, Tenant shall have the right to assign this Lease, upon 30 days prior written notice to Landlord but without obtaining Landlord's prior written consent, to a corporation or other entity which is a successor-in-interest to Tenant, by way of merger, consolidation or corporate reorganization, or by the purchase of all or substantially all of the assets or the ownership interests of Tenant provided that (i) such merger or consolidation, or such acquisition or assumption, as the case may be, is for a good business purpose and not principally for the purpose of transferring the Lease, and (ii) the net worth (as determined in accordance with generally accepted accounting principles ("**GAAP**")) of the assignee is not less than the greater of the net worth (as determined in accordance with GAAP) of Tenant as of (A) the Commencement Date, or (B) as of the date of Tenant's most current quarterly or annual financial statements, and (iii) such assignee shall agree in writing to assume all of the terms, covenants and conditions of this Lease (a "**Corporate Permitted Assignment**"). Control Permitted Assignments and Corporate Permitted Assignments are hereinafter referred to as "**Permitted Assignments**."

(c) **Additional Conditions**. As a condition to any such assignment or subletting, whether or not Landlord's consent is required, Landlord may require:

(i) that any assignee or subtenant agree, in writing at the time of such assignment or subletting, that if Landlord gives such party notice that Tenant is in default under this Lease, such party shall thereafter make all payments otherwise due Tenant directly to Landlord, which payments will be received by Landlord without any liability except to credit such payment against those due under the Lease, and any such third party shall agree to attorn to Landlord or its successors and assigns should this Lease be terminated for any reason; provided, however, in no event shall Landlord or its successors or assigns be obligated to accept such attornment; and

(ii) A list of Hazardous Materials, certified by the proposed assignee or sublessee to be true and correct, which the proposed assignee or sublessee intends to use, store, handle, treat, generate in or release or dispose of from the Premises, together with copies of all documents relating to such use, storage, handling, treatment, generation, release or disposal of Hazardous Materials by the proposed assignee or subtenant in the Premises or on the Project, prior to the proposed assignment or subletting, including, without limitation: permits; approvals; reports and correspondence; storage and management plans; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall

only be permitted after Landlord has given its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); and all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks. Neither Tenant nor any such proposed assignee or subtenant is required, however, to provide Landlord with any portion(s) of the such documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities.

(d) **No Release of Tenant, Sharing of Excess Rents**. Notwithstanding any assignment or subletting, Tenant and any guarantor or surety of Tenant's obligations under this Lease shall at all times remain fully and primarily responsible and liable for the payment of Rent and for compliance with all of Tenant's other obligations under this Lease. If the Rent due and payable by a sublessee or assignee (or a combination of the rental payable under such sublease or assignment plus any bonus or other consideration therefor or incident thereto in any form) exceeds the sum of the rental payable under this Lease, (excluding however, any Rent payable under this Section) and actual and reasonable brokerage fees, legal costs and any design or construction fees directly related to and required pursuant to the terms of any such sublease ("**Excess Rent**"), then Tenant shall be bound and obligated to pay Landlord as Additional Rent hereunder 50% of such Excess Rent within 10 days following receipt thereof by Tenant. If Tenant shall sublet the Premises or any part thereof, Tenant hereby immediately and irrevocably assigns to Landlord, as security for Tenant's obligations under this Lease, all rent from any such subletting, and Landlord as assignee and as attorney-in-fact for Tenant, or a receiver for Tenant appointed on Landlord's application, may collect such rent and apply it toward Tenant's obligations under this Lease; except that, until the occurrence of a Default, Tenant shall have the right to collect such rent.

(e) **No Waiver**. The consent by Landlord to an assignment or subletting shall not relieve Tenant or any assignees of this Lease or any sublessees of the Premises from obtaining the consent of Landlord to any further assignment or subletting nor shall it release Tenant or any assignee or sublessee of Tenant from full and primary liability under the Lease. The acceptance of Rent hereunder, or the acceptance of performance of any other term, covenant, or condition thereof, from any other person or entity shall not be deemed to be a waiver of any of the provisions of this Lease or a consent to any subletting, assignment or other transfer of the Premises.

(f) **Prior Conduct of Proposed Transferee**. Notwithstanding any other provision of this Section 22, if (i) the proposed assignee or sublessee of Tenant has been required by any prior landlord, lender or Governmental Authority to take remedial action in connection with Hazardous Materials contaminating a property, where the contamination resulted from such party's action or use of the property in question, (ii) the proposed assignee or sublessee is subject to an enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority), or (iii) because of the existence of a pre-existing environmental condition in the vicinity of or underlying the Project, the risk that Landlord would be targeted as a responsible party in connection with the remediation of such pre-existing environmental condition would be materially increased or exacerbated by the proposed use of Hazardous Materials by such proposed assignee or sublessee, Landlord shall have the absolute right to refuse to consent to any assignment or subletting to any such party.

23. **Estoppel Certificate**. Tenant shall, within 10 business days of written notice from Landlord, execute, acknowledge and deliver a statement in writing in any form reasonably requested by a proposed lender or purchaser, (i) certifying that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease as so modified is in full force and effect) and the dates to which the rental and other charges are paid in advance, if any, (ii) acknowledging that there are not any uncured defaults on the part of Landlord hereunder, or specifying such defaults if any are claimed, and (iii) setting forth such further information with respect to the status of this Lease or the Premises as may be reasonably requested thereon. Any such statement may be relied upon by any prospective purchaser or encumbrancer of all or any portion of the real property of which the Premises are a part. Tenant's failure to deliver such statement within 5 days after Tenant's receipt of a

second written request from Landlord delivered after the expiration of the initial 10 business day period shall, at the option of Landlord, constitute a Default under this Lease, and, in any event, shall be conclusive upon Tenant that the Lease is in full force and effect and without modification except as may be represented by Landlord in any certificate prepared by Landlord and delivered to Tenant for execution.

24. **Quiet Enjoyment**. So long as Tenant is not in Default under this Lease, Tenant shall, subject to the terms of this Lease, at all times during the Term, have peaceful and quiet enjoyment of the Premises against any person claiming by, through or under Landlord.

25. **Prorations**. All prorations required or permitted to be made hereunder shall be made on the basis of a 360 day year and 30 day months.

26. **Rules and Regulations**. Tenant shall, at all times during the Term and any extension thereof, comply with all reasonable rules and regulations at any time or from time to time established by Landlord covering use of the Premises and the Project. The current rules and regulations are attached hereto as **Exhibit E**. If there is any conflict between said rules and regulations and other provisions of this Lease, the terms and provisions of this Lease shall control. Landlord shall not have any liability or obligation for the breach of any rules or regulations by other tenants in the Project and shall not enforce such rules and regulations in a discriminatory manner.

27. **Subordination**. This Lease and Tenant's interest and rights hereunder are hereby made and shall be subject and subordinate at all times to the lien of any Mortgage now existing or hereafter created on or against the Project or the Premises, and all amendments, restatements, renewals, modifications, consolidations, refinancing, assignments and extensions thereof, without the necessity of any further instrument or act on the part of Tenant; provided, however that so long as there is no Default hereunder, Tenant's right to possession of the Premises shall not be disturbed by the Holder of any such Mortgage. Tenant agrees, within 10 business days' written notice from Landlord, at the election of the Holder of any such Mortgage, to attorn to any such Holder. Tenant agrees upon written demand to execute, acknowledge and deliver such instruments, confirming such subordination, and such instruments of attornment as shall be requested by any such Holder, provided that any such instruments contain appropriate non-disturbance provisions assuring Tenant's quiet enjoyment of the Premises as set forth in Section 24 hereof. Notwithstanding the foregoing, any such Holder may at any time subordinate its Mortgage to this Lease, without Tenant's consent, by notice in writing to Tenant, and thereupon this Lease shall be deemed prior to such Mortgage without regard to their respective dates of execution, delivery or recording and in that event such Holder shall have the same rights with respect to this Lease as though this Lease had been executed prior to the execution, delivery and recording of such Mortgage and had been assigned to such Holder. The term "**Mortgage**" whenever used in this Lease shall be deemed to include deeds of trust, security assignments and any other encumbrances, and any reference to the "**Holder**" of a Mortgage shall be deemed to include the beneficiary under a deed of trust.

28. **Surrender**. Upon the expiration of the Term or earlier termination of Tenant's right of possession, Tenant shall surrender the Premises to Landlord in substantially the same condition as received, subject to any Alterations or Installations permitted by Landlord to remain in the Premises, free of Hazardous Materials brought upon, kept, used, stored, handled, treated, generated in, or released or disposed of from, the Premises by any person other than a Landlord Party (collectively, "**Tenant HazMat Operations**") and released of all Hazardous Materials Clearances, broom clean, ordinary wear and tear and casualty loss and condemnation covered by Sections 18 and 19 excepted. At least 3 months prior to the surrender of the Premises, Tenant shall deliver to Landlord a narrative description of the actions proposed (or required by any Governmental Authority) to be taken by Tenant in order to surrender the Premises (including any Installations permitted by Landlord to remain in the Premises) at the expiration or earlier termination of the Term, free from any residual impact from the Tenant HazMat Operations and otherwise released for unrestricted use and occupancy (the "**Surrender Plan**"). Such Surrender Plan shall be accompanied by a current listing of (i) all Hazardous Materials licenses and permits held by or on behalf of any Tenant Party with respect to the Premises, and (ii) all Hazardous Materials used, stored, handled, treated, generated, released or disposed of from the Premises during the Term and any holding over, and shall be subject to the review and approval of Landlord's environmental consultant, which

approval shall not be unreasonably withheld, conditioned or delayed. In connection with the review and approval of the Surrender Plan, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such additional non-proprietary information concerning Tenant HazMat Operations as Landlord shall request. On or before such surrender, Tenant shall deliver to Landlord evidence that the approved Surrender Plan shall have been satisfactorily completed and Landlord shall have the right, subject to reimbursement at Tenant's expense as set forth below, to cause Landlord's environmental consultant to inspect the Premises and perform such additional procedures as may be deemed reasonably necessary to confirm that the Premises are, as of the effective date of such surrender or early termination of the Lease, free from any residual impact from Tenant HazMat Operations. Tenant shall reimburse Landlord, as Additional Rent, for the actual out-of pocket expense incurred by Landlord for Landlord's environmental consultant to review and approve the Surrender Plan and to visit the Premises and verify satisfactory completion of the same, which cost shall not exceed $2,500. Landlord shall have the unrestricted right to deliver such Surrender Plan and any report by Landlord's environmental consultant with respect to the surrender of the Premises to third parties.

If Tenant shall fail to prepare or submit a Surrender Plan approved by Landlord, or if Tenant shall fail to complete the approved Surrender Plan, or if such Surrender Plan, whether or not approved by Landlord, shall fail to adequately address any residual effect of Tenant HazMat Operations in, on or about the Premises, Landlord shall have the right to take such actions as Landlord may deem reasonable or appropriate to assure that the Premises and the Project are surrendered free from any residual impact from Tenant HazMat Operations, the cost of which actions shall be reimbursed by Tenant as Additional Rent, without regard to the limitation set forth in the first paragraph of this Section 28.

Tenant shall immediately return to Landlord all keys and/or access cards to parking, the Project, restrooms or all or any portion of the Premises furnished to or otherwise procured by Tenant. If any such access card or key is lost, Tenant shall pay to Landlord, at Landlord's election, either the reasonable cost of replacing such lost access card or key or the reasonable cost of reprogramming the access security system in which such access card was used or changing the lock or locks opened by such lost key. Any Tenant's Property, Alterations and property not so removed by Tenant as permitted or required herein shall be deemed abandoned and may be stored, removed, and disposed of by Landlord at Tenant's expense, and Tenant waives all claims against Landlord for any damages resulting from Landlord's retention and/or disposition of such property. All obligations of Tenant hereunder not fully performed as of the termination of the Term, including the obligations of Tenant under Section 30 hereof, shall survive the expiration or earlier termination of the Term, including, without limitation, indemnity obligations, payment obligations with respect to Rent and obligations concerning the condition and repair of the Premises.

29. **Waiver of Jury Trial**. TO THE EXTENT PERMITTED BY LAW, TENANT AND LANDLORD WAIVE ANY RIGHT TO TRIAL BY JURY OR TO HAVE A JURY PARTICIPATE IN RESOLVING ANY DISPUTE, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE, BETWEEN LANDLORD AND TENANT ARISING OUT OF THIS LEASE OR ANY OTHER INSTRUMENT, DOCUMENT, OR AGREEMENT EXECUTED OR DELIVERED IN CONNECTION HEREWITH OR THE TRANSACTIONS RELATED HERETO.

30. **Environmental Requirements**.

(a) **Prohibition/Compliance/Indemnity**. Tenant shall not cause or permit any Hazardous Materials (as hereinafter defined) to be brought upon, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises or the Project in violation of applicable Environmental Requirements (as hereinafter defined) by Tenant or any Tenant Party. If Tenant breaches the obligation stated in the preceding sentence, or if the presence of Hazardous Materials in the Premises during the Term, any holding over, or during any other period of occupancy of the Premises by Tenant results in contamination of the Premises, the Project or any adjacent property or if contamination of the Premises, the Project or any adjacent property by Hazardous Materials brought into, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises by anyone other than Landlord and Landlord's employees, agents and contractors otherwise occurs during the Term, any

holding over, or during any other period of occupancy of the Premises by Tenant, Tenant hereby indemnifies and shall defend and hold Landlord, its officers, directors, employees, agents and contractors harmless from any and all actions (including, without limitation, remedial or enforcement actions of any kind, administrative or judicial proceedings, and orders or judgments arising out of or resulting therefrom), costs, claims, damages (including, without limitation, punitive damages and damages based upon diminution in value of the Premises or the Project, or the loss of, or restriction on, use of the Premises or any portion of the Project), expenses (including, without limitation, attorneys', consultants' and experts' fees, court costs and amounts paid in settlement of any claims or actions), fines, forfeitures or other civil, administrative or criminal penalties, injunctive or other relief (whether or not based upon personal injury, property damage, or contamination of, or adverse effects upon, the environment, water tables or natural resources), liabilities or losses (collectively, "**Environmental Claims**") which arise during or after the Term as a result of such contamination. This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any investigation of site conditions or any cleanup, treatment, remedial, removal, or restoration work required by any federal, state or local Governmental Authority because of Hazardous Materials present in the air, soil or ground water above, on, or under the Premises. Without limiting the foregoing, if the presence of any Hazardous Materials on the Premises, the Building, the Project or any adjacent property caused or permitted by Tenant or any Tenant Party results in any contamination of the Premises, the Building, the Project or any adjacent property, Tenant shall promptly take all actions at its sole expense and in accordance with applicable Environmental Requirements as are necessary to return the Premises, the Building, the Project or any adjacent property to the condition existing prior to the time of such contamination, provided that Landlord's approval of such action shall first be obtained, which approval shall not unreasonably be withheld so long as such actions would not potentially have any material adverse long-term or short-term effect on the Premises, the Building or the Project. Notwithstanding anything to the contrary contained in Section 28 or this Section 30, Tenant shall not be responsible for, and the indemnification and hold harmless obligation set forth in this paragraph shall not apply to (i) contamination in the Premises which Tenant can prove to Landlord's reasonably satisfaction existed in the Premises immediately prior to Tenant's occupancy of the Premises, or (ii) the presence of any Hazardous Materials in the Premises which Tenant can prove to Landlord's reasonably satisfaction migrated from outside of the Premises into the Premises, unless in either case, the presence of such Hazardous Materials (x) is the result of a breach by Tenant of any of its obligations under this Lease, or (y) was caused, contributed to or exacerbated by Tenant or any Tenant Party.

(b) **Business**. Landlord acknowledges that it is not the intent of this Section 30 to prohibit Tenant from using the Premises for the Permitted Use. Tenant may operate its business according to prudent industry practices so long as the use or presence of Hazardous Materials is strictly and properly monitored according to all then applicable Environmental Requirements. As a material inducement to Landlord to allow Tenant to use Hazardous Materials in connection with its business, Tenant agrees to deliver to Landlord prior to the Commencement Date a list identifying each type of Hazardous Materials to be brought upon, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises and setting forth any and all governmental approvals or permits required in connection with the presence, use, storage, handling, treatment, generation, release or disposal of such Hazardous Materials on or from the Premises ("**Hazardous Materials List**"). Tenant shall deliver to Landlord an updated Hazardous Materials List at least once a year and shall also deliver an updated list before any new Hazardous Material is brought onto, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises. Tenant shall deliver to Landlord true and correct copies of the following documents (the "**Haz Mat Documents**") relating to the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials prior to the Commencement Date, or if unavailable at that time, concurrent with the receipt from or submission to a Governmental Authority: permits; approvals; reports and correspondence; storage and management plans, notice of violations of any Legal Requirements; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given Tenant its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks; and a Surrender Plan (to the extent surrender in accordance with Section 28 cannot be accomplished in 3 months). Tenant is not required, however, to provide Landlord with any portion(s) of the Haz Mat

Documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities. It is not the intent of this Section to provide Landlord with information which could be detrimental to Tenant's business should such information become possessed by Tenant's competitors.

(c) **Tenant Representation and Warranty**. Tenant hereby represents and warrants to Landlord that (i) neither Tenant nor, to the best of Tenant's knowledge, any of its legal predecessors has been required by any prior landlord, lender or Governmental Authority at any time to take remedial action in connection with Hazardous Materials contaminating a property which contamination was permitted by Tenant of such predecessor or resulted from Tenant's or such predecessor's action or use of the property in question, and (ii) Tenant is not subject to any enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority). If Landlord determines that this representation and warranty was not true as of the date of this lease, Landlord shall have the right to terminate this Lease in Landlord's sole and absolute discretion.

(d) **Testing**. Landlord shall have the right to conduct annual tests of the Premises to determine whether any contamination of the Premises or the Project has occurred as a result of Tenant's use. Tenant shall be required to pay the cost of such annual test of the Premises if there is violation of this Section 30 or if contamination for which Tenant is responsible under this Section 30 is identified; provided, however, that if Tenant conducts its own tests of the Premises using third party contractors and test procedures acceptable to Landlord which tests are certified to Landlord, Landlord shall accept such tests in lieu of the annual tests to be paid for by Tenant. In addition, at any time, and from time to time, prior to the expiration or earlier termination of the Term, Landlord shall have the right to conduct appropriate tests of the Premises and the Project to determine if contamination has occurred as a result of Tenant's use of the Premises. In connection with such testing, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such non-proprietary information concerning the use of Hazardous Materials in or about the Premises by Tenant or any Tenant Party. If contamination has occurred for which Tenant is liable under this Section 30, Tenant shall pay all costs to conduct such tests. If no such contamination is found, Landlord shall pay the costs of such tests (which shall not constitute an Operating Expense). Landlord shall provide Tenant with a copy of all third party, non-confidential reports and tests of the Premises made by or on behalf of Landlord during the Term without representation or warranty and subject to a confidentiality agreement. Tenant shall, at its sole cost and expense, promptly and satisfactorily remediate any environmental conditions identified by such testing for which Tenant is responsible under the terms of this Lease in accordance with all Environmental Requirements. Landlord's receipt of or satisfaction with any environmental assessment in no way waives any rights which Landlord may have against Tenant.

(e) **Control Areas**. Tenant shall be allowed to utilize up to its pro rata share of the Hazardous Materials inventory within any control area or zone (located within the Premises), as designated by the applicable building code, for chemical use or storage. As used in the preceding sentence, Tenant's pro rata share of any control areas or zones located within the Premises shall be determined based on the rentable square footage that Tenant leases within the applicable control area or zone. For purposes of example only, if a control area or zone contains 10,000 rentable square feet and 2,000 rentable square feet of a tenant's premises are located within such control area or zone (while such premises as a whole contains 5,000 rentable square feet), the applicable tenant's pro rata share of such control area would be 20%.

(f) **Underground Tanks**. Tenant shall have no right to use or install any underground or other storage tanks at the Project.

(g) **Tenant's Obligations**. Tenant's obligations under this Section 30 shall survive the expiration or earlier termination of the Lease. During any period of time after the expiration or earlier termination of this Lease required by Tenant or Landlord to complete the removal from the Premises of any Hazardous Materials for which Tenant is responsible under the terms of this Lease (including, without

limitation, the release and termination of any licenses or permits restricting the use of the Premises and the completion of the approved Surrender Plan), Tenant shall continue to pay the full Rent in accordance with this Lease for any portion of the Premises not relet by Landlord in Landlord's sole discretion, which Rent shall be prorated daily.

(h) **Definitions**. As used herein, the term "**Environmental Requirements**" means all applicable present and future statutes, regulations, ordinances, rules, codes, judgments, orders or other similar enactments of any Governmental Authority regulating or relating to health, safety, or environmental conditions on, under, or about the Premises or the Project, or the environment, including without limitation, the following: the Comprehensive Environmental Response, Compensation and Liability Act; the Resource Conservation and Recovery Act; and all state and local counterparts thereto, and any regulations or policies promulgated or issued thereunder. As used herein, the term "**Hazardous Materials**" means and includes any substance, material, waste, pollutant, or contaminant listed or defined as hazardous or toxic, or regulated by reason of its impact or potential impact on humans, animals and/or the environment under any Environmental Requirements, asbestos and petroleum, including crude oil or any fraction thereof, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). As defined in Environmental Requirements, Tenant is and shall be deemed to be the "**operator**" of Tenant's "**facility**" and the "**owner**" of all Hazardous Materials brought on the Premises by Tenant or any Tenant Party, and the wastes, by-products, or residues generated, resulting, or produced therefrom.

31. **Tenant's Remedies/Limitation of Liability**. Landlord shall not be in default hereunder unless Landlord fails to perform any of its obligations hereunder within 30 days after written notice from Tenant specifying such failure (unless such performance will, due to the nature of the obligation, require a period of time in excess of 30 days, then after such period of time as is reasonably necessary). Upon any default by Landlord, Tenant shall give notice by registered or certified mail to any Holder of a Mortgage covering the Premises and to any landlord of any lease of property in or on which the Premises are located and Tenant shall offer such Holder and/or landlord a reasonable opportunity to cure the default, including time to obtain possession of the Project by power of sale or a judicial action if such should prove necessary to effect a cure; provided Landlord shall have furnished to Tenant in writing the names and addresses of all such persons who are to receive such notices. All obligations of Landlord hereunder shall be construed as covenants, not conditions; and, except as may be otherwise expressly provided in this Lease, Tenant may not terminate this Lease for breach of Landlord's obligations hereunder.

All obligations of Landlord under this Lease will be binding upon Landlord only during the period of its ownership of the Premises and not thereafter. The term "**Landlord**" in this Lease shall mean only the owner for the time being of the Premises. Upon the transfer by such owner of its interest in the Premises, such owner shall thereupon be released and discharged from all obligations of Landlord thereafter accruing, but such obligations shall be binding during the Term upon each new owner for the duration of such owner's ownership.

32. **Inspection and Access**. Subject to the terms of this Section 32, Landlord and its agents, representatives, and contractors may enter the Premises at any reasonable time (upon not less than 48 hours advance written notice, except in the case of emergencies in which case no such notice shall be required and such entry may be at any time), to inspect the Premises and to make such repairs as may be required or permitted pursuant to this Lease and for any other business purpose. Landlord and Landlord's representatives may enter the Premises during business hours on not less than 48 hours advance written notice (except in the case of emergencies in which case no such notice shall be required and such entry may be at any time) for the purpose of effecting any such repairs, inspecting the Premises, showing the Premises to prospective purchasers and, during the last year of the Term, to prospective tenants or for any other business purpose. Landlord shall use reasonable efforts to minimize interruption of Tenant's operations in the Premises during any entry into the Premises pursuant to this Section 32. Landlord may erect a suitable sign on the Premises stating the Premises are available to let or that the Project is available for sale. Landlord may grant easements, make public dedications, designate Common Areas and create restrictions on or about the Premises, provided that no such easement, dedication, designation or restriction materially, adversely affects Tenant's parking (other than

on a temporary basis) and Tenant's use or occupancy of the Premises for the Permitted Use. At Landlord's request, Tenant shall execute such instruments as may be necessary for such easements, dedications or restrictions, provided that such items do not materially increase Tenant's obligations under this Lease. Tenant shall at all times, except in the case of emergencies, have the right to escort Landlord or its agents, representatives, contractors or guests while the same are in the Premises, provided such escort does not materially and adversely affect Landlord's access rights hereunder.

33. **Security**. Tenant acknowledges and agrees that security devices and services, if any, while intended to deter crime may not in given instances prevent theft or other criminal acts and that Landlord is not providing any security services with respect to the Premises. Tenant agrees that Landlord shall not be liable to Tenant for, and Tenant waives any claim against Landlord with respect to, any loss by theft or any other damage suffered or incurred by Tenant in connection with any unauthorized entry into the Premises or any other breach of security with respect to the Premises. Tenant shall be solely responsible for the personal safety of Tenant's officers, employees, agents, contractors, guests and invitees while any such person is in, on or about the Premises and/or the Project. Tenant shall at Tenant's cost obtain insurance coverage to the extent Tenant desires protection against such criminal acts.

34. **Force Majeure**. Landlord shall not be responsible or liable for delays in the performance of its obligations hereunder when caused by, related to, or arising out of acts of God, sinkholes or subsidence, strikes, lockouts, or other labor disputes, embargoes, quarantines, weather, national, regional, or local disasters, calamities, or catastrophes, inability to obtain labor or materials (or reasonable substitutes therefor) at reasonable costs or failure of, or inability to obtain, utilities necessary for performance, governmental restrictions, orders, limitations, regulations, or controls, national emergencies, delay in issuance or revocation of permits, enemy or hostile governmental action, terrorism, insurrection, riots, civil disturbance or commotion, fire or other casualty, and other causes or events beyond the reasonable control of Landlord ("**Force Majeure**").

35. **Brokers**. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with this transaction and that no Broker brought about this transaction, other than Cushman & Wakefield. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker, other than the broker, if any named in this Section 35, claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction. Landlord shall be responsible for all commissions due to Cushman & Wakefield arising out of the execution of this Lease in accordance with the terms of a separate written agreement between Cushman & Wakefield and Landlord.

36. **Limitation on Landlord's Liability**. NOTWITHSTANDING ANYTHING SET FORTH HEREIN OR IN ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT TO THE CONTRARY: (A) LANDLORD SHALL NOT BE LIABLE TO TENANT OR ANY OTHER PERSON FOR (AND TENANT AND EACH SUCH OTHER PERSON ASSUME ALL RISK OF) LOSS, DAMAGE OR INJURY, WHETHER ACTUAL OR CONSEQUENTIAL TO: TENANT'S PERSONAL PROPERTY OF EVERY KIND AND DESCRIPTION, INCLUDING, WITHOUT LIMITATION TRADE FIXTURES, EQUIPMENT, INVENTORY, SCIENTIFIC RESEARCH, SCIENTIFIC EXPERIMENTS, LABORATORY ANIMALS, PRODUCT, SPECIMENS, SAMPLES, AND/OR SCIENTIFIC, BUSINESS, ACCOUNTING AND OTHER RECORDS OF EVERY KIND AND DESCRIPTION KEPT AT THE PREMISES AND ANY AND ALL INCOME DERIVED OR DERIVABLE THEREFROM; (B) THERE SHALL BE NO PERSONAL RECOURSE TO LANDLORD FOR ANY ACT OR OCCURRENCE IN, ON OR ABOUT THE PREMISES OR ARISING IN ANY WAY UNDER THIS LEASE OR ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT WITH RESPECT TO THE SUBJECT MATTER HEREOF AND ANY LIABILITY OF LANDLORD HEREUNDER SHALL BE STRICTLY LIMITED SOLELY TO LANDLORD'S INTEREST IN THE PROJECT OR ANY PROCEEDS FROM SALE OR CONDEMNATION THEREOF AND ANY INSURANCE PROCEEDS PAYABLE IN RESPECT OF LANDLORD'S INTEREST IN THE PROJECT OR IN CONNECTION WITH ANY SUCH LOSS; AND (C) IN NO EVENT SHALL ANY PERSONAL LIABILITY BE ASSERTED AGAINST LANDLORD IN CONNECTION WITH THIS LEASE

NOR SHALL ANY RECOURSE BE HAD TO ANY OTHER PROPERTY OR ASSETS OF LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS. UNDER NO CIRCUMSTANCES SHALL LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS BE LIABLE FOR INJURY TO TENANT'S BUSINESS OR FOR ANY LOSS OF INCOME OR PROFIT THEREFROM.

37. **Severability**. If any clause or provision of this Lease is illegal, invalid or unenforceable under present or future laws, then and in that event, it is the intention of the parties hereto that the remainder of this Lease shall not be affected thereby. It is also the intention of the parties to this Lease that in lieu of each clause or provision of this Lease that is illegal, invalid or unenforceable, there be added, as a part of this Lease, a clause or provision as similar in effect to such illegal, invalid or unenforceable clause or provision as shall be legal, valid and enforceable.

38. **Signs; Exterior Appearance**. Tenant shall not, without the prior written consent of Landlord, which may be granted or withheld in Landlord's reasonable discretion: (i) attach any awnings, exterior lights, decorations, balloons, flags, pennants, banners, painting or other projection to any outside wall of the Project, (ii) use any curtains, blinds, shades or screens other than Landlord's standard window coverings, (iii) coat or otherwise sunscreen the interior or exterior of any windows, (iv) place any bottles, parcels, or other articles on the window sills, (v) place any equipment, furniture or other items of personal property on any exterior balcony, or (vi) paint, affix or exhibit on any part of the Premises or the Project any signs, notices, window or door lettering, placards, decorations, or advertising media of any type which can be viewed from the exterior of the Premises. Interior signs on doors and the directory tablet shall be inscribed, painted or affixed for Tenant by Landlord at the sole cost and expense of Tenant, and shall be of a size, color and type acceptable to Landlord. Nothing may be placed on the exterior of corridor walls or corridor doors other than Landlord's standard lettering. The directory tablet shall be provided exclusively for the display of the name and location of tenants.

Tenant shall have the non-exclusive right to display, at Tenant's cost and expense, Tenant's name on the monument sign serving the Building ("**Monument Sign**"). Tenant acknowledges and agrees that Tenant's signage on the Monument Sign including, without limitation, the location, size, color and type, shall be subject to Landlord's prior written approval, which shall not be unreasonably withheld and shall be consistent with Landlord's signage program at the Project and applicable Legal Requirements. Tenant shall be entitled to Tenant's pro rata share of the Monument Sign. Tenant shall be responsible, at Tenant's sole cost and expense, for the maintenance of Tenant's signage on the Monument Sign, for the removal of Tenant's signage from the Monument Sign at the expiration or earlier termination of this Lease and for the repair of all damage resulting from such removal. For the avoidance of doubt, Landlord acknowledges that Tenant shall not be required to pay or reimburse Landlord any costs in connection with Tenant's signage on the Monument Sign existing at the Project as of the date of this Lease and Landlord hereby approves such existing Tenant Signage on the Monument Sign.

Tenant shall have the non-exclusive right to display, at Tenant's cost and expense, Tenant's name on the top of the Building in a location designated by Landlord and reasonably acceptable to Tenant ("**Building Sign**"). Tenant acknowledges and agrees that Tenant's Building Sign including, without limitation, the location, size, color and type, shall be subject to Landlord's prior written approval, which shall not be unreasonably withheld and shall be consistent with Landlord's signage program at the Project and applicable Legal Requirements. Tenant shall be responsible, at Tenant's sole cost and expense, for the maintenance of Tenant's Building Sign, for the removal of Tenant's Building Sign at the expiration or earlier termination of this Lease and for the repair of all damage resulting from such removal.

39. **Right to Expand**.

(a) **Right of First Refusal**. So long as Tenant is occupying 100% of the Premises, then, subject to the provisions of this Section 39, each time after the date of this Lease and prior to the expiration of the Term that Landlord intends to accept a written proposal (the "**Pending Deal**") to lease all

or any portion the First Refusal Space (as hereinafter defined) to a third party, Landlord shall deliver to Tenant written notice (the "**Pending Deal Notice**") of the existence of such Pending Deal and the material terms of such Pending Deal. For purposes of this Section 39(a), "**First Refusal Space**" shall mean that certain portion of the Building commonly known as Suite 200, containing approximately 9,890 rentable square feet, to the extent such space is not occupied by a tenant or which is occupied by a then existing tenant whose lease is expiring within 9 months or less and such tenant does not wish to renew (whether or not such tenant has a right to renew) its occupancy of such space. For the avoidance of doubt, Tenant shall be required to exercise its right under this Section 39(a) with respect to all of the space described in the Pending Deal Notice, including any space in addition to the First Refusal Space that is described in the Pending Deal Notice, which additional space shall be deemed to be included as part of the First Refusal Space. Within 7 business days after Tenant's receipt of the Pending Deal Notice, Tenant shall deliver to Landlord written notice (the "**Space Acceptance Notice**") if Tenant elects to lease the First Refusal Space. Tenant's right to receive the Pending Deal Notice and election to lease or not lease the First Refusal Space pursuant to this Section 39(a) is hereinafter referred to as the "**Right of First Refusal**." If Tenant elects to lease the First Refusal Space described in the Pending Deal Notice by delivering the Space Acceptance Notice within the required 7 business day period, Tenant shall be deemed to agree to lease the First Refusal Space on the same general terms and conditions as this Lease except that the terms of this Lease shall be modified to reflect the terms of the Pending Deal Notice for the rental of the First Refusal Space. Tenant acknowledges that the term of the Lease with respect to the First Refusal Space and the Term of the Lease with respect to the original Premises may not be co-terminous. Notwithstanding anything to the contrary contained herein, in no event shall the Work Letter apply to the First Refusal Space. If Tenant fails to deliver a Space Acceptance Notice to Landlord within the required 7 business day period, Landlord shall have the right to lease the First Refusal Space to the third party subject to the Pending Deal (or an affiliate of such third party) ("**Pending Deal Party**") on substantially the same business terms and conditions set forth in the Pending Deal Notice. Notwithstanding anything to the contrary contained in this Section 39(a), Tenant shall have no right to exercise the Right of First Refusal and the provisions of this Section 39(a) shall no longer apply (x) after the date that is 9 months prior to the expiration date of the Base Term if Tenant has not exercised its Extension Right pursuant to Section 40, or (y) after the date that is 9 months prior to the expiration of the Extension Term. Notwithstanding anything to the contrary contained in this Lease, if Tenant exercises its Right of First Refusal pursuant to this Section 39(a), Tenant shall be deemed to have waived its Termination Right (as defined in Section 41 below), and Section 41 shall be null and void and of no further force or effect.

(b) **Amended Lease**. If: (i) Tenant fails to timely deliver a Space Acceptance Notice, or (ii) after the expiration of a period of 15 days after Landlord's delivery to Tenant of a lease amendment for Tenant's lease of the First Refusal Space, no lease amendment for the First Refusal Space acceptable to both parties each in their sole and absolute discretion, has been executed, Tenant shall, notwithstanding anything to the contrary contained herein, be deemed to have forever waived its right to lease such First Refusal Space.

(c) **Exceptions**. Notwithstanding the above, the Right of First Refusal shall, at Landlord's option, not be in effect and may not be exercised by Tenant:

(i) during any period of time that Tenant is in Default under any provision of the Lease; or

(ii) if Tenant has been in Default under any provision of the Lease 3 or more times, whether or not the Defaults are cured, during the 12 month period prior to the date on which Tenant seeks to exercise the Right of First Refusal.

(d) **Termination**. The Right of First Refusal shall, at Landlord's option, terminate and be of no further force or effect even after Tenant's due and timely exercise of the Right of First Refusal if, after such exercise, but prior to the commencement date of the lease of such First Refusal Space, (i) Tenant fails to timely cure any default by Tenant under the Lease; or (ii) Tenant has Defaulted 3 or more times

during the period from the date of the exercise of the Right of First Refusal to the date of the commencement of the lease of the First Refusal Space, whether or not such Defaults are cured.

(e) **Rights Personal**. The Right of First Refusal is personal to Tenant and is not assignable without Landlord's consent, which may be granted or withheld in Landlord's sole discretion separate and apart from any consent by Landlord to an assignment of Tenant's interest in the Lease, except that it may be assigned in connection with any Permitted Assignment of this Lease.

(f) **No Extensions**. The period of time within which the Right of First Refusal may be exercised shall not be extended or enlarged by reason of Tenant's inability to exercise the Right of First Refusal.

40. **Right to Extend Term**. Tenant shall have the right to extend the Term of the Lease upon the following terms and conditions:

(a) **Extension Rights**. Tenant shall have 1 right (the "**Extension Right**") to extend the term of this Lease for 5 years (the "**Extension Term**") on the same terms and conditions as this Lease (other than with respect to Base Rent and the Work Letter) by giving Landlord written notice of its election to exercise each Extension Right at least 9 months prior to the expiration of the Base Term of the Lease.

Upon the commencement of the Extension Term, Base Rent shall be payable at the Market Rate (as defined below). Base Rent shall thereafter be adjusted on each annual anniversary of the commencement of such Extension Term by a percentage as determined by Landlord and agreed to by Tenant at the time the Market Rate is determined. As used herein, "**Market Rate**" shall mean the rate that comparable landlords of comparable buildings have accepted in current transactions from non-equity (i.e., not being offered equity in the buildings) and nonaffiliated tenants of similar financial strength for space of comparable size, quality (including all Tenant Improvements, Alterations and other improvements) and floor height in comparable laboratory/office buildings in the Torrey Pines area of San Diego for a comparable term, with the determination of the Market Rate to take into account all relevant factors, including tenant inducements, available amenities (including, without limitation, the Amenities (as defined in Section 42 below)), age of the Building, age of mechanical systems serving the Premises, parking costs, leasing commissions, allowances or concessions, if any. In addition, Landlord may impose a market rent for the parking rights provided hereunder.

If, on or before the date which is 270 days prior to the expiration of the Base Term of this Lease, Tenant has not agreed with Landlord's determination of the Market Rate and the rent escalations during the Extension Term after negotiating in good faith, Tenant shall be deemed to have elected arbitration as described in Section 40(b). Tenant acknowledges and agrees that, if Tenant has elected to exercise the Extension Right by delivering notice to Landlord as required in this Section 40(a), Tenant shall have no right thereafter to rescind or elect not to extend the term of the Lease for the Extension Term.

(b) **Arbitration**.

(i) Within 10 days of Tenant's notice to Landlord of its election (or deemed election) to arbitrate Market Rate and escalations, each party shall deliver to the other a proposal containing the Market Rate and escalations that the submitting party believes to be correct ("**Extension Proposal**"). If either party fails to timely submit an Extension Proposal, the other party's submitted proposal shall determine the Base Rent and escalations for the Extension Term. If both parties submit Extension Proposals, then Landlord and Tenant shall meet within 7 days after delivery of the last Extension Proposal and make a good faith attempt to mutually appoint a single Arbitrator (and defined below) to determine the Market Rate and escalations. If Landlord and Tenant are unable to agree upon a single Arbitrator, then each shall, by written notice delivered to the other within 10 business days after the meeting, select an Arbitrator. If either party fails to timely give notice of its selection for an Arbitrator, the other party's submitted proposal shall determine the Base Rent for the Extension Term. The 2 Arbitrators so appointed shall, within 5 business days after their appointment, appoint a third Arbitrator. If the 2 Arbitrators

so selected cannot agree on the selection of the third Arbitrator within the time above specified, then either party, on behalf of both parties, may request such appointment of such third Arbitrator by application to any state court of general jurisdiction in the jurisdiction in which the Premises are located, upon 10 business days prior written notice to the other party of such intent.

(ii) The authority of the Arbitrator(s) shall be limited strictly to a selection of either Landlord's Extension Proposal in its entirety or Tenant's Extension Proposal in its entirety as the Extension Proposal which most closely approximates the Market Rate and escalations. The Arbitrator(s) shall have no authority to create an independent structure of the Market Rate and escalations, combine elements of both Extension Proposals to create a third, or compromise or alter in any way any of the components of the Extension Proposals submitted by the parties. The sole decision to be made shall be which of the parties' Extension Proposals in its entirety shall determine the Market Rate and escalations for the Extension Term. The decision of the Arbitrator(s) shall be made within 30 days after the appointment of a single Arbitrator or the third Arbitrator, as applicable. The decision of the single Arbitrator shall be final and binding upon the parties. Each party shall pay the fees and expenses of the Arbitrator appointed by or on behalf of such party and the fees and expenses of the third Arbitrator shall be borne equally by both parties. If the Market Rate and escalations are not determined by the first day of the Extension Term, then Tenant shall pay Landlord Base Rent in an amount equal to the Base Rent in effect immediately prior to the Extension Term and increased by the Rent Adjustment Percentage until such determination is made. After the determination of the Market Rate and escalations, the parties shall make any necessary adjustments to such payments made by Tenant. Landlord and Tenant shall then execute an amendment recognizing the Market Rate and escalations for the Extension Term.

(iii) An "**Arbitrator**" shall be any person appointed by or on behalf of either party or appointed pursuant to the provisions hereof and: (i) shall be (A) a member of the American Institute of Real Estate Appraisers with not less than 10 years of experience in the appraisal of improved office and high tech industrial real estate in the greater San Diego metropolitan area, or (B) a licensed commercial real estate broker with not less than 15 years experience representing landlords and/or tenants in the leasing of high tech or life sciences space in the greater San Diego metropolitan area, (ii) devoting substantially all of their time to professional appraisal or brokerage work, as applicable, at the time of appointment and (iii) be in all respects impartial and disinterested.

(c) **Rights Personal**. The Extension Right is personal to Tenant and is not assignable without Landlord's consent, which may be granted or withheld in Landlord's sole discretion separate and apart from any consent by Landlord to an assignment of Tenant's interest in the Lease, except that it may be assigned in connection with any Permitted Assignment of this Lease.

(d) **Exceptions**. Notwithstanding anything set forth above to the contrary, the Extension Right shall, at Landlord's option, not be in effect and Tenant may not exercise the Extension Right:

(i) during any period of time that Tenant is in Default under any provision of this Lease; or

(ii) if Tenant has been in Default under any provision of this Lease 3 or more times, whether or not the Defaults are cured, during the 12 month period immediately prior to the date that Tenant intends to exercise the Extension Right, whether or not the Defaults are cured.

(e) **No Extensions**. The period of time within which the Extension Right may be exercised shall not be extended or enlarged by reason of Tenant's inability to exercise the Extension Right.

(f) **Termination**. The Extension Right shall, at Landlord's option, terminate and be of no further force or effect even after Tenant's due and timely exercise of the Extension Right, if, after such exercise, but prior to the commencement date of the Extension Term, (i) Tenant fails to timely cure any

default by Tenant under this Lease; or (ii) Tenant has Defaulted 3 or more times during the period from the date of the exercise of the Extension Right to the date of the commencement of the Extension Term, whether or not such Defaults are cured.

41. **Early Termination Right**. Tenant shall have the right, subject to the provisions of this Section 41, to terminate this Lease ("**Termination Right**") with respect to the entire Premises only on the last day of the 60th month after the Commencement Date ("**Early Termination Date**"), so long as Tenant delivers to Landlord (a) a written notice ("**Termination Notice**"), of its election to exercise its Termination Right no less than 9 months in advance of the Early Termination Date, and (b) concurrent with Tenant's delivery of the Termination Notice to Landlord, an early termination payment equal to (i) the Base Rent that would have been payable for the 6 month period immediately following the Early Termination Date, plus (ii) the unamortized amount of the Excess TI Costs Allowance with interest as provided in Section 4(b) (collectively, the "**Early Termination Payment**"). If Tenant timely and properly exercises the Termination Right and delivers the Early Termination Payment, Tenant shall vacate the Premises and deliver possession thereof to Landlord in the condition required by the terms of this Lease on or before the Early Termination Date and Tenant shall have no further obligations under this Lease after the Early Termination Date except for those accruing prior to the Early Termination Date and those which, pursuant to the terms of this Lease, survive the expiration or early termination of this Lease. If Tenant (i) exercises its Right of First Refusal pursuant to Section 39(a), or (ii) does not deliver to Landlord the Termination Notice and the Early Termination Payment within the time period provided in this paragraph, Tenant shall be deemed to have waived its Termination Right and the provisions of this Section 41 shall have no further force or effect.

42. **The Alexandria Amenities**.

(a) **Generally**. ARE-SD Region No. 17, LLC, a Delaware limited liability company ("**The Alexandria Landlord**") has constructed certain amenities at the property owned by The Alexandria Landlord located at 10996 Torreyana Road, San Diego, California ("**The Alexandria**"), which include, without limitation, shared conference facilities ("**Shared Conference Facilities**"), a fitness center and restaurant (collectively, the "**Amenities**") for non-exclusive use by (a) Tenant, (b) other tenants of the Project, (c) Landlord, (d) the tenants of The Alexandria Landlord, (e) The Alexandria Landlord, (f) other affiliates of Landlord, The Alexandria Landlord and Alexandria Real Estate Equities, Inc. ("**ARE**"), (g) the tenants of such other affiliates of Landlord, The Alexandria Landlord and ARE, and (h) any other parties permitted by The Alexandria Landlord (collectively, "**Users**"). Landlord, The Alexandria Landlord, ARE, and all affiliates of Landlord, The Alexandria Landlord and ARE may be referred to collectively herein as the "**ARE Parties**." The Alexandria Landlord shall have the sole right to determine all matters related to the Amenities including, without limitation, relating to the reconfiguration, relocation, modification or removal of any of the Amenities at The Alexandria and/or to revise, expand or discontinue any of the services (if any) provided in connection with the Amenities.

(b) **License**. Commencing on the Commencement Date, and so long as The Alexandria and the Project continue to be owned by affiliates of ARE, Tenant shall have the non-exclusive right to the use of the available Amenities in common with other Users pursuant to the terms of this Section 42. Fitness center passes shall be issued to all employees of Tenant employed at the Premises. Commencing on the Commencement Date, Tenant shall commence paying Landlord a fixed fee during the Base Term equal to $0.18 per rentable square foot of the Premises per month ("**Amenities Fee**"), which Amenities Fee shall by payable on the first day of each month during the Term whether or not Tenant elects to use any or all of the Amenities. The Amenities Fee shall be increased annually on each anniversary of the Commencement Date by 3%, including during the Extension Term. If all of the Amenities at The Alexandria become materially unavailable for use by Tenant (for any reason other than a Default by Tenant under this Lease or the default by Tenant of any agreement(s) relating to the use of the Amenities by Tenant) for a period in excess of 90 consecutive days, then, commencing on the date that the Amenities in their entirety become materially unavailable for use by Tenant and continuing for the period that the Amenities in their entirety remain materially unavailable for use by Tenant, the Amenities Fee then-currently payable by Tenant shall be abated.

(c) **Shared Conference Facilities**. Use by Tenant of the Shared Conference Facilities and restaurant at The Alexandria shall be in common with other Users with scheduling procedures reasonably determined by The Alexandria Landlord. The Alexandria Landlord reserves the right to exercise its reasonable discretion in the event of conflicting scheduling requests among Users. Tenant hereby acknowledges that (i) Biocom/San Diego, a California non-profit corporation ("**Biocom**") has the right to reserve the Shared Conference Facilities and any reservable dining area(s) included within the Amenities for up to 50% of the time that such Shared Conference Facilities and reservable dining area(s) are available for use by Users each calendar month, and (ii) Illumina, Inc., a Delaware corporation, has the exclusive use of the main conference room within the Shared Conference Facilities for up to 4 days per calendar month.

Any vendors engaged by Tenant in connection with Tenant's use of the Shared Conference Facilities shall be professional licensed vendors. The Alexandria Landlord shall have the right to reasonably approve any vendors utilized by Tenant in connection with Tenant's use of the Shared Conference Facilities. Prior to any entry by any such vendor onto The Alexandria, Tenant shall deliver to Landlord a copy of the contract between Tenant and such vendor and certificates of insurance from such vendor evidencing industry standard commercial general liability, automotive liability, and workers' compensation insurance. Tenant shall cause all such vendors utilized by Tenant to provide a certificate of insurance naming Landlord, ARE, and The Alexandria Landlord as additional insureds under the vendor's liability policies. Notwithstanding the foregoing, Tenant shall be required to use the food service operator used by The Alexandria Landlord at The Alexandria for any food service or catered events held by Tenant in the Shared Conference Facilities.

Tenant shall, at Tenant's sole cost and expense, (i) be responsible for the set-up of the Shared Conference Facilities in connection with Tenant's use (including, without limitation ensuring that Tenant has a sufficient number of chairs and tables and the appropriate equipment), and (ii) surrender the Shared Conference Facilities after each time that Tenant uses the Shared Conference Facilities free of Tenant's personal property, in substantially the same set up and same condition as received, and free of any debris and trash. If Tenant fails to restore and surrender the Shared Conference Facilities as required by sub-section (ii) of the immediately preceding sentence, such failure shall constitute a "**Shared Facilities Default**." Each time that Landlord reasonably determines that Tenant has committed a Shared Facilities Default, Tenant shall be required to pay Landlord a penalty within 5 days after notice from Landlord of such Shared Facilities Default. The penalty payable by Tenant in connection with the first Shared Facilities Default shall be $200. The penalty payable shall increase by $50 for each subsequent Shared Facilities Default (for the avoidance of doubt, the penalty shall be $250 for the second Shared Facilities Default, shall be $300 for the third Shared Facilities Default, etc.). In addition to the foregoing, Tenant shall be responsible for reimbursing The Alexandria Landlord or Landlord, as applicable, for all reasonable out-of-pocket costs expended by The Alexandria Landlord or Landlord, as applicable, in repairing any damage to the Shared Conference Facilities, the Amenities, or The Alexandria caused by Tenant or any Tenant Party. The provisions of this Section 42(c) shall survive the expiration or earlier termination of this Lease.

(d) **Rules and Regulations**. Tenant shall be solely responsible for paying for any and all ancillary services (e.g., audio visual equipment) provided to Tenant, all food services operators and any other third party vendors providing services to Tenant at The Alexandria. Tenant shall use the Amenities (including, without limitation, the Shared Conference Facilities) in compliance with all applicable Legal Requirements and any rules and regulations imposed by The Alexandria Landlord or Landlord from time to time (which rules shall not be enforced in a discriminatory manner) and in a manner that will not interfere with the rights of other Users. The use of Amenities other than the Shared Conference Facilities by employees of Tenant shall be in accordance with the terms and conditions of the standard licenses, indemnification and waiver agreement required by The Alexandria Landlord or the operator of the Amenities to be executed by all persons wishing to use such Amenities. Neither The Alexandria Landlord nor Landlord (nor, if applicable, any other affiliate of Landlord) shall have any liability or obligation for the breach of any rules or regulations by other Users with respect to the Amenities. Tenant shall not make any alterations, additions, or improvements of any kind to the Shared Conference Facilities, the Amenities or The Alexandria.

Tenant acknowledges and agrees that The Alexandria Landlord shall have the right at any time and from time to time to reconfigure, relocate, modify or remove any of the Amenities at The Alexandria and/or to revise, expand or discontinue any of the services (if any) provided in connection with the Amenities.

(e) **Waiver of Liability and Indemnification**. Tenant warrants that it will use reasonable care to prevent damage to property and injury to persons while on The Alexandria. To the extent permitted by applicable law, Tenant waives any claims it or any Tenant Parties may have against any ARE Parties relating to, arising out of or in connection with the Amenities and any entry by Tenant and/or any Tenant Parties onto The Alexandria, and Tenant releases and exculpates all ARE Parties from any liability relating to, arising out of or in connection with the Amenities and any entry by Tenant and/or any Tenant Parties onto The Alexandria. Tenant hereby agrees to indemnify, defend, and hold harmless the ARE Parties from any claim of damage to property or injury to person relating to, arising out of or in connection with (i) the use of the Amenities by Tenant or any Tenant Parties, and (ii) any entry by Tenant and/or any Tenant Parties onto The Alexandria, except to the extent caused by the willful misconduct or negligence of any ARE Party. The provisions of this Section 42 shall survive the expiration or earlier termination of this Lease.

(f) **Insurance**. As of the Commencement Date, Tenant shall cause The Alexandria Landlord to be named as an additional insured under the commercial general liability policy of insurance that Tenant is required to maintain pursuant to Section 17 of this Lease.

43. **Landlord's Right to Relocate Tenant**. Landlord shall have no right to relocate Tenant to another premises during the Term of the Lease.

44. **Miscellaneous**.

(a) **Notices**. All notices or other communications between the parties shall be in writing and shall be deemed duly given upon delivery or refusal to accept delivery by the addressee thereof if delivered in person, or upon actual receipt if delivered by reputable overnight guaranty courier, addressed and sent to the parties at their addresses set forth above. Landlord and Tenant may from time to time by written notice to the other designate another address for receipt of future notices.

(b) **Joint and Several Liability**. If and when included within the term "**Tenant**," as used in this instrument, there is more than one person or entity, each shall be jointly and severally liable for the obligations of Tenant.

(c) **Financial Information**. Upon Landlord's reasonable request, Tenant shall furnish Landlord with true and complete copies of (i) Tenant's most recent audited annual financial statements within 90 days of the end of each of Tenant's fiscal years during the Term, (ii) Tenant's most recent unaudited quarterly financial statements within 45 days of the end of each of Tenant's first three fiscal quarters of each of Tenant's fiscal years during the Term, (iii) updated business plans, including cash flow projections and/or pro forma balance sheets and income statements, all of which shall be treated by Landlord as confidential information belonging to Tenant, (iv) corporate brochures prepared by Tenant for prospective investors, and (v) any other financial information or summaries that Tenant typically provides to its lenders or shareholders. Notwithstanding the foregoing, in no event shall Tenant be required to provide any financial information to Landlord which Tenant does not otherwise prepare (or cause to be prepared) for its own purposes. So long as Tenant is a "public company" and its financial information is publicly available, then the foregoing delivery requirements of this Section 44(c) shall not apply.

(d) **Recordation**. Neither this Lease nor a memorandum of lease shall be filed by or on behalf of Tenant in any public record. Landlord may prepare and file, and upon request by Landlord Tenant will execute, a memorandum of lease.

(e) **Interpretation**. The normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Lease or any exhibits or amendments hereto. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires. The captions inserted in this Lease are for convenience only and in no way define, limit or otherwise describe the scope or intent of this Lease, or any provision hereof, or in any way affect the interpretation of this Lease.

(f) **Not Binding Until Executed**. The submission by Landlord to Tenant of this Lease shall have no binding force or effect, shall not constitute an option for the leasing of the Premises, nor confer any right or impose any obligations upon either party until execution of this Lease by both parties.

(g) **Limitations on Interest**. It is expressly the intent of Landlord and Tenant at all times to comply with applicable law governing the maximum rate or amount of any interest payable on or in connection with this Lease. If applicable law is ever judicially interpreted so as to render usurious any interest called for under this Lease, or contracted for, charged, taken, reserved, or received with respect to this Lease, then it is Landlord's and Tenant's express intent that all excess amounts theretofore collected by Landlord be credited on the applicable obligation (or, if the obligation has been or would thereby be paid in full, refunded to Tenant), and the provisions of this Lease immediately shall be deemed reformed and the amounts thereafter collectible hereunder reduced, without the necessity of the execution of any new document, so as to comply with the applicable law, but so as to permit the recovery of the fullest amount otherwise called for hereunder.

(h) **Choice of Law**. Construction and interpretation of this Lease shall be governed by the internal laws of the state in which the Premises are located, excluding any principles of conflicts of laws.

(i) **Time**. Time is of the essence as to the performance of Landlord's and Tenant's obligations under this Lease.

(j) **OFAC**. Tenant and all beneficial owners of Tenant are currently (a) in compliance with and shall at all times during the Term of this Lease remain in compliance with the regulations of the Office of Foreign Assets Control ("**OFAC**") of the U.S. Department of Treasury and any statute, executive order, or regulation relating thereto (collectively, the "**OFAC Rules**"), (b) not listed on, and shall not during the term of this Lease be listed on, the Specially Designated Nationals and Blocked Persons List, Foreign Sanctions Evaders List, or the Sectoral Sanctions Identification List, which are all maintained by OFAC and/or on any other similar list maintained by OFAC or other governmental authority pursuant to any authorizing statute, executive order, or regulation, and (c) not a person or entity with whom a U.S. person is prohibited from conducting business under the OFAC Rules.

(k) **Incorporation by Reference**. All exhibits and addenda attached hereto are hereby incorporated into this Lease and made a part hereof. If there is any conflict between such exhibits or addenda and the terms of this Lease, such exhibits or addenda shall control.

(l) **Entire Agreement**. This Lease, including the exhibits attached hereto, constitutes the entire agreement between Landlord and Tenant pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, understandings, letters of intent, negotiations and discussions, whether oral or written, of the parties, and there are no warranties, representations or other agreements, express or implied, made to either party by the other party in connection with the subject matter hereof except as specifically set forth herein.

(m) **No Accord and Satisfaction**. No payment by Tenant or receipt by Landlord of a lesser amount than the monthly installment of Base Rent or any Additional Rent will be other than on account of the earliest stipulated Base Rent and Additional Rent, nor will any endorsement or statement on any check or letter accompanying a check for payment of any Base Rent or Additional Rent be an accord and satisfaction. Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of such Rent or to pursue any other remedy provided in this Lease.

(n) **Hazardous Activities**. Notwithstanding any other provision of this Lease, Landlord, for itself and its employees, agents and contractors, reserves the right to refuse to perform any repairs or services in any portion of the Premises which, pursuant to Tenant's routine safety guidelines, practices or custom or prudent industry practices, require any form of protective clothing or equipment other than safety glasses. In any such case, Tenant shall contract with parties who are acceptable to Landlord, in Landlord's reasonable discretion, for all such repairs and services, and Landlord shall, to the extent required, equitably adjust Tenant's Share of Operating Expenses in respect of such repairs or services to reflect that Landlord is not providing such repairs or services to Tenant.

(o) **Redevelopment of Project**. Tenant acknowledges that Landlord, in its sole discretion, may from time to time expand, renovate and/or reconfigure the Project as the same may exist from time to time and, in connection therewith or in addition thereto, as the case may be, from time to time without limitation: (a) change the shape, size, location, number and/or extent of any improvements, buildings, structures, lobbies, hallways, entrances, exits, parking and/or parking areas relative to any portion of the Project; (b) modify, eliminate and/or add any buildings, improvements, and parking structure(s) either above or below grade, to the Project, the Common Areas and/or any other portion of the Project and/or make any other changes thereto affecting the same; and (c) make any other changes, additions and/or deletions in any way affecting the Project and/or any portion thereof as Landlord may elect from time to time, including without limitation, additions to and/or deletions from the land comprising the Project, the Common Areas and/or any other portion of the Project. Notwithstanding anything to the contrary contained in this Lease, Tenant shall have no right to seek damages (including abatement of Rent) or to cancel or terminate this Lease because of any proposed changes, expansion, renovation or reconfiguration of the Project nor shall Tenant have the right to restrict, inhibit or prohibit any such changes, expansion, renovation or reconfiguration; provided, however, (i) Landlord shall not change the size, dimensions, location or Tenant's Permitted Use of the Premises, (ii) Landlord shall not materially adversely impair Tenant's use and access of the Premises (other than on a temporary basis), and (iii) Tenant's financial obligations under this Lease shall not be materially increased as a result of such redevelopment.

(p) **Intentionally Omitted**.

(q) **EV Charging Stations**. Landlord shall not unreasonably withhold its consent to Tenant's written request to install 1 or more electric vehicle car charging stations ("**EV Stations**") in the parking area serving the Project; provided, however, that Tenant complies with all reasonable requirements, standards, rules and regulations which may be imposed by Landlord, at the time Landlord's consent is granted, in connection with Tenant's installation, maintenance, repair and operation of such EV Stations, which may include, without limitation, the charge to Tenant of a reasonable monthly rental amount for the parking spaces used by Tenant for such EV Stations, Landlord's designation of the location of Tenant's EV Stations, and Tenant's payment of all costs whether incurred by Landlord or Tenant in connection with the installation, maintenance, repair and operation of each Tenant's EV Station(s). Nothing contained in this paragraph is intended to increase the number of parking spaces which Tenant is otherwise entitled to use at the Project under Section 10 of this Lease nor impose any additional obligations on Landlord with respect to Tenant's parking rights at the Project.

(r) **California Accessibility Disclosure**. For purposes of Section 1938(a) of the California Civil Code, Landlord hereby discloses to Tenant, and Tenant hereby acknowledges, that the Project has not undergone inspection by a Certified Access Specialist (CASp). In addition, the following notice is hereby provided pursuant to Section 1938(e) of the California Civil Code: "A Certified Access Specialist (CASp) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp inspection, and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the premises." In furtherance of and in connection with

such notice: (i) Tenant, having read such notice and understanding Tenant's right to request and obtain a CASp inspection, hereby elects not to obtain such CASp inspection and forever waives its rights to obtain a CASp inspection with respect to the Premises, Building and/or Project to the extent permitted by Legal Requirements; and (ii) if the waiver set forth in clause (i) hereinabove is not enforceable pursuant to Legal Requirements, then Landlord and Tenant hereby agree as follows (which constitute the mutual agreement of the parties as to the matters described in the last sentence of the foregoing notice): (A) Tenant shall have the one-time right to request for and obtain a CASp inspection, which request must be made, if at all, in a written notice delivered by Tenant to Landlord; (B) any CASp inspection timely requested by Tenant shall be conducted (1) at a time mutually agreed to by Landlord and Tenant, (2) in a professional manner by a CASp designated by Landlord and without any testing that would damage the Premises, Building or Project in any way, and (3) at Tenant's sole cost and expense, including, without limitation, Tenant's payment of the fee for such CASp inspection, the fee for any reports prepared by the CASp in connection with such CASp inspection (collectively, the "**CASp Reports**") and all other costs and expenses in connection therewith; (C) the CASp Reports shall be delivered by the CASp simultaneously to Landlord and Tenant; (D) Tenant, at its sole cost and expense, shall be responsible for making any improvements, alterations, modifications and/or repairs to or within the Premises to correct violations of construction-related accessibility standards including, without limitation, any violations disclosed by such CASp inspection; and (E) if such CASp inspection identifies any improvements, alterations, modifications and/or repairs necessary to correct violations of construction-related accessibility standards relating to those items of the Building and Project located outside the Premises that are Landlord's obligation to repair as set forth in this Lease, then Landlord shall perform such improvements, alterations, modifications and/or repairs as and to the extent required by Legal Requirements to correct such violations, and Tenant shall reimburse Landlord for the cost of such improvements, alterations, modifications and/or repairs within 10 business days after Tenant's receipt of an invoice therefor from Landlord.

[Signatures on next page]

IN WITNESS WHEREOF, Landlord and Tenant have executed this Lease as of the day and year first above written.

TENANT:

ARCTURUS THERAPEUTICS, INC.,
a Delaware corporation

By: /s/ Joseph E. Payne
Its: President & CEO

LANDLORD:
ARE-SD REGION NO. 44, LLC,

a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership,
managing member

By: ARE-QRS CORP.,
a Maryland corporation,
general partner

By: /s/ Gary Dean
Its: Senior Vice President, RE Legal Affairs

EXHIBIT A TO LEASE

DESCRIPTION OF PREMISES

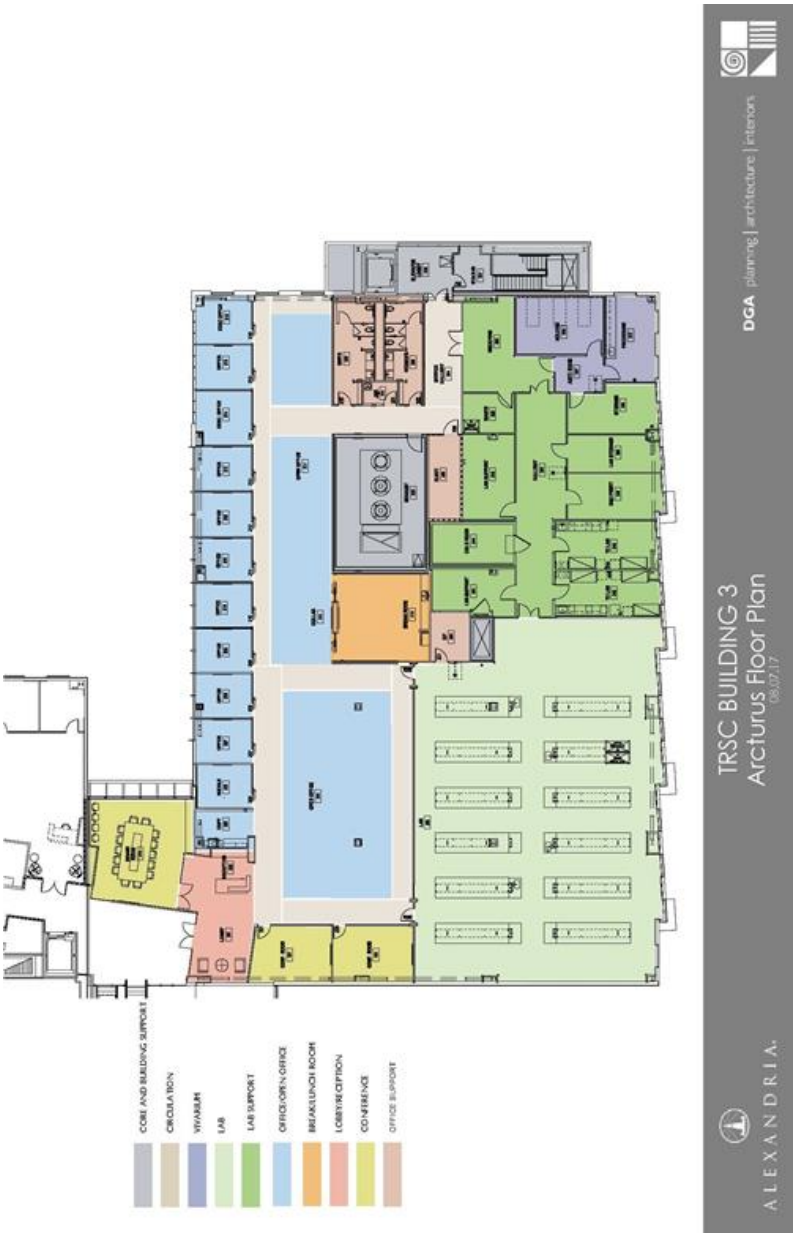


EXHIBIT B TO LEASE

DESCRIPTION OF PROJECT

The land is situated in the City of San Diego, County of San Diego, State of California, and is described as follows:

TRACT I:

PARCEL A:

PARCEL 1 OF PARCEL MAP NO. 19142 IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY JANUARY 24, 2003.

PARCEL B:

EASEMENT SET FORTH IN EASEMENT AGREEMENT (ACCESS) FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON DECEMBER 17, 2012, AS FILE NO. 2012- 0790636 OF OFFICIAL RECORDS.

PARCEL C:

EASEMENT SET FORTH IN EASEMENT AND ENCROACHMENT AGREEMENT (ACCESS AND UTILITY) FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON DECEMBER 17, 2012, AS FILE NO. 2012-0790637 OF OFFICIAL RECORDS.

PARCEL D:

EASEMENTS IN ARTICLE 8 OF DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS FOR TORREY PINES SCIENCE CENTER [UNIT 2], RECORDED JUNE 27, 1994 AS DOCUMENT NO. 1994-405385.

TRACT II:

PARCEL A:

PARCEL 1 OF PARCEL MAP NO. 19102, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 15, 2002 AS FILE NO. 2002-1027004.

PARCEL B:

AN EASEMENT FOR ACCESS, INGRESS AND EGRESS, AND UNDERGROUND UTILITIES, OVER, UNDER, ALONG AND ACROSS AND THROUGH THAT PORTION OF PARCEL 3 OF PARCEL MAP NO. 17448, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AS GRANTED AND DESCRIBED IN THAT CERTAIN “GRANT OF EASEMENT” RECORDED DECEMBER 15, 1994 AS INSTRUMENT NO. 1994-0714126 OF OFFICIAL RECORDS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID PARCEL 3; THENCE ALONG THE BOUNDARY OF SAID PARCEL 3 SOUTH 09° 57’ 23” EAST 100.00.FEET; THENCE NORTH 52° 20’ 03” WEST 43.04 FEET; THENCE CONTINUING ALONG SAID BOUNDARY AND A PROLONGATION THEREOF NORTH 85° 10’ 39” WEST 226.16 FEET; THENCE NORTH 04° 49’ 21” EAST 50.00 FEET TO THE NORTH LINE OF SAID PARCEL 3; THENCE ALONG SAID NORTH LINE SOUTH 85° 10’ 39” EAST 212.97 FEET TO AN ANGLE POINT THEREIN; THENCE CONTINUING ALONG SAID NORTH LINE NORTH 50° 24’ 56” EAST 33.37 FEET TO THE POINT OF BEGINNING.

PARCEL C:

EASEMENTS IN ARTICLE 8 OF DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS FOR TORREY PINES SCIENCE CENTER [UNIT 2], RECORDED JUNE 27, 1994 AS DOCUMENT NO. 1994-405385.

TRACT III:

PARCEL A:

PARCEL 2 OF PARCEL MAP NO. 19142 IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY JANUARY 24, 2003.

PARCEL B:

EASEMENT SET FORTH IN EASEMENT AGREEMENT (STORM DRAINAGE), RECORDED AUGUST 16, 2012, AS INSTRUMENT NO. 2012-0488328 OF OFFICIAL RECORDS.

PARCEL C:

EASEMENT SET FORTH IN EASEMENT AND ENCROACHMENT AGREEMENT, RECORDED AUGUST 16, 2012, AS INSTRUMENT NO. 2012-0488330 OF OFFICIAL RECORDS.

PARCEL D:

EASEMENT SET FORTH IN EASEMENT AND ENCROACHMENT AGREEMENT (ACCESS AND UTILITY), RECORDED DECEMBER 17, 2012, AS INSTRUMENT NO. 2012-0790637 OF OFFICIAL RECORDS.

PARCEL E:

EASEMENTS IN ARTICLE 8 OF DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS FOR TORREY PINES SCIENCE CENTER [UNIT 2], RECORDED JUNE 27, 1994 AS DOCUMENT NO. 1994-0405385.

APN: 340-180-35-00 and 340-180-34-00 and 340-180-36-00

EXHIBIT C TO LEASE

WORK LETTER

THIS WORK LETTER dated October 4, 2017 (this "**Work Letter**") is made and entered into by and between **ARE-SD REGION NO. 44, LLC**, a Delaware limited liability company ("**Landlord**"), and **ARCTURUS THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease Agreement dated October 4, 2017 (the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

1. **General Requirements**.

(a) **Tenant's Authorized Representative**. Tenant designates Jennifer Perkins ("**Tenant's Representative**") as the only person authorized to act for Tenant pursuant to this Work Letter. Landlord shall not be obligated to respond to or act upon any request, approval, inquiry or other communication ("**Communication**") from or on behalf of Tenant in connection with this Work Letter unless such Communication is in writing from Tenant's Representative. Tenant may change Tenant's Representative at any time upon not less than 5 business days advance written notice to Landlord. Neither Tenant nor Tenant's Representative shall be authorized to direct Landlord's contractors in the performance of Landlord's Work (as hereinafter defined).

(b) Landlord designates Michael Harrison and John Kavanagh (either such individual acting alone, "**Landlord's Representative**") as the only persons authorized to act for Landlord pursuant to this Work Letter. Tenant shall not be obligated to respond to or act upon any request, approval, inquiry or other Communication from or on behalf of Landlord in connection with this Work Letter unless such Communication is in writing from Landlord's Representative. Landlord may change either Landlord's Representative at any time upon not less than 5 business days advance written notice to Tenant. Landlord's Representative shall be the sole persons authorized to direct Landlord's contractors in the performance of Landlord's Work.

(c) **Architects, Consultants and Contractors**. Landlord and Tenant hereby acknowledge and agree that: (i) the general contractor and any subcontractors for the Tenant Improvements shall be selected by Landlord, subject to Tenant's approval, which approval shall not be unreasonably withheld, conditioned or delayed, and (ii) Dowler Gruman Architects shall be the architect (the "**TI Architect**") for the Tenant Improvements.

2. **Tenant Improvements**.

(a) **Tenant Improvements Defined**. As used herein, "**Tenant Improvements**" shall mean all improvements to the Premises of a fixed and permanent nature as shown on the TI Construction Drawings, as defined in Section 2(c) below, which shall be constructed using finishes comparable to the finishes of the improvements in the premises occupied by Tenant at the Project as of the date of the Lease. Other than Landlord's Work (as defined in Section 3(a) below), Landlord shall not have any obligation whatsoever with respect to the finishing of the Premises for Tenant's use and occupancy.

(b) **Tenant's Space Plans**. Landlord and Tenant acknowledge and agree that the plan prepared by the TI Architect attached hereto as **Annex 1** (the "**Space Plans**") and the scope of work attached hereto as **Annex 2** (the "**Scope of Work**") have been approved by both Landlord and Tenant. Landlord and Tenant further acknowledge and agree that any changes to the Space Plans or the Scope of Work requested by Tenant constitute a Change Request the cost of which changes shall be paid for by Tenant. Tenant shall be solely responsible for all costs incurred by Landlord to alter the Building (or Landlord's plans for the Building) as a result of Tenant's requested changes.

(c) **Working Drawings**. Landlord shall cause the TI Architect to prepare and deliver to Tenant for review and comment construction plans, specifications and drawings for the Tenant Improvements ("**TI Construction Drawings**"), which TI Construction Drawings shall be prepared substantially in accordance with the Space Plans. Tenant shall be solely responsible for ensuring that the TI Construction Drawings reflect Tenant's requirements for the Tenant Improvements. Tenant shall deliver its written comments on the TI Construction Drawings to Landlord not later than 10 business days after Tenant's receipt of the same; provided, however, that Tenant may not disapprove any matter that is consistent with the Space Plans without submitting a Change Request. Landlord and the TI Architect shall consider all such comments in good faith and shall, within 10 business days after receipt, notify Tenant how Landlord proposes to respond to such comments, but Tenant's review rights pursuant to the foregoing sentence shall not delay the design or construction schedule for the Tenant Improvements. Any disputes in connection with such comments shall be resolved in accordance with Section 2(d) hereof. Provided that the design reflected in the TI Construction Drawings is consistent with the Space Plans, Tenant shall approve the TI Construction Drawings submitted by Landlord, unless Tenant submits a Change Request. Once approved by Tenant, subject to the provisions of Section 4 below, Landlord shall not materially modify the TI Construction Drawings except as may be reasonably required in connection with the issuance of the TI Permit (as defined in Section 3(b) below).

(d) **Approval and Completion**. It is hereby acknowledged by Landlord and Tenant that the TI Construction Drawings must be completed and approved not later than October 18, 2017, in order for the Landlord's Work to be Substantially Complete by the Target Commencement Date (as defined in the Lease). Upon any dispute regarding the design of the Tenant Improvements, which is not settled within 10 business days after notice of such dispute is delivered by one party to the other, Tenant may make the final decision regarding the design of the Tenant Improvements, provided (i) Tenant acts reasonably and such final decision is either consistent with or a compromise between Landlord's and Tenant's positions with respect to such dispute, (ii) that all costs and expenses resulting from any such decision by Tenant shall be payable by Tenant, and (iii) Tenant's decision will not affect the base Building, structural components of the Building or any Building Systems. Any changes to the TI Construction Drawings following Landlord's and Tenant's approval of same requested by Tenant shall be processed as provided in Section 4 hereof.

3. **Performance of Landlord's Work**.

(a) **Definition of Landlord's Work**. As used herein, "**Landlord's Work**" shall mean the work of constructing the Tenant Improvements.

Tenant shall be solely responsible for ensuring that the design and specifications for Landlord's Work are consistent with Tenant's requirements. Landlord shall be responsible for obtaining all permits, approvals and entitlements necessary for Landlord's Work, but shall have no obligation to, and shall not, secure any permits, approvals or entitlements related to Tenant's specific use of the Premises or Tenant's business operations therein.

(b) **Commencement and Permitting**. Landlord shall commence construction of the Tenant Improvements upon obtaining a building permit (the "**TI Permit**") authorizing the construction of the Tenant Improvements consistent with the TI Construction Drawings approved by Tenant. The cost of obtaining the TI Permit shall be payable by Landlord. Tenant shall, at no additional cost to Tenant, cooperate with Landlord in obtaining the TI Permit. If any Governmental Authority having jurisdiction over the construction of Landlord's Work or any portion thereof shall impose terms or conditions upon the construction thereof that: (i) are inconsistent with Landlord's obligations hereunder, (ii) increase the cost of constructing Landlord's Work, or (iii) will materially delay the construction of Landlord's Work, Landlord and Tenant shall reasonably and in good faith seek means by which to mitigate or eliminate any such adverse terms and conditions.

(c) **Completion of Landlord's Work**. Landlord shall substantially complete or cause to be substantially completed Landlord's Work in a good and workmanlike manner, in accordance with the TI Permit subject, in each case, to Minor Variations and normal "punch list" items of a non-material nature

that do not interfere with the use of the Premises ("**Substantial Completion**" or "**Substantially Complete**"). Upon Substantial Completion of Landlord's Work, Landlord shall require the TI Architect and the general contractor to execute and deliver, for the benefit of Tenant and Landlord, a Certificate of Substantial Completion in the form of the American Institute of Architects ("**AIA**") document G704. For purposes of this Work Letter, "**Minor Variations**" shall mean any modifications reasonably required: (i) to comply with all applicable Legal Requirements and/or to obtain or to comply with any required permit (including the TI Permit); (ii) to comply with any request by Tenant for modifications to Landlord's Work; (iii) to comport with good design, engineering, and construction practices that are not material; or (iv) to make reasonable adjustments for field deviations or conditions encountered during the construction of Landlord's Work.

(d) **Selection of Materials**. Where more than one type of material or structure is indicated on the TI Construction Drawings approved by Landlord and Tenant, the option will be selected at Landlord's reasonable discretion after reasonable consultation with Tenant. As to all building materials and equipment that Landlord is obligated to supply under this Work Letter, Landlord shall select the manufacturer thereof in its reasonable discretion.

(e) **Delivery of the Premises**. When Landlord's Work is Substantially Complete, subject to the remaining terms and provisions of this Section 3(e), Tenant shall accept the Premises. Tenant's taking possession and acceptance of the Premises shall not constitute a waiver of: (i) any warranty with respect to workmanship (including installation of equipment) or material (exclusive of equipment provided directly by manufacturers), (ii) any non-compliance of Landlord's Work with applicable Legal Requirements, or (iii) any claim that Landlord's Work was not completed substantially in accordance with the TI Construction Drawings (subject to Minor Variations and such other changes as are permitted hereunder) (collectively, a "**Construction Defect**"). Tenant shall have one year after Substantial Completion within which to notify Landlord of any such Construction Defect discovered by Tenant, and Landlord shall use reasonable efforts to remedy or cause the responsible contractor to remedy any such Construction Defect within 30 days thereafter. Notwithstanding the foregoing, Landlord shall not be in default under the Lease if the applicable contractor, despite Landlord's reasonable efforts, fails to remedy such Construction Defect within such 30-day period. If the contractor fails to remedy such Construction Defect within a reasonable time, Landlord shall use reasonable efforts to remedy the Construction Defect within 30 days unless such Construction Defect cannot reasonably be remedied in 30 days in which case Landlord shall thereafter continue to diligently pursue such remedy.

Tenant shall be entitled to receive the benefit of all construction warranties and manufacturer's equipment warranties relating to equipment installed in the Premises. If requested by Tenant, Landlord shall attempt to obtain extended warranties from manufacturers and suppliers of such equipment, but the cost of any such extended warranties shall be borne solely by Tenant. Landlord shall promptly undertake and complete, or cause to be completed, all punch list items, which Landlord shall endeavor to complete within 30 days of Substantial Completion.

(f) **Commencement Date Delay**. Except as otherwise provided in the Lease, Delivery of the Premises shall occur when Landlord's Work has been Substantially Completed, except to the extent that completion of Landlord's Work shall have been actually delayed by any one or more of the following causes ("**Tenant Delay**"):

(i) Tenant's Representative was not available within 2 business days following Landlord's written notice to give or receive any Communication or to take any other action required to be taken by Tenant hereunder;

(ii) Tenant's request for Change Requests (as defined in Section 4(a) below) whether or not any such Change Requests are actually performed;

(iii) Construction of any Change Requests;

(iv) Tenant's request for materials, finishes or installations requiring unusually long lead times, provided that promptly after Landlord learns of such long lead times, Landlord informs Tenant that the requested items will required unusually long lead times;

(v) Tenant's delay in reviewing, revising or approving plans and specifications beyond the periods set forth herein;

(vi) Tenant's delay in providing information critical to the normal progression of the Project. Tenant shall provide such information as soon as reasonably possible, but in no event longer than one week after receipt of any request for such information from Landlord;

(vii) Tenant's delay in making payments to Landlord for Excess TI Costs (as defined in Section 5(d) below); or

(viii) Any other act or omission by Tenant or any Tenant Party (as defined in the Lease), or persons employed by any of such persons that continues for more than 1 business day after Landlord's written notice thereof to Tenant.

If Delivery is delayed for any of the foregoing reasons, then Landlord shall cause the TI Architect to certify the date on which the Tenant Improvements would have been completed but for such Tenant Delay and such certified date shall be the date of Delivery.

4. **Changes**. Any changes requested by Tenant to the Tenant Improvements after the approval by Landlord and Tenant of the Space Plans and Scope of Work shall be requested and instituted in accordance with the provisions of this Section 4 and shall be subject to the written approval of Landlord and the TI Architect, such approval not to be unreasonably withheld, conditioned or delayed.

(a) **Tenant's Request For Changes**. If Tenant shall request changes to the Tenant Improvements ("**Changes**"), Tenant shall request such Changes by notifying Landlord in writing in substantially the same form as the AIA standard change order form (a "**Change Request**"), which Change Request shall detail the nature and extent of any such Change. Such Change Request must be signed by Tenant's Representative. Landlord shall, before proceeding with any Change, use commercially reasonable efforts to respond to Tenant as soon as is reasonably possible with an estimate of: (i) the time it will take, and (ii) the architectural and engineering fees and costs that will be incurred, to analyze such Change Request (which costs shall be paid for by Tenant to the extent actually incurred, whether or not such change is implemented). Landlord shall thereafter submit to Tenant in writing, within 5 business days of receipt of the Change Request (or such longer period of time as is reasonably required depending on the extent of the Change Request), an analysis of the additional cost or savings involved, including, without limitation, architectural and engineering costs and the period of time, if any, that the Change will extend the date on which Landlord's Work will be Substantially Complete. Any such delay in the completion of Landlord's Work caused by a Change, including any suspension of Landlord's Work while any such Change is being evaluated and/or designed, shall be Tenant Delay.

(b) **Implementation of Changes**. If Tenant: (i) approves in writing the cost or savings and the estimated extension in the time for completion of Landlord's Work, if any, and (ii) deposits with Landlord any Excess TI Costs required in connection with such Change, Landlord shall cause the approved Change to be instituted. Notwithstanding any approval or disapproval by Tenant of any estimate of the delay caused by such proposed Change, the TI Architect's determination of the amount of Tenant Delay in connection with such Change shall be final and binding on Landlord and Tenant.

5. **Costs**.

(a) **TI Costs**. Landlord shall be responsible for the payment of design, permits and construction costs in connection with the construction of the Tenant Improvements, including, without limitation, the cost of preparing the TI Construction Drawings and the Space Plans and Landlord's out-of-

pocket expenses (collectively, "**TI Costs**"). Notwithstanding anything to the contrary contained herein, except as otherwise expressly provided in the Lease, TI Costs shall not include (and Landlord shall not be responsible for the cost of) furniture, personal property or other non-Building system materials or equipment, including, but not limited to, Tenant's voice or data cabling, non-ducted biological safety cabinets and other scientific equipment not incorporated into the Tenant Improvements.

(b) **Excess TI Costs**. Notwithstanding anything to the contrary contained herein, Tenant acknowledges and agrees that Landlord shall have no responsibility for any costs arising from or related to Tenant's changes to the Space Plans or TI Construction Drawings, Tenant Delays, the cost of Changes and Change Requests which would increase any of the costs anticipated by Landlord for Landlord's Work (collectively, "**Excess TI Costs**"). Landlord shall provide Tenant with the line-item amount of any Excess TI Costs incurred along with reasonable supporting evidence but, for the avoidance of any doubt, in no event shall Landlord be required to provide Tenant with its budget for Landlord's Work. Tenant shall deposit with Landlord, as a condition precedent to Landlord's obligation to complete the Tenant Improvements, 100% of the Excess TI Costs with respect to which Tenant has not elected to apply the Excess TI Costs Allowance or that exceed the Excess TI Costs Allowance. If Tenant fails to deposit such Excess TI Costs with Landlord, Landlord shall have all of the rights and remedies set forth in the Lease for nonpayment of Rent (including, but not limited to, the right to interest at the Default Rate and the right to assess a late charge). For purposes of any litigation instituted with regard to such amounts, those amounts will be deemed Rent under the Lease.

(c) **Excess TI Costs Allowance**. Landlord shall provide to Tenant an "**Excess TI Costs Allowance**" in the maximum amount of $20.00 per rentable square foot of the Premises, or $494,100 in the aggregate, which shall, to the extent used, result in Additional Rent as set forth in Section 4(b) of the Lease. The Excess Costs Allowance may be used only for the payment of Excess TI Costs.

(d) **Allowance**. Landlord shall make available to Tenant an allowance of up to $3.00 per rentable square foot of the Premises, or $74,115.00 in the aggregate (the "**Allowance**") for the costs of Tenant's cabling, Tenant's signage and the cost of other items reasonably acceptable to Landlord ("**Acceptable Items**"). Landlord shall reimburse Tenant for the actual reasonable cost of Acceptable Items within 30 days after Tenant's delivery to Landlord of invoices and other evidence reasonably requested by Landlord reflecting the actual reasonable costs incurred by Tenant for such Acceptable Items. The Allowance shall only be available for use by Tenant for costs incurred by Tenant for Acceptable Items during the period commencing on the execution date of the Lease through the date that is 90 days after the Commencement Date (such period, the "**Allowance Reimbursement Period**"). Any portion of the Allowance with respect to which Landlord has not received an invoice (and/or other evidence reasonably requested by Landlord) within 90 days after the Allowance Reimbursement Period for costs incurred during the Allowance Reimbursement Period shall be forfeited and shall not be available for use by Tenant.

6. **Tenant Access**.

(a) **Tenant's Access Rights**. Landlord hereby agrees to permit Tenant access, at Tenant's sole risk and expense, to the Building (i) 30 days prior to the Commencement Date to perform any work ("**Tenant's Work**") required by Tenant other than Landlord's Work, provided that such Tenant's Work is coordinated with the TI Architect and the general contractor, and complies with the Lease and all other reasonable restrictions and conditions Landlord may impose, and (ii) prior to the completion of Landlord's Work, to inspect and observe work in process; all such access shall be during normal business hours or at such other times as are reasonably designated by Landlord. Notwithstanding the foregoing, Tenant shall have no right to enter onto the Premises or the Project unless and until Tenant shall deliver to Landlord evidence reasonably satisfactory to Landlord demonstrating that any insurance reasonably required by Landlord in connection with such pre-commencement access (including, but not limited to, any insurance that Landlord may require pursuant to the Lease) is in full force and effect. Any entry by Tenant shall comply with all established safety practices of Landlord's contractor and Landlord until completion of Landlord's Work and acceptance thereof by Tenant.

(b) **No Interference**. Neither Tenant nor any Tenant Party (as defined in the Lease) shall interfere with the performance of Landlord's Work, nor with any inspections or issuance of final approvals by applicable Governmental Authorities, and upon any such interference, Landlord shall have the right to exclude Tenant and any Tenant Party from the portions of the Premises in which the Tenant Improvements are being constructed until Substantial Completion of Landlord's Work.

(c) **No Acceptance of Premises**. The fact that Tenant may, with Landlord's consent, enter into the Project prior to the date Landlord's Work is Substantially Complete for the purpose of performing Tenant's Work shall not be deemed an acceptance by Tenant of possession of the Premises, but in such event Tenant shall defend with counsel reasonably acceptable by Landlord, indemnify and hold Landlord harmless from and against any loss of or damage to Tenant's property, completed work, fixtures, equipment, materials or merchandise, and from liability for death of, or injury to, any person, caused by the act or omission of Tenant or any Tenant Party.

7. **Miscellaneous**.

(a) **Consents**. Whenever consent or approval of either party is required under this Work Letter, that party shall not unreasonably withhold, condition or delay such consent or approval, unless expressly set forth herein to the contrary.

(b) **Modification**. No modification, waiver or amendment of this Work Letter or of any of its conditions or provisions shall be binding upon Landlord or Tenant unless in writing signed by Landlord and Tenant.

(c) **No Default Funding**. In no event shall Landlord have any obligation perform any Landlord's Work during any period that Tenant is in Default under the Lease.

Annex 1

Space Plans

Annex 2

Scope of Work

GENERAL BASE BUILDING INFORMATION

1)	Project:	24,705 square feet
2)	Buildings / Stories:	One (1) Building: 10628 Science Center Drive, San Diego CA Level 2 - 24,705 SF (Lab / Office) Multi-Tenant Building
3)	Construction Type:	Type II B, Fully Sprinklered
4)	Parking:	Surface Parking and Two (2) Story Underground Parking.
5)	Applicable Codes:	California Building Code (CBC) California Electrical Code (CEC) California Mechanical Code (CMC) California Plumbing Code (CPC) California Fire Code (CFC) California Energy Code (CEC) California Green Building Standards Code (GBC) Accessibility Regulations as Prescribed by the 2013 California Building Code Americans with Disabilities Act Guidelines (ADA) All Codes and Ordinances Adopted by the City of San Diego

6) Landlord shall be responsible for securing all applicable design, engineering, permits and approvals required for the tenant improvement scope of work.

7) LANDLORD WORK PLANS for BASE SPEC SUITE

SITE WORK / BUILDING EXTERIOR / GENERAL

1. Exterior building facade and or shaft work to support new elevator.
2. New restroom finishes and accessibility modifications.
3. Existing and New supply air and exhaust air distribution systems.
4. Laboratory air compressor and vacuum pump systems are provided as part of the house systems.
5. Electrical infrastructure and SDGE Meters to support multitenant lab/office/campus use
6. Standby generator and transfer switches to support tenant improvements as identified in electrical scope.

STRUCTURAL SYSTEMS

1. All structural supports required for base building equipment.

MOITURE AND THERMAL PROTECTION

1. Kraft faced batt insulation at all non-glass exterior walls and rigid insulation at spandrel glass conditions.

STAIR / LOBBY / RESTROOMS / OTHER

1. Existing Level Two restrooms to be removed and new restroom fixtures, finishes and accessibility installed within tenant improvement area. Toilet and urinal count per floor to meet TI intended occupancy requirements.
2. New interior lobby finishes, mechanical, LED lighting and reception desk per spec suite. Reception to have power and data.
3. New elevator lobby finishes on level two to match tenant improvement finishes.
4. Updated stairwell finishes to match building standards defined by landlord.
5. Security - (3) exterior suite openings prepared for security hardware for tenant’s security vendor to trim-out, cable and program into tenant's security system.
6. Code compliant interior signage, all other by tenant.

FINISHES

Ceilings

1. Acoustical (ACT) lab grade ceilings in laboratory areas.
2. Drywall hard-lid paintable ceilings at break rooms.
3. Drywall hard-lid soffit/ceiling allowance for lobby area.
4. Acoustical office grade (ACT) ceilings at office and conference rooms.
5. Exposed ceilings to structural at work station and common areas.

Walls Finish

1. General latex wall paint in lobby, offices, conference rooms and laboratory areas.
2. Vivarium area to included cleanable paint surfaces.

Flooring

1. Laboratory areas have VCT tile with rubber base.
2. Lunchroom to have premium LVT.
3. Office and conference rooms to have carpet tile flooring.
4. Lobby flooring to be upgraded, flooring to be finalized with finishes.
5. Main circulation corridor to have polished exposed concrete.

Glazing

1. Storefront glazing system at entry.
2. Re-Use of Building 1 glazing system between lab and office area or equal.
3. Glazed wall systems at office fronts.

Millwork

1. Custom lobby desk.

2. Plastic laminate cabinets and drawers at lobby and lunch room.

Lab casework

1. Laboratory casework base cabinets, reagent shelving and trespa or equal tops relocated from Building 1.

CONVEYING SYSTEMS

1. New 4,0001b lab service elevator (Machine Room and elevator), with door opening of 4'- 0" wide.
   Elevator cab finish to be brushed stainless steel walls and ceiling.
2. Elevator and structural systems to be permitted and delivered under separate permit from general tenant improvement permit.
3. Sound insulation at elevator hoistways.

SPECIALTY EQUIPMENT

1. None

HVAC SYSTEMS

Laboratory

1. Exiting laboratory air handling unit, 100% outside air for laboratory only.
2. Re-use of existing duct risers and mains.
3. Option for Re-use of existing laboratory exhaust fan system and new supplemental exhaust fan systems.
4. Building Automation System connected to existing system.

Office

1. Fan coils units to support office area.
2. Building Automation System connected to existing system.

Other

1. Electrical and mechanical room ventilation as needed.
2. Lobby and general open collaborator areas to be conditioned with existing or new house system.

PLUMBING

1. Water and sewer services of adequate size to support the building type.
2. Sanitary sewer, waste and vent lines associated with toilet rooms and house mechanical systems included.
3. Water systems (ICW, IHW, DCW, DHW,) distributed to associated equipment as needed.
4. Laboratory air compressor and laboratory vacuum distributed.
5. DI water system by tenant.
6. Gases not identified will be fed from point of use cylinders maintained by tenant.
7. Condensate drains for HVAC equipment and plumbing equipment runs to nearest indirect waste receptor.

FIRE PROTECTION / FIRE PROOFING

1. Full building fire sprinkler system sized to meet building type and density. System includes vertical and horizontal distribution per TI test fit and to allow for final modifications.
2. Fully functional fire alarm system to support TI, elevator monitoring and fire protection flow switches.
3. Fireproofing and horizontal fire separations to include structural fire proofing if needed and firesafing as required to comply with Building Type.

ELECTRICAL SYSTEMS

1. Primary service 4,000A for overall building.

Distribution

1. Existing electrical room to be relocated with new or relocated panelboards and transformers to support 277/480Volt service as needed for power devices, equipment and lighting.
2. Power devices for laboratory, office, lobby and conference rooms.
3. New elevator to be installed and fed from house metered panel boards (under separate permit).
4. New IDF riser room located on Level 2. Tenant to extend existing or new service from the building MPOE to IDF room. IDF/Server room build-out, structured cabling, security & CCTV cabling by tenant.
5. Tele/data ring and string for laboratory and office areas. Conduit pathway for Level Two and IDF access.
6. Single gang box for tenant card access control system.

Lighting

7. New LED lighting at laboratory, office, restrooms and conferencing areas. Upgraded recessed LED lighting at lobby and conference room.
8. New Title 24 compliant lighting control system.

8) <u>LANDLORD WORK PLANS for ARCTURUS ADJUSTED TENANT IMPROVEMENT</u>

BUILDING INTERIOR / GENERAL WORK AREAS

1. Current Spec Suite has shell space with proposed Tenant Improvements to include Vivarium, receiving areas and laboratory support rooms as further identified within this document.
2. Tenant Improvements include (1) boardroom.
3. Existing and New supply air and exhaust air distribution systems.
4. Laboratory air compressor and vacuum pump systems are provided as part of the house systems and included with (3) additional fixed lab benches to be located within the laboratory.
5. Electrical infrastructure and SDGE Meters to support multitenant lab/office/campus use.

STRUCTURAL SYSTEMS

1. All structural supports required for base building equipment.

MOITURE AND THERMAL PROTECTION

1. Kraft faced batt insulation at all non-glass exterior walls and rigid insulation at spandrel glass conditions.

GENERAL / OTHER

1. Security - (3) interior doors and openings prepared for security hardware for tenant's security vendor to trim-out, cable and program into tenant's security system.
2. Code compliant interior signage, all other by tenant.

FINISHES

Ceilings

1. Acoustical (ACT) lab grade ceilings in laboratory and lab support rooms.
2. Drywall hard-lid paintable ceilings in Vivarium rooms only.

Walls Finish

1. General latex wall paint in conference rooms and laboratory support areas.
2. Vivarium area to included cleanable paint surfaces.

Flooring

1. Laboratory and Laboratory Support areas have VCT tile with rubber base.
2. Vivarium rooms have solid color epoxy coating with integral cove base.
3. Boardroom room to have carpet tile flooring.

Glazing

1. Storefront glazing at partial boardroom.

Millwork

1. None, See Spec Suite for areas included.

Lab Casework

2. Laboratory casework base cabinets, reagent shelving and trespa or equal tops relocated from Building 1.
3. Stainless steel benches by tenant.

CONVEYING SYSTEMS

1. None, See Spec Suite for areas included.

SPECIALTY EQUIPMENT

1. Environmentally controlled cold room.

HVAC SYSTEMS

Laboratory

1. Exiting laboratory air handling unit, 100% outside air for laboratory only.
2. Re-use of existing duct risers and mains.
3. Option for re-use of existing laboratory exhaust fan system and new supplemental in-line exhaust fan systems.
4. Building Automation System connected to existing system.

PLUMBING

1. Water and sewer services of adequate size to support the building type.
2. Sanitary sewer, waste and vent lines associated with toilet rooms and house mechanical systems included.
3. Water systems (ICW, IHW, DCW, DHW,) distributed to associated equipment as needed.
4. Laboratory air compressor and laboratory vacuum distributed at lab benches.
5. DI water system by tenant. (2) Point of use under counter water polishing units.
6. (1) N2 manifold and piping distribution to three lab benches.
7. O2 and other gases not identified will be fed from point of use cylinders maintained by tenant.
8. Condensate drains for HVAC equipment and plumbing equipment runs to nearest indirect waste receptor.

FIRE PROTECTION / FIRE PROOFING

1. Full building fire sprinkler system sized to meet building type and density. System includes vertical and horizontal distribution per TI test fit and to allow for final modifications.
2. Fully functional fire alarm system to support TI, elevator monitoring and fire protection flow switches.
3. Fireproofing and horizontal fire separations to include structural fire proofing if needed and firesafing as required to comply with Building Type.

ELECTRICAL SYSTEMS

1. Primary service 4,000A for overall building.

Distribution

1. Power devices for laboratory general and specified equipment, office, lobby and conference rooms.
2. Standby power to cold room, -20 & -80 Freezers, Incubators.
3. New IDF riser room located on Level 2. Tenant to extend existing or new service from the building MPOE to IDF room. IDF/Server room build-out, structured cabling, security & CCTV cabling by tenant.
4. Tele/data ring and string for laboratory and office areas. Conduit pathway for Level Two and IDF access.
5. Single gang box for tenant card access control system.

Lighting

1. New LED lighting at laboratory, vivarium and conferencing areas.
2. New Title 24 compliant lighting control system.

EXHIBIT D TO LEASE

ACKNOWLEDGMENT OF COMMENCEMENT DATE

This **ACKNOWLEDGMENT OF COMMENCEMENT DATE** is made this _____ day of _____, ____, between **ARE-SD REGION NO. 44, LLC**, a Delaware limited liability company ("**Landlord**"), and **ARCTURUS THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated _____, _____ (the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree, for all purposes of the Lease, that the Commencement Date of the Base Term of the Lease is _____, _____, and the termination date of the Base Term of the Lease shall be midnight on _____, _____. In case of a conflict between the terms of the Lease and the terms of this Acknowledgment of Commencement Date, this Acknowledgment of Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF COMMENCEMENT DATE to be effective on the date first above written.

TENANT:

ARCTURUS THERAPEUTICS, INC.,
a Delaware corporation

By: _____
Its: _____

LANDLORD:

ARE-SD REGION NO. 44, LLC,
a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership,
managing member

By: ARE-QRS CORP.,
a Maryland corporation,
general partner

By: _____
Its: _____

EXHIBIT E TO LEASE

Rules and Regulations

1. The sidewalk, entries, and driveways of the Project shall not be obstructed by Tenant, or any Tenant Party, or used by them for any purpose other than ingress and egress to and from the Premises.

2. Tenant shall not place any objects, including antennas, outdoor furniture, etc., in the parking areas, landscaped areas or other areas outside of its Premises, or on the roof of the Project.

3. Except for animals assisting the disabled, no animals shall be allowed in the offices, halls, or corridors in the Project.

4. Tenant shall not disturb the occupants of the Project or adjoining buildings by the use of any radio or musical instrument or by the making of loud or improper noises.

5. If Tenant desires telegraphic, telephonic or other electric connections in the Premises, Landlord or its agent will direct the electrician as to where and how the wires may be introduced; and, without such direction, no boring or cutting of wires will be permitted. Any such installation or connection shall be made at Tenant's expense.

6. Tenant shall not install or operate any steam or gas engine or boiler, or other mechanical apparatus in the Premises, except as specifically approved in the Lease. The use of oil, gas or inflammable liquids for heating, lighting or any other purpose is expressly prohibited. Explosives or other articles deemed extra hazardous shall not be brought into the Project.

7. Parking any type of recreational vehicles is specifically prohibited on or about the Project. Except for the overnight parking of operative vehicles, no vehicle of any type shall be stored in the parking areas at any time. In the event that a vehicle is disabled, it shall be removed within 48 hours. There shall be no "For Sale" or other advertising signs on or about any parked vehicle. All vehicles shall be parked in the designated parking areas in conformity with all signs and other markings. All parking will be open parking, and no reserved parking, numbering or lettering of individual spaces will be permitted except as specified by Landlord.

8. Tenant shall maintain the Premises free from rodents, insects and other pests.

9. Landlord reserves the right to exclude or expel from the Project any person who, in the judgment of Landlord, is intoxicated or under the influence of liquor or drugs or who shall in any manner do any act in violation of the Rules and Regulations of the Project.

10. Tenant shall not cause any unnecessary labor by reason of Tenant's carelessness or indifference in the preservation of good order and cleanliness. Landlord shall not be responsible to Tenant for any loss of property on the Premises, however occurring, or for any damage done to the effects of Tenant by the janitors or any other employee or person.

11. Tenant shall give Landlord prompt notice of any defects in the water, lawn sprinkler, sewage, gas pipes, electrical lights and fixtures, heating apparatus, or any other service equipment affecting the Premises.

12. Tenant shall not permit storage outside the Premises, including without limitation, outside storage of trucks and other vehicles, or dumping of waste or refuse or permit any harmful materials to be placed in any drainage system or sanitary system in or about the Premises.

13. All moveable trash receptacles provided by the trash disposal firm for the Premises must be kept in the trash enclosure areas, if any, provided for that purpose.

14. No auction, public or private, will be permitted on the Premises or the Project.

15. No awnings shall be placed over the windows in the Premises except with the prior written consent of Landlord.

16. The Premises shall not be used for lodging, sleeping or cooking or for any immoral or illegal purposes or for any purpose other than that specified in the Lease. No gaming devices shall be operated in the Premises.

17. Tenant shall ascertain from Landlord the maximum amount of electrical current which can safely be used in the Premises, taking into account the capacity of the electrical wiring in the Project and the Premises and the needs of other tenants, and shall not use more than such safe capacity. Landlord's consent to the installation of electric equipment shall not relieve Tenant from the obligation not to use more electricity than such safe capacity.

18. Tenant assumes full responsibility for protecting the Premises from theft, robbery and pilferage.

19. Tenant shall not install or operate on the Premises any machinery or mechanical devices of a nature not directly related to Tenant's ordinary use of the Premises and shall keep all such machinery free of vibration, noise and air waves which may be transmitted beyond the Premises.

EXHIBIT F TO LEASE

TENANT'S PERSONAL PROPERTY

None.

EXHIBIT G TO LEASE

TENANT'S PERSONAL PROPERTY

Second Floor Furniture

TRSC - Building 3 Furniture Exhibit
Dated: 9/7/2017

ITEM	FURNITURE TRSC B3 - 2nd Floor ARCTURUS	PHOTOS	LOCATION TRSC-B3	NOTES
1.0	Standard Office Desks		11	Desks will be adjusted to fit new office layout/size.
1.1	Standard Office- chair		11	Office chair
1.2	Standard Office - side chairs		22	Office side chair

Second Floor Furniture

ITEM	FURNITURE TRSC B3 - 2nd Floor ARCTURUS	PHOTOS	LOCATION TRSC-B3	NOTES
1.3	Office overhead shelving unit		8	Will not fit in all offices, but will review on case by case basis.
2.0	Breakroom bar stools RED		7	Available for break room, although no table included.
3.0	Lounge chairs from west collaboration area		2	Reception Seating
3.1	Mirror style end tabls from west collaboration area		1	Reception Table

Second Floor Furniture

ITEM	FURNITURE TRSC B3 - 2nd Floor ARCTURUS	PHOTOS	LOCATION TRSC-B3	NOTES
4.0	Conference room table 4'x15' (14) person		1	
4.1	Conference room chairs BLACK w/chrom base		14	Boardroom chair
5.0	Cubicle workstations (Steelcase)		36	Workstations with file storage.
5.1	Cubicle workstations (Steelcase) - 2nd View		See above	

Second Floor Furniture

ITEM	FURNITURE TRSC B3 - 2nd Floor ARCTURUS	PHOTOS	LOCATION TRSC-B3	NOTES
5.2	Standard Employee ergo Desk Chairs		36	Work station chair is different than office chair.

EXHIBIT H TO LEASE

TENANT MAINTENANCE OBLIGATIONS

Maintenance Responsibilities	ARCTURUS	ARE	Shared
RO/DI Lab Water	✓		
Air Compressors		✓	
Vacuum Pumps		✓	
Domestic backflow preventor certification - Industrial		✓	
Domestic backflow preventor certification - Fire		✓	
Elevators		✓	
Elevator Phone Lines		✓	
Fire Sprinkler System		✓	
Fire Alarm System (and phone lines)		✓	
Building HVAC1		✓	
Smoke Fire Dampers		✓	
Security2	✓		
Access Controls	✓		
CCTV	✓		
Underground parking lot sweeping		✓	
I/R Testing of electrical systems3			✓
Building Management System and Controls		✓	
Monthly and Annual Generator Testing4		✓	
Type 2 Fuel Oil: Delivery		✓	
Heating Hot Water		✓	
Water Treatment		✓	
External landscaping		✓	
BMS for central plant, hot water and BTU Meters		✓	
Pest Control - Exterior		✓	
Pest Control - Interior	✓		
External Parking lot sweeping, painting, maintenance		✓	
Eternal Project Security		✓	
Parking & Garage Lot Lighting		✓	
Outside lights and inverters		✓	
Storm Drain Maintenance		✓	
Roof: Annual Inspections		✓	
Fire Extinguishers		✓	
Emergency Showers	✓		
Parking Garage Roll-Up Doors		✓	

Notes
1 Exhaust Fans, Chiller, Fan Coils, AHU
2 Arcturus responsible for interior premises
3 Coordinated
4 Coordinated

Exhibit 4.7

EXECUTION COPY

*****Text Omitted and Filed Separately with the Securities and Exchange Commission. Confidential Treatment Requested Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2**

RESEARCH COLLABORATION AND LICENSE AGREEMENT

Between

Arcturus Therapeutics, Inc.

And

Janssen Pharmaceuticals, Inc.

INDEX OF DEFINITIONS

Third Party	44
Total Budget	5
Valid Claim	44

RESEARCH COLLABORATION AND LICENSE AGREEMENT

This research collaboration and license Agreement (this "**Agreement**") is dated October 18, 2017 (the "**Effective Date**"), and is between Arcturus Therapeutics, Inc., a Delaware corporation ("**Arcturus**"), and Janssen Pharmaceuticals, Inc., a Delaware corporation ("**JPI**"). Each of Arcturus and JPI may be referred to herein individually as a "**Party**" and collectively as the "**Parties**".

Arcturus is a biopharmaceutical company engaged in the business of identifying and developing NA Therapeutics to prevent, treat, and diagnose diseases, including Hepatitis B, […***…]* and respiratory disease viruses.

JPI is a pharmaceutical company engaged, in part, in the business of seeking regulatory approval of, manufacturing, and commercializing therapeutic agents around the world. As part of that business, it develops and commercializes therapeutic agents to prevent, treat, and diagnose diseases, including Hepatitis B.

Arcturus and JPI want to collaborate to identify and develop NA Therapeutics that prevent, treat or ameliorate ("**treat**") certain specified infectious diseases, including in any event Hepatitis B, with discovery, development, funding obligations, and ownership of related intellectual property being allocated among Arcturus and JPI, and JPI making milestone payments and royalty payments to Arcturus.

The Parties therefore agree as follows:

1 RESEARCH

1.1 **NA Therapeutics**. During the Research Term, Arcturus shall use Commercially Reasonable Efforts ("CRE") to create NA Therapeutics using Arcturus Technology that are intended to treat (a) Hepatitis B and, (b) at such time as either of the options set forth in Section 4.2 is exercised by JPI, […***…] or the Respiratory Disease Viruses ([…***…] and Respiratory Disease Viruses, each a "Option Disease Area" collectively the "Option Disease Areas"). Arcturus will further use CRE to develop NA Therapeutics that: (a) have In Vivo Efficacy and Safety; (b) target highly-conserved sequences of the known genomes of the target diseases; (c) have the least cross-reactivity with human genes (i.e., off-target effects); and (d) have the most potent potential therapeutic effect on the target genome.

1.2 **Joint Research Plans**. The research to be conducted during the Research Term (each, a "**Research Program**") shall be conducted pursuant to the applicable Joint Research Plan. During the Research Term, the Parties shall carry out the work assigned to them under the applicable Joint Research Plan.

*****Confidential Treatment Requested**

1.3 **Amendments**. The JRC may amend the Joint Research Plan in writing in accordance with this Agreement (or recommend an amendment to the Parties), subject to Article 2. Any such amendments will be deemed incorporated in the Joint Research Plan Exhibit. The JRC must review the Joint Research Plan as necessary at each meeting of the JRC and at any other time at the reasonable request of either Party and modify it as appropriate to reflect scientific and other developments. Each Party will promptly inform the other Party (via the JRC or the JRC chairpersons, including by email) upon becoming aware of any circumstances that such Party believes are likely to require an amendment to the Joint Research Plan or Annual Budget and the JRC will then promptly convene a meeting to decide the matter.

1.4 **Demonstration of Efficacy**. Arcturus shall promptly deliver to the JRC data and information it generates pursuant to a Research Program demonstrating that an applicable NA Therapeutic has demonstrated In Vivo Efficacy and Safety (as defined in the applicable Joint Research Plan describing the Research Program related to such NA Therapeutic) (such demonstration a "**Demonstration of In Vivo Efficacy and Safety**"). The data package delivered by Arcturus shall include the nucleotide sequence and nucleobase structure of each NA Therapeutic in the set of NA Therapeutics that have achieved a Demonstration of In Vivo Efficacy and Safety. Arcturus shall provide JPI any additional information reasonably requested by JPI regarding NA Therapeutics created by Arcturus under a Research Program. Within […***…]* Business Days after receipt of such data or information, JPI's JRC chairperson will inform Arcturus' JRC chairperson in writing (which may be satisfied by e-mail) whether it considers such data a Demonstration of In Vivo Efficacy. In the event JPI files an IND with respect to a NA Therapeutic provided by Arcturus, then the same shall be deemed a Demonstration of In Vivo Efficacy and Safety.

1.5 **Development Candidate Selection**. JPI may select certain NA Therapeutics under a Joint Research Plan for further development ("**Development Candidates**"): (a) at a duly-convened JRC meeting; (b) by email from JPI's JRC chairperson to Arcturus' JRC chairperson; or (c) either during or after the Research Term by written notice to Arcturus in accordance with this Agreement. Each compound that comprises a Development Candidate is a "**Licensed Compound**" and each pharmaceutical product containing a Licensed Compound is a "**Licensed Product**". Should JPI or its Affiliates conduct, or permit or cause to be conducted, any IND-enabling GLP study of, or any GLP manufacturing activity with respect to, any NA Therapeutics during the Research Term or any Selected NA Therapeutic after the Research Term, it shall be deemed to have designated such NA Therapeutic as a Development Candidate. Arcturus shall not be obligated to perform, or have performed, any IND-enabling GLP study of, or any GLP manufacturing activity with respect to any NA Therapeutic unless such NA Therapeutic has been designated a Development Candidate. JPI shall only select as Development Candidates those NA Therapeutics that JPI believes are potentially relevant to the treatment or diagnosis of the applicable infectious disease as set forth in the Joint Research Plan for the Research Program.

*****Confidential Treatment Requested**

1.6 **Selected NA Therapeutic List**. No later than […***…]* days after completion of the Research Program (other than as a result of termination of this Agreement), JPI shall deliver to Arcturus a list of the NA Therapeutics (including, but not limited to, previously-designated Development Candidates) that JPI determines to be of potential relevance to the treatment or diagnosis of the applicable infectious disease as set forth in the Joint Research Plan for the Research Program (the "**Selected NA Therapeutics List**").

1.7 **Exclusivity**. Arcturus shall use all Licensed Compounds only in accordance with this Agreement, and, until the […***…] anniversary of (i) the Effective Date, in the case of HBV based Research Program, and (ii) the respective Option Exercise Date, in the case of an […***…] or Respiratory Disease Viruses-based Research Program, as applicable, Arcturus and Arcturus-Controlled Affiliates will not:

1.7.1 perform, participate in, or fund any work directed to the discovery, research or development of NA Therapeutics licensed under this Agreement, other than in activities conducted pursuant to this Agreement;

1.7.2 grant any non-Party any license or other rights under Arcturus Technology to develop or commercialize NA Therapeutics licensed under this Agreement, extend the duration or scope of any existing license under Arcturus Technology to develop or commercialize NA Therapeutics licensed under this Agreement, or reduce the aggregate payment obligations to Arcturus under any such existing license with respect to NA Therapeutics licensed under this Agreement to an extent that would be likely to have a material adverse effect on the competitiveness of one or more Licensed Products; or

1.7.3 propose to any non-Party or solicit any non-Party to enter into any contractual relationship for work (including fee-for-service work) directed to the discovery, research or development of NA Therapeutics, other than for activities conducted pursuant to this Agreement.

The obligations of Sections 1.7.1 and 1.7.3 will not apply to, have no effect and exclusivity shall not apply with respect to: (a) […***…] being conducted by Arcturus with respect to NA Therapeutics […***…], but Arcturus and its Affiliates shall not expand such activities beyond […***…]; or (b) any activities to be conducted by Arcturus for the research, development, manufacturing, commercialization, use and sale of any […***…] agents (including NA Therapeutics) for use in humans or farm or companion animals involving the use of […***…] as […***…] for the […***…] of Hepatitis B, […***…] or […***…]; or (c) for pre-existing or subsequently acquired or initiated programs of a non-Party acquirer of Arcturus, provided that Arcturus ensures that Arcturus Know-How is not accessible to personnel of such non-Party acquirer who are engaged in the conduct of such program and such non-Party acquirer does not use Arcturus Technology in such programs. Arcturus shall not attempt to circumvent this provision through the use of non-Arcturus-Controlled Affiliates.

1.8 **Transfer of Supplies and Data for NA Therapeutics**. At JPI's reasonable request, Arcturus shall promptly transfer to JPI at no charge: (a) subject to availability, reasonable quantities of NA Therapeutics, Licensed Compounds or Licensed Products in Arcturus' possession or control (Arcturus may retain such quantities of NA Therapeutics, Licensed Compounds and Licensed Products as are necessary for Arcturus to perform its Research Program obligations); (b) all existing data for Licensed Compounds; and (c) any additional Arcturus Know-How that is necessary or useful for JPI to research, develop, manufacture, commercialize or otherwise Exploit any Selected NA Therapeutics, Licensed Compound or Licensed Product.

1.9 **Records**. Each Party shall maintain, consistent with its internal policies, accurate records of its activities under the Research Program that are suitable for all relevant scientific, patent, regulatory, and financial purposes.

1.10 **Reports**. During the first Calendar Year, Arcturus shall deliver to the JRC a quarterly written, detailed summary of all research and development efforts with respect to the NA Therapeutics and Licensed Compounds conducted by Arcturus since the previous such report and shall respond promptly to any reasonable JPI inquiries regarding the NA Therapeutics and Licensed Compounds. Until the JRC is disbanded, and in addition to any other reporting requirements under this Agreement, no later than […***…]* days after the end of each Calendar Quarter, each Party shall submit to the JRC a written report that: (a) describes that Party's progress under the Joint Research Plan during that Calendar Quarter; and (b) includes a summary of the results and data generated by that Party under the Joint Research Plan during that Calendar Quarter, in each case to the extent reasonably necessary to advance the Joint Research Plan and the Research Program.

1.11 **Materials**. At the request of JPI, Arcturus shall, as necessary, provide JPI quantities of Materials in excess of the quantities provided under Section 1.8, or other Materials identified in the Joint Research Plan that are proprietary to Arcturus or otherwise not commercially available, provided that JPI will reimburse Arcturus for the reasonable and documented costs associated with the purchase or provision of such Materials.

1.12 **Performance by Others**. Each Party may perform itself or through one or more Affiliates or permitted subcontractors that Party's obligations under the Joint Research Plan, on condition that each such Affiliate or subcontractor enters into a confidentiality agreement with that Party that contains confidentiality obligations substantially the same as those set forth in this Agreement. Each Party will remain liable for performance of any such Affiliate or subcontractor. Arcturus shall obtain JPI's prior written consent before engaging any subcontractor to perform its obligations hereunder (except to the extent that such subcontractor and the obligations to be subcontracted are identified in the Joint Research Plan).

1.13 **Budget**. Arcturus shall fund those activities to be funded by Arcturus pursuant to the HBV Joint Research Plan and associated Budget. Arcturus shall submit to the

*****Confidential Treatment Requested**

JRC for approval, for those activities to be funded by Janssen pursuant to the HBV Joint Research Plan and associated Budget, a detailed budget of planned FTE and Out-of-Pocket Expenses for the ensuing 12 months (the "**Annual Budget**") every 6 months beginning with the Effective Date, provided that Arcturus shall not be obligated to commence a particular Joint Research Program activity unless the JRC has approved an Annual Budget covering the budgeted costs for such activity. JPI shall reimburse Arcturus as set forth in Section 1.14 for the actual costs incurred by Arcturus for conducting the Research Program up to $[…***…]* (the "**Total Budget**"). JPI will not reimburse amounts above […***…]% of the Annual Budget except as approved by the JRC as provided in Section 2.4. The Annual Budget may be amended by unanimous written agreement of the JRC. Pursuant to Section 2.5, increase in the Total Budget will warrant an amendment to this Agreement.

1.14 **Invoicing and Payment**. Arcturus shall provide an invoice to Johnson & Johnson Accounts Payable (J&J AP) via the web portal www.ap.jnj.com within […***…] days of the end of each Calendar Month for all Research Program payments due for that month with a copy to the JRC/JPI and to […***…], J&J Innovation, 99 El Camino Real, Menlo Park, CA 94025. Arcturus may contact the Johnson & Johnson Accounts Payable Hotline at (877) 557-4487 with any questions related to the status of payments on invoices. The invoice will specify the actual number of FTEs expended (including an FTE time report break down to substantiate FTE work performed), and the applicable FTE Costs (the product of the actual total FTEs used by Arcturus to perform the Research Program and the FTE Rate) and Arcturus Out-of-Pocket Expenses (collectively "**Research Costs**") incurred by Arcturus during the Calendar Month. Within […***…] days of the date the invoice is submitted to the J&J AP portal, JPI shall pay Arcturus the Research Costs set forth in the invoice unless JPI disputes a portion of the invoice (in which event JPI shall pay the undisputed portion thereof). All invoices must reference a valid Purchase Order ("**PO**") Number which JPI shall provide to Arcturus within […***…] days after the Effective Date and invoices shall include the nature and amount of research and development services rendered or deliverables provided. JPI reserves the right to return to Arcturus unprocessed and unpaid those invoices that do not reference the applicable PO Number. Janssen Research & Development, L.L.C may act as a paying agent for JPI under this Agreement. Invoiced amounts not paid when due will bear interest in accordance with Section 5.18.

2 GOVERNANCE

2.1 **Joint Research Committee**. Promptly after the Effective Date, the Parties shall establish a committee (the "**Joint Research Committee**" or "**JRC**"), as more fully described below. The JRC shall review and oversee the Research Program. The JRC shall have no authority to amend this Agreement. The JRC's responsibilities shall include:

2.1.1 The review of the progress of the Research Program, and discussion and approval of any appropriate modifications to the Joint Research Plan in light of such progress, including applicable modifications to the Annual Budget;

2.1.2 The formation of sub-committees as agreed to be appropriate, which sub-committees shall report their progress to the JRC at each regularly scheduled JRC meeting, with any dispute among the sub-committee members referred to the JRC for resolution; and

2.1.3 Any other responsibilities as may be assigned to the JRC pursuant to this Agreement or as may be mutually agreed upon by the Parties in writing from time to time.

Where any decision of the JRC would alter or increase in a material manner Arcturus contractual obligations or Research Program commitments, or JPI's financial obligations, under this Agreement, including the Joint Research Plan, then the JRC's role shall be limited to making recommendations to the Parties as to the proposed decision. Any such decision shall not take effect unless and until agreed by the Parties in writing in an amendment to this Agreement.

2.2 **Membership of the JRC**. The JRC shall consist of an equal number of representatives from each of JPI and Arcturus. The exact number of such representatives shall be up to […***…]* for each Party, or such other number as the Parties may agree. Each Party shall provide the other with a list of its initial members of the JRC within […***…] days after the Effective Date. Each Party may replace any or all of its representatives and/or appoint a proxy at any time by giving prior written notification to the other. Each Party may, in its reasonable discretion, invite other employees of such Party to attend meetings of the JRC. Each Party will provide advance notice of any additional attendees it will include at a meeting of the JRC. Each Party shall designate 1 of its JRC members as co-chair.

2.3 **Meetings**. The JRC shall meet at least on a calendar quarterly basis in a manner, time and at a place as the Parties shall agree. Meetings of the JRC that are held in person shall alternate between the offices of the Parties, or such other place as the Parties may agree. Each Party will be responsible for its members' expenses incurred in attending all JRC meetings. The chairpersons of the JRC shall be responsible for calling each meeting, setting and distributing agenda items in advance of the meeting and issuing appropriate minutes of each meeting of the JRC within […***…] days of the date of such meeting and shall allocate such responsibilities between themselves. The minutes of each JRC meeting will provide a description, in reasonable detail, of the discussions at the meeting and document all actions and determinations approved by the JRC at such meeting, including identification of any NA Therapeutics, Demonstration of *In Vivo* Efficacy and Safety, and the identification of any Development Candidates. In addition, in the event of approval at any JRC meeting of any amendment to the Joint Research Plan or Annual Budget, such amendment will be attached to the minutes as an exhibit. The chairperson responsible for drafting the minutes of a particular JRC meeting shall provide a draft of such minutes (including by email) to the other

Party's chairperson within […***…]* Business Days after such meeting, and the chairpersons shall promptly discuss and address any comments the other Party's chairperson may have on such minutes and finalize such draft minutes as promptly as practicable, whereupon the drafting chairperson shall provide such draft minutes to all JRC members (including by email). The minutes shall be considered as accepted if, within […***…] days from receipt, no recipient has objected in writing (including e-mail) to the chairpersons.

2.4 **Quorum and Decision Making**. A meeting of the JRC shall be considered to have a quorum provided that the co-chairperson from each Party is in attendance and a majority of the JRC is present at such meeting. A decision by the JRC requires approval of each Party's co-chairperson. In the event the JRC is unable to agree on a decision as to a particular matter within the JRC's authority and requiring a decision, JPI shall have the final decision making authority on such matter, *except* as otherwise provided in Section 2.1 above. Any decision required or permitted to be taken by the JRC may be taken in accordance with the above without a meeting taking place, if a consent in writing including electronic mail, setting forth the decision so taken, is approved in writing by each of the co-chairpersons.

2.5 **No Authority**. The JRC shall not have the authority to increase the Total Budget.

2.6 **Dissolution of JRC**. The JRC shall be dissolved upon the completion of the Research Term.

3 DEVELOPMENT

3.1 **Development of Licensed Products**. JPI, directly or through one or more of its Affiliates or sublicensees, shall use Commercially Reasonable Efforts to: (a) develop a Licensed Product; (b) obtain Regulatory Approval for a Licensed Product in […***…]; and (c) where approved, commercialize a Licensed Product in […***…]. In the event that, after delivery of the Selected NA Therapeutics List, JPI determines that a specific NA Therapeutic that was not on the Selected NA Therapeutics List but has potential utility to treat or diagnose an infection caused by HBV (or, if the Option is exercised, the applicable Option Disease Area), JPI may provide notice to Arcturus identifying the particular NA Therapeutic and requesting that it be deemed a "Selected NA Therapeutic." Arcturus shall notify JPI within […***…] days of receipt of such request whether Arcturus accepts or denies such request, provided that Arcturus may deny such request only if, as of the date of such request: (i) such NA Therapeutic is […***…] unless permitted pursuant to the provisions of Section 1.7) and has progressed to at least […***…]; or (ii) Arcturus has […***…]

[…***…]*. Upon Arcturus' acceptance of such request, or, except under the circumstances described in clause (ii) above, Arcturus' failure to respond in accordance with this Section 3.1, such NA Therapeutic shall be deemed a "Selected NA Therapeutic."

3.2 **Arcturus Development Support**. For up to […***…] after the end of the Research Term (the "**Development Support Period**"), at JPI's request, Arcturus shall provide reasonable technical assistance to JPI in the practice of the Arcturus Know-How transferred to JPI to Develop, formulate and manufacture Development Candidates and their constituent Licensed Compounds (the "**Development Support**"). The Development Support will include making qualified Arcturus personnel reasonably available to JPI for scientific and technical explanations and advice reasonably requested by JPI; *provided, however,* that Arcturus will not be required to conduct any additional research, development or manufacturing activities, to generate or obtain new data or information, or to hire or engage additional personnel, or provide requested Development Support to the extent or at such a frequency that it would unduly impair the ability of Arcturus personnel to perform, or otherwise interferes with Arcturus' personnel's performance of, their regular duties for Arcturus. JPI shall reimburse Arcturus for all reasonable and documented FTE Costs and Out-of-Pocket Expenses incurred by Arcturus in providing the Development Support requested by JPI (which FTE Costs and Out-of-Pocket Expenses are in addition to any Research Costs that JPI is obligated to reimburse under Section 1.14 and are not subject to the Annual Budget or the Total Budget). Arcturus shall invoice JPI on a […***…] basis for any such FTE Costs and Out-of-Pocket Expenses, and JPI shall pay such invoiced amounts, in each case, in accordance with Section 1.14.

3.3 **Development Costs and Decision Making**. JPI will be responsible for all of the costs it incurs for development and commercialization of Licensed Products and will have decision-making authority for all development activities.

3.4 **Regulatory Filings**. JPI, directly or through one or more of its Affiliates or sublicensees, shall make, in the name of one or more of JPI, its Affiliates, and its sublicensees, all regulatory filings anywhere in the world it desires for Licensed Products. JPI will be responsible for communicating with Government Bodies regarding regulatory filings for Licensed Products and any Regulatory Approval for Licensed Products, once granted. Arcturus will own no interest in any application submitted or approval granted in connection with Regulatory Approval for Licensed Products. Arcturus shall cooperate with JPI as requested by JPI to support any regulatory filing for one or more Licensed Products. JPI shall reimburse Arcturus all reasonable expenses (including employee time at the FTE Rate) that Arcturus incurs in so cooperating.

3.5 **Commercialization**. JPI will be responsible for all matters relating to commercializing Licensed Products.

3.6 **Manufacturing**. JPI will have the exclusive right to manufacture Licensed Products itself or through Affiliates or Third Parties selected by JPI.

3.7 **Reports; Updates**. Commencing no later than […***…]* after the expiration of the Research Term, JPI shall once per Calendar Year provide a written progress report to Arcturus summarizing Product […***…], […***…] and […***…] activities during the previous 12-month period, the results of such activities, and a summary of the planned Product […***…], […***…], and […***…] activities for the upcoming 12-month period. In addition, […***…] per year between delivery of such progress reports, upon Arcturus' request, JPI shall make available to Arcturus by teleconference or other means of telecommunication, for a reasonable period and at a reasonable time, appropriately qualified and sufficiently senior personnel of JPI or its Affiliates having responsibility over and specific knowledge of JPI's and its Affiliates' ongoing and planned Licensed Product […***…], […***…] and […***…] activities, to discuss, and respond to Arcturus' reasonable questions regarding, the status and progress of JPI's and its Affiliates' ongoing and planned Licensed Product […***…], […***…] and […***…] activities.

4 LICENSES

4.1 **Compounds and Products**. Subject to the terms and conditions of this Agreement, Arcturus hereby grants to JPI an exclusive license under the Arcturus Technology and Arcturus' interest in the Joint Patent Rights to Exploit NA Therapeutics, Licensed Compounds and Licensed Products in the Field worldwide as identified and selected and on the terms and conditions set forth in this Agreement. The license granted under this Section 4.1 is exclusive even as to Arcturus, except as necessary for Arcturus to exercise its rights and perform its obligations under the Joint Research Plan. The license granted under this Section 4.1 includes the right for JPI to sublicense to its Affiliates and to Third Parties. This license includes the right to utilize NA Therapeutics, Licensed Products and Licensed Compounds in Combination Products that incorporate other active pharmaceutical ingredients that are not Licensed Compounds and in Bundled Products that incorporate other products that are neither Licensed Compounds nor Combination Products. For clarity, NA Therapeutics, Licensed Compounds and Licensed Products in the Option Disease Areas are not licensed pursuant to this Section 4.1 unless and until such time as an Option in an Option Disease Area is exercised by JPI pursuant to Section 4.2. For clarity, no license or Option rights are granted pursuant to this Article 4 with respect to NA Therapeutics that are not also subject to the Exclusivity obligations pursuant to Section 1.7 (i.e., with respect to NA Therapeutics for which the obligations under Sections 1.7.1 and 1.7.3 do not apply, no license rights are granted to JPI and no restrictions on exclusivity shall apply pursuant to this Agreement).

4.2 **Option**.

Arcturus grants to JPI an option, at JPI's sole election, to have developed and license (as set forth in Section 4.1) NA Therapeutics for each of […***…]* and Respiratory Disease Viruses (each, an "**Option**"). Each Option will remain in effect and expire […***…] months from the Effective Date ("**Option Period**") and, if not previously exercised for either or both, shall terminate and be of no further force and effect upon the expiration of the Option Period. JPI may exercise this option by delivering an irrevocable written notice to Arcturus ("**Option Exercise Date**") prior to the expiration of the Option Period and paying to Arcturus the Exercise Fee set forth in Section 5.10 within […***…] business days of the Option Exercise Date. Upon each exercise of an Option, an additional Joint Research Plan will be attached to this Agreement and made a part hereof, and the research specified to be conducted by the Parties under such Joint Research Plan will become a Research Program. During the Option Period, but prior to any Option Exercise Date, Arcturus shall be free to collaborate with third parties and license any rights in the Option Disease Areas to third parties. If licenses under the Arcturus Technology with respect to […***…] or Respiratory Disease Viruses have been granted to third parties prior to the respective Option Exercise Date, then exercising of an Option by JPI would result in a non-exclusive license in the applicable Option Disease Area subject to rights granted by Arcturus to the then-existing Third Party licensee(s), provided that to the extent that the grant of rights to a Third Party licensee in the applicable Option Disease Area is less than worldwide or narrower than the Field, then the JPI license shall be exclusive in such unlicensed portion and nonexclusive in the otherwise licensed portion of the Option Disease Area.

4.3 **Nonexclusive Licenses**.

4.3.1 JPI hereby grants to Arcturus a nonexclusive, royalty-free license to use JPI Patent Rights, and Know-How that JPI discloses to Arcturus during the Research Term, in performing Arcturus's obligations under this Agreement during the Research Term on the terms and conditions set forth in this Agreement; provided that no license rights are granted in any Option Disease Area until such time as an exercise of by JPI of its Option in the applicable Option Disease Area pursuant to Section 4.2.

4.3.2 Arcturus hereby grants to JPI a nonexclusive, royalty-free license under the Arcturus Technology to make, use, sell, and import, products using Arcturus Delivery Technology provided that such products are Licensed Products licensed to JPI according to Section 4.1.

4.3.3 Arcturus hereby grants to JPI a nonexclusive, royalty-free license under the Arcturus Technology to use NA Therapeutics, Licensed Compounds and Licensed Products for its own internal research purposes on the terms and conditions set forth in this Agreement.

*****Confidential Treatment Requested**

4.4 **No Other Licenses or Rights**. This Agreement creates no license or other right by implication, estoppel, or otherwise. All licenses and rights are granted only under this Agreement.

4.5 **Retained Rights**. Subject to Section 1.7, none of the rights granted to JPI under this Article 4 affect the rights of Arcturus to practice and grant licenses under the Arcturus Technology and Arcturus Confidential Information that are not expressly licensed to JPI pursuant to Section 4.1.

4.6 Further Licenses.

4.6.1 If, during the Research Term, JPI identifies any Third Party-owned or -controlled intellectual property rights not Controlled by Arcturus on the Effective Date that JPI believes may be necessary or useful for the Research Program or the Exploitation of Selected NA Therapeutics, Licensed Compounds or Licensed Products, then upon JPI's written request, the Parties will confer regarding whether it is necessary or useful for Arcturus to obtain rights to such Third Party-owned or –controlled intellectual property rights. If the Parties agree that it is necessary or useful for Arcturus to obtain such rights, Arcturus will use Commercially Reasonable Efforts to obtain such rights, provided that (i) […***…] and (ii) the Parties agree in writing to […***…]) and to the extent to which Section 5.6.3 will apply to royalties that become due by Arcturus to the Third Party as a result of JPI's use of such intellectual property. Notwithstanding clause (i) above, if any milestone payment becomes due by Arcturus as a result of both (A) JPI's and its Affiliates' and sublicensees' Exploitation of Selected NA Therapeutics, Licensed Compounds or Licensed Products and (B) Arcturus' and its Affiliates' and licensees' Exploitation of products other than Selected NA Therapeutics, Licensed Compounds or Licensed Products (e.g., a commercial milestone payment that becomes due as a result of combined sales of Licensed Products by JPI and sales by Arcturus of products other than Selected NA Therapeutics, Licensed Compounds or Licensed Products exceeding a specified amount), then responsibility for payment of such milestone payment shall […***…]. JPI may obtain rights to independently pursue or obtain a license to any Third-Party rights, and JPI shall have no obligation to consult with Arcturus regarding the same.

4.6.2 No After-Acquired Third-Party IP will be deemed to be within the Control of Arcturus unless, prior to using any such intellectual property in a Research Program activity: (a) Arcturus provides to JPI a true, complete and correct written description of Arcturus' royalty or milestone payment obligations to the applicable intellectual property; (b) Arcturus obtains JPI's written consent to use such intellectual property in the Research Program or that such intellectual property be used by JPI; and (c) […***…]

[…***…]*. Should Arcturus obtain rights to After-Acquired Third-Party IP during the Research Term that Arcturus determines to be relevant to, and useful for the performance of, the Research Program or the Exploitation of Selected NA Therapeutics, Licensed Compounds and Licensed Products hereunder or that is requested by JPI for utilization hereunder, Arcturus shall promptly provide JPI with notice thereof and, should such After-Acquired Third-Party IP have relevant payment obligations, the written description described in subsection (a) of the preceding sentence of this Section 4.6.2, provided that such After-Acquired Third-Party IP will not be deemed to be within the Control of Arcturus until all of the conditions set forth in the preceding sentence (clauses (a)-(c)) are met.

4.7 **Expiration of Royalty Payment Obligations**. When JPI owes Arcturus no more royalty payments on a given Licensed Product with respect to a given country under Article 5, all licenses that Arcturus has granted JPI under this Article 4 with respect to that Licensed Product and that country will become fully paid, perpetual, and irrevocable. JPI shall continue to pay Arcturus any pass-through royalties or milestones (as applicable) due to any Third Party that JPI has agreed to pay with respect to any After-Acquired Third Party IP pursuant to Section 4.6.2, for so long as Arcturus continues to be obligated to make such payments to the Third Party.

4.8 **Non-Circumvention**. Arcturus shall not attempt to circumscribe or limit the licenses granted hereunder by situating ownership or Control of intellectual property in an Arcturus Affiliate that is not an Arcturus-Controlled Affiliate.

5 PAYMENTS, MILESTONES AND ROYALTIES

5.1 **Up Front Payment**. Within 10 days after the execution of this Agreement JPI shall pay to Arcturus a non-refundable, non-creditable fee of […***…].

5.2 **Milestones**. When a Milestone Event as set forth in Section 5.3 or 5.4 occurs with respect to a Licensed Product JPI will, within […***…] days, inform Arcturus of the achievement of the Milestone Event and Arcturus may then submit to JPI an invoice for the payment due for that Milestone Event (each, a "**Milestone Amount**").

5.3 **Milestone Events and Payments**. On a Development Candidate-by-Development Candidate basis, JPI will pay Arcturus the following non-refundable, non-creditable milestone payments, upon first achievement of the specified milestone by the first two Licensed Products for each of (i) HBV, (ii) […***…] and (iii) each of the Respiratory Disease Viruses-based Research Program added upon exercise of an Option pursuant to Section 4.2 to achieve that milestone, regardless of how many Licensed Products achieve such milestone. Each milestone payment may be paid no more than twice for each of (i) HBV, (ii) […***…] and (iii) each of the Respiratory Disease Viruses-based Research Program added upon exercise of an Option pursuant to Section 4.2, regardless of how many Licensed Products meet such milestone. If development or other efforts to obtain

Regulatory Approval of a Licensed Product are discontinued after JPI has paid the milestone payment(s) for achievement of one or more milestones (a "**Dropped Licensed Product**"), and JPI develops a Licensed Product containing a different Development Candidate (a "**Replacement Licensed Product**") that is payable as a replacement for the Dropped Licensed Product, the milestone payment that would be payable for the achievement by such Replacement Licensed Product of any milestone previously achieved by the Dropped Licensed Product for which JPI paid a milestone payment to Arcturus would not be payable, but the milestone payment that would be payable for the achievement by such Replacement Licensed Product of any milestone that was not achieved by the Dropped Licensed Product would be payable at […***…]*% of the relevant amount set forth below.

Milestone Number	Milestone Event	Milestone Payment
1	[…***…]	$[…***…]
2	[…***…]	$[…***…]
3	[…***…]	$[…***…]
4	[…***…]	$[…***…]
5	[…***…]	$[…***…]
6a	[…***…]	$[…***…]
6b	[…***…]	$[…***…]
6c	[…***…]	$[…***…]
Total Milestones for each of the first two Licensed Products in HBV and, if the Option is exercised pursuant to Section 4.2, Milestones for each of the first two Licensed Products in each of the applicable Option Disease Areas as provided in Section 5.3		**$56,500,000**

5.4 **Net Sales Payments**. JPI shall pay Arcturus each of the following one-time, non-refundable, non-creditable milestone payments upon the first achievement of the applicable milestone event. Each such milestone payment shall be payable only one time for HBV and if the Option is exercised pursuant to Section 4.2, one time for each of the Option Disease Areas (as applicable), regardless of how many times the relevant milestone event may be achieved.

Milestone Event	Payment
First Calendar Year in which annual aggregate Net Sales of all Licensed Products, on a Research Program-by-Research Program basis, equal or exceed $[…***…]	$[…***…]*
First Calendar Year in which annual aggregate Net Sales of all Licensed Products, on a Research Program-by-Research Program basis, equal or exceed $[…***…]	$[…***…]

5.5 **Royalties**. During the Royalty Term, JPI will pay royalties on a product-by-product and country-by-country basis to Arcturus on aggregate annual Net Sales of Licensed Products by JPI, JPI's Affiliates and sublicensees in each Calendar Year at the applicable rate(s) set forth below.

Calendar Year Net Sales increment	**Royalty Rate (%)**
Portion of aggregate annual Net Sales of Licensed Products, on a Research Program-by-Research Program basis, less than or equal to $[…***…]	[…***…]%
Portion of aggregate annual Net Sales of Licensed Products, on a Research Program-by-Research Program basis, greater than $[…***…] but less than or equal to $[…***…]	[…***…]%
Portion of aggregate annual Net Sales of Licensed Products, on a Research Program-by-Research Program basis, greater than $[…***…]	[…***…]%

5.6 **Royalty Reductions**. On a country-by-country and Licensed Product by Licensed Product basis, the royalty rates above shall be reduced during the royalty term as follows:

5.6.1 to […***…]% of the amount otherwise payable from and after expiration of the last-to-expire Valid Claim of the Arcturus Patents covering the composition of the relevant Licensed Product in such country (if there is continued regulatory exclusivity for such Licensed Product in such country); and

5.6.2 to […***…]% of the amount otherwise payable from and after expiration of both: (a) the last-to-expire Valid Claim of the Arcturus Patents covering the

composition of such Licensed Product or all approved uses thereof in such country; and (b) expiration of regulatory exclusivity for such Licensed Product in such country. For purposes of this Section 5.6, regulatory exclusivity will be deemed to have expired in a country on the date a Third Party could reference data provided by a Party relating to the relevant Licensed Product to a regulatory agency in that country.

5.6.3 in the event JPI, at any time during the period it is obligated to pay royalties to Arcturus hereunder, is obligated to pay […***…]* to any Third Party in connection with the Exploitation of a Licensed Compound or Licensed Product (including in connection with the settlement of a patent infringement claim) under patents, patent applications or know-how of a Third Party (other than […***…] with respect to After-Acquired Third-Party IP under Section 4.6.2), JPI may deduct […***…]% of the royalties actually paid by JPI to such Third Party with respect to sales of such Licensed Product in the relevant country from the royalties due Arcturus with respect to Net Sales of such Product in such country; *provided, however,* that: (a) if such license does not contain rights under one or more patents or patent applications, only […***…]% of the royalties so paid would be deductible; and (b) in no event would the royalties payable to Arcturus with respect to Net Sales of such Licensed Product in such country be reduced by more than […***…]%.

The reductions to the royalty rates in this Section 5.6 in the aggregate will not reduce the effective royalty rate below […***…]%.

5.7 **Compulsory License**. If a government grants or compels JPI to grant a compulsory license to a Licensed Product to a Third Party, then, insofar as JPI is compensated on a royalty basis, JPI will pay to Arcturus […***…]% of the sum paid to it under the compulsory license instead of the royalties that would otherwise be due under this Agreement. Any sales under such compulsory license will not be used in the calculation of aggregate Net Sales for the purpose of attaining sales milestones under Section 5.4 or adjusting royalty rates under Section 5.6.

5.8 **Royalty Term**. Royalty payments will become payable upon the First Commercial Sale of a Licensed Product in a country and ending upon the latest of: (a) […***…] years following the first commercial sale of such Licensed Product in such country; (b) expiration of regulatory exclusivity for such Licensed Product in such country; and (c) expiration of the last-to-expire Valid Claim of the Arcturus Patent Rights or Joint Patent Rights Covering the composition of such Licensed Product or all approved uses thereof in such country

5.9 **Timing and Manner of Payment**. Except if this Agreement provides otherwise, JPI shall pay each invoice that Arcturus issues to JPI under this Agreement no later than […***…] days after JPI receives it. For a payment by JPI under this Agreement to be valid, JPI must make that payment by wire transfer to a bank account that Arcturus designates.

5.10 **Option Exercise Fees**. The Exercise Fee payable for the exercise of each Option pursuant to Section 4.2 is (a) $[…***…] per Option exercise (i.e., for each of

*****Confidential Treatment Requested**

[…***…]* or Respiratory Disease Viruses) if such Option is exercised before the end of […***…] from the Effective Date, or (b) $[…***…] per per Option exercise (i.e., for each of […***…] or Respiratory Disease Viruses) if such Option is exercised after […***…] from the Effective Date and before the end of […***…] from the Effective Date.

5.11 **Reports**. For as long as JPI owes royalties under this Article 5, no later than […***…] days after the end of each Calendar Quarter, JPI shall provide Arcturus a written report showing as of that Calendar Quarter the Net Sales of Licensed Product by country and the royalty owed for that Calendar Quarter. That written report must include at least the following information for that Calendar Quarter, each listed by Licensed Product and by country of sale: (a) Net Sales; and (b) the royalty due on those Net Sales.

5.12 **Records and Audits**.

5.12.1 Arcturus shall keep, and shall cause Arcturus-Controlled Affiliates to keep, such accounting records as are necessary to permit JPI to verify Research Costs invoiced by Arcturus under Section 1.14. Such records shall be retained at the respective places of business of Arcturus and Arcturus-Controlled Affiliates for at least the […***…] Calendar Years after the Calendar Year to which such records pertain. Until expiration of such retention period, JPI shall have the right to cause an independent certified accountant selected by JPI and reasonably acceptable to Arcturus to audit such records covering not more than the preceding […***…] full Calendar Years, subject to the terms of Section 5.13 below. If any such audit determines that JPI overpaid Arcturus, JPI will be entitled to a credit for that overpayment, plus interest calculated in accordance with Section 5.18 no later than […***…] days after being notified of the results of such audit, or, should insufficient further payments be due hereunder, a refund.

5.12.2 JPI shall keep, and shall instruct its Affiliates and sublicensees to keep, such accounting records as are necessary to permit Arcturus to verify determination of all royalties and other amounts paid or payable by JPI under this Agreement. Such records shall be retained at the respective places of business of JPI, its Affiliates and sublicensees for at least the […***…] Calendar Years after the Calendar Year to which such records pertain. Until expiration of such retention period, Arcturus shall have the right to cause an independent certified accountant selected by Arcturus and reasonably acceptable to JPI to audit such records covering not more than the preceding […***…] full Calendar Years, subject to the terms of Section 5.13 below. If any such audit determines that JPI underpaid Arcturus, JPI shall pay Arcturus an amount equal to that underpayment, plus interest calculated in accordance with Section 5.18 no later than […***…] days after being notified of the results of such audit, as requested by Arcturus. If any such audit determines that JPI overpaid Arcturus, JPI will be entitled to a credit for that overpayment, or, should insufficient further payments be due hereunder, a refund.

5.13 **Conduct of Audits**. It is a condition to the conduct of any audit permitted by Section 5.12 that the accountant sign and deliver to the audited Party a confidentiality agreement as reasonably requested by the audited Party. The Party engaging such accountant shall require such accountant to share the findings of any such audit with both Parties, and those findings will be binding on the Parties. The auditing Party shall pay for any such audit under Section 5.12, unless: (a) in the case of an audit under Section 5.12.1, such audit determines that JPI overpaid Arcturus by more than […***…]*% of the amount owed, in which case Arcturus shall reimburse JPI for the reasonable and documented fees and expenses of the auditor paid by JPI for such audit; and (b) in the case of an audit under Section 5.12.2, such audit determines that JPI underpaid Arcturus by more than […***…]% of the amount owed, in which case JPI shall reimburse Arcturus for the reasonable and documented fees and expenses of the auditor paid by Arcturus for such audit. Each Party shall have the right to inspect all such records no more frequently than once every […***…] months, during normal business hours with at least […***…] days prior written notice.

5.14 **Royalty Payments**. No later than […***…] days after the end of each Calendar Quarter in a given Calendar Year, JPI shall pay Arcturus royalties that JPI owes under Section 5.5 for that Calendar Quarter.

5.15 **Currency Exchange**. All payments under this Agreement must be in U.S. dollars. If Licensed Products are sold in a currency other than U.S. dollars, for purposes of calculating royalties, revenues from those sales must be expressed in U.S. dollars using the Currency Hedge Rates. Not later than […***…] Business Days after the Currency Hedge Rates for the next Calendar Year are available, JPI shall notify Arcturus of the Currency Hedge Rates for the local currency of each country in the Territory and all relevant details. The Currency Hedge Rates for a Calendar Year will remain unchanged during that Calendar Year.

5.16 **Indirect Taxes**. Amounts payable under this Agreement do not include any sales, use, excise, value added or other applicable taxes, tariffs or duties with respect to work or services to be performed pursuant to this Agreement. If any taxing authority imposes a VAT, GST, sales, use, service, consumption, business or similar tax with respect to the work or services undertaken under this Agreement, then JPI agrees to pay that amount if specified in a valid invoice or supply exemption documentation. For avoidance of doubt, Arcturus will not be entitled to pass on to JPI, and JPI will not be obligated to pay or bear, any tax that is based on Arcturus' real, personal or intangible property (whether owned or leased), corporate structure, franchise, continuing business operations, income, gross receipts, capital stock, net worth or imposed with respect to Arcturus' engagement of employees or independent contractors or that Arcturus incurs upon subcontracting any work hereunder, in whole or in part, to any affiliated or non-affiliated Third Party. Arcturus is solely responsible, to the extent required by applicable law, for identifying, billing, and collecting the taxes payable by JPI in all relevant federal, state, county, municipal and other taxing jurisdictions and for filing all required tax returns in a timely manner. To the extent that Arcturus does not

provide JPI a valid invoice (i.e., an invoice compliant with this Agreement setting forth the applicable work or services documentation required under the rules and regulations of the jurisdiction of both Arcturus and JPI, including separate identification of the tax where legally required), Arcturus shall be responsible for any penalty resulting directly from such noncompliance. The Parties will cooperate in good faith to minimize taxes to the extent legally permissible.

5.17 **Withholding Taxes**. JPI shall make all payments to Arcturus under this Agreement without any deduction or withholding for taxes except to the extent that any such deduction or withholding is required by law in effect at the time of payment. Any Tax required to be withheld on amounts payable under this Agreement will be paid by JPI on behalf of Arcturus to the appropriate government authority and JPI will furnish Arcturus proof of payment of such Tax. Any such tax required to be withheld will be an expense of and borne by Arcturus. If any such Tax properly is assessed against and paid by JPI, then Arcturus will indemnify JPI from and against such Tax. JPI and Arcturus will cooperate with respect to all documentation required by any taxing authority or reasonably requested by JPI to secure a reduction in the rate of withholding taxes. On the date Arcturus signs this Agreement it shall deliver to JPI an accurate and complete Internal Revenue Service Form W-9.

5.18 **Late Payments**. In the event that any payment due and undisputed under this Agreement is not made when due, the payment shall accrue interest at a rate per annum that is […***…]* basis points (*i.e.*, four percentage points) above the then-current prime rate quoted by Citibank in New York City for the period from the due date for payment until the date of actual payment; *provided, however,* that in no event shall such rate exceed the maximum legal annual interest rate.

6 OWNERSHIP OF INVENTIONS

6.1 **Ownership of Inventions**. Each Party will own all Patent Rights Covering inventions that are made solely by its employees, agents, or subcontractors and not jointly with employees, agents, or subcontractors of the other Party. The Parties will jointly own all Patent Rights Covering inventions that are made jointly by employees, agents, or subcontractors of both Parties. Whether an invention is the sole invention of a Party or the joint invention of the Parties for purposes of this Section 6.1 will be determined in accordance with United States patent laws, regardless of where the related activity took place.

6.2 **Exploitation of Inventions**. Except as expressly stated to the contrary in this Agreement (including in Section 1.7) and licenses granted under this Agreement, each Party may exploit (including sublicense) any Joint Patent Rights without obtaining the consent of, and without accounting to, the other Party.

6.3 **Joint Research Agreement**. This Agreement is a joint research agreement in accordance with 35 U.S.C. section 103(c)(3). Neither Party is required by this reference to have any Patent Right take advantage of or become subject to

35 U.S.C. section 103(c)(3) except in accordance with the provisions of Article 7 regarding Prosecution and Maintenance of Patent Rights.

6.4 **Trademarks**. JPI will be responsible for the trademarks and trade dress used in connection with commercialization of any Licensed Products. JPI will own all those trademarks and that trade dress and all associated goodwill. Arcturus shall not use or seek to register, anywhere in the world, any trademarks that are confusingly similar to any trademarks, trade names, trade dress, or logos used by or on behalf of JPI, its Affiliates, or its sublicensees in connection with any Licensed Product. Nothing in this Section 6.4 prevents Arcturus from enforcing its own trademark rights or house marks.

7 PATENT PROSECUTION AND MAINTENANCE

7.1 **Generally**. Except as otherwise expressly provided herein, as between the Parties, only the Party that Controls a Patent Right (including any Patent Right assigned to that Party under the terms of this Agreement) may at its expense Prosecute and Maintain that Patent Right, except: (a) as expressly provided in Sections 7.2 and 7.4 below with respect to Arcturus Product-Specific Patents; and (b) that JPI shall Prosecute and Maintain Joint Patent Rights, subject to Section 7.4. Arcturus will use counsel acceptable to JPI to Prosecute and Maintain Arcturus Product-Specific Patents. JPI shall Prosecute and Maintain Joint Patent Rights using counsel acceptable to Arcturus.

7.2 **Arcturus Responsibilities**. Arcturus shall use reasonable efforts to obtain in commercially significant countries (as identified by JPI to Arcturus in writing) valid and enforceable Arcturus Product-Specific Patents, provided that JPI shall reimburse the reasonable costs and expenses incurred by Arcturus in Prosecuting and Maintaining Arcturus Product-Specific Patents in accordance with Section 5.9. Arcturus shall timely apprise JPI of all pending prosecution and maintenance of Arcturus Product-Specific Patents and shall consider all of JPI's recommendations regarding such prosecution and maintenance. Prior to filing (a) any patent application during the Research Term that includes in its claims or description an NA Therapeutic or a method of making or using an NA Therapeutic, or (b) any patent application after the Research Term that includes in its claims or description a Selected NA Therapeutic or Licensed Compound or a method of making or using a Selected NA Therapeutic or Licensed Compound, Arcturus will, in each case, provide a copy of the proposed application to JPI. The Parties shall proceed with the filing and prosecution actions they agree so that, to the extent practicable, the application can be appropriately characterized as an Arcturus Product-Specific Patent.

7.3 **JPI Responsibilities**. JPI shall provide Arcturus timely advice and recommendations regarding prosecution and maintenance issues of which it is made aware by Arcturus. JPI shall timely apprise Arcturus of all pending prosecution and maintenance of Joint Patent Rights and shall consider all of Arcturus' recommendations regarding such prosecution and maintenance.

7.4 **Involvement in Prosecution and Maintenance**. If Arcturus decides not to Prosecute and Maintain any claim within any Arcturus Product-Specific Patent or decides to cease doing so, then: (a) Arcturus shall notify JPI promptly, but in any event not less than […***…]* days prior to the next deadline for any action that must be taken with respect to such Arcturus Product-Specific Patent in the relevant patent office; and (b) Arcturus shall permit JPI, if it wishes, to continue Prosecution and Maintenance of that Arcturus Product-Specific Patent in that country. If JPI decides not to Prosecute and Maintain any patent or patent application within any Joint Patent Right or decides to cease doing so, then (1) JPI shall notify Arcturus promptly, but in any event not less than […***…] days prior to the next deadline for any action that must be taken with respect to such Joint Patent Right in the relevant patent office, and (2) JPI shall permit Arcturus, if it wishes, to continue Prosecution and Maintenance of that Joint Patent Right in that country at Arcturus's expense.

7.5 **Solely-Controlled Arcturus Patents**. Arcturus will have the sole right, but not the obligation, to Prosecute and Maintain all Arcturus Patents that are not Arcturus Product-Specific Patents, at Arcturus sole cost and expense using counsel of its choice. Arcturus will use reasonable efforts to Prosecute and Maintain such Patents in a manner that will not damage the scope, validity, or enforceability of Arcturus Product-Specific Patents or Joint Patents.

7.6 **Cooperation**. Each Party shall cooperate with the other Party in Prosecution and Maintenance of Arcturus Patent Rights, Joint Patent Rights and JPI Patent Rights in accordance with this Agreement, including by promptly signing any documents reasonably necessary for Prosecution and Maintenance of any such Patent Rights in any country and by asking inventors, subcontractors, employees, former employees (to the extent reasonably available), consultants, and agents to sign any such documents.

7.7 **Patent Marking**. Consistent with it business practices, JPI may mark, and may instruct its Affiliates and sublicensees to mark, Licensed Products with applicable Arcturus Patent Rights. Consistent with it business practices, Arcturus may mark, and may instruct its Affiliates and sublicensees to mark, all Licensed Products with applicable Patent Rights licensed by JPI to Arcturus under Section 12.5. Each Party will be responsible for removing any patent markings from Licensed Products in accordance with applicable law and regulation after the applicable Patent Right expires.

8 PATENT ENFORCEMENT

8.1 **Generally**. Except as otherwise provided in this Article 8, each Party will be responsible for enforcing its respective Patent Rights as it sees fit.

8.2 **Notice**. If either Party becomes aware of any infringement from the sale of a product, anywhere in the world, of any Valid Claim included in Arcturus Patent Rights, Joint Patent Rights or JPI Patent Rights in HBV and, if an Option is exercised, the applicable Option Disease Area, then that Party shall notify the other Party within […***…] days of learning of such infringement.

8.3 **Infringement of Arcturus Patent Rights**. If any infringement by a non-Party of an Arcturus Product-Specific Patent or Joint Patent Right arises from registration, development, manufacture, use, sale, or importation of a compound or product in HBV and, if an Option is exercised, the applicable Option Disease Area, JPI may no later than […***…]* months after JPI learns of that infringement take action to stop that infringement or commence a Proceeding against a non-Party infringer. If JPI does not do so, Arcturus may do so. If any infringement by a non-Party of an Arcturus Patent that covers the composition or an approved use of a Licensed Compound or Licensed Product and is not an Arcturus Product-Specific Patent, arises from Competitive Infringement, the Parties shall meet to discuss what action, if any, to take. Arcturus shall consider any request by JPI that Arcturus commence a Proceeding against a Non-Party infringer with respect to Competitive Infringement, but Arcturus shall have the final decision-making authority as to whether to commence any such Proceeding. JPI shall not provide any communication or notice to any non-Party claiming or alleging that the conduct of such non-Party infringes, or may infringe, any Arcturus Patent Right that is not an Arcturus Product-Specific Patent. A Party that commences a Proceeding under this Section 8.3 shall pay all expenses of that Proceeding. The other Party shall cooperate with that Party in any such Proceeding, including by joining as a party plaintiff at that Party's written request, and may consult with that Party and participate in and be represented by independent counsel in that Proceeding at its own expense. That Party shall not, without the other Party's prior written consent, enter into any settlement or consent decree that requires any payment by or admits or imparts any other liability to the other Party or admits the invalidity or unenforceability of any such Arcturus Patent Right.

8.4 **Information Rights**. A Party that commences a Proceeding shall keep the other Party reasonably informed of all material developments in that Proceeding.

8.5 **Recoveries in JPI Actions**. If either Party recovers anything in a Proceeding commenced by JPI, then, to the extent such recovery is attributable to Competitive Infringement or to infringement of any Joint Patent Right, that Party shall allocate such recovery as follows: first, to each Party for its out-of-pocket litigation expenses incurred in that Proceeding; then as follows:

8.5.1 if that recovery was based on lost sales of a Licensed Product, to Arcturus in an amount equal to the royalty that it would have been paid for those sales in the one or more countries where the infringement occurred, with JPI receiving any remaining portion of that recovery; and

8.5.2 in all other circumstances, […***…]% of any remaining portion to JPI and […***…]% to Arcturus.

8.6 **Recoveries in Arcturus Actions**. If either Party recovers anything in a Proceeding commenced by Arcturus, then, to the extent such recovery is attributable to Competitive Infringement or to infringement of any Joint Patent Right, that Party shall allocate such recovery as follows: first, to each Party for its out-of-pocket litigation expenses incurred in that Proceeding; then as follows:

8.6.1 to the extent the recovery is attributable to lost sales of a Licensed Product (or lost profits or a reasonable royalty with respect thereto, as applicable), […***…]*% to Arcturus and […***…]% to JPI; and

8.6.2 […***…]% of any remaining portion to Arcturus and […***…]% to JPI.

8.7 **Infringement by a Party of Third Party Patent Rights**. If a Party learns that a Third Party alleges that a Party's use, development, manufacture, or commercialization of any Licensed Compound or Licensed Product infringes a Third Party's Patent Right or other intellectual property rights, that Party shall promptly notify the other Party. The Party that is alleged to infringe the Third Party's Patent Right or intellectual property may take whatever action it deems appropriate in response to that allegation and will be responsible for all damages, costs, and expenses arising from that action.

8.8 **Patent Certifications**. Each Party shall promptly notify the other if it becomes aware of any certification filed in accordance with 21 U.S.C. section 355(b)(2)(A) or 21 U.S.C. section 355(j)(2)(A)(vii) or any successor or equivalent law regarding biologic products in the U.S. or any other country claiming that an Arcturus Patent Right Covering any Licensed Product, or a Joint Patent Right, is invalid or that use, development, manufacture, or commercialization of a Licensed Product by a Non-Party will not infringe any Arcturus Patent Right or Joint Patent Right.

8.9 **Patent Term Restoration**. Arcturus shall obtain patent term restoration, supplemental protection certificates, or the equivalent in all countries (including under 35 U.S.C. § 156 or any successor or equivalent law in the U.S. or any other country) with respect to Arcturus Product-Specific Patents identified by JPI that Cover the chemical composition of matter and use of Licensed Products, provided that JPI shall have the first right to obtain patent term restoration, supplemental protection certificates, or the equivalent in all countries (including under 35 U.S.C. § 156 or any successor or equivalent law in the U.S. or any other country) if it decides to seek such restoration with respect to a JPI Patent Right or Joint Patent Right. JPI shall cooperate with Arcturus in seeking such patent term restoration, supplemental protection certificates, or the equivalent, including by providing information and signing documents. JPI may assume this responsibility at its expense and Arcturus will cooperate with such efforts. Arcturus shall have no obligation to seek or obtain, or to permit JPI to seek or obtain, patent term restoration, supplemental protection certificates, or the equivalent in any country (including under 35 U.S.C. § 156 or any successor or equivalent law in the U.S. or any other country) with respect to any Arcturus Patent Right that is not an Arcturus Product-Specific Patent.

8.10 **Orange Book Information**. JPI will be responsible for all submissions of patent information pertaining to each Licensed Product in accordance with 21 U.S.C. § 355(b)(1)(G) (or any amendment or successor statute thereto), any similar statutory or regulatory requirement enacted in the future regarding biologic products, or any similar statutory or regulatory requirement in any non-U.S. country or other regulatory jurisdiction.

8.11 **Non-Party Licensor Rights**. If a non-Party licensor has retained any right to enforce or otherwise be involved in the activities specified in this Article 8 for any Arcturus Patent Rights, Arcturus shall use reasonable efforts to cause that non-Party licensor to take the actions specified in this Article 8 in a manner consistent with the one or more agreements by which that non-Party retains those rights, but Arcturus will not be deemed to be in breach of its obligations under this Article 8 if despite using reasonable efforts it is unable to comply with those obligations because of actions taken or not taken by that non-Party licensor.

9 CONFIDENTIALITY

9.1 **Maintaining Confidentiality**. During the term of this Agreement and for […***…]* years thereafter, the Recipient shall not disclose Confidential Information except as contemplated in this Agreement or use Confidential Information other than for purposes of contemplated by this Agreement.

9.2 "**Confidential Information**" means information disclosed by one Party to the other Party (and Derived Information) that is not, in each case, Excluded Information.

9.3 "**Derived Information**" means information (including notes, analyses, compilations, and summaries) that is in writing or embodied in an electronic medium and that the Recipient or any of the Recipient's Representatives derive, in whole or in part, from any information described in Section 9.2.

9.4 "**Disclosing Party**" means a Party that discloses Confidential Information to a Recipient.

9.5 "**Excluded Information**" means information that the Recipient can establish by competent evidence comes within any of the following categories:

9.5.1 information that is or becomes public other than as a result of the Recipient's breach of any obligation under this Agreement;

9.5.2 information that, when it is disclosed to the Recipient, is already in the possession of the Recipient or any of the Recipient's Representatives as the result of disclosure by a Person that was not then under an obligation to the Disclosing Party to keep that information confidential;

9.5.3 information that, after it is disclosed to the Recipient under this Agreement, is disclosed to the Recipient or any of the Recipient's Representatives by a Person that was not then under an obligation to the Disclosing Party to keep that information confidential; and

9.5.4 information that the Recipient develops independently, as evidenced by contemporaneous written records, without any use of or reliance on Confidential Information disclosed by the Disclosing Party to the Recipient, whether before or after the Disclosing Party discloses such equivalent information to the Recipient.

9.6 "**Recipient**" means a Party that receives Confidential Information.

*****Confidential Treatment Requested**

9.7 **Disclosure Procedures**. For information to constitute Confidential Information, the following conditions must be satisfied: (a) if that information is contained in a printed document, computer disc or other electronic storage device, or is disclosed by transmitting it in an electronic file (including by email), or is otherwise in a recorded form, it must be marked "Confidential"; and (b) if that information is disclosed orally or visually, or is otherwise not disclosed in recorded form, then no later than […***…]* days after it is disclosed the Disclosing Party must confirm, in a notice to the Recipient describing the information, that that information is confidential.

9.8 **Disclosure to Representatives**. Any individual to whom the Disclosing Party discloses Confidential Information in accordance with this Agreement may disclose that Confidential Information only to Representatives of the Recipient who require that Confidential Information for purposes contemplated in this Agreement, on condition that before Confidential Information is disclosed to any individual in accordance with this Section 9.8, the Recipient notifies that individual of the confidential nature of the Confidential Information and that individual is party to a written confidentiality agreement with the Recipient (and enforceable by the Disclosing Party) in which that individual promises not to disclose any Confidential Information or use any Confidential Information other than for purposes contemplated in this Agreement.

9.9 **Precautions Against Unauthorized Disclosure or Use**. The Recipient shall take precautions to prevent disclosure or use of Confidential Information other than as authorized in this Agreement. Those precautions must be at least as effective as those taken by the Recipient to protect its own Confidential Information or those that would be taken by a reasonable person in the position of the Recipient, whichever are greater. If a non-Party misappropriates Confidential Information from the Recipient, the Recipient will be liable to the Disclosing Party for that misappropriation to the same extent that the Recipient would have been had the Recipient disclosed or used that Confidential Information other than as authorized in this Agreement.

9.10 **Unauthorized Disclosure or Use by Representatives**. If any one or more Representatives of the Recipient disclose or use Confidential Information other than as authorized in this Agreement, the Recipient will be liable to the Disclosing Party for that disclosure or use to the same extent that the Recipient would have been had the Recipient disclosed or used that Confidential Information.

9.11 **Notification of Unauthorized Disclosure or Use**. If the Recipient becomes aware of disclosure or use of Confidential Information other than as authorized in this Agreement, the Recipient shall promptly notify the Disclosing Party of that disclosure or use and shall cooperate with the Disclosing Party in mitigating any adverse consequences to the Disclosing Party of that disclosure or use.

9.12 **Permitted Disclosure**. It will not constitute breach of the Recipient's obligations under this Agreement for the Recipient or any of its Representatives to disclose Confidential Information as follows:

9.12.1 as necessary for Prosecuting and Maintaining Patent Rights in accordance with this Agreement;

9.12.2 as necessary in connection with seeking Regulatory Approval of one or more Licensed Products in accordance with this Agreement; and

9.12.3 to actual or prospective lenders, acquirers, merger counterparties, or investors in equity, and to advisors to any of the foregoing, as necessary for evaluating a financing, acquisition, merger, or investment transaction involving one or more of the Recipient and any of its Affiliates, on condition that each such Person enters into a written confidentiality agreement with the Recipient in which that Person promises not to disclose that Confidential Information or use that Confidential Information other than as contemplated in this clause and that otherwise contains terms that are reasonable in the circumstances.

9.13 **Disclosure in Connection with Clinical Trials**. It will not constitute breach of the Recipient's obligations under this Agreement for the Recipient or any of its Representatives to disclose Confidential Information in connection with clinical trials of a Licensed Product as required by a Government Body or other Person or in accordance with the Recipient's policies for transparency of clinical trial results with the public.

9.14 **Disclosure Required by Law**. It will not constitute breach of the Recipient's obligations under this Agreement for the Recipient or any of its Representatives to disclose Confidential Information as required by law provided that if any proceeding is brought to compel the Recipient or any of its Representatives to disclose Confidential Information or if the Recipient or any of its Representatives is otherwise required by law (including regulations promulgated by the Securities and Exchange Commission and the rules of a securities exchange or electronic quotation system) to disclose any Confidential Information, the Recipient shall do the following:

9.14.1 unless by doing so the Recipient would violate any law or an order of a Government Body, notify the Disclosing Party of that proceeding or that requirement, as the case may be, promptly after learning of it, taking into account for purposes of determining the Recipient's promptness any time constraints that the Disclosing Party would face in bringing a proceeding to prevent that disclosure or to protect the confidentiality of any information that is disclosed; and

9.14.2 at the Recipient's expense cooperate with the Disclosing Party in any proceeding the Disclosing Party brings to prevent that disclosure or to protect the confidentiality of any information that is disclosed.

9.15 **Nondisclosure of Restricted Information**. The Disclosing Party shall not disclose to the Recipient or any of its Representatives any information if doing so would cause the Disclosing Party to breach a duty to any other Person to keep that information confidential or would cause the Disclosing Party to violate any law or any order of a Government Body.

9.16 **No License**. The Disclosing Party's disclosure of Confidential Information will not constitute a grant to the Recipient or any of its Representatives of a license to, or any other interest in, any intellectual property of the Disclosing Party.

9.17 **No Statement as to Accuracy**. Neither Party is making in this Agreement any statement as to accuracy of any Confidential Information. The Recipient acknowledges that because the Recipient has not relied on, and will not be relying on, any statements made by the Disclosing Party to the Recipient as to accuracy of any Confidential Information, the Recipient will have no basis for bringing any claim for fraud in connection with any such statements.

9.18 **Publications**. Either Party (that Party, the "**Publishing Party**") may submit for publication in a journal or for presentation at a conference results of the Research Program if the following conditions have been satisfied:

9.18.1 the JRC (if it has not been disbanded) has reviewed that analysis;

9.18.2 the other Party has approved that analysis, with unreasonable withholding of approval being deemed approval;

9.18.3 the Publishing Party has provided a copy of the proposed publication or presentation to the other Party;

9.18.4 the other Party has by notice to the Publishing Party approved the proposed publication or presentation, with unreasonable withholding of approval being deemed approval, or in the […***…]* days after receiving a copy of the proposed publication or presentation the other Party has not notified the Publishing Party of its approval or disapproval;

9.18.5 at least […***…] days before submitting the proposed publication or presentation to a non-Party, the Publishing Party has submitted a copy to the other Party to allow the other Party to comment on the content and timing of the proposed publication or presentation;

9.18.6 the Publishing Party has complied with any request of the other Party to delay publication for […***…] days or more to allow the other Party to take steps to protect its or its Affiliates' Know-How;

9.18.7 the Publishing Party has at the request of the other Party deleted from the proposed publication or presentation any Confidential Information of the other Party; and

9.18.8 the Publishing Party has acknowledged in the proposed publication or presentation the other Party's contributions, unless the other Party has instructed the Publishing Party in writing to omit any such acknowledgment.

After the conditions stated in this Section 9.18 have been approved with respect to a given analysis, the Publishing Party will not be required to satisfy those conditions again when resubmitting that analysis to a journal or a conference.

9.19 **Nondisclosure of Terms**. During the term of this Agreement and for […***…] years thereafter, each Party shall not disclose to any other Person the terms of

this Agreement, except to the extent expressly permitted in this Agreement, in which case that disclosure will not constitute a breach of the Party in question's obligations under this Section 9.19.

9.20 **Press Releases**. Except (a) with respect to the Arcturus Press Release attached hereto as the Arcturus Press Release Exhibit the time for release of which shall be agreed by the Parties, without the prior approval of JPI, (b) as expressly permitted by Article 9, or (c) as required by applicable law or the listing rules of any stock exchange on which securities issued by a Party or its Affiliates are traded, neither Party shall make any public statements, by press release or otherwise, concerning this Agreement. The foregoing shall not prohibit or restrict JPI's and its Affiliates' and sublicensees' Exploitation (and any communications regarding such Exploitation) of Licensed Compounds or Licensed Products, including, without limitation, any launch, marketing, advertising, promotional or other commercialization activities with respect to Licensed Compounds or Licensed Products. If a Party is required by applicable law or the listing rules of any stock exchange on which securities issued by it or its Affiliates are traded to make any public statement, public filing or other public disclosure concerning this Agreement, it shall: (i) except where impracticable, give reasonable advance notice to the other Party of such required disclosure; (ii) disclose only the information that such Party or its Affiliate determines on advice of counsel is required to be disclosed; and (iii) to the extent confidential treatment may be obtained for the information required to be disclosed, use reasonable efforts to secure such confidential treatment. Except as provided above in this Section 9.20, if Arcturus wishes to make a public statement disclosing achievement of a Milestone Event or payment of a Milestone Amount, Arcturus shall provide JPI with a copy of the proposed public statement. Arcturus may issue the public statement once JPI has approved it in writing. If JPI does not provide Arcturus with comments in the […***…]* days after the day JPI received the proposed public statement, JPI will be deemed to have approved that public statement. If JPI provides Arcturus with comments during that period, the Parties shall discuss them. Arcturus or JPI may subsequently publicly disclose any information previously contained in a public statement approved in accordance with this Article 9.

10 STATEMENT OF FACTS; DISCLAIMERS

10.1 **By Each Party**. Each Party states that the following facts are accurate as of the Effective Date:

10.1.1 it is an entity duly organized, validly existing, and in good standing under the laws of its jurisdiction of organization, with all power and authority necessary to own or use its assets and conduct its business as it is now being conducted;

10.1.2 it is qualified to do business in all jurisdictions in which the nature of the business that it conducts makes qualification necessary and where failure to so qualify would have a material adverse effect on its ability to perform its obligations under this Agreement;

*****Confidential Treatment Requested**

10.1.3 it has full power and authority to enter into this Agreement and to perform its obligations under this Agreement;

10.1.4 its entry into this Agreement and performance by it of its obligations under this Agreement have been duly authorized by its governing body;

10.1.5 it has the consent or authorization of any Person, including any permit issued by any Government Body and the consent of any counterparty to any contract to which it is party, that it requires in connection with its entry into this Agreement and its performance of its obligations under this Agreement;

10.1.6 its entry into this Agreement and its performance of its obligations under this Agreement do not: (a) violate any provision of its organizational documents as currently in effect; (b) conflict with, result in a breach of, or constitute a default under any contract to which it is a party or by which any of its properties or assets are bound; or (c) conflict with or violate any law or order to which it is subject;

10.1.7 no Proceeding is pending or, to its knowledge, threatened against it, except for any Proceeding that would not reasonably be expected to have, individually or in the aggregate, a material adverse effect on its ability to perform its obligations under this Agreement, and it is not aware of any facts that would be reasonably likely to result in any such Proceeding; and

10.1.8 it is not currently in violation of any law or order, except for any law or order the violation of which would not reasonably be expected to have, individually or in the aggregate, a material adverse effect on its ability to perform its obligations under this Agreement.

10.2 **By Arcturus**. Arcturus states that the following facts are accurate as of the Effective Date:

10.2.1 the Arcturus Patent Rights listed in the Arcturus Patent Rights Exhibit are existing, and the issued Patent Rights in the Arcturus Patent Rights Exhibit are not, to Arcturus's knowledge, invalid or unenforceable, in whole or in part;

10.2.2 Arcturus is the sole and exclusive owner of, or has valid and enforceable rights to, Arcturus Patent Rights listed in the Arcturus Patent Rights Exhibit, and Arcturus has the right to grant JPI the license set forth in Section 4.1, free and clear of all encumbrances, security interests, options and licenses;

10.2.3 except as set forth in the Granted Rights Exhibit, no license granted by Arcturus to any non-Party conflicts with the license granted to JPI under this Agreement, and the Granted Rights Exhibit is a complete list of rights under Arcturus Technology granted to non-Parties with respect to HBV NA Therapeutics, […***…]* NA Therapeutics and Respiratory Disease Virus NA Therapeutics. During the term of this Agreement, Arcturus shall not grant any non-Party any license that conflicts with the license granted to JPI herein;

10.2.4 to the knowledge of Arcturus, neither the practice of the Arcturus Technology by Arcturus as contemplated by this Agreement, nor the development, manufacture and commercialization of any NA Therapeutics Controlled by Arcturus as of the

Effective Date, infringes any Patent Right or misappropriates any Know-How owned or possessed by any Third Party; and

10.2.5 no Proceeding is pending or, to its knowledge, threatened against it relating to the Arcturus Technology, and it is not aware of any facts that would be reasonably likely to result in any Proceeding.

10.3 **Disclaimers**. Each Party acknowledges:

10.3.1 that the Research Program and development and commercialization of products under this Agreement might fail and that any such failure will not in itself constitute a breach of this Agreement;

10.3.2 neither Party is making any warranty of merchantability or any other warranty with respect to any Arcturus Patent Rights, Arcturus Know-How, JPI Patent Rights, JPI Know-How, Joint Patent Rights, Joint Know-How, Licensed Compounds, Materials, or Licensed Products, other than the warranties expressly set forth in this Agreement; and

10.3.3 neither Party will be liable to the other for any indirect, punitive, special, or consequential damages, lost profits or other non-direct damages in connection with this Agreement even if that Party has been informed or should have known of the possibility of such damages, except that this Section 10.3.3 will not apply to either Party's obligations under Article 11.

11 INDEMNIFICATION

11.1 **Indemnification by JPI**. With respect to any Proceeding brought by a Third Party (other than an Arcturus Indemnitee) against one or more Arcturus Indemnitees arising out of this Agreement or development or commercialization by JPI or any of its Affiliates or sublicensees of the Licensed Compounds or Licensed Products (each, an "**Arcturus Nonparty Claim**"), JPI shall indemnify those Arcturus Indemnitees against all Indemnifiable Losses arising out of that Proceeding, except to the extent that Arcturus or one of the Arcturus Indemnitees negligently or intentionally caused those Indemnifiable Losses.

11.2 **Indemnification by Arcturus**. With respect to any Proceeding brought by a Third Party (other than a JPI Indemnitee) against one or more JPI Indemnitees arising out of this Agreement or development or commercialization by Arcturus or any of its Affiliates, JPIs, or sublicensees of the Terminated Compounds, Licensed Compounds, or Licensed Products (each, a "**JPI Nonparty Claim**"), Arcturus shall indemnify those JPI Indemnitees against all Indemnifiable Losses arising out of that Proceeding, except to the extent that JPI or one of the JPI Indemnitees negligently or intentionally caused those Indemnifiable Losses.

11.3 **Procedures**. To be entitled to indemnification under Section 11.1 or 11.2, an Indemnitee subject to any Third Party Claim must promptly (and in any event no later than […***…]* days after the Indemnitee first knew of that Proceeding) notify the Indemnifying Party of that Third Party Claim and deliver to the Indemnifying Party a copy of all legal pleadings with respect to the Third Party Claim. If the

Indemnitee fails to timely notify the Indemnifying Party of a Third Party Claim, the Indemnifying Party will be relieved of its indemnification obligations with respect to that Third Party Claim to the extent that the Indemnifying Party was prejudiced by that failure and the Indemnifying Party will not be required to reimburse the Indemnitee for any Litigation Expenses the Indemnitee incurred during the period in which the Indemnitee failed to notify the Indemnifying Party.

11.3.1 To assume the defense of a Third Party Claim, the Indemnifying Party must notify the Indemnitee that it is doing so. Promptly thereafter, the Indemnifying Party shall retain to represent it in the Third Party Claim independent legal counsel that is reasonably acceptable to the Indemnitee.

11.3.2 An Indemnitee is entitled to participate in the defense of a Third Party Claim. An Indemnitee may defend a Third Party Claim with counsel of its own choosing and without the Indemnifying Party participating if: (a) the Indemnifying Party notifies the Indemnitee that it does not wish to defend the Third Party Claim; (b) by midnight at the end of the […***…]* day after the Indemnitee notifies the Indemnifying Party of the Third Party Claim the Indemnifying Party fails to notify the Indemnitee that it wishes to defend the Third Party Claim; or (c) representation of the Indemnifying Party and the Indemnitee by the same counsel would, in the opinion of that counsel, constitute a conflict of interest.

11.3.3 The Indemnifying Party shall pay any Litigation Expenses that an Indemnitee incurs in connection with defense of the Third Party Claim before the Indemnifying Party assumes the defense of that Third Party Claim, except with respect to any period during which the Indemnitee fails to timely notify the Indemnifying Party of that Third Party Claim. The Indemnifying Party will not be liable for any Litigation Expenses that a Indemnitee incurs in connection with defense of a Third Party Claim after the Indemnifying Party assumes the defense of that Third Party Claim, other than Litigation Expenses that the Indemnitee incurs in employing counsel in accordance with Section 11.3.2 which Litigation Expenses the Indemnifying Party shall pay promptly as they are incurred.

11.3.4 After the Indemnifying Party assumes the defense of a Third Party Claim, the Indemnifying Party may contest, pay, or settle the Third Party Claim without the consent of the Indemnitee only if that settlement: (a) does not entail any admission on the part of the Indemnitee that it violated any law or infringed the rights of any Person; (b) has no effect on any other claim against the Indemnitee; (c) provides as the claimant's sole relief monetary damages that are paid in full by the Indemnifying Party; and (d) requires that the claimant release the Indemnitee from all liability alleged in the Third Party Claim. After the Indemnifying Party assumes the defense of a Third Party Claim, the Indemnifying Party will have no further obligations under this Section 11.3 with respect to the Third Party Claim if the Indemnitee contests, pays, or settles the Third Party Claim without the consent of the Indemnifying Party.

11.4 **Definitions**. In this Agreement, the following definitions apply:

*****Confidential Treatment Requested**

11.4.1 "**Arcturus Indemnitee**" means Arcturus, any Affiliate of Arcturus, each Representative of any of the foregoing, and each of the heirs, executors, successors, and assignees of any of the foregoing.

11.4.2 "**Indemnifiable Losses**" means the aggregate of Losses and Litigation Expenses.

11.4.3 "**Indemnitee**" means an Arcturus Indemnitee or a JPI Indemnitee.

11.4.4 "**JPI Indemnitee**" means JPI, any Affiliate of JPI, each Representative of any of the foregoing, and each of the heirs, executors, successors, and assignees of any of the foregoing.

11.4.5 "**Litigation Expense**" means any reasonable out-of-pocket expense incurred in defending a Proceeding or in any related investigation or negotiation, including court filing fees, court costs, arbitration fees, witness fees, and attorneys' and other professionals' fees and disbursements.

11.4.6 "**Loss**" means any amount awarded in, or paid in settlement of, any Proceeding, including any interest but excluding any Litigation Expenses.

11.4.7 "**Proceeding**" means any judicial, administrative, or arbitration action, suit, claim, investigation, or proceeding.

11.4.8 "**Representative**" means, with respect to an entity, any of that entity's directors, officers, employees, agents, actual or potential consultants, actual or potential advisors, and other representatives.

11.4.9 "**Nonparty Claim**" means an Arcturus Nonparty Claim or a JPI Nonparty Claim.

12 TERM AND TERMINATION

12.1 **Automatic Termination**. This Agreement will terminate when JPI owes Arcturus no more royalty payments on any Licensed Product.

12.2 **Termination by Arcturus**. In the following circumstances, Arcturus may by notice to JPI terminate this Agreement:

12.2.1 JPI breaches any obligation under this Agreement to make an undisputed payment and fails to make that payment no later than 60 days after Arcturus notifies it of that breach; or

12.2.2 JPI materially breaches this Agreement and fails to cure such breach within 60 days after Arcturus notifies it of that breach, except that allegations of JPI's breach of its obligation to use Commercially Reasonable Efforts to develop or commercialize Licensed Products will be solely subject to the conditions and procedures set out in Section 14.4.

12.3 **Termination by JPI**. In the following circumstances, JPI may by notice to Arcturus terminate this Agreement:

12.3.1 On a Licensed Product-by-Licensed Product and country-by-country basis, or in its entirety, in each case upon 60 days' written notice;

12.3.2 If Arcturus materially breaches this Agreement and fails to cure such breach within 60 days after JPI notifies it of that breach; or

12.3.3 There occurs a Change of Control of Arcturus.

12.4 **Effects of Any Termination**. In the event of any termination of this Agreement in its entirety (other than automatic termination in accordance with Section 12.1), then in each case all rights and obligations of each party under this Agreement will terminate, including all rights, licenses, and sublicenses granted by a party to the other, except (a) that the license granted to JPI under Section 4.3.2 shall survive solely with respect to Arcturus Know-How (and shall terminate with respect to Arcturus Patents) and (b) as provided in Sections 12.5 and 12.6.

12.5 **Effects of Certain Terminations.**

12.5.1 In the event that JPI terminates this Agreement in its entirety prior to completion of all Research Programs, JPI […***…]* during the […***…]month period beginning on JPI's delivery of notice of termination to Arcturus as specified in the Joint Research Plan and […***…] (or, if less than […***…] months […***…], such […***…] obligation being subject to […***…]. Arcturus will use Commercially Reasonable Efforts to […***…]. Notwithstanding the foregoing, in the event that JPI delivers Arcturus a written notice of termination of this Agreement prior to […***…], JPI shall […***…] pursuant to this Section 12.5.1.

12.5.2 Solely in the event of any termination of this Agreement by JPI in its entirety or by Arcturus under Section 12.2, in each case prior to the First Commercial Sale of a Licensed Product:

(a) JPI shall, and it hereby does, grant to Arcturus an exclusive, worldwide, royalty-free, perpetual license, with the right to sublicense through multiple tiers, under JPI Licensed Patent Rights and any JPI formulation, delivery or manufacturing technology actively utilized in a Licensed Compound or Licensed Product under active development by JPI, solely to Exploit Licensed Compounds and Licensed Products (other than any Combination Product or Bundled Product) in the Field on the terms and conditions of this Agreement;

(b) JPI shall promptly transfer to Arcturus all available data, information, and regulatory filings relating to Licensed Compounds and Licensed Products and shall thereafter provide additional such available data, information, and regulatory filings at the reasonable written request of Arcturus, and JPI shall transfer to Arcturus all (or, as requested by Arcturus, a specified portion of)

available quantities of Licensed Compounds and Licensed Products at a price equal to JPI's fully burdened cost of those supplies;

(c) JPI shall for […***…]* days after the effective date of termination, at Arcturus's written request, reasonably assist at its own expense in the orderly and prompt transition of sponsorship and management of clinical trials then being conducted to Arcturus; and

(d) if JPI was manufacturing, or having manufactured on its behalf, any Licensed Product, or the Licensed Compounds contained therein, prior to termination, then at Arcturus's request and upon the pricing terms set forth below and other commercially reasonable terms, until the earlier of: (i) such time as Arcturus has secured another source of Licensed Compound or Licensed Product that is able to meet Arcturus's Licensed Product quality and quantity requirements; and (ii) […***…] months after such termination, JPI shall use commercially reasonable efforts to supply, or cause to be supplied, to Arcturus such quantities of Licensed Product (or Licensed Compound contained therein) as Arcturus may reasonably require for the Exploitation of Licensed Products in the Field, subject to payment by Arcturus of […***…]% of JPI's fully-burdened cost of such supplies; provided that Arcturus shall use commercially reasonable efforts to secure another source of supply as soon as reasonably practicable.

In no event shall Arcturus as a result of this Section 12.5.2 have any right or license with respect to any active therapeutic ingredient that is not a Licensed Compound nor will Arcturus have any right to Exploit Combination Products that contain any materials Covered by any Patent Right or other proprietary right of a non-Party. JPI reserves all rights under the JPI Licensed Patent Rights other than the rights exclusively granted to Arcturus under subsection (a) of this Section 12.5.2. JPI will not be required to initiate or continue, any clinical trial as to any Licensed Compound or Licensed Product in the event of a termination of the Agreement. If the Parties agree to transition any clinical trials to Arcturus, Arcturus shall reimburse JPI for any costs incurred by JPI in transitioning such clinical trials to Arcturus, and Arcturus shall be responsible for reimbursing JPI […***…]% of the costs incurred by JPI prior to such transition in connection with the conduct of such clinical trials. Should JPI be obligated to any Third Party to pay milestones or royalties with respect to any Licensed Compound or Licensed Product then, prior to JPI granting a license to the same to Arcturus hereunder, Arcturus shall agree in writing to pay to JPI all royalties and milestone payments that become due by JPI to the Third Party on account of use by Arcturus or its licensee.

12.6 **Accrued Rights and Obligations; Survival**. Termination of this Agreement will not relieve either Party of any obligation or liability accruing prior to such termination, nor shall termination of this Agreement preclude either Party from pursuing all rights and remedies it may have under this Agreement, at law or in equity, with respect to breach of this Agreement. In addition, the Parties' rights and obligations under Sections 4.3.2 (solely with respect to Arcturus Know-How), 4.7, 5.12, 5.13, 5.16, 5.18, 6.1, 6.4, 10.3, 12.4, 12.5, 12.6 and 12.7 and Articles 9

(excluding Section 9.18), 11, 14 and 15 of this Agreement shall survive termination of this Agreement.

12.7 **Rights in Bankruptcy**. The Parties intend that all rights and licenses granted under this Agreement by one Party to the other are for all purposes of section 365(n) of Title 11 of the U.S. Bankruptcy Code licenses of rights to "intellectual property" as defined in section 101 of Title 11. During the term of this Agreement, each Party may create and maintain current copies to the extent practicable of all intellectual property licensed to it under this Agreement. If there occurs a Bankruptcy Event with respect to either Party (that Party, the "**Bankrupt Party**"), the following will apply: each Party will retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code with respect to any intellectual property licensed to it under this Agreement, the other Party will have all rights stated in section 365(n) of Title 11, if in its capacity as licensor of intellectually property under this Agreement the Bankrupt Party rejects this Agreement in any proceeding under the U.S. Bankruptcy Code, the other Party will be entitled to a complete duplicate of (or complete access to, as appropriate) that intellectual property and all embodiments of that intellectual property and the Bankrupt Party shall deliver to the other Party a complete duplicate of that intellectual property if one is not already in the other Party's possession, the Bankrupt Party shall not interfere with the other Party's rights to intellectual property and all embodiments of intellectual property and shall assist and not interfere with the other Party in obtaining intellectual property and all embodiments of intellectual property (including all tangible, intangible, electronic or other embodiments of rights and licenses under this Agreement, including all compounds and products embodying intellectual property, Licensed Compounds, Licensed Products, regulatory filings and related rights and technology) from anyone else. All rights of the Parties under this Section 12.7 and under section 365(n) of Title 11 are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party might have under this Agreement, Title 11, and any other law, the right of access to any intellectual property (including all embodiments of that intellectual property, to the extent protected by non-bankruptcy law) of the Bankrupt Party under this Agreement, and the right to contract directly with any non-Party to complete the work contracted to the Bankrupt Party. Any intellectual-property rights granted under this Section 12.7 are subject to the licenses granted elsewhere in this Agreement and the payment obligations stated in Sections 5.3, 5.4, 5.5 and 5.7.

13 DEFINITIONS

In this Agreement, the following definitions apply:

13.1 "**Affiliate**" means, with respect to any given Person, any other Person at the time directly or indirectly controlling, controlled by or under common control with that Person. For purposes of this definition, "control" means the possession, directly or indirectly, of the power to direct or cause the direction of the management and

policies of a Person, whether through ownership of voting securities, by contract or otherwise.

13.2 "**After-Acquired Third-Party IP**" means any Patent Right or Know-How of a Third Party with respect to which, in each case, Arcturus first obtains a right to grant access, or a license or sublicense, from such Third Party after the Effective Date, under an agreement that would obligate Arcturus to pay royalties and/or milestone payments to such Third Party with respect to JPI's Exploitation of such Patent Right or Know-How were it to be licensed to JPI hereunder.

13.3 "**API**" means, in the case of a Combination Product, any of the active pharmaceutical ingredients in such Combination Agreement, including the Licensed Compound.

13.4 "**Arcturus-Controlled Affiliate**" means a Person controlled by Arcturus where "control" means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of a Person, whether through ownership of voting securities, by contract or otherwise.

13.5 "**Arcturus Delivery Technologies**" or "**ADT**" means any Arcturus proprietary technology that can be combined with NA Therapeutics to enable or improve delivery of such NA Therapeutics (including Arcturus' proprietary LUNAR™ lipid-enabled delivery system).

13.6 "**Arcturus Know-How**" means Know-How that Arcturus and Arcturus-Controlled Affiliates Control (other than through grant of a license by an Affiliate of JPI) that is necessary or useful for the research, discovery, development, manufacture, commercialization or other Exploitation of a NA Therapeutic, Licensed Compound or Licensed Product but does not include Joint Know-How.

13.7 "**Arcturus Patent Right**" means any Patent Right (other than a Joint Patent Right) that Arcturus or any Arcturus-Controlled Affiliates Controls other than through the grant of a license by JPI and that is necessary or useful for the research, discovery, development, manufacture, commercialization or other Exploitation of a NA Therapeutic, Licensed Compound or Licensed Product.

13.8 "**Arcturus Platform Technologies**" means: (a) any Arcturus proprietary technology that can be combined with NA Therapeutics to deliver or distribute the NA Therapeutics to enable or improve delivery of such NA Therapeutics (including Arcturus' proprietary LUNAR™ lipid-enabled delivery system); and (b) any Arcturus proprietary chemistry that may be used to modify NA Therapeutics for improved or enhanced potency, safety, stability or other physicochemical properties (including, without limitation, Arcturus' proprietary Unlocked Nucleic Acid (UNA) chemistry ("**UNA Technology**")). NA Therapeutics are not Arcturus Platform Technologies.

13.9 "**Arcturus Product-Specific Patent**" means Arcturus Patent Rights that claim: the composition or formulation of a Selected NA Therapeutic, Development Candidate, Licensed Compound or Licensed Product or, if filed during the

Research Term, an NA Therapeutic for the treatment of HBV (or Option Disease Area, as applicable); or any method of using or making a Selected NA Therapeutics for the treatment of HBV (or Option Disease Area, as applicable), Development Candidate, Licensed Compound or Licensed Product or, if filed during the Research Term, any method of using or making an NA Therapeutic for the treatment of HBV (or Option Disease Area, as applicable). However, "**Arcturus Product-Specific Patents**" exclude any Arcturus Patent Right that does not claim an NA Therapeutic, Development Candidate, Licensed Compound, or Licensed Product, the manufacture or use of a NA Therapeutic, Development Candidate, Licensed Compound, or Licensed Product, or the treatment of HBV (or Option Disease Area, as applicable) and claims:

13.9.1 subject matter broadly applicable to therapeutics that are not NA Therapeutics, Selected NA Therapeutics, Development Candidates, Licensed Compounds or Licensed Products for the treatment of HBV (or Option Disease Area, as applicable), provided that such Arcturus Patent Right does not specifically claim or describe the composition of matter or formulation of, or a method of making or using, an NA Therapeutic, Selected NA Therapeutic, Development Candidate, Licensed Compound or Licensed Product for the treatment of HBV (or Option Disease Area, as applicable);

13.9.2 methods of use of therapeutics that are not NA Therapeutics, Selected NA Therapeutics, Development Candidates, Licensed Compounds or Licensed Products to treat or diagnose a disease, disorder or condition other than for the treatment of HBV (or Option Disease Area, as applicable);

13.9.3 any therapeutic that is not an NA Therapeutic, Selected NA Therapeutics, Development Candidate, Licensed Compound or Licensed Product for the treatment of HBV (or Option Disease Area, as applicable), except that if: (i) such Arcturus Patent Right also claims the composition of matter or method of use of an NA Therapeutic (if filed during the Research Term), Selected NA Therapeutic, Development Candidate or Licensed Compound for the treatment of HBV (or Option Disease Area, as applicable); (ii) the earliest worldwide priority date to which such Arcturus Patent Right is entitled is after […***…]*; and (iii) such Arcturus Patent Right does not claim any subject matter described in subsection 13.9.1, 13.9.2 or 13.9.4 of this definition, then such Arcturus Patent Right shall be deemed an "Arcturus Product-Specific Patent" for purposes of this Agreement; or

13.9.4 Arcturus Platform Technologies.

13.10 "**Arcturus Technology**" means Arcturus Patent Rights and Arcturus Know-How.

13.11 "**Bankruptcy Event**" refers, with respect to any Person, to occurrence of one or more of the following:

13.11.1 that Person commences a voluntary case under Title 11 of the United States Code or the corresponding provisions of any successor laws;

13.11.2 anyone commences an involuntary case against that Person under Title 11 of the United States Code or the corresponding provisions of any successor laws and either: (a) the case is not dismissed by midnight at the end of the […***…]* day after commencement; or (b) the court before which the case is pending issues an order approving the case; and

13.11.3 a court of competent jurisdiction appoints, or that Person makes an assignment of all or substantially all its assets to, a custodian (as that term is defined in Title 11 of the United States Code or the corresponding provisions of any successor laws) for that Person or all or substantially all its assets.

13.12 "**Bundled Product**" means a Licensed Product that is sold by JPI, its Affiliates or sublicensees "bundled" with one or more other products that are not Licensed Products, each in finished dosage form, and not a fixed combination of a Licensed Product and one or more other products in a single finished product.

13.13 "**Business Day**" means any day that is not a Saturday, a Sunday, or a day on which banks are not open for business in the place where an obligation has to be performed under this Agreement or, in case of obligations for which a place of performance is not specified (or cannot be reasonably inferred from the contents of this Agreement), in San Diego, California.

13.14 "**Calendar Month**" means a financial month based on the Johnson & Johnson Universal Calendar (attached hereto as the Johnson & Johnson Universal Calendar Exhibit) for that year, except that the first Calendar Month for the first Calendar Year extends from the date of this Agreement to the end of that Calendar Month and the last Calendar Month extends from the first day of that Calendar Month until termination of this Agreement.

13.15 "**Calendar Quarter**" means a financial quarter based on the Johnson & Johnson Universal Calendar for that year, except that the first Calendar Quarter for the first Calendar Year extends from the date of this Agreement to the end of that Calendar Quarter and the last Calendar Quarter extends from the first day of that Calendar Quarter until termination of this Agreement.

13.16 "**Calendar Year**" means one year based on the Johnson & Johnson Universal Calendar for that year, except that the first Calendar Year extends from the date of this Agreement to the end of that Calendar Year and the last Calendar Year extends from the first day of that Calendar Year until termination of this Agreement.

13.17 "**Change of Control**" means, with respect to any Person other than an individual, occurrence of any of the following:

13.17.1 a Person who is not a shareholder of that Person on the date of this Agreement (or a group of such Persons acting in concert) acquires, during a period of 12 consecutive entire months, shares of that Person representing a majority of the voting power of all shares of that Person having the right to vote for the election of directors;

13.17.2 a merger or consolidation of that Person with any other Person, other than the following: (a) a merger or consolidation that would result in the voting securities of that Person outstanding immediately before that merger or consolidation continuing to represent (either by remaining outstanding or by being converted into voting securities of the surviving entity) more than half of the combined voting power of the voting securities of that Person or the surviving entity, as applicable, outstanding immediately after that merger or consolidation; (b) a merger or consolidation effected to implement a recapitalization (other than a redomiciliation of that Person); or (c) sale or other disposition by that Person of all or substantially all of that Person's assets or any transaction having a similar effect.

13.18 "**Combination Product**" means a product that is sold by JPI, its Affiliates or sublicensees in a finished dosage form containing a Licensed Product in combination with one or more other APIs.

13.19 "**Commercially Reasonable Efforts**" means, with respect to the efforts to be expended by a Party or its Affiliate in conducting any activity or achieving any objective in connection with an activity or objective under the Agreement, reasonable, good-faith efforts to conduct such activity or achieve such objective as such Party would normally devote to such activity or objective, based on all conditions then prevailing and taking into account all relevant commercial, scientific and technical factors, including: (a) issues of efficacy, safety, and expected and actual approved labeling; (b) the competitiveness of products sold by Third Parties in the marketplace; (c) the expected and actual product profile of a Licensed Product; (d) patent and other proprietary positions; (e) the likelihood of regulatory approval of a Licensed Product given the regulatory structure involved, including the likelihood of obtaining regulatory exclusivity; and (f) the expected and actual profitability and return on investment. To the extent that the performance of a Party hereunder is adversely affected by failure by the other Party to perform its obligations hereunder, the impact of such performance failure will be taken into account in determining whether Commercially Reasonable Efforts have been used.

13.20 "**Competitive Infringement**" means, with respect to an Arcturus Product-Specific Patent, another Arcturus Patent Right or a Joint Patent Right (as applicable), any infringement by a non-Party of such Patent Right that arises from registration, development, manufacture, use, sale, or importation of a compound or product that is, or is reasonably likely to be, competitive with a Licensed Compound or Licensed Product.

13.21 "**Control**" means, with respect to any Know-How, Patent Right, or other intellectual property right, the possession (whether by ownership or by exclusive or non-exclusive license) by a Party or any of its Controlled Affiliates of the ability to grant to the other Party, in accordance with this Agreement, access, ownership, a license, or a sublicense to that Know-How, Patent Right, or other intellectual property right without violating the terms of any agreement with a Third Party. If a Party has rights to any Know-How, Patent Right, or other intellectual property right

by virtue of a non-exclusive license granted to such Party that includes the right to grant sublicenses, and this Agreement specifies that an exclusive license is granted to the other Party under such Know-How, Patent Right, or other intellectual property right, then such right shall be deemed "Controlled" hereunder, and the license granted by such Party to the other Party hereunder, while non-exclusive with respect to non-Parties, shall be exclusive as to such Party (i.e., such Party shall not have the right to practice such right for any purpose within the scope of the exclusive license granted by such Party to the other Party), subject to any rights expressly retained or reserved by such Party in this Agreement.

13.22 "**Controlled Affiliate**" means, with respect to a Party, any corporation or other business entity that is controlled (as defined in Section 13.1) by such Party.

13.23 "**Covers**" or "**Covering**" means, with respect to a Patent Right, that making, using, selling, offering for sale, or importing a composition of matter or other material or practice of a claimed method would infringe a Valid Claim (or, if a Valid Claim has not issued, if a Valid Claim were to issue), within that Patent Right in the country in which that activity occurs.

13.24 "**Currency Hedge Rate**" means the weighted-average hedge rate of the outstanding external foreign-currency forward hedge under arm's-length contracts between Johnson & Johnson's Global Treasury Services Center and its Affiliates and banks.

13.25 "**Exploit**" means manufacture, use, sell, offer for sale, import, or otherwise exploit including have manufactured, have used, have sold, and have imported.

13.26 "**FDA**" means the U.S. Food and Drug Administration and any successor agency.

13.27 "**Field**" means all uses.

13.28 "**First Commercial Sale**" means, with respect to a Licensed Product, first sale by JPI in an arms-length transaction to a Third Party (other than a sublicensee) for use or consumption by the general public of that Licensed Product in a country after all required Regulatory Approvals for commercial sale of that Licensed Product have been obtained in that country. Licensed Product provided for: (a) clinical study purposes; (b) compassionate use; (c) similar uses by a limited number to support Licensed Product Regulatory Approvals (provided that the Licensed Product is not otherwise generally available for purchase in such country); and (d) early access programs; shall not constitute a First Commercial Sale. In addition, sales of a Licensed Product by and between JPI, its Affiliates and/or sublicensees, or between the Parties (or their respective Affiliates or Sublicensees), shall not constitute a First Commercial Sale.

13.29 "**FTE**" means a full-time employee or consultant, or more than one employee or consultant working the equivalent of a full-time employee or consultant, with "full-time" meaning […***…]* hours per Calendar Year.

13.30 "**FTE Rate**" means $[…***…] per FTE.

13.31 "**GLP**" means good laboratory practices in accordance with the then-current practices and procedures stated in Title 21, United States Code of Federal Regulations, Part 58, or any successor statute, any other regulations or guidelines relating to good laboratory practices, and any foreign equivalents in the country in which the studies or clinical trials in question are conducted.

13.32 "**Government Body**" means: (a) the government of a country or of a political subdivision of a country or supranational organization such as the EU; (b) an agency of any such government; (c) any other individual, entity, or organization authorized by law to perform any executive, legislative, judicial, regulatory, administrative, military, or police functions of any such government; or (d) an intergovernmental organization.

13.33 "**HBV NA Therapeutic**" means a NA Therapeutic targeting […***…]* of the Hepatitis B virus (HBV) genome.

13.34 "[**…***…**] NA Therapeutic**" means a NA Therapeutic targeting […***…] of the […***…].

13.35 "**IND**" means: (a) an investigational new drug application filed with the FDA for authorization to commence clinical studies; and (b) its equivalents in countries other than the United States.

13.36 "**Joint Know-How**" means Know-How that is conceived of or created jointly by employees, agents, or subcontractors of both Parties.

13.37 "**Joint Patent Right**" means any Patent Right that is conceived of or created jointly by employees, agents, or subcontractors of both Parties under this Agreement.

13.38 "**Joint Research Plan**" means the written plan specifying the research to be conducted during the Research Term (a) for HBV, set forth on the HBV Joint Research Plan attached hereto; and (b) for any Option Disease Area, following agreement between the Parties on the Research Program work for such Option Disease Area.

13.39 "**JPI Licensed Patent Rights**" means: (a) all Patent Rights (other than Joint Patent Rights) that JPI or any of its Controlled Affiliates Controls, other than through the grant of a license by Arcturus, that Cover Licensed Compounds or Licensed Products; and (b) JPI's interest in Joint Patent Rights.

13.40 "**Know How**" means all information not generally known to the public including screens, models, inventions, practices, methods, knowledge, know-how, skill, experience, test data including pharmacological, toxicological and clinical test data, analytical and quality control data, marketing, pricing, distribution, costs, sales, manufacturing data, manufacturing secrets and procedures, secret processes, reports, plans, designs, prototypes, test results, working drawings, methods including testing methods, formulas, recipes, material and performance specifications and current accumulated experience acquired as a result of

technical research or otherwise, and patent and legal data related to chemical, biological and other tangible materials.

13.41 "**Materials**" means any tangible chemical or biological materials, including any compounds, libraries, small molecules, DNA, RNA, clones, cells, and any expression product, progeny, derivative, or other improvement

13.42 "**NA Therapeutic**" or "**NA Therapeutics**" means therapeutic agents based on nucleic acids such as […***…]*. The term '[…***…]' used in this definition means the use of […***…]. For clarity, references to NA Therapeutics are references only to an HBV NA Therapeutic, provided that if an Option is exercised, shall also mean an […***…] NA Therapeutic or a Respiratory Disease Virus NA Therapeutic, as applicable following such Option exercise.

13.43 "**Net Sales**" means the gross amounts invoiced on sales of Licensed Products by JPI or any of its Affiliates or sublicensees to a Third Party purchaser in arm's-length transaction, less the following deductions, determined in accordance United States generally accepted accounting principles consistently applied ("U.S. GAAP") and its internal policies, and procedures and accounting standards, to the extent allocable to such Licensed Product under U.S. GAAP and actually taken, paid, accrued, allowed, included, or allocated based on estimates in the gross sales prices with respect to such sales:

(a) normal and customary trade, cash and quantity discounts, allowances, deductions, fees and credits, in the form of deductions actually allowed with respect to sales of such Licensed Product (to the extent not already reflected in the amount invoiced), excluding commissions for commercialization;

(b) excise taxes, use taxes, tariffs, sales taxes, and customs duties, and other governmental charges imposed on the sale of such Licensed Product to the extent separately itemized on the invoice (but specifically excluding, for clarity, any income taxes assessed against the income arising from such sale);

(c) outbound freight, shipment and insurance costs to the extent separately itemized on the invoice;

(d) compulsory payments and cash rebates related to the sales of such Licensed Products paid to a governmental authority (or agent thereof) pursuant to governmental regulations, including government levied fees as a result of healthcare reform policies;

(e) retroactive price reductions, credits or allowances for rejections or returns of such Licensed Products including for recalls, damaged goods and billing errors; and

(f) rebates, chargebacks, and discounts (or the equivalent thereof) to managed health care organizations, pharmacy benefit managers (or the equivalent thereof), federal, state, provincial, local or other governments, or their agencies or purchasers, reimbursers, or trade customers.

The foregoing deductions shall be based on the Johnson & Johnson group of companies' sales reporting system to the extent the same complies with applicable law. All such discounts, allowances, credits, rebates, and other deductions shall be fairly and equitably allocated between such Licensed Product and other products of JPI and its Affiliates and sublicensees such that such Product does not bear a disproportionate portion of such deductions. Sales of a Licensed Product by and between JPI and its Affiliates and sublicensees are not sales to Third Parties and shall be excluded from Net Sales calculations for all purposes; provided that any resale by the purchaser to a Third Party distributor or to a Third Party for end use, shall be included in Net Sales. Compassionate use, "named patient sales", sales made in connection with clinical trials, and product donations shall be excluded from Net Sales calculations for all purposes.

In the event a Licensed Product is sold in combination with other products by JPI, its Affiliates or sublicensees and the […***…]*, the Net Sales of such Licensed Product, for the purposes of determining royalty and sales-based milestone payments, shall be determined on a country by country basis by […***…]. In the event that […***…], then, for purposes of determining the royalty payments due in respect of such Licensed Product, the […***…]. …***…For the purpose of determining royalty and sales-based milestone payments payable on a Combination Product, Net Sales for such Combination Product will be calculated by […***…]. For clarity, the term "invoice price" on a unit basis refers to the Net Sales for a given Calendar Year divided by the total number of units of the Licensed Compound sold in that country during that same Calendar Year.

[…***…]

*****Confidential Treatment Requested**

[…***…]*.

13.44 "**Out-of-Pocket Expenses**" means expenses actually paid (with no mark-up) to any Third Party that is either: (a) not an Affiliate of a Party claiming such expenses; or (b) is an Affiliate of that Party where such payment is limited to reimbursing such Affiliate for expenses actually paid by such Affiliate to a Third Party that is not an Affiliate of the Party claiming such expenses.

13.45 "**Patent Right**" means:(a) a patent; (b) a pending patent application (including a provisional application, substitution, continuation, continuation-in-part, division, and renewal); (c) a patent-of-addition, reissue, reexamination, and extension or restoration by existing or future extension or restoration mechanisms (including supplementary protection certificate or the equivalent); (d) any other form of government-issued right substantially similar to any of the foregoing; and (e) all U.S. and foreign counterparts of any of the foregoing.

13.46 "**Person**" means an individual, an entity, and organization, or a Government Body.

13.47 **"Phase 1 Study"** means a human clinical trial which satisfies the requirements of 21 CFR §312.21(a).

13.48 "**Phase 2 Study**" means a human clinical trial which satisfies the requirements of 21 CFR §312.21(b).

13.49 "**Phase 3 Study**" means a human clinical trial which satisfies the requirements of 21 CFR §312.21(c).

13.50 "**Prosecution and Maintenance**" and "**Prosecute and Maintain**" refer to preparation, filing, prosecution, and maintenance of a Patent Right, as well as re-examinations, reissues, and the like with respect to that Patent Right, together with conduct of interferences, defense of oppositions, and other similar proceedings with respect to that Patent Right.

13.51 "**Regulatory Approval**" refers, with respect to a country or extranational territory, to obtaining all approvals (however referred to) necessary to distribute, sell, or market a product in that country or some or all of that extranational territory,

including all pricing and third-party reimbursement approvals, if any, required by one or more Government Bodies to receive governmental reimbursement in such country.

13.52 "**Research Term**" means the period in which Arcturus conducts the Research Program under this Agreement.

13.53 "**Respiratory Disease Virus**" means virus that causes one or more respiratory symptoms, including, without limitation, orthomyxo and paramyxo viruses.

13.54 "**Respiratory Disease Virus NA Therapeutic**" means NA Therapeutic targeting any region of the virus genome that causes one or more respiratory symptoms, including, without limitation, orthomyxo and paramyxo virus genomes.

13.55 "**Selected NA Therapeutic**" means (a) an NA Therapeutic that is on the Selected NA Therapeutics List delivered by JPI to Arcturus under Section 1.6 or (b) an NA Therapeutic that, after delivery of the Selected NA Therapeutics List, is deemed to be a "Selected NA Therapeutics" in accordance with Section 3.1 or 4.5.

13.56 "**Tax**" or "**Taxes**" means any present or future taxes, levies, imposts, duties, charges, assessments or fees of any nature (including any interest thereon).

13.57 "**Third Party**" means any entity other than the Parties and their respective Affiliates.

13.58 "**Valid Claim**" means the following with respect to a particular country:

13.58.1 a claim of an issued and unexpired patent in that country that: (a) has not been held permanently revoked, unenforceable, or invalid by a decision of a court or other Government Body of competent jurisdiction that is unappealable or has not been appealed within the time allowed for appeal; and (b) has not been abandoned, disclaimed, denied, or admitted to be invalid or unenforceable through reissue or disclaimer or otherwise in that country; and

13.58.2 a claim of a pending patent application that: (a) has been prosecuted and pending for […***…]* years or less from the earliest worldwide priority date; or (b) after pending for more than […***…] years from the priority date issues or grants as a patent within the scope of Section 13.58.1.

14 DISPUTE RESOLUTION

14.1 **Governing Law**. This Agreement, its interpretation, construction and performance, and the rights granted and obligations arising under it is governed by, and construed in accordance with, the laws of the state of New York, without giving effect to its principles of conflicts of law. The interpretation and construction of any Patent Rights or other intellectual property rights, and any disputes pertaining to the interpretation, construction, validity, enforceability or infringement of Patent Rights or other intellectual property rights (collectively, "**Patent Matters**"), is governed by the laws of the jurisdiction in which such Patent Rights

were filed or granted or such other intellectual property rights exist or are alleged to exist, as the case may be.

14.2 **Discussion by Senior Executives**. Either Party may submit to the President of Arcturus and the President of JPI or a designee of one or both of them a written account of an ongoing disagreement (excluding a Patent Matter) between the Parties. Those individuals or their designees must promptly meet and attempt to resolve the disagreement. As part of that process, those individuals may consult anyone they wish. If those individuals cannot resolve the disagreement in […***…]* days either Party may refer the matter to arbitration as described below.

14.3 Arbitration. Except as expressly provided in Section 14.6, in the event that resolution of a dispute (other than a Patent Matter) cannot be obtained through the process described in Section 14.2, as the exclusive means of initiating adversarial proceedings to resolve any dispute arising out of this Agreement, a party may demand that the dispute be resolved by arbitration administered by the International Institute for Conflict Prevention and Resolution for Non-Administered Arbitration in accordance with its rules, and each party hereby consents to any such dispute being so resolved. Judgment on any award rendered in any such arbitration may be entered in any court having jurisdiction. If Arcturus believes that JPI is in material breach of its obligations to use Commercially Reasonable Efforts, the matter will be exclusively resolved according to the procedure described in Section 14.4.

14.3.1 Any arbitration commenced in accordance with this Section 14.3 will be conducted by a single arbitrator agreed to by the Parties and selected within […***…] days after commencement of any arbitration in accordance with this Section 14.3. If they fail to do so, the Parties shall instruct the International Institute for Conflict Prevention and Resolution for Non-Administered Arbitration to select the arbitrator.

14.3.2 Any arbitration commenced in accordance with this Section 14.3 must be conducted in New York, New York. The arbitrator will, in rendering his or her decision, apply the substantive law of the state of New York, excluding its conflicts of laws principles.

14.3.3 The arbitrator's authority to award damages shall be subject to the limitation set forth in Section 10.3.3.

14.3.4 The award rendered by the arbitrator shall be confidential (except as necessary to enforce such award in a court of competent jurisdiction), final, binding and non-appealable.

14.4 **Procedures for a Dispute Involving JPI's CRE**. If Arcturus believes that JPI is in material breach of its obligations to use Commercially Reasonable Efforts to develop or commercialize a Licensed Product, it will send a written notice to JPI stating the same. Within […***…] days thereafter, Arcturus and JPI will meet and discuss an appropriate solution. Should the Parties be unable to agree on an appropriate solution within […***…] days after Arcturus' written notice to JPI, then, upon the written request of either Party, the matter will be referred to the Chief

*****Confidential Treatment Requested**

Executive Officer of Arcturus and the head of infectious disease research, development, and/or commercialization (as relevant) of JPI or its Affiliates for attempted resolution. If such executives are unable to resolve such matter within […***…]* days of such matter being referred to them, then Arcturus, upon written notice to JPI and CPR Institute for Dispute Resolution ("**CPR**"), the matter shall be subject to binding arbitration conducted pursuant to the CPR Global Rules for Accelerated Commercial Arbitration ("**CPR Accelerated Rules**"), except to the extent the CPR Accelerated Rules conflict with this Section 14.4, in which case this Section 14.4 shall control. The arbitration shall be conducted by a panel of three neutral, mutually agreed arbitrators with at least 10 years' experience in the life sciences industry and with appropriate expertise in the area in which the subject dispute arose; provided that if the Parties are unable to agree as to appropriate arbitrators, such arbitrators shall be appointed by CPR from its Health Care & Life Sciences Panel of Distinguished Neutrals or other Panel provided such arbitrators have the credentials referenced above. The expert arbitrators shall be impartial and independent of the Parties and shall abide by the Code of Ethics for Arbitrators in Commercial Disputes (available at http://www.adr.org/EthicsAndStandards). Each Party shall provide the arbitrators and the other Party with a written report setting forth its position with respect to the substance of the dispute within […***…] days after the Initial Conference (as defined by the CPR Accelerated Rules). Each Party may submit a revised report and position to the arbitrators within […***…] days of receiving the other Party's report. If so requested by the arbitrators, each Party shall make oral and/or other written submissions to the arbitrators in accordance with the CPR Accelerated Rules; provided that the other Party shall have the right to be present during any oral submissions. In any arbitration under this Section 14.4 the arbitrators and the Parties shall use their diligent efforts to resolve such dispute within […***…] days after the selection of the arbitrators. The arbitrators' ruling shall be final and binding upon the Parties. If the arbitrators determine that JPI has not met its CRE obligations set forth in this Agreement, Arcturus may terminate this Agreement upon […***…] days' written notice to JPI, unless JPI either: (a) has cured such breach prior to the end of such […***…]day period; or (b) prior to the end of such […***…]day period, has presented a reasonable written plan setting forth the specific actions JPI commits to undertake to meet its obligations, in which case Arcturus shall notify JPI in writing within […***…] days of Arcturus acceptance or non-acceptance of such plan. If Arcturus notifies JPI of its acceptance of such plan, JPI shall promptly undertake and diligently perform such plan. If Arcturus notifies JPI that Arcturus does not accept the plan, the Parties will submit the plan to an independent Third Party expert in the field of drug development and commercialization who is acceptable to both Parties (or, failing such mutual agreement, designated by the International Centre for Dispute Resolution located in New York City, NY). The sole authority of such expert will be to determine whether or not such plan is reasonable or shall propose changes so as to render it reasonable (*i.e.*, if performance of such plan would cause JPI to meet its CRE obligations), and such expert's determination shall be final and binding upon the Parties. The independent Third Party expert shall be required to make his or her

determination within […***…]* days after his or her selection as the independent Third Party expert. If the independent Third Party expert determines that such plan is not reasonable and cannot be amended to be reasonable or JPI does not adopt the expert's changes that would make the plan reasonable, Arcturus may terminate this Agreement upon […***…] days' written notice to JPI. In the case of any arbitration or expert determination pursuant to this Section 14.4, the Parties shall bear the fees and expenses of the arbitrators or independent expert (as applicable) equally.

Any arbitration commenced in accordance with this Section 14.4 must be conducted in New York, New York.

14.5 **No Implied Diligence Obligations**. Except as expressly provided in the Agreement, there shall be no obligations of diligence, either implied or construed, upon a Party.

14.6 **Court Actions**. Each Party has the right to seek injunctive or other equitable relief from a court of competent jurisdiction in the context of a *bona fide* emergency or prospective irreparable harm, and such an action may be filed and maintained notwithstanding any ongoing discussions between the Parties or any ongoing arbitration proceeding. In addition, either Party may bring an action in any court of competent jurisdiction to resolve Patent Matters, and no Patent Matter shall be subject to arbitration pursuant to Section 14.3.

15 MISCELLANEOUS

15.1 **Notices**. For a notice or other communication between the Parties under this Agreement to be valid, it must be in writing and delivered by hand or by a national transportation company (with all fees prepaid). A valid notice or other communication under this Agreement will be effective when received by the Party to which it is addressed, with any such notice or other communication sent to any non-Party specified in Section 15.1 as a Party's co-addressee constituting a courtesy copy that is not to be considered when determining when that Party received that notice. It will be deemed to have been received as follows:

15.1.1 if it is delivered by hand or delivered by a national transportation company, with all fees prepaid, upon receipt as indicated by the date on the signed receipt;

15.1.2 if it is delivered by email, when the Party to which the email is addressed, by notice in accordance with this Section 15.1 (but without any need for further acknowledgement), acknowledges having received that email, with an automatic "read receipt" not constituting acknowledgment of an email for purposes of this Section 15.1.2; or

15.1.3 if the Party to which it is addressed rejects or otherwise refuses to accept it, or if it cannot be delivered because of a change in address for which no notice was given, then upon that rejection, refusal, or inability to deliver.

*****Confidential Treatment Requested**

For a notice or other communication to a Party under this Agreement to be valid, it must be addressed using the information specified below for that Party or any other information specified by that Party in a notice in accordance with this Section 15.1.

To Arcturus:	Arcturus Therapeutics, Inc. 10628 Science Center Drive, Suite 200 San Diego, CA 92121 Attn: Chief Executive Officer
To JPI:	Janssen Pharmaceuticals, Inc. 1125 Trenton-Harbourton Road Titusville, NJ 08560
With copies to:	Chief Intellectual Property Counsel Office of General Counsel Johnson & Johnson One Johnson & Johnson Plaza New Brunswick, New Jersey 08933 United States of America
	Head Johnson & Johnson Innovation Center, California 99 El Camino Real Menlo Park, CA 94025

If a notice or other communication addressed to a Party is received after 5:00 p.m. on a business day at the location specified in the address for that Party, or on a day that is not a business day, then the notice will be deemed received at 9:00 a.m. on the next business day.

15.2 **Entire Agreement**. This Agreement constitutes the entire understanding between the Parties as to the subject matter of this Agreement and supersedes all other agreements, whether written or oral, between the Parties. For clarity, the Parties intend that the prior Research Collaboration and License Agreement dated May 29, 2015 be terminated in its entirety.

15.3 **Amendments**. No amendment to this Agreement will be effective unless it is in writing and signed by both Parties.

15.4 **No Assignment**. Neither Party may assign any of its rights or delegate any of its obligations under this Agreement without the prior written consent of the other Party, other than: (a) to an Affiliate, provided that the assigning Party shall remain liable and responsible to the non-assigning Party hereto for the performance and observance of all such duties and obligations by such Affiliate; or (b) in connection with the transfer or sale of all or substantially all of the business of such Party to which this Agreement relates to a Third Party ("**Third Party Acquirer**"), whether by merger, sale of stock, sale of assets or otherwise (each, a "**Sale Transaction**"), provided that in the event of a Sale Transaction (whether this Agreement is

actually assigned or is assumed by the Third Party Acquirer or the surviving corporation resulting from such Sale Transaction by operation of law (*e.g.*, in the context of a reverse triangular merger)): (i) intellectual property rights of the Third Party Acquirer that existed prior to the Sale Transaction shall not be included in the technology licensed hereunder or otherwise subject to this Agreement, and (ii) in the case of a Sale Transaction involving Arcturus in which the Third Party Acquirer has, later acquires or initiates a program with respect to HBV NA Therapeutics (and to the extent that Janssen has exercised an Option pursuant to Section 4.2, […***…]* NA Therapeutics or Respiratory Disease Virus NA Therapeutics, as applicable), the Third Party Acquiror (or the surviving corporation, as applicable) establishes reasonable internal safeguards designed to ensure that Arcturus Technology is not accessible to personnel of the Third Party Acquiror (or the surviving corporation, as applicable) who are engaged in the conduct of such program. The rights and obligations of the Parties under this Agreement shall be binding upon and inure to the benefit of the successors and permitted assigns of the Parties, and the name of a Party appearing herein shall be deemed to include the name of such Party's successors and permitted assigns to the extent necessary to carry out the intent of this Section 15.4. Any purported assignment not in accordance with this Section 15.4 will be void.

15.5 **Relationship of the Parties**. Both Parties are acting as independent contractors under this Agreement. The Parties do not intend that anything in this Agreement creates an employment, agency, joint venture, or partnership relationship between the Parties or any of their agents or employees. Neither Party has authority to enter into any contracts or incur liabilities on behalf of the other Party.

15.6 **No Non-Party Beneficiaries**. Except for the provisions of Article 11 with respect to Arcturus Indemnitees and JPI Indemnitees, and except as provided in Section 15.4 with respect to a Party's successors and permitted assigns, no provision of this Agreement grant rights to any Person other than a Party to this Agreement.

15.7 **Compliance with Laws**. In performing under this Agreement, each Party shall comply with all laws and generally recognized standards for good scientific conduct.

15.8 **No Presumption Against Drafting Party**. Each Party has had the opportunity to consult with counsel in connection with reviewing, drafting, and negotiating this Agreement. Accordingly, the Parties intend that the principle of construction that any ambiguity in a contract be construed against the drafting Party not apply.

15.9 **Waiver**. No waiver of any provision of this Agreement will be effective unless it is in writing and signed by the Party granting the waiver. No failure or delay in exercising any right or remedy under this Agreement operates as a waiver of that right or remedy. A waiver granted on one occasion will not operate as a waiver on future occasions.

15.10 **Severability**. The Parties intend as follows:

15.10.1 that if any provision of this Agreement is held to be unenforceable, then that provision will be modified to the minimum extent necessary to make it enforceable, unless that modification is not permitted by law, in which case that provision will be disregarded;

15.10.2 that if modifying or disregarding the unenforceable provision would result in failure of an essential purpose of this Agreement, either Party may terminate this Agreement upon written notice to the other Party; and

15.10.3 that if an unenforceable provision is modified or disregarded in accordance with this Section 15.10, then the rest of the Agreement will remain in effect as written.

15.10.4 **Force Majeure**. If a Force Majeure Event prevents a Party from complying with any one or more obligations under this Agreement, that inability to comply will not constitute breach if (a) that Party uses reasonable efforts to perform those obligations; and (b) that Party's inability to perform those obligations is not due to its failure to: (i) take reasonable measures to protect itself against events or circumstances of the same type as that Force Majeure Event; or (ii) develop and maintain a reasonable contingency plan to respond to events or circumstances of the same type as that Force Majeure Event. For purposes of this Agreement, "**Force Majeure Event**" means, with respect to a Party, any event or circumstance, whether or not foreseeable, that was not caused by that Party and any consequences of that event or circumstance. If a Force Majeure Event occurs, the noncomplying Party shall promptly notify the other Party of occurrence of that Force Majeure Event, its effect on performance, and how long the noncomplying Party expects it to last. Thereafter the noncomplying Party shall update that information as reasonably necessary. During a Force Majeure Event, the noncomplying Party shall use reasonable efforts to limit damages to the other Party and to resume its performance under this Agreement.

15.10.5 **Anti-Corruption Compliance**. Neither Party shall perform any actions that are prohibited by local and other anti-corruption laws (collectively "Anti-Corruption Laws") that may be applicable to one or both Parties to this Agreement. Without limiting the foregoing, neither Party shall make any payments, or offer or transfer anything of value, to any government official or government employee, to any political party official or candidate for political office or to any other third party related to the transaction in a manner that would violate Anti-Corruption Laws.

15.10.6 **Further Actions**. Each Party shall take all actions reasonably necessary to carry out the intent of the Parties in entering into this Agreement.

[SIGNATURE PAGE FOLLOWS]

The Parties are signing this Agreement on the Effective Date.

ARCTURUS THERAPEUTICS, INC.

By: /s/ Joseph E. Payne
Name: Joseph E. Payne
Title: President

JANSSEN PHARMACEUTICALS, INC.

By: /s/ Vanessa Broadhurst
Name: Vanessa Broadhurst
Title: President

Exhibits:

Johnson & Johnson Universal Calendar

Arcturus Patent Rights

Arcturus Press Release [NTD: ARCTURUS TO UPDATE]

Granted Rights

HBV Joint Research Plan

Exhibit

Johnson & Johnson Universal Calendar […***…]*

***Confidential Treatment Requested

Exhibit

Arcturus Patent Rights […***…]*

***Confidential Treatment Requested

[…***…]*

***Confidential Treatment Requested

[…***…]*

***Confidential Treatment Requested

[…***…]*

***Confidential Treatment Requested

[…***…]*

***Confidential Treatment Requested

[…***…]*

***Confidential Treatment Requested

Exhibit
Arcturus Press Release [TBD]

Arcturus Therapeutics Announces Strategic Collaboration with Johnson & Johnson Innovation to Discover and Develop RNA Medicines

Initial Focus on Hepatitis B, With Option to Expand to Additional Disease Areas

San Diego, Calif., October 19, 2017 – Arcturus Therapeutics, Inc., a leading RNA medicines company, announced today that it has entered into a research collaboration and worldwide license agreement with Janssen Pharmaceuticals, Inc. (Janssen), a Johnson & Johnson company. The two companies will work together to develop and commercialize nucleic acid-based drug products for the treatment of Hepatitis B, using Arcturus' UNA Oligomer chemistry and LUNARTM lipid-mediated delivery platform. The agreement also includes an option to expand into other infectious and respiratory diseases. The deal was facilitated by the Johnson & Johnson California Innovation Center.

Under the agreement, facilitated by J&J Innovation, Arcturus will receive an upfront cash payment, R&D support, and pre-clinical, development, and sales milestone payments, as well as royalty payments on any future licensed product sales. Janssen will assume responsibility for development costs and all commercialization costs associated with the program.

"This new partnership signifies an expanded relationship between Arcturus and Janssen," said Joseph Payne, President and CEO of Arcturus. "Arcturus' expertise and intellectual property in the field of RNA medicines is complemented by Janssen's broad capabilities in clinical development, regulatory affairs, and marketing. Together we aim to bring new treatments to patients who are suffering from Hepatitis B and potentially other infectious diseases."

About Arcturus Therapeutics, Inc.

Founded in 2013 and based in San Diego, Arcturus Therapeutics, Inc. is an RNA medicines company with enabling technologies — UNA Oligomer chemistry and LUNARTM lipid-mediated delivery. Arcturus's versatile RNA therapeutics platforms can be applied toward multiple types of RNA medicines including small interfering RNA, messenger RNA, antisense RNA, microRNA and gene editing therapeutics. The company owns LUNAR nanoparticle delivery and Unlocked Nucleomonomer Agent (UNA) technology including UNA Oligomers, which are covered by its patent portfolio (>110 patents and patent applications, issued in the U.S., Europe, Japan, China and other countries). Arcturus' proprietary UNA technology can be used to target individual genes in the human genome, as well as viral genes, and other species for therapeutic purposes. The company's commitment to the development of novel RNA therapeutics has led to partnerships with Ultragenyx Pharmaceutical, Inc., Takeda Pharmaceutical Inc., and Cystic Fibrosis Foundation Therapeutics Inc. For more information, visit www.ArcturusRx.com, the content of which is not incorporated herein by reference. On September 27, 2017, Arcturus and Alcobra Ltd. (Alcobra) (NASDAQ: ADHD) entered into an agreement and plan of merger and reorganization pursuant to which a wholly-owned subsidiary of Alcobra will merge with and into Arcturus, with Arcturus becoming a wholly-owned subsidiary of Alcobra and the surviving corporation of the merger, and the holders of Arcturus

outstanding capital stock immediately prior to the merger will receive ordinary shares representing approximately 60% of the outstanding shares of Alcobra. Upon consummation of the transaction, Alcobra's name will be changed to Arcturus Therapeutics, Ltd., and Alcobra will change its ticker symbol to ARCT on NASDAQ.

Forward-looking Statements

This press release contains "forward-looking statements" that involve substantial risks and uncertainties for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, included in this press release regarding strategy, future operations, prospects, plans and objectives of management are forward-looking statements. Examples of such statements include, but are not limited to, statements relating to whether the agreement will result in a successful collaboration or potential products; the structure, timing and completion of the proposed merger transaction; and the combined company's listing on NASDAQ after closing of the proposed merger. You should not place undue reliance on these forward-looking statements. Such statements are based on management's current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a result of many factors. Except as otherwise required by law, all parties disclaim any intention or obligation to update or revise any forward-looking statements, which speak only as of the date they were made, whether as a result of new information, future events or circumstances or otherwise.

Additional Information about the Proposed Merger involving Alcobra and Arcturus and Where to Find It

In connection with the previously disclosed proposed merger involving Alcobra and Arcturus, a proxy statement and a proxy card [will be][1] furnished to the Securities and Exchange Commission (SEC) and [will be] mailed to Alcobra's shareholders seeking any required shareholder approvals in connection with the proposed merger transactions. Before making any voting or investment decision, investors and shareholders are urged to read the proxy statement (including any amendments or supplements thereto) and any other relevant documents that Alcobra may furnish to or file with the SEC when they become available because they will contain important information about the proposed merger transactions.

This communication shall not constitute an offer to sell or the solicitation of an offer to sell or the solicitation of an offer to buy any securities, nor shall there be any sale of securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction.

[1] NTD: May change to past tense depending on timing of the proxy filing.

Contact

Arcturus Therapeutics
858-900-2660
info@arcturusRx.com

Andrew McDonald Ph.D.
LifeSci Advisors LLC
646-597-6979

Exhibit
Granted Rights
[…***…]*

***Confidential Treatment Requested

Exhibit
HBV Joint Research Plan (and associated budget)

HBV – Joint Research Plan

[…***…]*

*****Confidential Treatment Requested**

[…***…]*

***Confidential Treatment Requested

[…***…]*

*****Confidential Treatment Requested**

[…***…]*

***Confidential Treatment Requested

Exhibit 4.8

CONFIDENTIAL

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

RESEARCH AND EXCLUSIVE LICENSE AGREEMENT

This Research and Exclusive License Agreement ("***Agreement***") is entered into by and between Arcturus Therapeutics, Inc., a Delaware corporation ("***Arcturus***"), and Synthetic Genomics, Inc., a Delaware corporation ("***SGI***") and effective October 24, 2017 ("***Effective Date***"). SGI and Arcturus may each be referred to herein individually as a "***Party***" and collectively as the "***Parties***." In consideration of the mutual covenants and promises set forth in this Agreement, the Parties agree as follows:

1. Certain Definitions.

1.1 "***Acquisition***" shall mean a transaction or series of related transactions pursuant to which an entity directly or indirectly (a) obtains ownership of more than fifty percent (50%) of the voting securities of Arcturus, or (b) succeeds to substantially all the assets and business of Arcturus (whether via merger, sale of assets, or otherwise). "***Acquiring Organization***" shall mean the acquiring entity in an Acquisition, together with its controlled Affiliates (other than Arcturus and Arcturus's controlled Affiliates).

1.2 "***Arcturus Owned Program IP***" has the meaning given in Section 3.2.

1.3 "***Affiliate***" means, with respect to an entity, any entity which controls, is controlled by, or is under common control with such first entity, as of the Effective Date or anytime thereafter (but only so long as such control exists). For purposes of this Section 1.3 only, "control" and, with corresponding meanings, the terms "controlled by," "controlling," and "under common control with" means (a) the ownership, directly or indirectly, of fifty percent (50%) or more of the voting securities, participating profit interest, or other ownership interests of a legal entity, or (b) the possession, directly or indirectly, of the power to direct the management or policies of a legal entity, whether through the ownership of voting securities or by contract relating to voting rights or corporate governance.

1.4 "***Confidential Information***" has the meaning given in Section 7.1.

1.5 "***control***" means in relation to Intellectual Property, the ownership of such Intellectual Property or the ability to grant a sublicense to such Intellectual Property without accounting to any Third Party.

1.6 "***Expected Sublicense Milestone Fees***" for a Sublicense Agreement shall mean the sum of all amounts that, if paid, would constitute Sublicense Milestone Fees for such Sublicense Agreement.

1.7 ***"Expected Sublicense Royalties***" for a Sublicense Agreement means the value of Sublicense Royalties that SGI reasonably and in good faith expects to receive under such Sublicense Agreement (assuming the LUNAR Product licensed thereunder is launched commercially in each of the U.S., Great

Britain, France, Germany, Italy, Spain and Japan) after considering Intellectual Property protection, pricing and reimbursement, market size, and competition.

1.8 "***Field***" means all uses other than the diagnosis, prophylaxis and treatment of any respiratory disease viruses other than influenza (which is included in the Field).

1.9 "***Initial Research Plan***" means the first research plan for Arcturus to conduct research relating to LNP delivery as approved through the JSC pursuant to Section 2.5(d)(i) or Section 2.5(d)(ii), and upon such approval is hereby incorporated by reference into this Agreement.

1.10 "***Intellectual Property***" means inventions (whether patentable or not), discoveries, data, results, know-how, trade secrets and information of any type, and any and all intellectual property rights in and to any of the foregoing.

1.11 "***JSC***" has the meaning given in Section 2.5.

1.12 "***Licensed IP***" means all Intellectual Property that is both (a) related to LNP delivery, and (b) owned or controlled by Arcturus at any time during the Term; provided that Licensed IP shall not include any Intellectual Property of an Acquiring Organization that is both (i) not Arcturus Owned Program IP, and (ii) not Licensed IP at any time prior to the corresponding Acquisition. For clarity, Licensed IP includes, without limitation, any Arcturus Owned Program IP and the patents and patent applications listed in **Exhibit A** (and any divisionals, continuations, continuations-in-part, reissues, renewals, re-examinations, extensions, registrations, certificates of inventions thereof or foreign equivalents thereof or of any other patent application claiming priority thereto or resulting from a provisional to which any of the foregoing claims priority and any patents resulting from any of the foregoing).

1.13 "***LNP***" means lipid nanoparticles in any form, format, shape, size or composition.

1.14 ***"LUNAR Contemplated Research Agreement***" means a written agreement pursuant to which SGI or any of its Affiliates conducts research for a Third Party under a research plan that expressly contemplates significant research of a LUNAR Product. Notwithstanding the foregoing, such an agreement shall not be deemed a LUNAR Contemplated Research Agreement if, prior to the execution of such agreement both: (a) SGI or its Affiliates previously entered into an agreement with such Third Party to

research, develop, or license a Product; and (b) such agreement does not grant such Third Party a sublicense under the Licensed IP.

1.15 "***LUNAR Product***" means a Product that, absent the license granted in this Agreement, would infringe a Valid Claim of a patent or patent application within the Licensed IP when manufactured, used, or sold.

1.16 "***Non-LUNAR Product***" means a Product that is not a LUNAR Product.

1.17 "***Officers***" has the meaning given in Section 2.5(d)(ii).

1.18 "***Product***" means self-amplifying mRNA as part of a vaccine or therapeutic agent for use in humans or farm or companion animals.

1.19 "***Program IP***" means all Intellectual Property conceived or first reduced to practice by or for Arcturus in performance of any Research Plan.

1.20 "***Qualified Personnel***" shall mean such personnel that […***…]*reasonably deems appropriately qualified in the field of LNP delivery.

1.21 "***Quarterly FTE***" means a full-time equivalent person-quarter of Qualified Personnel based upon a total of four hundred fifty (450) working hours per calendar quarter.

1.22 "***Quarterly Report***" has the meaning given in Section 4.1.

***Confidential Treatment Requested**

1.23 "***Requested Quarterly FTE***" for a calendar quarter means the amount designated by […***…]* pursuant to Section 2.2. The initial Requested Quarterly FTE for the first calendar quarter shall be […***…] Quarterly FTE.

1.24 "***Research Data***" has the meaning given in Section 4.2.

1.25 "***Research Plan(s)***" means (a) the Initial Research Plan, as amended by the JSC from time to time, or (b) such other research plans for Arcturus to conduct research relating to LNP delivery and approved through the JSC pursuant to Section 2.5(d)(i) or Section 2.5(d)(ii).

1.26 "***SGI Related IP***" means Program IP that incorporates, is an improvement of or necessarily requires the use of any (a) patents and patent applications owned or, other than Licensed IP, licensed to SGI or its Affiliates (or any of the inventions claimed therein), or (b) Confidential Information of SGI.

1.27 "***Sublicense Agreement***" means an agreement pursuant to which SGI or its Affiliates grant a Third Party a sublicense under the Licensed IP to make, have made, use, import and sell a LUNAR Product.

1.28 "***Sublicense Income***" means (a) Sublicense Milestone Fees, (b) Sublicense Royalties and (c) Sublicense Upfront Fees, collectively.

1.29 "***Sublicense Milestone Fees***" shall mean all cash payments received by SGI or its Affiliates under a Sublicense Agreement for amounts due upon a LUNAR Product's achievement of certain development, regulatory or sales milestones as specified in such Sublicense Agreement. For clarity, Sublicense Milestone Fees exclude, without limitation, payments for equity or debt to the extent at or below fair market value and payments allocated to (and actually used for) research or development (including, without limitation, for advancements of research and development activities to be conducted by SGI's personnel).

1.30 "***Sublicense Royalties***" means all cash payments received by SGI or its Affiliates pursuant to a Sublicense Agreement as earned royalties paid by a Third Party with respect to commercial sales of LUNAR Products.

1.31 "***Sublicense Upfront Fees***" shall mean all upfront cash payments received by SGI or its Affiliates due upon execution of a Sublicense Agreement for the grant of a commercial license to make, use, and sell LUNAR Product(s). Sublicense Upfront Fees exclude, without limitation, payments for equity or debt to the extent at or below fair market value and payments allocated to (and actually used for) research or development (including, without limitation, for advancements of research and development activities to be conducted by SGI's personnel).

1.32 "***Sublicense Value***" of a Sublicense Agreement means the sum of the following for such Sublicense Agreement: (a) Sublicense Upfront Fees; (b) Expected Sublicense Milestone Fees; and (c) Expected Sublicense Royalties.

1.33 "***Term***" means the period commencing on the Effective Date and ending on termination of this Agreement.

1.34 "***Third Party***" means a person or entity other than Arcturus, SGI, or their Affiliates.

******Confidential Treatment Requested***

1.35 "***Valid Claim***" means a claim contained in: (a) an issued and unexpired patent which has not been held unenforceable or invalid by a decision of a court or other governmental agency of competent jurisdiction, unappealable or unappealed within the time allowed for appeal, and which has not been admitted to be invalid or unenforceable through abandonment, reissue, disclaimer or otherwise; or (b) a patent application that has not been irretrievably cancelled, withdrawn or abandoned and that has been pending for less than […***…]* years from the date of priority claimed by such pending patent application.

2. Research Plans.

2.1 Performance. All research and development under this Agreement shall be performed pursuant to Research Plans. Arcturus shall use commercially reasonable efforts to carry out each Research Plan. Without limiting the foregoing, for each calendar quarter, Arcturus shall dedicate the corresponding Requested Quarterly FTE to the extent necessary to perform each of the Research Plans. Arcturus shall have no obligations under this Section 2.1 for any calendar quarter in which the Requested Quarterly FTE is zero (0) Quarterly FTE.

2.2 Quarterly FTE Change. […***…] may designate the Requested Quarterly FTE for a calendar quarter by informing […***…] of such designation (a) in writing at least […***…] days prior to the commencement of such calendar quarter, or (b) at any meeting of the JSC prior to the commencement of such calendar quarter; provided that if […***…]'s designation deviates by more than plus/minus […***…] FTEs compared with the estimate set forth in the then current Research Plan, […***…] may reject the designation to the extent of the deviation. Unless so designated by […***…], the Requested Quarterly FTE for each calendar quarter shall be the Requested Quarterly FTE for the previous calendar quarter. Notwithstanding the foregoing, the Requested Quarterly FTE for a calendar quarter shall not exceed […***…] Quarterly FTE without […***…]'s written consent.

2.3 Qualified Personnel.

(a) Initial Qualified Personnel. At least […***…] business days (but no earlier than […***…] business days) prior to the commencement of each calendar quarter, […***…] shall provide […***…] with: (i) the qualifications of all Qualified Personnel designated to perform work under each Research Plan in such calendar quarter; and (ii) the estimated time […***…] expects each of such Qualified Personnel to dedicate to the performance of each Research Plan in such calendar quarter. […***…] shall as soon as practicable, but in any event within […***…] business days, thereafter notify […***…] if any such Qualified Personnel are not reasonably acceptable and the reasons therefor, and […***…] shall designate an alternative Qualified Personnel replacement reasonably acceptable to […***…] prior to initiation of the applicable work.

(b) Core Personnel. If a Research Plan designates certain personnel of […***…] as "Core Personnel" or the like, then such personnel must be assigned as Qualified Personnel for the applicable period of performance by such individuals of such Research Plan and, in each calendar quarter, to the extent not designated in the Research Plan, must dedicate a mutually agreed percent of time to performance of such Research Plan (to the extent the Research Plan requires such work). […***…] may otherwise change Qualified Personnel assigned to each Research Plan from calendar quarter to calendar quarter provided that it uses commercially reasonable efforts to maintain consistency in the Qualified Personnel assigned to each Research Plan. To the extent that any Core Personnel are not reasonably necessary to perform the Research Plan for a calendar quarter, […***…] shall have the right to notify […***…] and the Parties shall discuss in good faith the potential for reducing the available percentage of such Core Personnel availability for the

remainder of such calendar quarter, provided that any such reduction shall be subject to mutual agreement between the Parties.

(c) Replacement. […***…]* may, at any time, request the replacement of any […***…] personnel assigned to a Research Plan if such personnel are reasonably unacceptable to […***…], provided that […***…] shall specify in writing the reason for the replacement. […***…] shall as soon as practicable following the written request, remove such personnel from performance of such Research Plan and use commercially reasonable efforts to replace them with someone with qualifications reasonably acceptable to […***…] as soon as reasonably possible. For clarity, "commercially reasonable efforts" required in the foregoing sentence does not require that […***…] hire new personnel but does require that: (i) […***…] promptly identify potential alternatives from existing personnel with appropriate qualifications responsive to the concerns specified by […***…]; and (ii) in any event, […***…] continue to make progress on the Research Plan.

(d) No Employment Requirement. For clarity, nothing in this Section 2.3 shall be deemed to require […***…] to keep employing a certain individual or hire an individual with certain qualifications.

2.4 Costs and Expenses. Except as expressly set forth in Section 5.2, […***…] is responsible for all costs and expenses that […***…] incurs under or in connection with performing its obligations under the Research Plans and participation on the JSC.

2.5 Joint Steering Committee.

(a) Establishment. The Parties shall: (i) establish, within […***…] days of the Effective Date, a Joint Steering Committee ("***JSC***") which shall consist of […***…] members; and (ii) determine and approve the Initial Research Plan within […***…] days of the Effective Date. SGI and Arcturus shall each designate […***…] members with appropriate expertise. Each of SGI and Arcturus may replace any or all of its representatives on the JSC at any time upon written notice to the other Party. A Party may designate a substitute to temporarily attend and perform the functions of such Party's designee at any meeting of the JSC.

(b) Responsibilities. The JSC shall perform the following functions:

(i) determine and approve the Initial Research Plan;

(ii) coordinate the Parties' activities hereunder;

(iii) review whether there is a need to amend any Research Plan to meet the goals set forth therein; and

(iv) review and approve additional Research Plans.

(c) Meetings. The JSC shall meet at such times and at such locations as the JSC agrees (but at least once during each calendar quarter if requested by SGI), whether in-person or by telephone or video conference. The Parties shall endeavor to have the first meeting of the JSC within […***…] days after the Effective Date.

(d) Decision-Making.

(i) The JSC may make decisions with respect to any subject matter that is subject to the JSC's decision making authority set forth in Section 2.5(b) or as otherwise delegated to the JSC as set forth in this Agreement or by the Parties. Except as specified in Section 2.5(d)(ii), all decisions of the JSC shall be made

****Confidential Treatment Requested***

by consensus, with each Party having a single vote regardless of the number of the representatives of such Party.

(ii) With respect to any issue, if the JSC cannot reach consensus within […***…]* business days after the matter has been brought to the JSC's attention, then such issue shall be referred to the Chief Executive Officer of SGI and the Chief Executive Officer of Arcturus (collectively, the "***Officers***") for resolution. If the Officers are unable to reach consensus within […***…] days after the matter has been referred to them, the final decision on such disputed issue will reside with SGI with respect to all matters relating to a Research Plan or proposed Research Plan (including, without limitation, amending any Research Plan, approving any proposed Research Plan or determining the Initial Research Plan).

3. Licenses; Intellectual Property.

3.1 License. Arcturus hereby grants SGI and its Affiliates an exclusive, perpetual, irrevocable, worldwide, sublicensable (through multiple tiers) license, under the Licensed IP, solely to research, develop, make, have made, use, sell, offer for sale, distribute, promote, import or export Products (including, without limitation. LUNAR Products) in the Field.

3.2 Ownership of Program IP. Subject to the assignment of Program IP in accordance with this Section 3.2, ownership of Intellectual Property conceived or first reduced to practice pursuant this Agreement shall follow U.S. patent laws. Subject to the following sentence, Arcturus shall own all Program IP that both (a) is not SGI Related IP, and (b) would necessarily infringe at least one Valid Claim within the Licensed IP when made, used, or sold ("***Arcturus Owned Program IP***"). Each Party shall retain their ownership rights of any Arcturus Owned Program IP that is invented jointly by SGI and Arcturus (as determined under U.S. patent law); provided, however, that Arcturus shall own (and SGI hereby assigns) to Arcturus all LUNAR Product manufacturing process and process technology inventions within any Arcturus Owned Program IP that is jointly invented by Arcturus and SGI. SGI shall own and be assigned (and Arcturus hereby assigns to SGI) all Program IP other than Arcturus Owned Program IP. Each Party shall assist the other Party, at the expense of requiring assistance, in every reasonable way to evidence, record and perfect the ownership and assignments set forth in this Section 3.2 and to apply for, obtain recordation of, and enforce, maintain, and defend such assigned rights.

3.3 Reservation of Rights. Except for the licenses expressly granted pursuant this Agreement with respect to the Research Plan and Products, no right or license to use any of Arcturus Intellectual Property or Confidential Information is granted pursuant to this Agreement.

4. Research Results; Reports.

4.1 Research Reports. Within […***…] days after the close of each calendar quarter, Arcturus will provide SGI with a written report (a "***Quarterly Report***") that (a) summarizes in reasonable detail all significant accomplishments and research findings in performance of the Research Plans, and (b) reports the number of hours Arcturus's Qualified Personnel spent in performance of the Research Plans in such calendar quarter.

4.2 Access to Research Data. Arcturus shall maintain complete and accurate accounts, notes, reports and data relating to the performance of the Research Plans ("***Research Data***") in accordance with Arcturus' practices and policies involving data of a similar nature (but, in any event, no less stringent than practices and policies common in the biotechnology industry) and shall provide SGI with (and permit SGI to access during Arcturus's regular business hours and upon at least […***…] business days' notice) Research Data upon SGI's request. For clarity, Arcturus shall not be required to provide any Third Party Confidential

Information (as defined in Section 4.3) included in or as part of the records or preparation of such Research Data, provided that foregoing does not limit the disclosure of the completed Research Data.

4.3 Regulatory Related Data. To the extent available to Arcturus and requested by SGI, Arcturus shall provide SGI all LNP related data and information reasonably necessary or useful for obtaining any approval for marketing or any clinical activity with respect to any LUNAR Product. Notwithstanding the foregoing, this Section 4.3 does not require Arcturus to disclose any information to SGI in violation of any of its confidentiality obligations to a Third Party ("***Third Party Confidential Information***"). Arcturus shall provide the Third Party Confidential Information to any regulatory authority, institutional review board, or ethics committee to the extent requested by SGI and reasonably necessary or useful for obtaining any regulatory approval or clinical trial approval.

5. Financial Terms.

5.1 Upfront Payment. SGI shall pay Arcturus […***…]*.

5.2 FTE Consideration. Together with (or within […***…] days after) delivery of each Quarterly Report pursuant to Section 4.1, Arcturus shall invoice SGI for an amount equal to the product of […***…] dollars ($[…***…]) multiplied by the lesser of (a) the amount of actual Quarterly FTE reported in the Quarterly Report for such calendar quarter, and (b) the Requested Quarterly FTE for such calendar quarter. SGI shall pay such invoice within […***…] days after receipt.

5.3 Sublicensee Consideration.

(a) Within […***…] days after the close of each calendar quarter, SGI shall: (i) provide Arcturus with a report of all Sublicense Income received by SGI and its Affiliates during such calendar quarter; and (ii) pay Arcturus […***…] percent ([…***…]%) of such Sublicense Income. For clarity, this is the sole consideration payable to Arcturus with respect to a sublicensee's manufacture, use, or sale of a Product.

(b) On a LUNAR Product-by-LUNAR Product basis, SGI shall be entitled to deduct from the payments pursuant to Section 5.3(a) […***…] percent ([…***…]%) of all amounts paid to Third Parties to obtain the right to practice any Intellectual Property used to develop or necessary to make, use, or sell all or a part of such LUNAR Product licensed by SGI or its Affiliates, provided, that such deductions shall not reduce the aggregate amount paid to Arcturus pursuant to Section 5.3(a) for any calendar quarter by more than fifty (50%) percent with respect to that specific LUNAR Product. For the purposes of this Section 5.3(b), the full amount of each Sublicense Milestone Fee and Sublicense Upfront Fee under a Sublicense Agreement shall be deemed specific to each LUNAR Product licensed under such Sublicense Agreement.

5.4 Consideration for LUNAR Contemplated Research Agreements. If SGI or any of its Affiliates enters into a LUNAR Contemplated Research Agreement with a Third Party, does not develop a LUNAR Product with such Third Party, and subsequently licenses Non-LUNAR Products to and develops Non-LUNAR Products with such Third Party, then SGI shall notify Arcturus upon entry into such Third Party agreement, and pay Arcturus […***…] percent ([…***…]%) of all Sublicense Income received from such Third Party for such Non-LUNAR Product(s) as if such Non-LUNAR Product(s) were LUNAR Product(s) (subject to the deductions set forth in Section 5.3(b) as applied to such Non-LUNAR Product(s)). Notwithstanding the foregoing, SGI shall have no obligation to pay: (a) any amounts pursuant to this Section 5.4 with respect to Sublicense Upfront Fees of such LUNAR Contemplated Research Agreement for which SGI makes payment pursuant to Section 5.3(a); or (b) more than […***…] dollars ($[…***…]) in the aggregate (inclusive of all Third Party licensees/sublicensees and all Products)

***Confidential Treatment Requested**

pursuant to this Section 5.4, prior to any offset pursuant to Section 5.1 or Section 6.4. For all purposes of clause (b) of the foregoing sentence, all Sublicense Upfront Fees paid to Arcturus pursuant to Section 5.3 for a LUNAR Contemplated Research Agreement shall be deemed payments pursuant to this Section 5.4. SGI will use commercially reasonable efforts to obtain the right to provide Arcturus with a copy of any LUNAR Contemplated Research Agreement it enters into with a Third Party. If SGI obtains such right, SGI shall use provide Arcturus a copy of such LUNAR Contemplated Research solely for purposes of verification. Any copy provided by SGI shall be deemed the Confidential Information of SGI.

The Parties acknowledge that the exclusive license granted to SGI under this Agreement may enable SGI to induce Third Parties to enter into self-amplifying mRNA related collaborations with SGI or its Affiliates that such Third Parties would not otherwise enter into, regardless of whether a LUNAR Product is eventually commercialized pursuant to such collaborations. The payments in this Section 5.4 are intended to compensate Arcturus for the value this enablement provides. For clarity, to the extent a LUNAR Product is sublicensed or commercialized, then the provisions of Section 5.3 shall apply.

5.5 SGI Direct Commercialization of a LUNAR Product. To the extent SGI or its Affiliates desire to sell LUNAR Products for which SGI or its Affiliates obtaining Marketing Approval (as defined below), then, prior to the first commercial sale of such LUNAR Product, the Parties shall negotiate in good faith […***…]* within […***…] after SGI informs Arcturus of such intent to sell LUNAR products. For clarity, "first commercial sale" of a LUNAR Product means SGI or its Affiliates first shipment of commercial quantities of such LUNAR Product sold by SGI or its Affiliates to a Third Party for use in a country after receipt of final approval by the applicable government authority to market such product for human or animal use in such country (e.g. NDA approval) ("***Marketing Approval***"). For clarity, Section 5.3 continues to apply (and this Section 5.5 does not apply) to a Future SGI Affiliate's commercialization of any LUNAR Product if such Future SGI Affiliate (as defined below) is sublicensed to commercialize such LUNAR Product under a Sublicense Agreement entered into prior to the date such Future SGI Affiliate becomes an Affiliate of SGI. "***Future SGI Affiliate***" means an entity that becomes an Affiliate of SGI after the Effective Date. Notwithstanding any other provisions of
this Agreement, this Section 5.5 shall terminate in the event of an Acquisition of SGI or any Affiliate of SGI with rights to the Licensed IP pursuant to this Agreement.

5.6 Records.

(a) Maintenance. SGI shall keep complete and accurate books and records pertaining to Sublicense Income it receives for a period of at least […***…] years after the relevant receipt thereof.

(b) Records Examination. SGI shall permit its books and records relating to any amounts payable under this Agreement to be examined by an independent accounting firm appointed by Arcturus on a non-contingency fee basis and reasonably acceptable to SGI, upon reasonable notice during normal business hours, provided such examination is requested in writing at least […***…] days in advance. Such examination is to be made at the expense of Arcturus, except in the event that the results of the examination reveal an underpayment by SGI of […***…] percent ([…***…]%) or more over the period being examined, in which case the costs and expenses of such examination shall be paid (or reimbursed to Arcturus, if such amounts have already been paid) by SGI. The results of any such examination shall be SGI's Confidential Information. Arcturus may not conduct such audits more than […***…] in any twelve (12) month period.

5.7 Method of Payment. All payments due to Arcturus under this Agreement shall be paid in United States Dollars by wire transfer to a bank in the U.S. designated in writing by Arcturus. All references to

"dollars" or "$" herein shall refer to United States Dollars. Any payment that is not paid on or before the date such payment is due hereunder shall bear interest at a rate equal to the Citibank, N.A. prime rate plus […***…]* percent ([…***…]%).

5.8 Payment of Taxes. To the extent a Party is required by applicable laws to deduct and withhold taxes on any payment to the other Party, the withholding Party shall promptly notify the other Party. The recipient Party shall provide the withholding Party any tax forms that may be reasonably necessary in order for the withholding Party not to withhold tax or to withhold tax at a reduced rate under an applicable bilateral income tax treaty. The recipient Party shall use reasonable efforts to provide any such tax forms to the other Party in advance of the due date. After making reasonable effort to obtain the lowest tax rate, the withholding Party shall have the right to: (i) deduct those taxes from the payment; (ii) pay the taxes to the proper taxing authority in a timely manner; and (iii) send evidence of the obligation together with proof of payment to the recipient Party within […***…] business days following that payment. Each Party shall also provide the other Party with reasonable assistance to enable the recovery, as permitted by applicable laws, of withholding taxes or similar obligations resulting from payments made under this Agreement, such recovery to be for the benefit of the recipient Party as the Party bearing such withholding tax under this Section 5.8.

5.9 Invoice. Each invoice sent pursuant to this Section 5 shall be addressed to […***…] with a copy to […***…] (or such other email addresses as requested by SGI from time to time).

6. Diligence.

6.1 24-Month Milestone. Prior to the second (2nd) anniversary of the Effective Date, SGI or any of its Affiliates shall enter into a Sublicense Agreement with a Sublicense Value of at least […***…] dollars ($[…***…]).

6.2 36-Month Milestone. Prior to the third (3rd) anniversary of the Effective Date, SGI or any of its Affiliates shall enter into a Sublicense Agreement with a Sublicense Value of at least […***…] dollars ($[…***…]). Subject to Section 6.3, SGI shall have no obligation under this Section 6.2 if it has failed to meet its obligations under Section 6.1. For clarity, a Sublicense Agreement that satisfies the milestone in this Section 6.2 will also be deemed to satisfy the milestone in Section 6.1 if entered into prior to the second (2nd) anniversary of the Effective Date.

6.3 Failure to Meet Milestones. SGI shall notify Arcturus promptly after failing to meet a milestone set forth in Section 6.1 or 6.2 ("***Milestone Failure***") and SGI shall thereupon irrevocably elect in writing within […***…] business days of the Milestone Failure to either: (a) have SGI pay Arcturus the additional amounts set forth in Section 6.4 below to maintain exclusivity of the license in Section 3.1; (b) convert the license in Section 3.1 to a non-exclusive license (a "***Non-Exclusive Election***"); or (c) terminate the Agreement effective as of […***…] days after such election. SGI's failure to so notify Arcturus within […***…] business days after Milestone Failure shall be deemed a Non-Exclusive Election.

6.4 Election to Maintain Exclusivity. If SGI makes the election set forth in Section 6.3(a) above, then SGI shall promptly pay Arcturus an annual exclusivity maintenance fee within […***…] days after: (a) the date of Milestone Failure; and (b) each subsequent anniversary of Milestone Failure prior to SGI entering into a Sublicense Agreement with a Sublicense Value of at least […***…] dollars ($[…***…]). The annual maintenance fee for the first payment pursuant to this Section 6.4 shall be […***…] dollars ($[…***…]). Each subsequent annual maintenance fee shall be an amount equal to the previous annual maintenance fee plus […***…]% thereof (e.g. $[…***…] for the second maintenance fee, $[…***…] for the third maintenance fee, etc.). For clarity, SGI shall have no further payment

*****Confidential Treatment Requested**

obligations under this Section 6.4 (and the license in Section 3.1 shall remain exclusive) after SGI enters into a Sublicense Agreement with a Sublicense Value of at least […***…]* dollars ($[…***…]). […***…].

6.5 Non-Exclusive Election. If SGI makes (or, pursuant to Section 6.3 or 6.4, is deemed to have made) a Non-Exclusive Election, then the license in Section 3.1 shall become non-exclusive.

6.6 Exclusive Remedies. Section 6 sets forth Arcturus's sole and exclusive remedies and SGI's sole and exclusive liability for any breach of this Section 6 (but not any breach by SGI of any other provisions of this Agreement). For clarity, Arcturus may neither terminate this Agreement nor seek any damages against SGI for any breach of this Section 6.

7. Confidentiality.

7.1 Definition. "***Confidential Information***" means proprietary information, materials, and data of a financial, commercial or technical nature that the disclosing Party (the "***Disclosing Party***") has supplied or otherwise made available to the other Party hereunder (the "***Receiving Party***"). Notwithstanding the foregoing: (a) all Research Data shall be deemed the Confidential Information of SGI only; (b) all Arcturus Owned Program IP shall be deemed the Confidential Information of Arcturus only; and (c) all Program IP (other than Arcturus Owned Program IP) shall be deemed the Confidential Information of SGI only. For clarity, Confidential Information includes only the information shared by the Parties pursuant to this Agreement, which Confidential Information shall not be governed by that certain Mutual Nondisclosure Agreement between Arcturus and Synthetic Genomics Vaccines, Inc., effective October 13, 2016, which shall remain in full force and effect.

7.2 Obligations. The Receiving Party shall protect all Confidential Information against unauthorized disclosure to third parties with the same degree of care as the Receiving Party uses for its own similar information, but in no event less than a reasonable degree of care. The Receiving Party shall not use the Confidential Information except as necessary to exercise its rights and fulfill its obligations under this Agreement. The Receiving Party may disclose the Confidential Information only to its respective Affiliates, directors, officers, employees, subcontractors, licensees, consultants, attorneys, accountants, and banks (collectively, "***Recipients***"), who have a need-to-know such information in order for Receiving Party or its Affiliates to exercise their rights or fulfill their obligations under this Agreement, provided that such Recipients are bound by confidentiality and non-use obligations at least as protective of the Confidential Information as those set forth in this Agreement. Receiving Party shall be liable for any act or omission of any Recipient that would be a breach of this Section 7 if committed or omitted by Receiving Party. The terms and conditions of this Agreement shall be deemed the Confidential Information of each Party.

7.3 Exceptions. The obligations under this Section 7 shall not apply to any information to the extent the Receiving Party can demonstrate that such information:

(a) is (at the time of disclosure) or becomes (after the time of disclosure) generally known to the public through no breach of this Agreement by the Receiving Party or any Recipients to whom it disclosed such information;

(b) was rightfully known by, or was otherwise in the rightful possession of, the Receiving Party prior to the time of disclosure by the Disclosing Party;

(c) is disclosed to the Receiving Party on a non-confidential basis by a Third Party who is entitled to disclose it without breaching any confidentiality obligation (directly or indirectly) to the Disclosing Party; or

(d) is independently developed by or on behalf of the Receiving Party, as evidenced by its written records, without use of, reliance upon or access to the Confidential Information.

7.4 Permitted Disclosures and Use.

(a) Sublicensee; Collaborators. SGI may disclose Arcturus's Confidential Information: (i) to Third Parties in connection with any sublicense (or potential sublicense) of the Licensed IP or a LUNAR Contemplated Research Agreement (or potential agreement therefor), in each case, provided that such Third Party agrees to confidentiality terms substantially similar to those set forth herein with respect to such Confidential Information and such disclosure is solely to the extent reasonably necessary or useful for the purposes of any such sublicense; or (ii) regulatory authorities, institutional review boards, or ethics committees to the extent reasonably necessary or useful for obtaining any regulatory approval or clinical trial approval, provided that SGI will use reasonable efforts to request confidential treatment with respect thereto.

(b) Research Data. Arcturus may use (but may not disclose) the Research Data for its own internal research purposes.

(c) Disclosure of Terms. Each Party may disclose the terms of this Agreement to its potential investors and acquirers on a confidential basis in connection with a potential investment or acquisition (as applicable). In addition, either Party may disclose may disclose the terms of this Agreement to its potential licensees or sublicensees on a confidential basis as reasonably necessary in connection with a potential license; provided that SGI shall have a pre-approval right, not to be unreasonably withheld, with respect to any proposed disclosure of the terms of this Agreement by Arcturus to any potential licensees or sublicensees. SGI's decision not to approve such disclosure to an entity that SGI in good faith believes is, or reasonably may be, competitive with respect to the Products shall not be deemed unreasonable.

(d) Disclosure Pursuant to Law or Order. Receiving Party may disclose Confidential Information that it is required to disclose under applicable laws or a court order, provided that the Receiving Party: (i) provides the Disclosing Party with prompt notice of such disclosure requirement if legally permitted; (ii) affords the Disclosing Party an opportunity to oppose or limit, or secure confidential treatment for such required disclosure and reasonably cooperates with the Disclosing Party's opposition or limitation efforts, as the case may be; and (iii) if the Disclosing Party is unsuccessful in its efforts pursuant to subsection (ii),

discloses only that portion of the Confidential Information that the Receiving Party is legally required to disclose.

(e) Publicity. The Parties agree that they will mutually agree in good faith upon a press release announcing the execution of this Agreement within […***…]* business days of the Effective Date.

7.5 Use of Name. Neither Party shall use the name of the other Party in relation to this Agreement in any public announcement, press release or other public document without the written consent of the

*****Confidential Treatment Requested**

other Party; provided, however, that either Party may use the name of the other Party to the extent reasonably required in any document filed with the FDA or SEC (or similar authorities).

8. Representations and Warranties; Disclaimer.

8.1 Mutual Representations and Warranties. Each Party represents and warrants to the other that:

(a) it has the requisite corporate power and authority to enter into and to deliver this Agreement, to grant the rights and licenses under this Agreement and to perform its obligations under this Agreement;

(b) this Agreement constitutes its legal, valid and binding obligations, enforceable against it in accordance with its terms;

(c) entry into this Agreement does not conflict with or is inconsistent in any material respect with the terms of any existing agreement with a Third Party;

(d) to the knowledge of such Party the research and development of a LUNAR Product as contemplated under this Agreement does not infringe or misappropriate any Intellectual Property owned by any Third Party;

(e) to the knowledge of such Party the Licensed IP does not misappropriate any Intellectual Property owned by any Third Party;

(f) there are no claims, judgments or settlements against or owed by such Party (or any of its Affiliates) and no pending claims or litigation, or the knowledge of such Party, threatened claims or litigation, with respect to any Intellectual Property licensed pursuant to this Agreement;

(g) none of the employees or consultants that a Party assigns to any Research Plan has, at the time of such assignment, been debarred by the FDA (or similar action by any similar foreign authority), or subject to any FDA debarment investigation or proceeding (or similar proceeding by any similar foreign authority) for any reason; and

(h) the execution, delivery and performance of this Agreement by it (i) has been duly authorized by all necessary action on its part and on the part of its board of directors, or board of managers as

applicable, and (ii) shall not conflict with, or result in a violation of, its certificate of incorporation, bylaws or other equivalent organizational or institutional documents.

8.2 Representations and Warranties of Arcturus. Arcturus represents and warrants to SGI that:

(a) **Exhibit A** sets forth a complete and accurate list of all patents and patent applications that are both (i) relevant to LNP delivery, and (ii) owned or controlled by Arcturus as of the Effective Date;

(b) Arcturus has not assigned, transferred, conveyed or otherwise encumbered its right, title and interest in the Licensed IP in a manner that conflicts with any rights granted to SGI; and

(c) Arcturus's employees who are assigned to work on any Research Plan have signed Intellectual Property assignment agreements and non-disclosure agreements with obligations consistent with those contained in this Agreement.

8.3 Disclaimer. EXCEPT AS EXPRESSLY STATED IN THIS SECTION 8, (A) NEITHER PARTY MAKES ANY REPRESENTATIONS OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, AND THE LICENSED IP IS PROVIDED "AS IS," AND (B) EACH PARTY DISCLAIMS ANY AND ALL WARRANTIES OF ANY KIND OR NATURE, WHETHER EXPRESS OR IMPLIED, RELATING TO THE SUBJECT MATTER HEREUNDER, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT.

9. Patents.

9.1 Prosecution. Arcturus shall control the prosecution, filing and maintenance of all patents and patent applications within the Licensed IP (including, without limitation, the Arcturus Owned Program IP). Arcturus shall provide SGI with reasonably complete drafts of all material submissions to patent authorities relating to the Licensed IP, including, without limitation, patent applications and amendments, and to give SGI a reasonable opportunity (but no less than […***…]* days) to comment on such documents with respect to specific LUNAR Products prior to their filing. Arcturus shall not unreasonably refuse to accept SGI's suggestions and advice with respect to such documents.

9.2 Standby Prosecution Rights. Arcturus shall promptly notify SGI if Arcturus determines (a) not to file a patent application on any material invention within the Arcturus Owned Program IP, or (b) to abandon any patent or patent application within the Licensed IP specific to LUNAR Products. In any event, Arcturus shall provide such notification at least […***…] days prior to the deadline for filing or the date on which such abandonment, as the case may be, would become effective. Upon such notification, SGI shall have the right, at its option, to control the preparing, filing, prosecuting and maintenance of such patent or patent applications, as well as re-examinations, reissues and requests for patent term extensions and the like with respect to such patent or patent application, together with the conduct of interferences, the defense of oppositions and other similar proceedings with respect to any such patent or patent application. For clarity, to "abandon" a patent or patent application shall include deciding not to defend against an opposition, not to defend an interference or similar proceeding or not to pursue an appeal of an adverse decision, in each case, with respect to such patent or patent application.

9.3 Infringement.

(a) SGI Right to Prosecute. So long as SGI remains the exclusive licensee of the Licensed IP with respect to any LUNAR Products, SGI, to the extent permitted by law, shall have the right, under its own control and at its own expense, to prosecute any Third Party infringement of the Licensed IP with respect

to any LUNAR Products, provided that SGI shall consult with Arcturus and shall consider the views of Arcturus regarding the advisability of the proposed action on the proposed strategy with respect prosecution of any Third Party infringement of the Licensed IP with respect to LUNAR Products. If required by law, Arcturus shall permit any such action to be brought in its name, including being joined as a party-plaintiff at SGI's cost and expense.

(b) Arcturus Right to Prosecute. In the event that SGI is unsuccessful in persuading the alleged infringer to desist or fails to have initiated an infringement action within […***…]* days after SGI first becomes aware of the basis for such action, and in the event Arcturus desires to prosecute such infringement, it shall so notify SGI. During the […***…] day period following receipt of such notice by SGI, Arcturus shall consult with SGI and shall consider the views of SGI regarding the advisability of the proposed action. Arcturus agrees that it shall not commence any such action if SGI either commits to initiating an infringement action within […***…] days or demonstrates a reasonable concern that bringing such action may adversely affect a LUNAR Product. If SGI fails to prosecute such infringement or make such commitment or demonstration within this […***…] day period, Arcturus shall have the right, at its sole discretion, to prosecute such infringement under its sole control and at its sole expense.

(c) Declaratory Judgment Actions. If a declaratory judgment action is brought naming either Party as a defendant and alleging invalidity or unenforceability of any of any patent or patent application with the Licensed IP, the Party first having notice of the claim or assertion shall promptly notify the other Party, and the Parties shall promptly confer to consider the claim or assertion and the appropriate course of action. Each Party shall have the right to defend itself against a suit that names it as a defendant. If Arcturus is named in such legal action but not SGI, then SGI shall have the right to join, at its own expense, any such legal action and to be represented in such action by its own counsel.

(d) Settlements. Neither Party shall enter into any settlement of any claim described in this Section 9.3 that admits to the invalidity, narrowing of scope or unenforceability of any patent applications or patents within the Licensed IP or this Agreement, incurs any financial liability on the part of any other Party, or requires an admission of liability, wrongdoing or fault on the part of the other Party without such other Party's prior written consent, not to be unreasonably withheld.

(e) Recovery. Any recovery obtained in claims brought by either Party under Sections 9.3(a) or 9.3(b) shall be distributed as follows: (a) each Party shall be reimbursed for any costs and expenses incurred in the action (including the amount deducted from payment to Arcturus pursuant to Section 9.3(d)); (b) as to any remaining amounts attributable to ordinary damages, the Party bringing the action shall receive all such amounts, provided that any such damages that are not punitive or exemplary damages received by SGI shall be deemed Sublicense Income and subject to payment to Arcturus pursuant to Section 5.3; and (c) as to any remaining amounts attributable punitive or exemplary damages, the Party bringing the action shall

be entitled to seventy five percent (75%) of the award and the other Party shall be entitled to twenty five percent (25%) of the award.

(f) Cooperation. Each Party agrees to cooperate in any action under this Section 9 that is controlled by the other Party, provided that the controlling Party reimburses the cooperating Party promptly for any costs and expenses incurred by the cooperating Party in connection with providing such assistance.

10. Term and Termination.

10.1 Term.

(a) Unless earlier terminated pursuant to this Section 10.1, this Agreement shall continue in full force and effect until the expiration, abandonment, or termination of the last Valid Claim of a patent within the Licensed IP (the "Term").

(b) The Agreement shall terminate on the seventh (7th) anniversary of the Effective Date if both: (i) SGI makes (or pursuant to Section 6.3 or 6.4 is deemed to have made) a Non-Exclusive Election; and (ii) neither SGI nor any sublicensee of SGI has commenced a GLP toxicology study for at least one (1) LUNAR Product (A) in rodents by the fifth (5th) anniversary of the Effective Date, or (B) in non-human primates by the sixth (6th) anniversary of the Effective Date. If the Term terminates pursuant to this Section 10.1(b) then either Party may notify the other Party that it desires to extend the Term and, upon the other Party's receipt of such notification, the Parties shall meet for a period not to exceed thirty (30) days to discuss the potential for a mutually agreed extension of the Term.

(c) SGI Termination for Convenience. SGI may terminate this Agreement at any time upon ninety (90) days prior written notice to Arcturus.

(d) Termination for Breach. Either Party may terminate this Agreement upon a material uncured breach of this Agreement by the other Party by providing sixty (60) days prior written notice to the other Party. The termination shall become effective at the end of the notice period unless the breaching Party cures such breach during such notice period.

10.2 Effect of Termination. Upon termination or expiration of this Agreement, payment obligations that accrued prior to termination and the following provisions shall survive termination or expiration of this Agreement: Sections 1, 3.2, 4 (for a period of ninety (90) days following termination), 5.3 (but only with respect to sublicenses granted prior to such termination or expiration and then only if the sublicensee is not required to make payments directly to Arcturus as provided in clause (a) of the next sentence of this Section 10.2), 5.4 (with respect to LUNAR Contemplated Research Agreements entered into prior to termination), 5.6, 5.7, 5.8, 7, 8.3, 10.2, 11 and 12. Notwithstanding the foregoing, each sublicense granted by SGI prior to the termination of this Agreement shall: (a) if such termination is pursuant to Section 10.1(c) or 10.1(d) for SGI's material breach, survive but be assumed by Arcturus as if Arcturus granted the sublicensed rights directly to the sublicensee, provided that such sublicensee (i) agree to directly pay Arcturus the amounts Arcturus would receive pursuant to Section 5.3 for Sublicense Income that becomes payable to SGI after the date of termination, rather than paying such portion of Sublicense Income to SGI, and (ii) agree to grant Arcturus the same audit rights that such sublicensee grants to SGI; or (b) if such termination is for any other reason, such sublicense shall survive, provided that SGI or its designee makes the corresponding payments pursuant to Section 5.3 when due. For clarity, neither the amounts paid or payable by a sublicensee to Arcturus pursuant to clause 10.2(a)(i) nor the corresponding amounts paid or payable by a sublicensee to SGI shall be deemed Sublicense Income. Additionally, Section 3.1 shall survive expiration (but not

termination) of this Agreement solely with respect to Licensed IP in existence as of the date of expiration of this Agreement.

11. Limitation of Liability. Except for a breach of Section 3.1 or Section 7, neither Party nor its directors, officers, employees, consultants or agents, shall be responsible or liable for a breach of this Agreement for any indirect, special, punitive, incidental or consequential damages regardless of legal theory.

12. General Provisions.

12.1 Relationship of the Parties. The Parties recognize and agree that each is operating as an independent contractor and not as an agent of the other. This Agreement shall not constitute a partnership or joint venture, and neither Party shall be bound by the other to any contract, arrangement or understanding except as specifically stated herein.

12.2 Assignment. Neither Party may assign this Agreement without the other Party's written consent. Notwithstanding the foregoing, each Party may, without the other Party's written consent, assign its rights under this Agreement to: (a) an Affiliate; or (b) an entity that acquires all (or substantially all) of its stock, business, or assets to which this Agreement relates. Any assignment not in accordance with the first sentence of this Section 12.2 shall be void and without effect. The assigning Party shall notify the other Party of any permitted assignment pursuant to this Section 12.2, identifying the assignee and contact information within […***…]* business days after any such permitted assignment. For clarity, the assignment of rights pursuant to this Section 12.2 shall not be deemed a sublicense.

12.3 Notices. Any notice, report, approval or consent required or permitted hereunder shall be in writing and shall be deemed to have been duly given to a Party if delivered personally or mailed by first-

*****Confidential Treatment Requested**

class, registered or certified mail, postage prepaid to the address of that Party as set forth below; or such other address as is provided by that Party to the other upon ten (10) days written notice.

Arcturus:

Arcturus Therapeutics, Inc.
10628 Science Center Drive, Suite 200
San Diego, CA 92121
Attn: Chief Executive Officer

With a copy to:

Cooley LLP
3175 Hanover St.
Palo Alto, CA 94303
Attn: Glen Sato
Email: gsato@cooley.com

SGI:

Synthetic Genomics, Inc.
Attn: CTO (with a copy to the General Counsel)
11149 North Torrey Pines Road
La Jolla, CA 92037

12.4 Waiver. No failure to exercise, and no delay in exercising, on the part of either Party, any privilege, power, or right hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any privilege, right or power hereunder preclude further exercise of any other privilege, right or power hereunder. Any waivers or amendments shall be effective only if made in writing and signed by authorized representatives of the Parties.

12.5 Severability. If any provision of this Agreement shall be adjudged by any court of competent jurisdiction to be unenforceable or invalid, that provision shall be limited or eliminated to the minimum extent necessary so that this Agreement shall otherwise remain in full force and effect and enforceable.

12.6 Governing Law; Arbitration. This Agreement shall be governed by and construed pursuant to the laws of the State of California without regard to conflicts of laws provisions thereof and without regard to the United Nations Convention on Contracts for the International Sale of Goods. For all purposes of this Agreement, the Parties hereby submit to the exclusive jurisdiction of the state and federal courts located in San Diego County, California. In any action or proceeding to enforce rights under this Agreement, the prevailing Party shall be entitled to recover its reasonable costs and attorneys' fees.

12.7 Entire Agreement. This Agreement is the complete and exclusive statement of the agreement and understanding of the Parties and supersedes and cancels all previous written and oral agreements, understandings and communications relating to the subject matter of this Agreement. No amendment or change hereof or addition hereto shall be effective or binding on either of the Parties unless reduced to writing and duly executed on behalf of both Parties.

12.8 Construction. The headings to the sections in this Agreement are not a part of this Agreement, but are included merely for convenience of reference only and shall not affect its meaning or interpretation. Any use of the term "including" shall mean "including without limitation." Unless the context clearly requires otherwise, whenever used in this Agreement the word "or" shall have its inclusive meaning of "and/or" except when paired as "either/or" or as otherwise clearly indicated by the context.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed so as to be effective on the date set forth above.

SYNTHETIC GENOMICS, INC.

By: /s/ Oliver Fetzer
Name: Oliver Fetzer
Title: CEO

ARCTURUS THERAPEUTICS, INC.

By: /s/ Joseph E. Payne
Name: Joseph E. Payne
Title: President & CEO

Exhibit A

Arcturus Patents and Patent Applications

[…***…]*

*__***Confidential Treatment Requested__

[…***…]*

*__***Confidential Treatment Requested__

[…***…]*

*__***Confidential Treatment Requested__

Exhibit 4.9

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

COVERSHEET

RESEARCH AGREEMENT

Arcturus Therapeutics, Inc., a corporation organized and existing under the laws of Delaware, USA and having its registered office at 10628 Science Center Drive Suite 200, San Diego, California 92121, USA ("**Arcturus**") and Millennium Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited, a corporation organized and existing under the laws of Delaware and having it registered office at 40 Landsdowne Street. Cambridge, MA 02139 ("**Takeda**") agree as follows:

PURPOSE AND DOCUMENTS COMPRISING THIS AGREEMENT

Arcturus is an industry leader in the application of RNA technologies for the treatment of disease and possesses platform technologies enabling discovery and development of RNA medicines. Takeda is a pharmaceutical company engaging in the research, development, manufacture and commercialization of pharmaceutical products for the treatment of gastroenterological or gastrointestinal disease or disorders and interested in accessing Arcturus's RNA platform technologies. Arcturus and Takeda agree to execute this Research Agreement ("**Agreement**") and jointly conduct a research program to discover siRNA medicines for the treatment of Nonalcoholic Steatohepatitis ("**NASH**"). This Agreement governs the performance of the research program and the rights, obligations and licenses granted to Arcturus and Takeda and includes the following documents and mutually agreed upon updates thereto:

1. **Cover Sheet**
2. **Appendix A – Terms and Conditions**
3. **Appendix B – Research Program and Budget**
4. **Appendix C – Report Form**
5. **Appendix D – Funding**
6. **Appendix E – Patent List**

KEY ADMINISTRATIVE INFORMATION

ARCTURUS CONTACT INFORMATION
Address: 10628 Science Center Drive, San Diego, California 92121, USA
Telephone: 858-900-2662

Principal Investigator: Pad Chivukula, Ph.D.

TAKEDA CONTACT INFORMATION
Address: 26-1, Muraoka-Higashi 2-Chome, Fujisawa, Kanagawa 251-8555, Japan
Telephone:[…*…]***

Takeda Contact: […*…]**

Effective Date: December 6, 2016 **Research Term: Eighteen (18) months from the Effective Date**

SIGNATURES

Arcturus and Takeda agree they have read and understand this entire Agreement, including without limitation their respective responsibilities and obligations, and agree to be bound by it. This Agreement will be effective as of the Effective Date set forth above and is executed by duly authorized representatives of Arcturus and Takeda.

Arcturus Therapeutics, Inc.,

By: /s/ Pad Chivukula
Print Name: Pad Chivukula
Title: Chief Scientific Officer
Date: 12 06, 2016

Millennium Pharmaceuticals, Inc.

By: /s/ Nenad Grmusa
Print Name: Nenad Grmusa
Title: Head of Global R&D Finance
Date: 12 06, 2016

APPENDIX A – TERMS AND CONDITIONS

1. DEFINITIONS

1.1 Defined Terms. Capitalized terms shall have the following definitions:

1.1.1 "**Access Fee**" has the meaning set forth in Section 3.1.

1.1.2 "**Affiliate**" means any corporation, company, partnership, joint venture and/or firm which controls, is controlled by or is under common control with Takeda, and "control" in this definition means direct or indirect ownership of the voting stock or other comparable ownership interest of such corporation, company, partnership, joint venture or firm on no less than a fifty percent (50%) basis.

1.1.3 "**Applicable Law**" means any law, regulation, directive, treaty, convention, statute, rule, ordinance, industrial code, any pronouncement, judgment, order or ruling of any legislative body, competent court, tribunal or other governmental or regulatory agency or authority that would apply to any and all activities contemplated hereunder.

1.1.4 "**Arcturus Background Technology**" means any scientific knowhow, data, result, information, conclusion, technology, knowledge, experience, expertise, skill technique, method, process, practice, discovery, invention, trade secret, formula, pattern, compilation, program, device, material, compound, composition, formulation, product, preparation, usage information and/or any material or source thereof, whether or not claimed by a Patent, that are necessary or useful for conducting the Research Program or for Exploiting the Research Results and that (a) are owned or controlled by or on behalf of Arcturus prior to or as of the Effective Date or (b) thereafter come to be owned or controlled by or on behalf of Arcturus outside of activities conducted for the Research Program hereunder, including clinical expertise in siRNA therapeutics, LUNAR™ and UNA Oligomer.

1.1.5 "**Arcturus Research Results**" means the Research Results that are specifically related to improvements to LUNAR™ or UNA Oligomer itself.

1.1.6 "**Bankruptcy Laws**" has the meaning set forth in Section 6.4.3.1.

1.1.7 "**Claim**" has the meaning set forth in Section 8.1.

1.1.8 "**Confidential Information**" means any scientific, technical, trade or business information given by one party (as applicable, "**Disclosing Party**") or its Affiliate to the other party ("**Receiving Party**") or its Affiliate which is treated by the Disclosing Party as confidential or proprietary. Confidential Information does not include information that (a) is in the possession of the Receiving Party or its Affiliate at the time of disclosure hereunder, as reasonably demonstrated by competent records; (b) is or later becomes generally available to the public through no fault of the Receiving Party or its Affiliate; (c) is received by the Receiving Party or its Affiliate from a third party having no confidentiality obligation to the Disclosing Party or its Affiliate; or (d) is developed or acquired independently by or on behalf of the Receiving Party or its Affiliate without reference of the Confidential Information, as reasonably demonstrated by competent records.

1.1.9 "**Cover Sheet**" means the cover sheet to this Agreement, which contains, among other things, the signatures of the parties.

1.1.10 "**Criteria**" has the meaning set forth in Section 2.4.

1.1.11 "**Disclosure Notice**" has the meaning set forth in Section 4.1.

1.1.12 "**Exploit**" means to research, develop, make, use, sell, offer to sell, import, **export**, and/or otherwise commercialize (e.g., to distribute, manufacture, introduce, market, detail, promote and/or advise), including to have made, used, sold, offered to sell

imported, exported and/or otherwise commercialized. "**Exploitation**" or "**Exploiting**" has a corresponding meaning.

1.1.13 "**Final Report**" means the report described in Section 2.4.

1.1.14 "**Force Majeure**" means, with respect to a party, any contingency beyond its reasonable control that could not have been avoided by due care being taken by such party which, in whole or in material part, prevents such party's performance of its obligations, except payment obligations, under this Agreement, including war, hostilities between nations, civil unrest, riots, strikes, lockouts, sabotage, energy shortages, fire, floods and acts of nature such as typhoons, hurricanes, earthquakes, or tsunamis.

1.1.15 "**Indemnitee**" has the meaning set forth in Section 8.3.

1.1.16 "**Licensed Technology**" means Arcturus Background Technology and Arcturus Research Results granted by Arcturus to Takeda in Section 4.3.

1.1.17 "**LUNAR™**" means Arcturus's proprietary lipid-enabled and unlocked nucleic acid modified RNA delivery technology including, any invention claimed by a Patent listed in Appendix E.

1.1.18 "**Negotiation Period**" has the meaning set forth in Section 4.3.

1.1.19 "**Option**" has the meaning set forth in Section 4.3.

1.1.20 "**Option Period**" has the meaning set forth in Section 4.3.

1.1.21 "**Patent**" means, with respect to a particular invention, (a) any patent application, originally filed and pending anywhere in the world, that includes any claim covering the invention, including any provisional or non-provisional application and any related patent application, thereafter filed and pending anywhere in the world, that includes any claim covering such invention or any common priority right, including continuation, continuation-in-part, divisional or substitute application and/or (b) any patent, issued or granted from any such patent application and existing anywhere in the world, any reissue, renewal, re-examination or extension (including by virtue of any supplementary protection certificate) of any such patent, any confirmation, registration, substitution of such patent, or patent of addition based on any such patent, and/or any foreign counterpart or equivalent in any country or jurisdiction in the world.

1.1.22 "**Research Funding**" has the meaning set forth in Section 3.2.

1.1.23 "**Research Milestone**" has the meaning set forth in Section 3.3.

1.1.24 "**Research Program**" means the research whose plan (including, role and responsibility of each party hereto, timeline and schedule) is set forth in **Appendix B**.

1.1.25 "**Research Results**" means any knowhow, data, information, conclusion, **technology**, knowledge, experience, expertise, skill, technique, method, idea, concept, experimental protocol, process, practice, discovery, invention, trade secret, principle, formula, pattern, compilation, program, device, material, compound, composition, formulation, product, preparation, usage information and/or any material or source thereof conceived or developed in the performance of the Research Program, or as a result of performance of the Research Program. For purposes of this Agreement, Research Results include all patent applications and patents that issue or have issued from any of those applications that disclose and/or claim that invention or discovery, including, U.S. and foreign applications, divisions, continuations, and continuations- in-part, patents, applications for certificates of invention and priority rights, certificates of invention, reissues, re-examination certificates, extensions or other governmental acts that effectively extend the period of exclusivity by the patent holder, substitutions, renewals, supplementary protection certificates, confirmations,

registrations, validations and additions.

1.1.26 "**Stage Report**" has the meaning set forth in Section 2.4.

1.1.27 "**Subject Patent**" means any Patent comprised within the Licensed Technology and Takeda Research Result.

1.1.28 "**Subject Product**" mean any pharmaceutical preparation for any human use which contains siRNA generated based on UNA Oligomer™ in the Research Program as its active ingredient and whose formulation is based on LUNAR™, and whose manufacture, import, use, offer for sale or sale would, absence the license of Licensed Technology and the assignment of Takeda Research Results to Takeda hereunder, constitute an infringement, induced of infringement or contributory infringement of any valid claim of a Subject Patent.

1.1.29 "**Takeda Collaborator**" has the meaning set forth in Section 4.3.

1.1.30 "**Takeda Research Results**" means any Research Results other than the Arcturus Research Results.

1.1.31 "**Term**" has the meaning set forth in Section 6.1.

1.1.32 "**Third Party**" means any person or entity other than either party hereto or its Affiliate.

1.1.33 "**UNA Oligomer**" means Arcturus's unlocked nucleomonomer agent (UNA) oligomer including any invention claimed by a Patent listed in **Appendix E**.

1.2 **Interpretation**. In this Agreement, unless the context requires otherwise:

1.2.1 References to an Article, Section or Appendix is a reference to an article or section of or appendix attached to, this Agreement, as the case may be;

1.2.2 References to this "Agreement" include the Cover Sheet and Appendixes attached hereto, which form an integral part of this Agreement for all purposes, as this Agreement may be amended from time to time in accordance with its terms and conditions; it being agreed that in case of discrepancy between this instrument and one or more of the Appendix(es) hereto, this instrument shall prevail;

1.2.3 Words using the singular or plural number also include the plural or singular number, respectively, and words denoting any gender shall include all genders;

1.2.4 References to a document are to that document as varied, supplemented or replaced from time to time in accordance with its terms; and

1.2.5 The words "include" or "including" or "for example" or "e.g.," shall be deemed to be without limitation whatsoever, except if otherwise specified.

2. **RESEARCH PROGRAM**.

2.1 **Research Program Performance**. Arcturus and Takeda shall use commercially reasonable effort to conduct the Research Program in a scientifically proficient and professional manner and in accordance with its plan specified in Appendix B to maximize the results and output therefrom. The Research Program shall commence on the Effective Date and continue for the Research Term specified on the Cover Sheet unless terminated or extended in accordance with Article 6.

2.2 **Grants of License for Research Program**. During the Research Term, Arcturus hereby grants a non-exclusive and worldwide license to Takeda, with a right to sublicense to Takeda's

Affiliates and/or bone fide collaborators, to use Arcturus Background Technology for the purpose of conducting the Research Program.

2.3 **Primary Contacts for Scientific Matters / Scientific Communications**. The Principal Investigator and the Takeda Contact who are named in the Cover Sheet, or their respective designees, are the primary contacts for Arcturus and Takeda, respectively, on scientific matters which arise under the Research Program. During the Research Term, Arcturus shall have the Principal Investigator or its designee meet or communicate Takeda Contact or its designees regularly (at least monthly) to discuss and monitor the status of Research Program and the Research Results and to consider modifications, if necessary, to the Research Program based upon that status or then available Research Results.

2.4 **Reports**. Upon the completion of each stage of Research Program, Arcturus shall submit to Takeda a written report ("**Stage Report**") in a format substantially similar to the format set forth in **Appendix C**, including, without limitation (a) summary in the stage, (b) any Research Results generated during the stage period and (c) Research Program funds expended during the stage period, so that Takeda may confirm whether criteria specified in **Appendix B** ("**Criteria**") are achieved before Arcturus commences the subsequent stage. Arcturus shall also submit to Takeda a comprehensive final report ("**Final Report**") within […***…] days after termination or expiration of the Research Program detailing the performance of the Research Program and all Research Results made hereunder (including, raw data of any experiment and protocol and methods used in the Research Program) as well as expended Research Funding.

2.5 **Record Keeping**. Arcturus and Takeda shall keep accurate scientific records relating to its responsible activities in the Research Program that are sufficient to document any patentable Research Results. Those records kept by Arcturus shall be made available to Takeda during normal business hours upon reasonable advance notice for the Term and thereafter […***…] years.

2.6 **Contracting to Third Party**. Unless explicitly permitted in the **Appendix B**, Arcturus shall not contract to any Third Party to conduct the Research Program, in part or whole, without obtaining prior written approval of Takeda. Takeda may contract to any Third Party to conduct the Research Program, in part or whole, without obtaining approval of Arcturus. In the event that Arcturus or Takeda contracts to the Third Party to conduct the Research Program, in part or whole, the contracting party shall impose on the Third Party contractor the same obligations that such party undertakes to the other party hereunder and the contracting party shall remain responsible to the other party for the performance of such obligations by the Third Party contractor.

2.7 **Exclusivity**. During the Research Term and two (2) years thereafter, Arcturus shall not engage in any research or development activities for which LUNAR™ and UNA Oligomer are used and whose target is the same as or substantially similar to the targets of the Research Program (i.e., […***…]). If Takeda requests to add additional targets in the Research Program, the parties hereto will negotiate in good faith an amendment to this Agreement, including the scope of exclusivity set forth in this Section 2.7 and Appendix B. Any amendments to the Research Program and Budget must be approved in writing by both parties.

3. ACCESS FEE, RESEARCH FUNDING AND RESEARCH MILESTONES.

3.1 **Access Fee**. In consideration of the license to Arcturus Background Technology granted to Takeda under Section 2.2 and the exclusivity granted to Takeda pursuant to Section 2.7, Takeda shall pay to Arcturus […***… US Dollar (US$ […***…])]("**Access Fee**"). The Access Fee shall be onetime upfront payment and become due and payable within sixty (60) days after Takeda receives an invoice from Arcturus.

3.2 **Research Funding**. In support of the performance by Arcturus of the Research Program, Takeda shall pay to Arcturus […***…] US Dollar (US$ […***…]) ("**Research Funding**"). Research Funding shall be paid in accordance with the fixed payment schedule set forth in **Appendix D**. Unless otherwise agreed in writing with Takeda, the total amount of Research Funding payable by Takeda to Arcturus shall not exceed […***…] US Dollar (US$ […***…]) and Arcturus shall bear any additional costs necessary for the performance of Research Programs. Arcturus shall use

the Research Funding solely for the performance of the Research Program (including, wages, supplies, operating expenses and other expenses as set forth in the budget in Section 2 of **Appendix B**), report to Takeda on expended Research Funds in the Stage Reports and the Final Report and upon the completion of Research Program, reimburse to Takeda any part of the Research Funding which is paid by Takeda to Arcturus and remains unspent or uncommitted for expenditure at the time of completion.

3.3 **Research Milestones**. In consideration of the rights to Takeda Research Results that Takeda comes to own hereunder, Takeda shall pay to Arcturus the following research milestone ("**Research Milestone**"). Each Research Milestone shall be onetime payment and due and payable within […***…]* days after Takeda receives the relevant invoice from Arcturus.

Milestone Event	Amount
[…***…]	[…***…]
[…***…]	[…***…]

3.4 **Taxes**.

3.4.1 **Payment of Tax**. A party receiving a payment pursuant to this Agreement shall pay any and all taxes levied on such payment. A party making a payment pursuant to this Agreement shall make a reasonable effort to obtain the lowest tax rate under Applicable Law for taxes required to be deducted and withheld. If Applicable Law require that taxes be deducted and withheld from a payment made pursuant to this agreement, after a party making a payment makes a reasonable effort to obtain the lowest tax rate, the remitting party shall: (i) deduct those taxes from the payment; (ii) pay the taxes to the proper taxing authority; and (iii) send evidence of the obligation together with proof of payment to the other Party within […***…] days following that payment.

3.4.2 **Tax Residence Certificate**. A party receiving a payment pursuant to this Agreement shall provide the remitting party appropriate certification from relevant revenue authorities that such party is a tax resident of that jurisdiction, if such receiving party wishes to claim the benefits of an income tax treaty to which that jurisdiction is a party. Upon the receipt thereof, any deduction and withholding of taxes shall be made at the appropriate treaty tax rate.

3.4.3 **Assessment**. Either party hereto may, at its own expense, protest any assessment, proposed assessment, or other claim by any governmental authority for any additional amount of taxes, interest or penalties or seek a refund of such amounts paid if permitted to do so by Applicable Law. The parties hereto shall cooperate with each other in any protest by providing records and such additional information as may reasonably be necessary for a party to pursue such protest.

4. RESEARCH RESULTS.

4.1 **Disclosure of Patentable Research Results**. Arcturus and Takeda shall promptly and fully disclose to the other party in writing any patentable Research Results. Disclosure of the patentable Research Results by one party to the other party shall be sent to Takeda Contact or Arcturus Contact, by certified or registered mail, return receipt requested, by courier, return receipt requested or by prepaid recognized next business day delivery service. For clarity, the submission of other documents contemplated herein (e.g., reports provided in Section 2.4) do not fulfill the requirements of this Section 4.1.

4.2 **Research Results**.

4.2.1 **Arcturus Research Results**. Regardless of the inventorship, the Arcturus Research Results shall be vested solely in Arcturus and become sole property of Arcturus. Takeda shall assign and hereby assigns any right, title and interest in and to the

*** ***Confidential Treatment Requested**

Arcturus Research Result originally vested in it to Arcturus so that Arcturus solely owns Arcturus Research Results without seeking any consideration from Arcturus and shall take reasonable action, procedure or step, including executing valid and enforceable agreement, document, instruments or any other arrangements with Arcturus, necessary to effectuate the assignment of the said interests pursuant to this Section 4.2.1. Subject to the license granted to Takeda under Sections 4.3 below, Arcturus may be free to Exploit the Arcturus Research Results at its costs and responsibilities. Arcturus may control the prosecution of the patent comprised within Arcturus Research Results (including, preparation, filing, maintenance, defence and disposal thereof), and Takeda shall cooperate with Arcturus for such prosecution at Arcturus's reasonable cost bearing and upon request of Arcturus, including, to provide Arcturus with data, information, books and record regarding the relevant invention in Arcturus Research Results or to execute documentations and interviews necessary therefor.

4.2.2 **Takeda Research Results**. Regardless of the inventorship, the Takeda Research Results shall be vested solely in Takeda and become sole property of Takeda. Arcturus shall assign and hereby assigns any interest in and to the Takeda Research Result originally vested in it to Takeda so that Takeda solely owns Takeda Research Results without seeking any consideration from Takeda other than the consideration set forth in Section 3.3 and shall take reasonable action, procedure or step, including executing valid and enforceable agreement, document, instruments or any other arrangements with Takeda, necessary to effectuate the assignment of the said interests pursuant to this Section 4.2.2. Takeda may be free to Exploit any Takeda Research Results. Takeda may control the prosecution of the patent comprised within Takeda Research Results (including, preparation, filing, maintenance, defence and disposal thereof), and Arcturus shall cooperate with Takeda for such prosecution at Takeda's reasonable cost bearing and upon request of Takeda, including, to provide Takeda with data, information, books and record regarding the relevant invention in Takeda Research Results or to execute documentations and interviews necessary therefor.

4.3 **Grants of Negotiation Option for License**. Arcturus hereby grants to Takeda an option to negotiate with Arcturus to obtain a non-exclusive and worldwide license to use Arcturus Background Technology and Arcturus Research Results for the purposes of Exploitation of Takeda Research Results, with a right to sublicense to any Affiliate and any Third Party who engage in any activities for or on behalf of Takeda and/or its Affiliate including a contract research organization, contract manufacturing organization and any other contractor, and any collaborator in research, development and commercialization ("**Takeda Collaborator**"). The aforementioned negotiation option ("**Option**") may be exercised by Takeda with a written notice to Arcturus at any time for a period commencing on the Effective Date and ending on […***…]* days after the date of Takeda's receipt of the Final Report ("**Option Period**"). The terms and conditions of any such license shall be negotiated in good faith and agreed upon in writing between the parties within […***…] months after the exercise of the Option by Takeda ("**Negotiation Period**"). During the Option Period and the Negotiation Period if Takeda exercises the Option with in the Option Period, Takeda has a right to use, by itself or through its Affiliate and/or Takeda Collaborator, Arcturus Background Technology and Arcturus Research Results solely for the purpose of evaluating Takeda Research Results and/or evaluating its interests in exercising an Option or entering into a license agreement with Arcturus and, in addition, during such period, upon Takeda's request, Arcturus shall provide Takeda with reasonable assistance, advice and consultation with respect to the Arcturus Background Technology and Arcturus Research Results, so that Takeda may effectively perform the evaluation.

The financial terms (e.g., the amount of milestone payment and royalty rate) shall be determined by taking (a) the value of the relevant patent comprised within the Licensed Technology and Takeda Research Results, including the scope of valid claim, exclusivity and enforceability thereof, the Third Party's intellectual properties relevant thereto, (b) profitability of the Subject Product, and (c) other factors involving similar transactions within the pharmaceutical industry, into account.

4.4 **No Implied License**. Except as explicitly set forth in this Agreement or unless otherwise agreed in writing between the parties hereto, neither party hereto shall acquire any license or

*** ***Confidential Treatment Requested**

other intellectual property right, by implication or otherwise, under or to any Research Results that are vested solely in the other party pursuant to Section 4.2 (or Arcturus Background Technology, in the case of Takeda).

5. CONFIDENTIALITY.

5.1 **Confidential Information**. During the Term and for a period of […***…]* years thereafter, except as otherwise provided in this Agreement, Receiving Party shall (a) not publish or disclose any Confidential Information of the other party to any Third Party other than a Third Party contractor, collaborator or sub-license contemplated hereunder or (b) use any Confidential Information of the other party solely for the purpose of this Agreement.

5.2 **Research Results**. The Arcturus Research Result shall be treated as the Confidential Information of Arcturus and the Takeda Research Results shall be treated as the Confidential Information of Takeda.

5.3 **Authorized Disclosure**. Notwithstanding the foregoing, the Receiving Party may disclose Confidential Information to the extent required to be disclosed by Applicable Laws, government agency, court order or valid discovery request in connection with a legal proceeding, provided that the Receiving Party provides the Disclosing Party as promptly as possible with prior written notice of any such disclosure (unless such notice is prohibited by such Applicable Law) so that application for an appropriate protective order can be made. The Receiving Party shall fully cooperate (at the Disclosing Party's expense) in connection with the Disclosing Party's efforts to obtain any such order or other remedy. The Receiving Party shall disclose only that portion of the Confidential Information that it is legally required to disclose.

6. TERM AND TERMINATION.

6.1 **Term**. The term of this Agreement ("**Term**") begins on the Effective Date and continues as long as Takeda's payment obligation to Arcturus set forth in Section 3.3 exists, unless terminated prior to that date in accordance with this Section 6.

6.2 **Termination for Causes by Either Party**. Either party may terminate this Agreement upon providing written notice to the other party, (a) if the other party materially breaches any warranty, term or condition of this Agreement and fails to remedy that material breach within sixty (60) days after receipt of notice in writing of that material breach from the non-breaching party; ***provided, however***, in case of breach by the other party of Section 9.2, the non-breaching party may terminate this Agreement by providing a written notice to the breaching party with immediate effect; or (b) on or after the time that the other Party makes a general assignment for the benefit of creditors, files an insolvency petition in bankruptcy, petitions for or acquiesces in the appointment of any receiver, trustee or similar officer to liquidate or conserve its business or any substantial part of its assets, commences under the Applicable Laws of any jurisdiction any proceeding involving its insolvency, bankruptcy, reorganization, adjustment of debt, dissolution, liquidation or any other similar proceeding for the release of financially distressed debtors, or becomes a party to any proceeding or action of the type described above, and such proceeding or action remains un-dismissed or un-stayed for a period of more than sixty (60) days.

6.3 **Termination for Specific Cause by Takeda**.

6.3.1 **Discretionary Termination of Research Program**. During the Research Term, Takeda may terminate this Agreement for any reason or without any reason upon sixty (60) days' prior written notice to Arcturus.

6.3.2 **Termination for Other Reasons**. In case that Takeda in good faith determines that Takeda cannot continue pursuing further development and commercialization of Subject Product (including a case where Takeda detect any safety issue or concern on the Subject Product), Takeda shall have the right to terminate this Agreement by providing sixty (60) days prior written notice to Arcturus.

6.4 **Effect of Termination / Expiration**.

6.4.1 **General**. All of the effect of termination set forth in this Section 6.4 are in addition to other right and remedies that may be available to the parties under the Applicable

*** ***Confidential Treatment Requested**

Laws, and shall not construes to limit such right or remedies. Either party exercising its termination rights set forth in Section 6.2 or 6.3 shall not be liable for any losses, damages, costs or expenses incurred by the other party, arising from or in connection with such party's exercise of the termination right. In the event this Agreement is not terminated or does not expire in its entirety, but rather is terminated or expires on a country by a country basis, the effect of termination or expiration set forth in this Section 6.4 shall only apply to the relevant country and this Agreement shall remain in full force and effect in accordance with the terms and conditions with respect to all remaining countries.

6.4.2 **Termination during the Research Term**. Promptly after the termination of this Agreement, but in any event within thirty (30) days thereafter, for any reason during the Research Term:

6.4.2.1 The parties hereto shall cease conducting the Research Program and mutually determine and confirm then available Research Results and such Research Results shall be treated in accordance with Section 4.2; and

6.4.2.2 Arcturus shall submit the Final Report to Takeda and reimburse to Takeda any part of the Research Funding which is paid by Takeda to Arcturus and remains unspent or uncommitted for expenditure at the time of termination if any.

6.4.3 **Termination after the Research Term**. Promptly after the termination of this Agreement, but in any event within thirty (30) days thereafter, for any reason after the Research Term:

6.4.3.1 Any right and/or license granted under or pursuant to this Agreement is (or shall otherwise be deemed to be) for purposes of Section 365(n) of Title 11 of the U.S. Code and other similar laws in any jurisdiction outside the U.S. (collectively, the "**Bankruptcy Laws**"), licenses of rights to "intellectual property" as defined under the Bankruptcy Laws. If a case is commenced during the Term by or against a party under Bankruptcy Laws then, unless and until this Agreement is rejected as provided pursuant to such Bankruptcy Laws, such party (in any capacity, including debtor-in-possession) and its successors and assigns (including a Title 11 trustee) shall perform all of the obligations in this Agreement intended to be performed by such party. If a case is commenced during the Term by or against a party under the Bankruptcy Laws, this Agreement is rejected as provided for under the Bankruptcy Laws, and the non-bankrupt party elects to retain its rights hereunder as provided for under the Bankruptcy Laws, then the party subject to such case under the Bankruptcy Laws (in any capacity, including debtor- in-possession) and its successors and assigns (including a Title 11 trustee), shall provide to the non-bankrupt party copies of all Licensed Technology and any associated information necessary for the non-bankrupt party to prosecute, maintain and enjoy its rights under the terms of this Agreement. All rights, powers and remedies of the non-bankrupt party as provided herein are in addition to and not in substitution for any and all other rights, powers and remedies now or hereafter existing at law or in equity (including the Bankruptcy Laws) in the event of the commencement of a case by or against a party under the Bankruptcy Laws. In particular, it is the intention and understanding of the parties that the rights granted to Takeda under Section 4.3 are essential to Takeda's businesses and the parties acknowledge that damages are not an adequate remedy.

6.4.3.2 In case of termination by Takeda due to Section 6.2, the licenses granted to Takeda under Section 2.2 shall terminate as of the termination date

6.5 Survival. The following Articles and Sections of this Agreement shall survive expiration or termination of this Agreement: Sections 2.5 and 2.7, Articles 4 and 5, Sections 6.4 and 6.5, and Articles 7, 8, 9 and 10.

7. REPRESENTATIONS, WARRANTIES AND COVENENTS.

7.1 **Representations and Warranties of Each Party**. Each party hereby represents and warrants to the other party and agrees as follows.

7.1.1 **Due Organization and Due Execution**. It is a corporation duly organized, validly existing and is in good standing under the laws of the jurisdiction of its incorporation and is qualified to do transaction in each jurisdiction in each jurisdiction in which the conduct of its business or the ownership of its properties requires such qualification and a failure to have such would prevent it from performing its obligation hereunder. It is duly authorized to execute and deliver this Agreement and also has a power and capability to perform its obligations hereunder appropriately and proficiently. The person executing this Agreement on its behalf had been duly authorized to do so by all requisite corporate action.

7.1.2 **Binding Agreement**. This Agreement is a legal, valid and binding obligation upon the parties hereto and enforceable in accordance of its terms and conditions.

7.1.3 **No Conflict Agreement**. The execution, delivery and performance of this Agreement by it does not conflict with any agreement, instrument or understanding, oral or written, to which it is a party or by which it may be bound.

7.1.4 **No Violation**. In the course of the Research Program, it does not conduct any activities in violation of Applicable Laws

7.1.5 **No Debarred Individuals**. To the best of its knowledge as of the Effective Date and as far as related to the Research Program, it has neither employed nor used a contractor or consultant that has employed, any individual or entity debarred by a regulatory authority in any other country or countries of the Territory, or, any individual who or entity which is the subject of a debarment investigation or proceeding (or similar proceeding) of a regulatory authority in any other country or countries of the Territory.

7.2 **Representations, Warranties and Covenants by Arcturus**. Arcturus hereby represents warrants and covenants to Takeda and agrees as follows.

7.2.1 **No Third Party Right**. To the best of its knowledge as of the Effective Date, there are no Third Party rights that would be infringed by the performance of the Research Program.

7.2.2 **No Third Party Right on the Research Results**. There is no agreement, instrument, or understanding, oral or written, that would results in the creation of any right of Third Party or that would result in the Imposition of any restriction on Exploitation of Research Results by or on behalf of Takeda permitted hereunder.

7.2.3 **Patent in Arcturus Background Technology**. **Appendix E** provides a complete listing of Patents covering LUNAR™ and UNA Oligomer as of the Effective Date. Except as set forth on **Appendix E**, Arcturus does not own or control as of the Effective Date, any other Patents covering LUNAR™ and UNA Oligomer.

7.3 **Limitations on Representations and Warranties**. EXCEPT AS EXPRESSLY SET FORTH IN THIS ARTICLE 7, NEITHER ARCTURUS NOR TAKEDA MAKES ANY WARRANTY, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, EQUITY OR OTHERWISE.

8. LIABILITY AND INDEMNIFICATION.

8.1 **Indemnification by Takeda**. Except to the extent required to be indemnified by Arcturus pursuant to Section 8.2, Takeda shall defend, indemnify and hold harmless Arcturus and their officers, directors, shareholders, employees, agents, representatives, successors and assigns from and against all claims, complaints, or lawsuits for damages made by a Third Party (hereinafter collectively referred to as "**Claims**") arising out of (a) any negligent act or omission, or willful wrongdoing by Takeda in the performance of this Agreement, (b) the failure by Takeda to comply with any Applicable Laws or other governmental requirement in any activities

conducted by Takeda hereunder, (c) any breach of the terms of this Agreement, including any breach of representation or warranty of Takeda as set forth in Section 7.1, and (d) the performance by Takeda of its roles and responsibilities in the Research Program, and (e) Exploitation of Subject Product by or on behalf of Takeda or its Affiliate.

8.2 **Indemnification by Arcturus**. Except to the extent required to be indemnified by Takeda pursuant to Section 8.1, Arcturus shall defend, indemnify and hold harmless Takeda and its Affiliates and their officers, directors, shareholders, employees, agents, representatives, successors and assigns from and against all Claims arising out of (a) any negligent act or omission, or willful wrongdoing by Arcturus in the performance of this Agreement, (b) the failure by Arcturus to comply with any Applicable Laws or other governmental requirement in any activities conducted by Enterome hereunder, (c) any breach of the terms of this Agreement, including any breach of representation, warranty or covenants of Arcturus as set forth in Section 7.1 or 7.2, and (d) the performance by Arcturus of its roles and responsibilities in the Research Program (including the use of the Arcturus Background Technology Arcturus provided by Arcturus for the Research Program hereunder).

8.3 **Limitations on Indemnification**. The obligations to indemnify, defend, and hold harmless as set forth in Sections 8.1 and 8.2 in respect of any Claim by a Third Party shall be contingent upon the party seeking indemnification ("**Indemnitee**"): (a) notifying the indemnifying party of a Claim within […***…]* days of receipt of the same; *provided*, *however*, that Indemnitees failure or delay in providing such notice shall not relieve the indemnifying party of its indemnification obligation except to the extent the indemnifying party is prejudiced thereby; (b) allowing the indemnifying party and/or its insurers the right to assume direction and control of the defense of any such Claim; (c) using its commercially reasonable efforts to cooperate with the indemnifying Party and/or its insurers in the defense of such Claim at the indemnifying party's expense; and (d) agreeing not to settle or compromise any claim, demand or suit without prior written authorization of the indemnifying party. The Indemnitee shall have the right to participate in the defense of any such Claim referred to in this Article 8 utilizing attorneys of its choice, at its own expense; *provided*, *however*, that the indemnifying party shall have full authority and control to handle any such Claim.

8.4 **Disclaimer**. NEITHER PARTY SHALL BE LIABLE TO THE OTHER PARTY FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR INDIRECT DAMAGES OR LOST PROFIT ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT, REGARDLESS OF ANY NOITICE OF THE POSSIBILITY OF SUCH DAMAGES.

9. FORCE MAJEURE.

9.1 **Notice of Force Majeure**. A party affected by an event of Force Majeure shall promptly provide the other party with written notice describing the event, its cause and foreseeable duration, and its possible consequences upon such party's performance of its obligations under this Agreement.

9.2 **Suspension of Performance**. After an affected party has given notice under Section 9.1, that party shall be relieved of any liability under this Agreement (other than the obligations to make any payments or of confidentiality), but only to the extent and only for so long as the Force Majeure prevents performance; *provided*, *however*, that the party so affected shall use commercially reasonable efforts to resume performance of its obligations. The other party may likewise suspend the performance of all or part of its obligations (other than the obligations to make any payments or of confidentiality) to the extent that such suspension is commercially reasonable. In any event, if either party cannot fulfil any of its obligations pursuant to this Agreement due to the Force Majeure, then both parties shall discuss in good faith and without delay, proper measures so that the affected obligations will be fulfilled or any other proper alternative measures of similar effect will be taken, as soon as reasonably feasible.

9.3 **Amendment or Termination**. If the period of the Force Majeure continues for more than […***…] days after the affected Party has given notice under Section 9.1, the parties shall discuss and determine in good faith as to whether this Agreement shall be amended or terminated.

10. GENERAL PROVISIONS.

*** ***Confidential Treatment Requested**

10.1 **Compliance**. In performing this Agreement, Arcturus and Takeda shall comply with the Applicable Laws.

10.2 **Anti-Bribery**. In performing the Research Program, the parties hereto and their trustees, directors, officers, medical and professional staff, employees and agents (a) shall not offer to make, make, promise, authorize or accept any payment or giving anything of value, including but not limited to bribes, either directly or indirectly to any public official, regulatory authority or anyone else for the purpose of influencing, inducing or rewarding any act, omission or decision which may secure an improper advantage including to obtain or retain business and (b) shall comply with all applicable anti-corruption and anti-bribery laws and regulations. The parties and their trustees, directors, officers, medical and professional staff, employees and agents shall not make any payment or provide any gift to a third party in connection with performance of this Agreement without first identifying the intended third-party recipient to the other party and obtaining the other party's prior written approval. Arcturus shall notify Takeda immediately upon becoming aware of any breach of Arcturus's obligations under this Section 10.2.

10.3 **No Use of Name**. No party shall, without the prior written consent of the other party, use in endorsement, advertising, publicity (including, without limitation, press releases), or otherwise, the name, trademark, logo, symbol, or other image of the party or that party's employees or agents, ***provided***, ***however***, each party agrees that its name may be used whenever required by law or regulation, including, without limitation, disclosure to the Securities and Exchanges Commission, and that Takeda may reference the existence and subject matter of this Agreement in lists of its academic collaborators.

10.4 **Press Release**. Each party agrees not to issue any press release or other public statement, whether oral or written, disclosing the existence of this Agreement, the terms hereof or any information relating to this Agreement without the prior written consent of the other party; ***provided***, such consent shall not be unreasonably withheld, delayed, or conditioned.

10.5 **Governing Law; Dispute Resolution**. This Agreement shall be governed by, construed, and interpreted in accordance with the laws of the State of New York, the U.S., without reference to principles of conflicts of laws. All disputes arising out of or in connection with this Agreement which cannot be settled in an amicable way between the parties hereto shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by three (3) arbitrators, one appointed by each party and the third appointed by the first two arbitrators. The award rendered shall be final and binding upon both parties hereto. Such arbitration shall be conducted in New York City, New York, the U.S.

10.6 **No Partnership or Employment Relationship**. Arcturus and Takeda are independent contractors. This Agreement does not create a joint venture, partnership or employment relationship between Arcturus and Takeda.

10.7 **Assignment**. This Agreement may not be assigned or transferred by any of the parties hereto without the prior written consent of the other party; ***provided***, ***however***, that Takeda may assign or transfer Takeda's rights and obligations under this Agreement, in whole or in part, to an Affiliate of Takeda or to a successor to all or substantially all of its assets or business relating to this Agreement, whether by sale, merger, operation of law or otherwise upon written notice to Arcturus.

10.8 **Notices**. With the exception of Disclosure Notices, any notice or other communication required or permitted under this Agreement shall be sent to the address set forth on the Cover Sheet, shall be in writing and shall be (a) hand delivered, (b) mailed, postage prepaid, first class, certified mail, return receipt requested, (c) sent, shipping prepaid, receipt requested via a reputable courier service, or (d) dispatched by facsimile, if promptly confirmed by one of the preceding notice mechanisms. Either party may change its address to which notices shall be sent by giving notice to the other party in accordance with the terms of this Section 10.8.

10.9 **Modification**. No modification to this Agreement shall be effective unless agreed to in writing by duly authorized representatives of the parties.

10.10 **Waiver**. No waiver of any rights shall be effective unless assented to in writing by the party to be charged and the waiver of any breach or default shall not constitute a waiver of any other right hereunder or any subsequent breach or default.

10.11 **Entire Agreement**. This Agreement constitutes the entire and only agreement between the parties relating to the subject matter hereof, and all prior negotiations, representations, agreements and understandings are superseded by this Agreement. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one agreement. The section headings are intended for convenience of reference only and are not intended to be a part of or to affect the meaning or interpretation of this Agreement. The parties have participated equally in the formation of this Agreement; the language of this Agreement shall not be presumptively construed against either party.

10.12 **Severability**. In the event that any provision of this Agreement becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable or void, this Agreement shall continue in full force and effect without said provision; provided that no severability shall be effective if the result of that action materially changes the economic benefit of this Agreement to Arcturus or to Takeda.

- End of Document –

APPENDIX B– RESEARCH PROGRAM AND BUDGET

[…***…]*

* ***Confidential Treatment Requested

[…***…]*

*** ***Confidential Treatment Requested**

[…***…]*

*** ***Confidential Treatment Requested**

[…***…]*

* ***Confidential Treatment Requested

[…***…]*

* ***Confidential Treatment Requested

* [...***...]

*** ***Confidential Treatment Requested**

APPENDIX C – STAGE-X REPORT FORM

(Attach additional pages if needed)

Date: **Takeda Contact:**

Name of Principal Investigator: **Takeda Agreement No. : Phone Number:**

Fax Number:

Name of Arcturus:

Arcturus: Street Address:

City, State, Zip Code:

Summary in Stage X

Research Results Made in Stage X / Patent Applications:

Publications / Patent Applications During Stage X (Title, Journal Name, Date):

Details of Research Program Funds Expended in Stage X:

Research Program Goals for Next Stage:

Principal Investigator Signature	**Date**	**Takeda Scientific Reviewer**	**Date**

APPENDIX D – FUNDING

1. **Research Funding**. Total amount of […***…]* US Dollar (US$ […***…]) shall be paid by Takeda to Arcturus as follows:

Payment Schedule

Amount Due	Date Due
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

2. Payment.

2.1 Invoices for all payments due and payable from Takeda to Arcturus hereunder shall be provided by Arcturus to:

[…***…]

2.2 Payment to Arcturus hereunder shall be made by wire transfer to:

[…***…]

*** ***Confidential Treatment Requested**

APPENDIX E – PATENT LIST

[…***…]*

*** ***Confidential Treatment Requested**

[…***…]*

* ***Confidential Treatment Requested

[…***…]*

* ***Confidential Treatment Requested

Amendment to Research Agreement

This Amendment, made as of December 21, 2017 (the "**Amendment Date**") by and between Arcturus Therapeutics, Inc., a corporation organized and existing under the laws of Delaware, USA and having its registered office at 10628 Science Center Drive Suite 200, San Diego, California 92121, USA ("**Arcturus**") and Millennium Pharmaceuticals, Inc., a wholly owned subsidiary of Takeda Pharmaceutical Company Limited and a corporation organized and existing under the laws of Delaware, USA and having its registered office at 40 Landsdowne Street, Cambridge, Massachusetts 02139, USA ("**Takeda**"),

WITNESSETH THAT:

WHEREAS, Arcturus and Takeda concluded the Research Agreement effective as of November December 6, 2016 ("**Original Agreement**"), pursuant to which Arcturus and Takeda are jointly conducting the Research Program (as defined in the Original Agreement) to discover siRNA medicines for the treatment of NASH;

WHEREAS, after evaluating and discussing the Research Results available as of November 1, 2017, Arcturus and Takeda desire to conduct additional research activities for achieving the purpose of the Research Program;

NOW, THEREFORE, in consideration of mutual covenants and promises hereinafter set forth, Arcturus and Takeda agree to amend the Original Agreement as follows:

1. Defined Terms. All capitalized terms not defined herein shall have the meanings given to them in the Original Agreement.

2. Extension of the Research Term. "Research Term" defined in the Cover Sheet of Original Agreement is hereby revised from "Eighteen (18) months from the Effective Date" to "Twelve (12) months from the Amendment Data".

3. Additional Research. Additional studies described in Appendix B attached hereto are hereby added to Appendix B attached to the Original Agreement and shall constitute the Research Program.

4. Additional Funding. In addition to the Research Funding as set forth in Section 3.2 of the Original Agreement, in Support of the performance by Arcturus of the additional studies described in Appendix B attached hereto, Takeda shall pay to Arcturus […***…]* US Dollars ([…***…]), which shall be paid to Arcturus in accordance with payment method provided in Appendix D of the Original Agreement and following schedule.

Payment Schedule

Amount Due (USD $)	Date Due
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

*** ***Confidential Treatment Requested**

5. Miscellaneous. This Amendment shall be effective from the Amendment Date and in full force and effect until the expiration or termination of Original Agreement, Except as expressly provided in this Amendment, the Original Agreement remain unmodified and in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be signed in duplicate by their duly authorized representatives as of the dates below. One each official text of this Amendment shall be held by the parties hereto.

Arcturus Therapeutics, Inc.

By: /s/Joseph E. Payne

Print Name: Joseph E. Payne

Title: President and CEO

Date:

Millennium Pharmaceuticals, Inc.

By: /s/Nenad Grmusa

Print Name: Nenad Grmusa

Title: Head of Global R&D Finance

Date:

APPENDIX B– RESEARCH PROGRAM AND BUDGET (only for additional studies)

Research Plan

[…***…]*

*** ***Confidential Treatment Requested**

[…***…]*

*** ***Confidential Treatment Requested**

[…***…]

*** ***Confidential Treatment Requested**

[…***…]

*** ***Confidential Treatment Requested**

[…***…]

*** ***Confidential Treatment Requested**

Timeline

[…***…]

*** ***Confidential Treatment Requested**

Budget

[…***…]

*** ***Confidential Treatment Requested**

Exhibit 4.10

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

Confidential

RESEARCH COLLABORATION AND LICENSE AGREEMENT

THIS RESEARCH COLLABORATION AND LICENSE AGREEMENT (this "***Agreement***") is entered into as of October 26, 2015 (the "***Effective Date***") by and between **ULTRAGENYX PHARMACEUTICAL INC.**, a Delaware corporation having an address at 60 Leveroni Court, Novato, CA 94949 ("***Ultragenyx***"), and **ARCTURUS THERAPEUTICS, INC.** a Delaware corporation having an address at 10628 Science Center Drive, Suite 200, San Diego, CA 92121 ("***Arcturus***"). Arcturus and Ultragenyx are sometimes referred to herein individually as a "***Party***" and collectively as the "***Parties***".

RECITALS

WHEREAS, Arcturus is a biotechnology company possessing expertise in RNA medicines;

WHEREAS, Ultragenyx is a biotechnology company specializing in the research, development, manufacturing and commercialization of products to treat rare and ultra-rare diseases; and

WHEREAS, Ultragenyx and Arcturus desire to perform a collaboration to identify and optimize mRNA products with respect to targets relevant in rare […***…] diseases, and for Arcturus to grant Ultragenyx the exclusive rights to research, develop, manufacture and commercialize such products, pursuant to the terms and conditions of the Agreement.

NOW THEREFORE, in consideration of the premises and the mutual promises and covenants contained in this Agreement, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereto agree as follows:

ARTICLE 1

DEFINITIONS

All references to particular Exhibits, Articles or Sections shall mean the Exhibits to, and Articles and Sections of, this Agreement, unless otherwise specified. For the purposes of this Agreement and the Exhibits hereto, the following words and phrases shall have the following meanings:

1.1 "***Acquired Party's IP***" shall have the meaning set forth in Section 13.4.

1.2 "***Acquirer***" shall have the meaning set forth in Section 13.4.

1.3 "***Affiliate***" means, with respect to any Person, any other Person which controls, is controlled by or is under common control with such Person, for as long as such control exists. For purposes of this Section, "***control***" shall mean the direct or indirect ownership of more than fifty percent (50%) of the voting or economic interest of a Person, or the power, whether pursuant to contract, ownership of securities or otherwise, to direct the management and policies of a Person.

*****Confidential Treatment Requested**

1.4 "***Alliance Manager***" shall have the meaning set forth in Section 2.1.2.

1.5 "***Arcturus Indemnified Parties***" shall have the meaning set forth in Section 10.1.1.

1.6 "***Arcturus Know-How***" means any Know-How Controlled by Arcturus and/or any of its Affiliates as of the Effective Date and/or during the Term that is actually used by Arcturus or its Affiliates in its Collaborative Development activities and/or is necessary or useful for the Exploitation of any Compound and/or Product. For the avoidance of doubt, Arcturus Know-How does not include the Arcturus Patents. Subject to and to the extent as provided in Section 13.4, the use of "***Affiliate***" in this definition shall exclude any Third Party that becomes an Affiliate due to such Third Party's or such Third Party's Affiliate acquisition of Arcturus in a Change of Control Transaction.

1.7 "***Arcturus Materials***" means Materials Controlled by Arcturus and used by Arcturus, or provided by Arcturus for use in the conduct of the Collaborative Development, including Materials disclosed or claimed within the Arcturus Patents, and including progeny, expression products, mutants, replicates, derivatives and modifications of any of the foregoing.

1.8 "***Arcturus Patents***" means all Patent Rights Controlled by Arcturus and/or any of its Affiliates as of the Effective Date and/or during the Term that (a) Cover any Compound and/or Product (but not with respect to any active ingredient other than a Compound); (b) is necessary for the Exploitation of any Compound and/or Product (but not with respect to any active ingredient other than a Compound); and/or (c) is reasonably useful for the Exploitation of any Compound and/or Product (but not with respect to any active ingredient other than a Compound) other than Arcturus Platform Technology. The Arcturus Patents existing as of the Effective Date are listed on **Exhibit A**. Subject to and to the extent as provided in Section 13.4, the use of "***Affiliate***" in this definition shall exclude any Third Party that becomes an Affiliate due to such Third Party's or such Third Party's Affiliate acquisition of Arcturus in a Change of Control Transaction.

1.9 "***Arcturus Platform Technology***" means LUNAR Nanoparticle Delivery Technology and/or UNA Oligomer Chemistry.

1.10 "***Arcturus Technology***" means Arcturus Patents, Improvements to Arcturus Platform Technology, and Arcturus Know-How.

1.11 "***Audited Party***" shall have the meaning set forth in Section 7.14.

1.12 "***Auditing Party***" shall have the meaning set forth in Section 7.14.

1.13 "***Background Technology***" means Patent Rights and Know-How (a) Controlled by a Party or any of its Affiliates prior to the Effective Date or (b) Controlled by such Party or any of its Affiliates during the Term, but not generated through exercising its rights and/or performing its obligations under this Agreement.

1.14 "***Budget***" means, with respect to a Development Target, the budget for Collaborative Development activities to be performed by Arcturus and Ultragenyx with respect to such Development Target, as defined by the JSC and approved in accordance with Section 4.1.

1.15 "***Challenge***" shall have the meaning set forth in Section 12.4.

1.16 "***Change of Control Transactions***" means with respect to a Party: (l) a sale of all or substantially all of such Party's assets or business relating to this Agreement; (2) a merger, reorganization or consolidation involving a Party in which the stockholders of such Party immediately prior to such transaction cease to own collectively a majority of the voting equity securities of a successor entity; or (3) a person or group of persons acting in concert (other than current stockholders of such Party) acquire fifty percent (50%) or more of the voting equity securities of such Party (other than through sales by the Party of equity in a venture funding or other private or public financing transaction).

1.17 "***Collaboration Know-How***" means any and all Know-How generated by or on behalf of a Party or the Parties jointly in performing their obligations under the Collaborative Development Plan.

1.18 "***Collaboration Patents***" means Patent Rights that claim an invention within Collaboration Know-How.

1.19 "***Collaboration Technology***" means the Collaboration Know-How and Collaboration Patents.

1.20 "***Collaborative Development***" shall mean, with respect to a particular Target, any Development activities relating to such Target by or on behalf of a Party or the Parties jointly in performing their obligations in accordance with the Collaborative Development Plan.

1.21 "***Collaborative Development Costs***" shall have the meaning set forth in Section 7.4.

1.22 "***Collaborative Development Plan***" means, for each Development Target, the written plan executed by the Parties hereunder containing the overall strategy and timelines, and any updates thereto, for the Collaborative Development of Compounds and Products with respect to such Development Target, which includes Arcturus' optimization of one (1) lead per Development Target (or more if the Parties otherwise agree). The Collaborative Development Plan shall include a reasonably detailed description of the schedule of work activity, the responsibility between the Parties for the work activities and an associated Budget for such activities. As the circumstances may require, the JSC may propose from time to time and approve amendments to the Collaborative Development Plan in accordance with Section 2.1.3(b).

1.23 "***Commercialize***" means, with respect to a Product, all activities directed to (a) commercial manufacturing; (b) marketing, promoting, distributing, importing, offering for sale and/or selling such Product; and (c) post-First Commercial Sale regulatory affairs for such product. Cognates of the word "***Commercialize***" shall have correlative meanings.

1.24 "***Commercially Reasonable Efforts***" means, with respect to a Party, the reasonable, diligent, good faith efforts that a similarly situated biotechnology or pharmaceutical company would use to accomplish a similar objective under similar circumstances exercising reasonable business judgment, including with respect to the development and commercialization of a Product, the utilization of efforts and resources commensurate with the efforts and resources commonly used by such Party (or a similarly situated entity) in connection with the development or commercialization of biopharmaceutical products that are of similar status (with respect to stage of development), including, with respect to commercial potential, the proprietary position of the product, the regulatory status and approval process, the probable profitability of the applicable product, and other relevant factors such as technical, legal, scientific or medical factors.

1.25 "***Compound***" means an mRNA or UNA Oligomer designed to express a Development Target, where such molecule has been discovered and/or optimized under the Collaborative Development Plan, and any and all derivatives of any such molecule.

1.26 "***Confidential Information***" shall have the meaning set forth in Section 11.1.1.

1.27 "***Control***" or "***Controlled***" means, with respect to Know-How or Patent Rights, that the applicable Party owns or has a license to such Know-How or Patent Right and has the ability to grant to the other Party access to and a license or sublicense (as applicable) under such Know-How or Patent Right as provided for herein without violating the terms of any agreement or other arrangement with any Third Party and either (a) without payment of consideration to any Third Party as a result of any grant of rights to the other Party as contemplated under this Agreement or (b) pursuant to an agreement between the Parties if such payment is due.

1.28 "***Cover***" means, with respect to a Patent Right, a Valid Claim would (absent a license thereunder or ownership thereof) be Infringed by the Exploitation of the applicable product; *provided, however,* that in determining whether a Valid Claim that is a claim of a pending application would be Infringed, it shall be treated as if issued in the form then currently being prosecuted. Cognates of the word "***Cover***" shall have correlative meanings.

1.29 "***Designated Executive Officers***" means the Chief Executive Officer of Arcturus and the Chief Executive Officer of Ultragenyx, or their duly authorized respective designees with decision-making authority within the applicable Party with respect to the relevant matters.

1.30 "***Develop***" means, with respect to a Compound or Target, all non-clinical and clinical activities that relate to obtaining, maintaining or expanding Regulatory Approval of a Product in accordance with this Agreement up to and including the obtaining of Regulatory Approval to Commercialize a Product, including regulatory toxicology studies, statistical analysis and report writing, clinical trial design and operations, preparing and filing Drug Approval Applications, and all regulatory affairs relating to the foregoing. Cognates of the word "***Develop***" shall have correlative meanings.

1.31 "***Development Milestone Payments***" shall have the meaning set forth in Section 7.7.1.

1.32 "***Development Target***" shall have the meaning set forth in Section 3.5.

1.33 "***Development Target Exclusivity Period***" shall have the meaning set forth in Section3.3.l(a).

1.34 "***Development Target ROFN***" shall have the meaning set forth in Section 3.3.l(b).

1.35 "***Development Target ROFN Negotiation Period***" shall have the meaning set forth in Section 3.3.l(b).

1.36 "***Development Target ROFN Notice***" shall have the meaning set forth in Section 3.3.l(b).

1.37 "***Disclosing Party***" shall have the meaning set forth in Section 11.1.1.

1.38 "***Discontinued Target***" shall have the meaning set forth in Section 3.5.

1.39 "***Dollars***" means U.S. Dollars, and"***$***" shall be interpreted accordingly.

1.40 "***EMA***" means the European Medicines Agency or any successor entity thereto.

1.41 "***Exclusivity Extension Fee***" has the meaning set forth in Section 7.3.

1.42 "***Expansion Option Payment***" has the meaning set forth in Section 7.2.

1.43 "***Exploit***" means to Develop, Commercialize, discover, optimize, research, make, have made, use, offer for sale, sell, import, export or otherwise exploit a product. Cognates of the word "***Exploit***" shall have correlative meanings.

1.44 "***FDA***" means the United States Food and Drug Administration or any successor entity thereto.

1.45 "***First Commercial Sale***" means, with respect to any Product in any country, the first sale on a commercial basis to a Third Party of such Product in such country after Regulatory Approval for such Product has been granted in such country.

1.46 "***FTE***" means the equivalent of the work of one qualified employee or agent for the applicable activities dedicated to the Collaborative Development, full time, for one year (constituting 1,750 working hours). For clarity, no more than 1,750 hours per year (or equivalent pro-rata portion thereof for a period less than 12 months) may be charged for an individual contributing work factoring into any reimbursable FTE costs hereunder, regardless of how much additional work time is contributed by such individual during such period. An individual contributing work for less than 1,750 hours per year shall be deemed a fraction of an FTE on a pro-rata basis. FTE activities shall not include the work of general managers, clerical staff and/or administrative personnel.

1.47 "***FTE Costs***" means the FTE Rate times the number of FTEs expended during the applicable financial period. The FTE Costs shall be determined based on time (as calculated in

pro-rated FTEs) actually spent performing the applicable development activities, unless another basis is expressly specified herein or otherwise agreed in advance by the Parties in writing.

1.48 "***FTE Rate***" means the monetary rate at which FTEs expended by Arcturus during the applicable financial reporting period will accrue toward Arcturus's FTE Costs hereunder, which shall be $[…***…] per allocable FTE. Each such FTE Rate shall be adjusted annually, based on changes in the Consumer Price Index (as quoted by the U.S. Department of Labor, Bureau of Labor Statistics), with the first adjustment taking effect in the calendar year for 2017. Each Party acknowledges that the foregoing FTE Rate has been set to include all salary, employee benefits, routine supplies, and other expenses, including support staff and overhead for or directly allocable to an FTE.

1.49 ***"GAAP***" means United States generally accepted accounting principles applied on a consistent basis. Unless otherwise defined or stated herein, financial calculations made hereunder shall be calculated under GAAP.

1.50 "***Governmental Authority***" means any court, agency, department, authority or other instrumentality of any national, state, county, city or other political subdivision.

1.51 "***Improvements to Arcturus Platform Technology***" means any and all improvements to the Arcturus Platform Technology that are: (a) generally applicable to components of LUNAR Nanoparticle Delivery Technology (including new species of lipids used in such formulations and other improvements of such formulations, in each case as made and/or in-licensed by Arcturus, its Affiliates or subcontractors after the Effective Date) and/or UNA Oligomer Chemistry that are proprietary to Arcturus (including any extensions and/or additions to such chemistry that are generally applicable to RNA species incorporating UNA Oligomer Chemistry but not specific to Compounds and/or Products) (and in each case, together with all intellectual property rights therein), and (b) conceived, discovered, invented, developed, created, made or reduced to practice or tangible medium solely or jointly by or on behalf of the Parties, but excluding Product-Specific Technology.

1.52 "***IND***" means an investigational new drug application filed with the applicable Regulatory Authority for authorization to commence clinical studies.

1.53 "***Infringe***" or "***Infringement***" means any infringement as determined by Law, including direct infringement, contributory infringement or any inducement to infringe.

1.54 "***Initiation***" means, with respect to a clinical trial, the first dosing in the first human subject in such clinical trial.

1.55 "***Issuing Party***" shall have the meaning set forth in Section 11.3.

1.56 "***Joint Collaboration Know-How***" means Collaboration Know-How that is conceived, discovered, invented, created, made or reduced to practice or tangible medium jointly by or on behalf of both Parties, but excluding any Product-Specific Know-How and/or Improvements to Arcturus Platform Technology.

1.57 "***Joint Collaboration Patents***" means any Collaboration Patents claiming Joint Collaboration Know-How.

1.58 "***Joint Collaboration Technology***" means Joint Collaboration Patents and Joint Collaboration Know-How.

1.59 "***Joint Steering Committee***" or "***JSC***" shall have the meaning set forth in Section 2.1.1.

1.60 "***Know-How***" means techniques, technology, trade secrets, inventions (whether patentable or not), methods, processes, formulae, know-how, data and results (including pharmacological, toxicological and clinical data and results), analytical and quality control data and results, regulatory documents, and other information. Know-How does not include Patent Rights in the foregoing.

1.61 "***Law***" means, individually and collectively, any and all laws, ordinances, rules, directives, administrative circulars and regulations of any kind whatsoever of any Governmental Authority within the applicable jurisdiction.

1.62 "***Licensed Field***" means the diagnosis, prevention or treatment of human diseases.

1.63 "***Losses***" shall have the meaning set forth in Section 10.1.1.

1.64 "***LUNAR Nanoparticle Delivery Technology***" means Arcturus' proprietary lipidbased formulation that contains an Arcturus' proprietary lipid molecule.

1.65 "***Materials***" means any tangible chemical or biological material, including any compounds, DNA, RNA, clones, vectors, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How.

1.66 "***Modified mRNA***" means an mRNA having one or more chemically-modified structures, or monomers, or non-natural nucleotide structures, or monomers, or a structurallyaltered mRNA, but excluding any UNA Oligomer.

1.67 "***mRNA***" means an active pharmaceutical ingredient that is a single stranded RNA molecule that conveys genetic information, specifying the amino acid sequence for a protein of therapeutic interest , including Modified mRNA.

1.68 "***Net Sales***" means, with respect to any Product, the gross amounts invoiced for sales of such Product by Ultragenyx, its Affiliates or Sublicensee(s) (the "***Selling Party***") to Third Parties (excluding any Sublicensees) (in an arms' length transaction), less the following customary deductions to the extent actually taken, paid, accrued, allowed, included, or allocated based on good faith estimate and in compliance with Laws, in the gross sales prices with respect to such sales (and consistently applied as set forth below):

(a) non-recoverable sales taxes, excise taxes, use taxes, VAT and duties paid by the Selling Party in relation to Product(s) and any other equivalent governmental

charges imposed upon the importation, use or sale of Product(s) (including the annual fees due under Section 9008 of the United States Patient Protection and Affordable Care Act of 2010 (Pub. L. No. 111-48) (excluding taxes when assessed on income derived from sales);

(b) credits and allowances (actually allowed or paid) for defective or returned Product(s), including allowances for spoiled, damaged, outdated, rejected, returned, withdrawn or recalled Product(s);

(c) governmental and other rebates and refunds (or equivalents thereof) granted to managed health care organizations, pharmacy benefit managers (or equivalents thereof), federal, state, provincial, local and other governments, their agencies and purchasers and reimbursers or to trade customers, in each case with respect to such Product;

(d) reasonable price adjustments, allowances, credit, chargeback payments and rebates granted to and actually used by group purchasing organizations, Third Party payors, other contractees and managed care entities, in each case with respect to such Product;

(e) actual bad debt expense actually written off (but not exceeding […***…]% of Net Sales);

(f) chargebacks and retroactive price reductions actually granted to the Third Party applicable to sales of such product; and

(g) trade, cash, prompt payment and/or quantity discounts, actually allowed and taken directly by the Third Party, and mandated discounts.

All such deductions shall be allowable only to the extent they are commercially reasonable and shall be determined, on a country-by-country basis, as incurred in the ordinary course of business in type and amount consistent with the Selling Party's business practices consistently applied across its product lines and accounting standards and verifiable based on its sales reporting system. All such discounts, allowances, credits, rebates, and other deductions shall be fairly and equitably allocated to Product and other products of the Selling Party such that Product does not bear a disproportionate portion of such deductions. Net Sales will be determined from books and records maintained in accordance with GAAP, consistently applied throughout the organization and across all products of the entity whose sales of Products are giving rise to Net Sales.

Where a Product is sold in combination with other pharmaceutical or biologics products, diagnostic products, or active ingredients (collectively, "***Combination Product***") the Net Sales applicable to such transaction shall be calculated by multiplying the total Net Sales of such combined product by the fraction A/(A+B), where A is the sale price of the Product portion of such Combination Product when sold separately and B is the sale price of the other active ingredient(s) in such Combination Product when sold separately; provided, however, that if the Product portion of such Combination Product or any of the other active ingredients in such Combination Product is not then sold separately, then Net Sales for purposes of determining royalty payments shall be agreed upon by the Parties based on the relative value contributed by each component, such agreement not to be unreasonably withheld, conditioned or delayed.

*****Confidential Treatment Requested**

Sales of Product(s) between or among Ultragenyx and its Affiliates or Sublicensees for further resale shall be excluded from the computation of Net Sales and no payments shall be payable on such sales except where such Affiliates or Sublicensees are end users. For the avoidance of doubt, sales of a Product for use in conducting clinical trials of such Product in a country in order to obtain the Regulatory Approval of such Product in such country shall be excluded from Net Sales calculations for all purposes. Also, notwithstanding anything to the contrary above, sales or transfers of a Product at or below cost for any charitable purposes, compassionate use, named patient sales or free samples shall be excluded from Net Sales calculations.

1.69 "***Non-Publishing Party***" shall have the meaning set forth in Section 11.4.

1.70 "***Opt-In Data Package***" shall have the meaning set forth in Section 4.1.

1.71 "***Optimized Lead Designation***" means the formal designation of a Compound by the JSC as an optimized lead (as such term is defined in the applicable Development Target's Collaborative Development Plan) in accordance with the applicable Collaborative Development Plan.

1.72 "***Out-of-Pocket Costs***" means amounts paid by Arcturus or its Affiliates: (a) for the procurement of any reagents and/or materials as permitted in the Collaborative Development Plan and in accordance with the Budget contained therein; and/or (b) to any Third Party subcontractors, for services or materials provided by such subcontractors to directly support the Collaborative Development activities under a Collaborative Development Plan, as expressly provided in the Collaborative Development Plan. For clarity, Out-of-Pocket Costs do not include payments for Arcturus' or its Affiliates' internal: salaries or benefits; facilities; utilities; general office, laboratory, or facility supplies; insurance; or information technology, capital expenditures or the like and Out-of-Pocket Costs expressly exclude charges accounted for under the FTE Rate.

1.73 "***Owned Patents***" shall have the meaning set forth in Section 8.2.1

1.74 "***Owning Party***" shall have the meaning set forth in Section 8.2.1

1.75 "***Patent Rights***" means any provisional and non-provisional patents and patent applications, together with all additions, divisions, continuations, continuations-in-part, substitutions, and reissues claiming priority thereto, as well as any re-examinations, extensions, registrations, patent term extensions, supplemental protection certificates, renewals and the like with respect to any of the foregoing and all foreign counterparts thereof.

1.76 "***Preclinical Candidate Designation***" or "***PCC Designation***" means with respect to a Product candidate, the designation of the candidate by the JSC as a preclinical candidate (as such term is defined in the applicable Development Target's Collaborative Development Plan).

1.77 "***Person***" means any corporation, limited or general partnership, limited liability company, joint venture, trust, unincorporated association, governmental body, authority, bureau or agency, any other entity or body, or an individual.

1.78 "***Phase 1 Clinical Trial***" means any human clinical trial of a Product conducted mainly to evaluate its safety that would satisfy the requirements of 21 C.F.R. § 312.21(a) or its non-United States equivalents.

1.79 "***Pivotal Trial***" means a pivotal clinical trial of a product in human patients in order to establish the safety and efficacy of the Product for a particular indication, which study is prospectively designed to demonstrate with statistical significance that the Product is sufficiently safe and effective for use in the indication to support the filing of an application for approval to market such Product for such indication in any jurisdiction without the need to conduct additional clinical trials, as more fully described in US federal regulation 21 C.F.R. § 312.21(b) or 21 C.F.R. § 312.21(c) and equivalents in other jurisdictions.

1.80 "***Plan Completion Date***" shall have the meaning set forth in Section 5.2.2.

1.81 "***Press Release***" shall have the meaning set forth in Section 11.3.

1.82 "***Product***" means any product that contains a Compound as an active ingredient, in all forms, presentations, formulations, methods of administration and dosage forms.

1.83 "***Product Infringement***" shall have the meaning set forth in Section 8.5.1(a).

1.84 "***Product-Specific Know-How***" shall have the meaning set forth in Section 8.1.2(b).

1.85 "***Product-Specific Patents***" shall have the meaning set forth in Section 8.1.2(b).

1.86 "***Product-Specific Technology***" shall have the meaning set forth in Section 8.1.2(b).

1.87 "***Publishing Party***" shall have the meaning set forth in Section 11.4.

1.88 "***Receiving Party***" shall have the meaning set forth in Section 11.1.1.

1.89 "***Regulatory Approval***" means, with respect to any country, any and all approvals, licenses, registrations or authorizations by a Governmental Authority in a country necessary for the marketing and full commercial sale of a product in such country, including any necessary pricing and reimbursement approval.

1.90 "***Regulatory Authority***" means any Governmental Authority or other authority responsible for granting INDs and/or Regulatory Approvals for products, including the FDA, EMA and any corresponding national or regional regulatory authorities.

1.91 "***Regulatory Filing***" means any filing with any Regulatory Authority in a country with respect to the research, development, manufacture, distribution , pricing, reimbursement, marketing or sale of a product in such country, including any INDs and New Drug Applications.

1.92 "***Replacement Target***" shall have the meaning set forth in Section 3.1.2.

1.93 "***Reserved Target***" shall have the meaning set forth in Section 3.2.1, subject to Sections 3.1.3 and 3.2.2.

1.94 "***Reserved Target Exclusivity Period***" shall have the meaning set forth in Section 3.3.3.

1.95 "***Reserved Target ROFN***" shall have the meaning set forth in Section 3.4.

1.96 "***Reserved Target ROFN Negotiation Period***" shall have the meaning set forth in Section 3.4.

1.97 "***Reserved Target ROFN Notice***" shall have the meaning set forth in Section 3.4.

1.98 "***Results***" means Arcturus' final results of the Collaborative Development Plan.

1.99 "***Reviewing Party***" shall have the meaning set forth in Section 11.3.

1.100 "***RNA Product***" means a product designed to have its therapeutic effect through a nucleic acid, which shall include any product containing an mRNA, UNA Oligomer, and any other RNA species (e.g. siRNA), and/or any product designed to knockout or otherwise modulate the expression level, properties, half-life, distribution or activity of any nucleic acid.

1.101 "***Royalty Term***" shall have the meaning set forth in Section 7.8.3.

1.102 "***Statutory Exclusivity***" shall have the meaning set forth in Section 7.8.3.

1.103 "***Sublicensee(s)***" shall mean any Person other than an Affiliate of Ultragenyx to which Ultragenyx has granted a Sublicense under this Agreement.

1.104 "***Target***" means any single protein (i.e., a protein designated by a unique NCBI reference sequence but including all of its naturally-occurring mutations and variants) that could be used as a potential treatment for a rare or ultra rare disease and that is expressed in the liver.

1.105 "***Term***" shall have the meaning set forth in Section 12.1.

1.106 "***Terminated Products***" shall have the meaning set forth in Section 12.5.7.

1.107 "***Territory***" means the entire world.

1.108 "***Third Party***" means a Person other than (a) Ultragenyx or any of its Affiliates and (b) Arcturus or any of its Affiliates.

1.109 "***Third Party Challenge***" shall have the meaning set forth in Section 8.4.2.

1.110 "***Ultragenyx Expansion Notice***" shall have the meaning set forth in Section 3.1.3.

1.111 "***Ultragenyx Expansion Option***" shall have the meaning set forth in Section 3.1.3.

1.112 "***Ultragenyx Indemnified Parties***" shall have the meaning set forth in Section 11.1.2.

1.113 "***UNA Oligomer***" means a molecule that incorporates UNA Oligomer Chemistry, and can express a Development Target or Reserved Target, as applicable, as part of its composition.

1.114 "***UNA Oligomer Chemistry***" means Arcturus' proprietary unlocked nucleomonomer agents, monomers and oligomers and UNA structures, but excluding any sequence of a Compound.

1.115 "***Valid Claim***" means a claim of any issued and unexpired patent or patent application within the Arcturus Patents or Product-Specific Patents, as applicable, that has not been held invalid or unenforceable by a final decision of a court or governmental agency of competent jurisdiction, which decision can no longer be appealed or was not appealed within the time allowed; *provided, however,* that if a claim of a pending patent application within the Arcturus Patents or Product-Specific Patents shall not have issued within […***…] years after the earliest filing date from which such claim takes priority, such claim shall not constitute a Valid Claim for the purposes of this Agreement unless and until a Patent Right issues with such claim (from and after which time the same would be deemed a Valid Claim).

1.116 "VAT'shall have the meaning set forth in Section 7.15.2.

ARTICLE 2

RESEARCH COLLABORATION

2.1 Management.

2.1.1 Overview. Within […***…] days after the Effective Date, the Parties shall establish a joint steering committee (the "***Joint Steering Committee***" or the "***JSC***") which shall manage the collaboration between the Parties.

2.1.2 Alliance Managers. Each of Ultragenyx and Arcturus shall appoint one representative who possesses a general understanding of development, regulatory, manufacturing and commercialization matters to act as its respective alliance manager(s) for this relationship (an "***Alliance Manager***"). Each Party may replace its respective Alliance Manager at any time upon written notice to the other in accordance with this Agreement. Each Alliance Manager shall be charged with creating and maintaining a collaborative work environment between the Parties. Each Alliance Manager will also be responsible for:

(a) providing a primary single point of communication responsible for the flow of communication and for seeking consensus both within the respective Party's organization and together with the other Party regarding key strategy and plan issues;

(b) ensuring awareness of the governance procedures and rules set forth herein and monitoring compliance therewith;

*****Confidential Treatment Requested**

(c) identifying and raising disputes to the JSC for discussion in a timely manner; and

(d) planning and coordinating internal and external communications in accordance with the terms of this Agreement.

The Alliance Managers shall have the right to attend all subcommittee meetings, as a non-voting member. Consistent with Section 2.1.3(c), each Alliance Manager may bring any matter to the attention of the JSC where such Alliance Manager reasonably believes that such matter requires attention of the JSC.

Within […***…] days after the Effective Date, each Party shall appoint and notify the other Party of the identity of their representative to act as its Alliance Manager under this Agreement.

2.1.3 Joint Steering Committee.

(a) Composition. The Joint Steering Committee shall be comprised of […***…] named representatives for each Party (or such other number as the Parties may agree) in addition to each Party's Alliance Manager (who are not members of the JSC). The JSC will be led by […***…] co-chairs, one (1) appointed by each of the Parties. Each Party may replace one or more of its representatives, in its sole discretion, effective upon written notice to the other Party of such change.

(b) Function and Powers of the JSC. The JSC shall, in accordance with the terms and conditions set forth in the Agreement:

(i) prepare and approve each Collaborative Development Plan and associated Budget for each Development Target;

(ii) prepare and approve amendments to the Collaborative Development Plan and associated Budget for each Development Target, and review progress against the goals in such plans;

(iii) oversee the implementation of the Collaborative Development Plan(s);

(iv) establish, direct and oversee any subcommittees, as appropriate;

(v) resolve disputed matters that may arise at the subcommittees;

(vi) review and discuss potential Targets for consideration as potential replacements for Reserved Targets;

(vii) review, discuss and decide if a Compound has achieved Optimized Lead Designation;

(viii) review and discuss and decide if a Product candidate has achieved PCC Designation;

(ix) keep minutes of JSC meetings that record all decisions and all actions recommended or taken in reasonable detail.

(x) perform any and all tasks and responsibilities that are expressly attributed to the JSC under this Agreement.

(c) Frequency of Meetings. The Joint Steering Committee shall meet at least once per quarter or more or less often as otherwise agreed by the Parties, and such meetings may be conducted by telephone, videoconference or in person as determined by the cochairs; provided that no less than […***…] meetings during each calendar year shall be conducted in person. Each Party may also call for special meetings of the Joint Steering Committee with reasonable prior written notice (it being agreed that at least […***…] business days shall constitute reasonable notice) to resolve particular matters requested by such Party and within the decisionmaking responsibility of the Joint Steering Committee. Each co-chair shall ensure that its Joint Steering Committee members receive adequate notice of such meetings. Each Party shall be responsible for all of its own expenses incurred in connection with participating in all such meetings. Drafts of the minutes shall be prepared and circulated to the members of the JSC by the Arcturus Alliance Manager within […***…] days after the meeting. Each member of the JSC may circulate comments on the draft minutes.

(d) Subcommittees. The JSC may establish and disband subcommittees as deemed necessary by the JSC. Except as expressly provided in this Agreement, no subcommittee shall have the authority to bind the Parties hereunder and each subcommittee shall report to the JSC. If a dispute arises which cannot be resolved by a subcommittee, such dispute shall be referred to the Joint Steering Committee for resolution under Section 2.1.5. Each Party shall be responsible for all of its own expenses incurred in connection with participating in all such meetings.

2.1.4 Cooperation. Each Party shall provide the JSC such information as required under each of the Collaborative Development Plans, or as reasonably requested by the other Party and reasonably available, relating to the progress of the goals or performance of activities under each of the Collaborative Development Plans.

2.1.5 Decisions. Other than as set forth herein, in order to make any decision required of it hereunder, the Joint Steering Committee must have present (in person, by videoconference or telephonically) at least the co-chair of each Party (or his/her designee for such meeting). Decisions of the JSC shall be by consensus, with each Party having one (1) vote. If the JSC cannot reach consensus or a dispute arises which cannot be resolved within the JSC within […***…]days, the co-chair of either Party may cause such dispute to be referred to the Designated Executive Officers for resolution within […***…] days. In the event that consensus cannot be reached with respect to a decision after a meeting of the Designated Executive Officers, then: (a) for a decision with respect to the technical application of LUNAR Nanoparticle Delivery Technology or UNA Oligomer Chemistry, the decision will be made by the Designated Executive Officer appointed by Arcturus; and (b) for all other

decisions, including decisions with respect to Product profile and formulation, decision as to whether to utilize the LUNAR Nanoparticle Delivery Technology (or any other deliver technology) in connection with the Product, and decisions with respect to advancement of Compounds in research and development, the decision will be made by the Designated Executive Officer appointed by Ultragenyx, provided that neither Party's Designated Executive Officer shall exercise its final decision making authority to increase in a material manner the other Party's contractual obligations or Collaborative Development Plan commitments, including that: (A) Arcturus's Designated Executive Officer shall not exercise such final decision making authority in a manner that would increase any Budget under any Collaborative Development Plan; and (B) Ultragenyx's Designated Executive Officer shall not exercise such final decision making authority to approve a Collaborative Development Plan or to amend a Collaborative Development Plan in a manner that would (1) require an increase in a Budget under such Collaborative Development Plan that Ultragenyx is not required to reimburse Arcturus for, or (2) requires Arcturus to hire additional FTEs that Ultragenyx has not agreed to reimburse Arcturus for.

2.1.6 Authority. The JSC and any subcommittee shall have only the powers assigned expressly to it in this Article 2 and elsewhere in this Agreement, and shall not have any power to amend, modify or waive compliance with this Agreement. In furtherance thereof, each Party shall retain the rights, powers and discretion granted to it under this Agreement and no such rights, powers or discretion shall be delegated or vested in the JSC or subcommittee unless such delegation or vesting of rights is expressly provided for in this Agreement or the Parties expressly so agree in writing.

2.1.7 Discontinuation of JSC. The JSC shall continue to exist until the Parties mutually agree to disband the JSC; provided, that once all Collaborative Development under the Collaborative Development Plans has been completed, the JSC shall meet only […***…] per year for discussion purposes and shall have no decision-making authority. Once all Collaborative Development under a Collaborative Development Plan has been completed for a Development Target, and Ultragenyx has exercised the option in Section 5.2 for such Development Target, Ultragenyx shall have control over the Development and Commercialization of Compounds and Products with respect to such Development Target, subject to the terms and conditions of this Agreement.

ARTICLE 3

TARGET SELECTION; EXCLUSIVITY

3.1 Development Targets.

3.1.1 Development Target Selection. As of the Effective Date, Ultragenyx has elected to initiate Collaborative Development with respect to the two (2) Targets set forth on **Exhibit B** (each, a "***Development Target***").

3.1.2 Replacement of Development Targets. During the Reserved Target Exclusivity Period for any particular Reserved Target(s) (as further set forth in Section 3.2), Ultragenyx shall have the right (so long as there are no outstanding, overdue payments due to

Arcturus under this Agreement), at […***…] to Ultragenyx …***…], to replace any of the Development Target(s) with a Reserved Target (each, a "***Replacement Target***") by written notification to Arcturus. Effective upon any such notification, (a) the list of Development Targets set forth in **Exhibit B** shall automatically be amended by substituting the Replacement Target for the Development Target (and such substitution shall be noted in **Exhibit B**), and (b) the list of Reserved Targets set forth on **Exhibit C** shall automatically be amended by substituting the Discontinued Target for the Reserved Target (and such substitution shall be noted in **Exhibit C**). The Parties shall promptly generate a Collaborative Development Plan for such Replacement Target in accordance with Section 4.1.

3.1.3 Ultragenyx Expansion Option. During the Reserved Target Exclusivity Period (so long as there are no outstanding, overdue payments due to Arcturus under this Agreement), on a Reserved Target-by-Reserved Target basis, Ultragenyx shall have the option to convert […***…] to an additional Development Target by providing Arcturus with written notification (such option, the "***Ultragenyx Expansion Option***" and such notification, the "***Ultragenyx Expansion Notice***") and concurrently making the Expansion Option Payment under Section 7.2, whereupon (a) the list of Development Targets set forth on **Exhibit B** shall automatically be amended by adding such Target; (b) the list of Reserved Targets set forth on **Exhibit C** shall be amended by deleting such Target. The Parties shall promptly generate a Collaborative Development Plan for such new Development Target in accordance with Section 4.1. For avoidance of doubt, the conversion of a Reserved Target to an additional Development Target shall not permit Ultragenyx to add an additional Reserved Target in place of such converted Reserved Target.

3.2 Reserved Targets.

3.2.1 Reserved Target Selection. As of the Effective Date, the Parties have agreed to a list of eight (8) Targets for which Ultragenyx will have the exclusive right to evaluate whether it desires to initiate Collaborative Development, such list set forth on **Exhibit C** (each, a "***Reserved Target***"). The Reserved Targets were chosen based on potential relevance to the treatment of Rare […***…] Diseases. Ultragenyx shall only have the right to initiate Collaborative Development under this Agreement with respect to a particular Reserved Target by converting such Reserved Target into a Replacement Target pursuant to Section 3.1.2 or by exercising its option to designate such Reserved Target as an Expansion Target pursuant to Section 3.1.3; provided, that Ultragenyx shall have the right to conduct preliminary non-clinical research with respect to Reserved Targets and related compounds to evaluate whether it wishes to convert such Reserved target into a Development Target and, at Ultragenyx's request and expense, Arcturus shall cooperate with Ultragenyx to conduct activities with respect to such Reserved Targets to facilitate such evaluation.

3.2.2 New Targets.

(a) During the Reserved Target Exclusivity Period, Ultragenyx shall have the right to replace each Reserved Target with a proposed new Target by providing Arcturus with written notice thereof; provided that as of the time Ultragenyx provides such notification, (i) Arcturus has not already granted an option or a license to any Third Party to

develop and/or commercialize products with respect to such Target, or otherwise has entered into an agreement with a Third Party that prevents Arcturus from accepting such Target as a Reserved Target, (ii) Arcturus has not commenced a bona fide internal research and development program directed to such Target, and (iii) such Target was not previously subject to Third Party rights or obligations to Third Parties under an agreement between Arcturus and a Third Party and returned to Arcturus, where the Target program has been advanced to demonstrate proof of concept activity in an animal model. Ultragenyx shall have the right to make no more than a total of eight (8) such replacements pursuant to this Section 3.2.2.

(b) Promptly upon the receipt of such notification and subject to the foregoing, the list of Reserved Targets set forth in **Exhibit C** shall automatically be amended accordingly. For the avoidance of doubt, the maximum number of Reserved Targets is eight (8).

3.3 Development Target Exclusivity.

3.3.1 Arcturus Development Target Exclusivity.

(a) mRNA and UNA Oligomer Exclusivity. With respect to a particular Development Target, during the corresponding Development Target Exclusivity Period, Arcturus shall not conduct or participate in, or advise, assist or intentionally enable any Third Party to conduct or participate in the preclinical or clinical development, manufacture or commercialization of any product containing mRNA (including Modified mRNA) or UNA Oligomer with respect to such Development Target. The "***Development Target Exclusivity Period***" means the period beginning on the date that a Target becomes a Development Target and ending on the earlier of (i) the date that such Development Target becomes a Discontinued Target or (ii) termination of the Agreement with respect to such Development Target.

(b) Right of First Negotiation with Respect to RNA Products. On a Development Target-by-Development Target basis, during the corresponding Development Target Exclusivity Period, Arcturus hereby grants Ultragenyx an exclusive right of first negotiation to obtain an exclusive license to Exploit RNA Products other than a product described under Section 3.3.l(a) with respect to each Development Target within the Territory (each, a "***Development Target ROFN***") as further described herein. Arcturus shall provide written notice to Ultragenyx promptly upon Arcturus' decision to seek a partner for the research, development and/or commercialization of any such RNA Product with respect to a Development Target ("***Development Target ROFN Notice***"). Ultragenyx shall have […***…]days from its receipt of the Development Target ROFN Notice to notify Arcturus if Ultragenyx desires to exercise its Development Target ROFN with respect to such Development Target and upon such notice from Ultragenyx, Arcturus and Ultragenyx will negotiate such rights in good faith for a period of […***…] days (the "***Development Target ROFN Negotiation Period***"). If, at the end of the Development Target ROFN Negotiation Period, Arcturus and Ultragenyx are unable to reach agreement on such terms, or if Ultragenyx does not notify Arcturus of its interest in such Development Target during such […***…] day period, Arcturus shall be free to grant a license or enter into any other arrangement with a Third Party to Exploit such RNA Products with respect to such Development Target; provided, for clarity, that this Section 3.3.1(b) shall not relieve Arcturus of its restrictions under Section 3.3.1(a) or (c).

(c) LUNAR Exclusivity. Within the first […***…] years after the Effective Date, Arcturus shall not conduct or participate in, or advise, assist or intentionally enable any Third Party to conduct or participate in the preclinical or clinical development, manufacture or commercialization of any product utilizing LUNAR Nanoparticle Delivery Technology with respect to a Development Target.

3.3.2 Ultragenyx Development Target Exclusivity. With respect to a particular Development Target, during the corresponding Development Target Exclusivity Period, Ultragenyx shall not conduct or participate in, or advise, assist or intentionally enable any Third Party to conduct or participate in the preclinical or clinical development, manufacture or commercialization of any product containing any mRNA or UNA Oligomer with respect to such Development Target.

3.3.3 Reserved Target Exclusivity. With respect to each Reserved Target, during the Reserved Target Exclusivity Period, Arcturus shall not conduct or participate in, or advise, assist or intentionally enable any Third Party to conduct or participate in the preclinical or clinical development, manufacture or commercialization of (a) any product containing mRNA, including Modified mRNA, or UNA Oligomer with respect to such Reserved Target, or (b) without offering Ultragenyx the right of first negotiation comparable to that described in Section 3.3.1(b), any other RNA Product or a product utilizing the LUNAR Delivery Technology with respect to such Reserved Target. The foregoing restriction shall expire on the […***…] anniversary of the Effective Date (such period for each Reserved Target, the "***Reserved Target Exclusivity Period***"), provided, that the Reserved Target Exclusivity Period may be extended, upon written notice to Arcturus, on a Reserved Target-by-Reserved Target basis for up to […***…] additional […***…] year period(s) by paying the Exclusivity Extension Fee pursuant to Section 7.3. For clarity, Section 3.3.1 and not this Section 3.3.3 shall apply to any Reserved Target that becomes a Development Target pursuant to Section 3.1.2 or Section 3.1.3.

3.4 Reserved Target Right of First Negotiation. On a Reserved Target-by-Reserved Target basis, after the Reserved Target Exclusivity Period for such Reserved Target, Arcturus hereby grants Ultragenyx an exclusive right of first negotiation to obtain an exclusive license to Exploit RNA Products with respect to each Reserved Target within the Territory (each, a "***Reserved Target ROFN***") as further described herein. For avoidance of doubt, the Reserved Target ROFN shall not apply to any Target that had been a Reserved Target and was replaced under Section 3.2.2 (New Targets). Arcturus shall provide written notice to Ultragenyx promptly upon its decision to seek a partner for the research, development and/or commercialization of any RNA Product with respect to a Reserved Target ("***Reserved Target ROFN Notice***"). Ultragenyx shall have a period of […***…] days from its receipt of the Reserved Target ROFN Notice to inform Arcturus if it desires to exercise its Reserved Target ROFN with respect to such Reserved Target and upon such notice from Ultragenyx, Arcturus and Ultragenyx will negotiate such rights in good faith for a period of […***…] days (the "***Reserved Target ROFN Negotiation Period***"). If, at the end of the Reserved Target ROFN Negotiation Period, Arcturus and Ultragenyx are unable to reach agreement on such terms, or if Ultragenyx does not notify Arcturus of its interest in such Reserved Target during such […***…] day period, Arcturus shall be free to grant a license or enter into any other arrangement with a Third Party to

Exploit RNA Products with respect to such Reserved Target; provided, for clarity, that this Section 3.4 shall not relieve Arcturus of its restrictions under Section 3.3.3.

3.5 Discontinued Targets. This Section 3.5 shall apply to (i) all Development Targets that are discontinued under Section 3.1.2 prior to Ultragenyx's exercise of its option under Section 5.2.2 with respect to such Development Target and (ii) all Development Targets for which Ultragenyx does not exercise the option set forth in Section 5.2.1 prior to the expiration of the option period (each of such Development Targets under clause (i) or (ii) referred to herein as a "***Discontinued Target***"). For clarity, for any Development Target for which Ultragenyx has exercised its option under Section 5.2.2, the discontinuation of the Parties' collaboration with respect to such Development Target under this Agreement shall be governed by Article 12 and not by this Section 3.5.

3.5.1 For each Discontinued Target: (i) all licenses granted to Ultragenyx under this Agreement with respect to such Discontinued Target will terminate, (ii) Ultragenyx shall grant and hereby grants to Arcturus an exclusive, royalty-bearing (in accordance with Section 3.5.2) worldwide, perpetual (provided that Arcturus fulfills its payment obligations under Section 3.5.2, subject to breach/cure procedures comparable to that described in Section 12.2) license, with right of sublicense, under (a) all Product-Specific Technology, (b) Collaboration Technology (including Joint Collaboration Technology) and (c) other Patent Rights and Know-How that as of the date of discontinuation of the Discontinued Target had been practiced or used by Ultragenyx under this Agreement, in each case to the extent Controlled by Ultragenyx and/or its Affiliates, to Exploit Compounds and Products with respect to such Discontinued Target ("***Discontinued Products***"), provided that such license shall not include the right for Arcturus to Exploit any type of RNA Product other than an mRNA, including Modified mRNA, or UNA Oligomer type of RNA Product unless otherwise expressly agreed in writing by the Parties; (iii) Ultragenyx shall, within […***…] days of the applicable Development Target becoming a Discontinued Target and at Arcturus's expense, transfer to Arcturus available data and information relating to such Discontinued Products Controlled by Ultragenyx and in Ultragenyx's possession at such time, (iv) if mutually agreed by the Parties, Ultragenyx shall transfer to Arcturus the responsibility for the prosecution and maintenance of all Product-Specific Patents that specifically pertain to Compounds and/or Products with respect to the Discontinued Target and Arcturus shall perform such prosecution and maintenance activities in accordance with Section 8.2.2 and (v) Arcturus shall have the first right to enforce such Product-Specific Patents in a Product Infringement with respect to Compounds and/or Products with respect to the Discontinued Target in the manner similar to Ultragenyx's enforcement rights described in Section 8.

3.5.2 Arcturus shall pay Ultragenyx royalties on Net Sales of Discontinued Products, on a country-by-country basis, until the expiration of the last Valid Claim of the Product-Specific Patents or Patent Rights licensed by Ultragenyx to Arcturus under Section 3.5.1 covering such Discontinued Product in such country at the following rates depending on the stage of development for the corresponding Discontinued Target at the time of such discontinuation: (i) […***…] percent ([…***…]%) if the applicable Development Target becomes a Discontinued Target prior to the first Optimized Lead Designation for any Discontinued Product for such Discontinued Target; (ii) […***…] percent ([…***…]%) if the applicable Development Target becomes a Discontinued Target after the first Optimized Lead Designation for any

Discontinued Product for such Discontinued Target and prior to the first PCC Designation of such Discontinued Target; and (iii) […***…] percent ([…***…]%) if the applicable Development Target becomes a Discontinued Target after the first PCC Designation of any Discontinued Product for such Discontinued Target. For the purposes of this Section 3.5.2, the definition of "Net Sales" and "First Commercial Sale" shall apply mutatis mutandis to sales of any Discontinued Product sold by Arcturus, its Affiliates or sublicensees and the definition of "Valid Claim" shall apply mutatis mutandis to claims of the Product-Specific Patents and Collaboration Patents (including Joint Collaboration Patents) and Patent Rights licensed by Ultragenyx to Arcturus under Section 3.5.1.

3.6 Right of First Negotiation with Respect to Ultragenyx Pipeline Targets. The Parties acknowledge that Ultragenyx is pursuing development of pharmaceutical products with respect to those targets set forth on **Exhibit F**. Within the first […***…] years after the Effective Date, in the event Arcturus desires to pursue research and development work with respect to such targets, Arcturus shall first notify Ultragenyx in writing and the Parties shall discuss in good faith as to any potential collaboration with respect to such targets for a period not to exceed […***…] days unless the Parties otherwise agree.

3.7 Acknowledgment. Ultragenyx acknowledges and agrees that (a) the designation of Targets is at Ultragenyx's sole discretion (provided, for avoidance of doubt, that such Targets must meet the criteria set forth in the definition of "Targets"), and (b) Arcturus makes no representations or warranties as to whether any Target is appropriate for therapeutic intervention or whether a successful drug can be developed on the basis of Arcturus Technology.

3.8 Exclusivity with Respect to Acquirers. Sections 3.3, 3.4 and 3.5 shall have no effect with respect to pre-existing or subsequently acquired or initiated programs of an Acquirer of a Party, provided that such programs are carried out independent of the activities of the Parties under this Agreement and without the reference, use or access to any Collaboration Technology or the other Party's Confidential Information.

ARTICLE 4

COLLABORATIVE DEVELOPMENT

4.1 Collaborative Development Plan. The JSC shall establish a Collaborative Development Plan with respect to each Development Target (including the allocation of activities between the Parties), as well as the corresponding Budget and timeline of activities. The Collaborative Development Plans and Budgets for the Development Targets as of the Effective Date are attached hereto as Exhibit D. The Budget for each Development Target shall include at least […***…] Dollars ($[…***…]) for Collaborative Development Costs to be incurred by Arcturus and reimbursed by Ultragenyx for the first […***…] years of the applicable Collaborative Development Plan combined. The Parties intend that the Collaborative Development Plan shall address activities prior to the first PCC Designation of the first Product candidate with respect to such Target. Each Collaborative Development Plan shall set forth the Opt-In Data Package. "***Opt-In Data Package***" means the data and materials to be provided by Arcturus to Ultragenyx for the purpose of enabling Ultragenyx to make an informed decision

regarding its option, which data and materials shall be described in each Collaborative Development Plan, as may be updated from time to time by the JSC.

4.2 Collaborative Development of Products. Upon approval by the JSC of the applicable Collaborative Development Plan and associated Budget, each Party shall commence and conduct Collaborative Development activities assigned to it under, and in accordance with, such Collaborative Development Plan in good scientific manner and in accordance with all applicable Laws. It is the Parties' intent for Arcturus to be primarily responsible for identification and optimization of Compounds with respect to each Development Target for potential Product candidates in accordance with the Collaborative Development Plan, and for Ultragenyx to be primarily responsible for carrying out the in vitro and in vivo efficacy and proof-of-concept studies, including in animal disease models, with respect to each such Product candidate. For clarity, Ultragenyx shall have the right to generate modified products or derivatives incorporating the Compound identified by Arcturus under the Collaborative Development Plan, provided that (i) Ultragenyx shall promptly identify in writing all such modified products and derivatives to Arcturus and (ii) such modified products and derivatives shall be deemed as Products under this Agreement. Ultragenyx shall be solely responsible, at its discretion, for the development, manufacture and, if successful, commercialization of any and all Products after their respective PCC Designation.

4.3 Budget Updates. In the event that Arcturus determines that the Budget is not likely to be sufficient to fund adequate resources to timely complete the objectives of the Collaborative Development Plan due to unforeseen events or results, the Parties shall, through the JSC, meet and discuss in good faith an update to the Budget.

4.4 Subcontracting. Either Party may engage its Affiliates, or Third Party subcontractors (including contract research organizations and contract manufacturing organizations) to perform certain of its obligations under this Agreement; provided that Arcturus shall obtain the prior written consent of Ultragenyx for any such subcontractor of Arcturus to perform Collaborative Development under this Agreement, which consent shall not be unreasonably withheld, delayed or conditioned; provided further that Ultragenyx shall obtain the prior written consent of Arcturus for any such subcontractor of Ultragenyx to perform Collaborative Development under this Agreement that involves the application or modification of Arcturus Platform Technology. Any Third Party subcontractor to be engaged by a Party to perform its obligations set forth in this Agreement will meet the qualifications typically required by such Party for the performance of work similar in scope and complexity to the subcontracted activity. The activities of any of each Party's Third Party subcontractors will be considered activities of such Party under this Agreement. Each Party will be responsible for ensuring compliance by any of its Third Party subcontractors with the terms of this Agreement, as if such Third Party(ies) are such Party hereunder.

4.5 Records.

4.5.1 Research Records. Each Party shall maintain, and cause its employees, subcontractors and consultants to maintain, records and laboratory notebooks of all data generated by or on behalf of such Party under each Collaborative Development Plan in sufficient detail and in a good scientific manner appropriate for (i) regulatory purposes, and

(ii) obtaining and maintaining intellectual property rights and protections, including Patent Rights. Such records and laboratory notebooks shall be complete and accurate in all material respects and shall fully and properly reflect all work done, data and developments made, and results achieved. Laboratory notebooks shall be signed, dated and witnessed on a regular basis.

4.5.2 JSC Reports. Each Party shall keep the JSC informed of the progress of its activities under each Collaborative Development Plan, including a detailed written quarterly report of its progress under each Collaborative Development Plan.

4.5.3 Data Sharing. Arcturus shall, at Ultragenyx's written request, promptly make available to Ultragenyx all topline data generated by Arcturus and its Affiliates or on their behalf under each Collaborative Development Plan, and any other data and materials described in such Collaborative Development Plan for delivery by Arcturus to Ultragenyx or as otherwise reasonably requested by Ultragenyx, including all Know-How in the Opt-In Data Package, and allow Ultragenyx to inspect and, to the extent necessary or useful for regulatory or intellectual property protection purposes, copy such records.

4.6 Materials Transfer. If a Party provides Materials to the other Party for use by the other Party in performance of this Agreement, all such Materials shall be used by the receiving Party in accordance with the terms and conditions of this Agreement solely for purposes of performing this Agreement, and the receiving Party shall not transfer such Materials to any Third Party unless expressly contemplated by this Agreement (including the Collaborative Development Plan). The transferring Party may require that the transfer of the Materials be subject to a reasonable material transfer agreement consistent with the objectives of such transfer. All such Materials shall be retained and used solely to perform this Agreement, be returned to the providing Party (or destroyed as may be requested in writing) promptly following the end of the Term or earlier upon request by the providing Party.

4.7 Research Efforts. Each Party shall use Commercially Reasonable Efforts to perform the Collaborative Development, including its responsibilities under the Collaborative Development Plan.

ARTICLE 5

OPTION AND LICENSE GRANTS

5.1 Development License to Ultragenyx. Arcturus hereby grants to Ultragenyx a co-exclusive, royalty-free, sublicenseable (but only in accordance with Section 5.3) license under Arcturus Technology and under Collaboration Technology (including Arcturus' interest in the Joint Collaboration Technology) to conduct Collaborative Development of Development Targets, Compounds and Products in the Licensed Field in the Territory and to evaluate whether to exercise its option under Section 5.2. This license shall be in effect only during the Reserved Target Exclusivity Term with respect to Development Targets and Reserved Targets, and shall be in effect until the expiration of the option under Section 5.2.2 with respect to Compounds and Products that are directly related to Development Targets and Reserved Targets.

5.2 Development and Commercialization Option.

5.2.1 Grant of Development and Commercialization Option. On a Development Target-by-Development Target basis, Arcturus hereby grants to Ultragenyx and its Affiliates the exclusive option, exercisable at Ultragenyx's sole discretion in accordance with Section 5.2.2, to obtain an exclusive license with respect to such Development Target as described in Section 5.2.3.

5.2.2 Option Exercise. Ultragenyx shall have the right, but not the obligation, to exercise the option set forth in Section 5.2.1 on a Development Target-byDevelopment Target basis, during the period of time commencing upon the Effective Date and ending upon the earlier of (i) […***…] days following the first PCC Designation for the first Product candidate with respect to such Development Target or (ii) […***…] year after the Plan Completion Date for the applicable Collaborative Development Plan for such Development Target and Arcturus delivers to Ultragenyx the Opt-In Data Package, by notifying Arcturus and concurrently making the applicable PCC option exercise payment for such Development Target under Section 7.6, whereupon the license pursuant to Section 5.2.3 shall become effective with respect to such Development Target. "***Plan Completion Date***" means the date that the activities set forth in the Collaborative Development Plan (as amended, if applicable) are completed; provided, however, that the Plan Completion Date shall not extend beyond the date that is […***…] years from the initially scheduled completion date of the Collaborative Development Plan, unless Ultragenyx is funding bona fide Development activities under such Collaborative Development Plan (i.e., expending no less than […***…] Dollars ($[…***…]) under such Collaborative Development Plan (calculated to include internal and out-of-pocket expenses incurred by or on behalf of Ultragenyx and/or by or on behalf of Arcturus and reimbursed by Ultragenyx) for each […***…]-month period after such […***…] year extension); provided further that the initially scheduled completion date may be extended to the extent the Collaborative Development Plan is delayed due to any failure by Arcturus in conducting its activities under the Collaborative Development Plan where such failure has a material adverse impact on the Collaborative Development Plan.

5.2.3 Development and Commercialization License. Subject to the terms and conditions of this Agreement, effective automatically upon and only in the event of Ultragenyx's exercise of its option pursuant to Section 5.2.2, with respect to each Development Target, Arcturus hereby grants to Ultragenyx and its Affiliates an exclusive (even as to Arcturus and its Affiliates), royalty bearing, sublicenseable (but only in accordance with Section 5.3), license under Arcturus Technology and under Collaboration Technology (including Arcturus' interest in the Joint Collaboration Technology) to Exploit the Compounds and Products (including their components) with respect to such Development Target in the Licensed Field in the Territory. For avoidance of doubt, the foregoing does not include the right for Ultragenyx to practice Arcturus Platform Technology to Exploit compounds that are not Compounds.

5.3 Sublicenses. Ultragenyx and its Affiliates shall be entitled, without the prior consent of Arcturus, to grant one or more sublicenses under the licenses granted to Ultragenyx under Section 5.2.3 in full or in part to Develop and/or Commercialize the Product, by means of written agreement to one or more Third Parties (with the right to sublicense through multiple tiers), *provided*, *however,* that as a condition precedent to and requirement of any such sublicense: (a) any such permitted sublicense shall (i) be consistent with and subject to the terms

and conditions of this Agreement, (ii) require such Sublicense to comply with all applicable terms of this Agreement, including keeping books and records and permitting audit of such books and records as required in Section 7.14; and (b) Ultragenyx will continue to be responsible for full performance of Ultragenyx's obligations under the Agreement and will be responsible for all actions of such Sublicensee as if such Sublicensee were Ultragenyx hereunder. Ultragenyx and its Affiliates shall be entitled to grant one or more sublicenses under the license granted to Ultragenyx under Section 5.1 without the prior written consent of Arcturus, and such license shall be subject to the same terms as set forth above for sublicenses under the license granted under Section 5.2.3. Ultragenyx shall, within […***…] days of execution, provide Arcturus with a fully executed copy of each sublicense agreement, and all amendments thereto and all related side agreements, each of which may be redacted of confidential information not reasonably required for Arcturus to verify that such agreement complies with this Section 5.3. All such agreements and amendments shall be deemed Ultragenyx's Confidential Information.

5.4 Delivery of Arcturus Know-How. From time to time during the Term, Arcturus shall deliver to Ultragenyx copies or summaries of the Arcturus Know-How generated by Arcturus pursuant to the Collaborative Development that may contain patentable subject matter or is necessary or useful for the Exploitation of any Compound and/or Product.

5.5 No Other Rights. Each Party acknowledges that the rights and licenses granted to it under this Article 5 and elsewhere in this Agreement are limited to the scope expressly granted. Accordingly, except for the rights expressly granted under this Agreement, no right, title, or interest of any nature whatsoever is granted whether by implication, estoppel, reliance, or otherwise, by the other Party to such Party. All rights that are not specifically granted herein are reserved to the possessing Party.

ARTICLE 6

DEVELOPMENT, REGULATORY AND COMMERCIAL MATTERS

6.1 Development. Following the Effective Date and at all times during the Term (except as expressly stated otherwise herein), Ultragenyx shall be responsible for, and shall bear all costs associated with, all preclinical, non-clinical and clinical development and manufacture of Products (including Out-of-Pocket Costs of Arcturus incurred in connection with the activities assigned to Arcturus under the Collaborative Development Plan to the extent in accordance with the applicable Budget).

6.2 Regulatory.

6.2.1 Ultragenyx Right. Ultragenyx will be solely responsible for the preparation, submission and maintenance of all Regulatory Filings and Regulatory Approvals. Ultragenyx will own all right, title and interest in and to any and all Regulatory Filings and Regulatory Approvals for Products and all such Regulatory Filings and Regulatory Approvals will be held in the name of Ultragenyx. All decisions concerning the Regulatory Approval of Products including the clinical and regulatory strategy of Products covered under this Agreement shall be within the sole discretion of Ultragenyx. Ultragenyx shall have the sole responsibility for communicating with any Regulatory Authority regarding any application for

a Regulatory Approval or any Regulatory Approval once granted, and for filing all reports required to be filed in order to maintain any Regulatory Approvals granted for Products in the Territory.

6.2.2 Cooperation. At Ultragenyx's request and expense, Arcturus will cooperate reasonably with Ultragenyx and provide reasonable assistance to Ultragenyx in preparing, submitting and maintaining any Regulatory Filings and/or Regulatory Approvals for Products, including drafting specified sections as requested by Ultragenyx. Ultragenyx and its designees shall have a right of reference to Arcturus's and/or its Affiliate's drug master file(s) to extent that such reference is reasonably required in order for Ultragenyx to obtain and maintain Regulatory Approvals in any country, if any, and any other Regulatory Filings maintained by or on behalf of Arcturus anywhere in the world related to any Products. Arcturus will not interface with any Regulatory Authority with respect to any Product at any stage of development without Ultragenyx's prior written consent.

6.3 Commercialization. Ultragenyx shall be responsible for, and shall bear all costs associated with, the commercialization of Products, including the distribution, marketing and sales activities with respect to Products.

6.4 Diligence. Ultragenyx shall (directly and/or through one or more Affiliates and/or Sublicensees) use Commercially Reasonable Efforts to Develop, obtain Regulatory Approvals for Commercialization of, and, Commercialize at least one (1) Product with respect to each Development Target for which Ultragenyx has exercised its option under Section 5.2. For the avoidance of doubt such Commercially Reasonable Efforts shall include efforts specifically directed to Regulatory Approvals within each of the United States, EU and Japan.

6.5 Reports. On an Development Target-by- Development Target basis, until the First Commercial Sale of a Product relating to such Development Target, Ultragenyx shall submit to Arcturus annual written reports providing a status of Ultragenyx's and its Affiliates' and Sublicensees' activities related to the Exploitation of such Products during the preceding […***…] months. Upon Arcturus' written request but not to exceed once annually, Ultragenyx shall provide written summaries of its and its Affiliates' and Sublicensees' major marketing, promotional and sales activities and results. In performing its marketing and promotion activities in respect of Products, Ultragenyx and its Affiliates and Sublicensees shall comply with all Law concerning such promotional activities. All such reports provided under this Section 6.5 shall be deemed Ultragenyx's Confidential Information.

ARTICLE 7

FINANCIAL TERMS

7.1 Upfront Payment. As partial consideration for the rights granted to Ultragenyx by Arcturus under this Agreement, Ultragenyx will pay to Arcturus a one-time payment of Ten Million Dollars (US$10,000,000.00) within fifteen (15) days after the Effective Date.

7.2 Expansion Option Payment. For […***…] Reserved Target for which Ultragenyx exercises the Ultragenyx Expansion Option under Section 3.1.3, Ultragenyx will pay to Arcturus

a one-time payment equal to […***…] Dollars (US$[…***…]), less all Exclusivity Extension Fee(s) paid for such Reserved Target paid under Section 7.3 (each, an "***Expansion Option Payment***"). For clarity, exercise of Ultragenyx's right to replace a Development Target with a Reserved Target pursuant to Section 3.1.2 shall be […***…] to Ultragenyx and […***…] pursuant to this Section 7.2.

7.3 Exclusivity Extension Fee. On a Reserved Target-by-Reserved Target basis, Ultragenyx shall have the right, in its sole discretion, to extend the Reserved Target Exclusivity Period for any particular Reserved Target by up to […***…] additional […***…]year period(s) by paying to Arcturus a non-refundable payment of […***…] Dollars (US$[…***…]) for each such […***…] year period (each, an "***Exclusivity Extension Fee***"). All Exclusivity Extension Fees paid for a particular Reserved Target shall be fully creditable against any Expansion Option Payment due for such Reserved Target pursuant to Section 7.2.

7.4 Collaborative Development Costs. Ultragenyx shall reimburse Arcturus for all FTE Costs and Out-of-Pocket Costs incurred by Arcturus in carrying out the activities assigned to it under each Collaborative Development Plan ("***Collaborative Development Costs***") in accordance with the applicable Budget. Arcturus shall invoice Ultragenyx on a […***…] basis in advance for all Collaborative Development Costs forecasted by Arcturus to be incurred by Arcturus during the upcoming calendar quarter. Arcturus shall invoice Ultragenyx on a quarterly basis within […***…] days after the end of each calendar quarter for all Collaborative Development Costs actually incurred by Arcturus during such calendar quarter, minus the advance payment made by Ultragenyx for such calendar quarter. For Collaborative Development Costs paid by Ultragenyx but not incurred by Arcturus during any given calendar quarter, such payments will be credited against subsequent invoices and if no further Collaborative Development is being conducted under this Agreement by Arcturus, Arcturus shall promptly refund any such payment to Ultragenyx. Invoices shall include reasonable documentation for such Collaborative Development Costs, to the extent consistent with the amount set forth in the Budget for such activity. Ultragenyx shall pay good faith undisputed portions of each Arcturus invoice, and each other undisputed amount payable by Ultragenyx hereunder, within […***…] days of its receipt thereof. If Ultragenyx wishes to withhold a disputed amount under any invoice, it must notify Arcturus of such dispute within the original time for payment, and shall concurrently provide Arcturus with a written explanation of such dispute. Arcturus may then inform the Alliance Managers of such dispute in which case they shall work diligently and in good faith to resolve the dispute as quickly as possible. If the Alliance Managers cannot resolve the dispute, they shall refer it to the JSC. If Ultragenyx fails to make any undisputed payments when due, or if Ultragenyx withholds an amount equal to […***…] percent ([…***…]%) or more of the amount budgeted for the period subject to the disputed invoiced, then Arcturus may, upon […***…] days' notice to Ultragenyx and without limiting Arcturus' other rights or remedies, suspend performance of the Collaborative Development Plan.

7.5 Optimized Lead Milestone. On a Development Target-by-Development Target basis, within […***…] days after the first Optimized Lead Designation for the first Product with respect to such Development Target, Ultragenyx shall pay Arcturus a one-time milestone payment of […***…] ($[…***…]).

7.6 Option Exercise Fee. For each Development Target for which Ultragenyx exercises its option under Section 5.2, within […***…] days after such option exercise, Ultragenyx shall pay Arcturus a one-time, non-refundable, non-creditable option exercise fee, in the amount of: (a) […***…] USD ($[…***…]) for each of the first […***…] Development Targets for which Ultragenyx exercises such option, if any; (b) […***…] USD ($[…***…]) for the […***…] Development Target for which Ultragenyx exercises such option, if any; (c) […***…] USD ($[…***…]) for the […***…] Development Target for which Ultragenyx exercises such option, if any; (d) […***…] USD ($[…***…]) for the […***…] through […***…] Development Target for which Ultragenyx exercises such option, if any. On a Development Target-by-Development Target basis, in the event that the Exploitation of Products with respect to such Development Target does not utilize the LUNAR Nanoparticle Delivery Technology Covered by either an Arcturus Patent and/or a Product-Specific Patent or another RNA delivery technology Covered by an Arcturus Patent, then the option exercise fee with respect to such Development Target shall be reduced by […***…] percent ([…***…]%).

7.7 Development, Regulatory and Commercial Milestone Payments After Option Exercise.

7.7.1 Development and Regulatory Milestones. On a Development Targetby-Development Target basis, Ultragenyx shall notify Arcturus in writing within […***…] days of the first achievement of each of the corresponding milestone events set forth below by a Product with respect to such Development Target. Following receipt of such notice, Arcturus shall invoice Ultragenyx for, and Ultragenyx shall pay to Arcturus the following one-time milestone payments (each, a "***Development Milestone Payment***") within […***…] days of its receipt of such invoice:

Milestone Event	Milestone Payment
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]

*****Confidential Treatment Requested**

For clarity, each Development Milestone Payment is payable only once per Development Target and the maximum amount payable under this Section 7.7.1 is Forty-Nine Million Dollars ($49,000,000) per Development Target.

7.7.2 Commercial Milestone Payments. On a Development Target-byDevelopment Target basis, Ultragenyx shall notify Arcturus in writing within […***…] days following the end of the calendar year during which the corresponding commercial milestone events set forth below with respect to Products with respect to such Development Target is achieved. Following receipt of such notice, Arcturus shall invoice Ultragenyx for, and Ultragenyx shall pay the following one-time (per Development Target), non-refundable, noncreditable milestone payments within […***…] days of its receipt of such invoice:

Milestone Event	Milestone Payment
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]

7.7.3 No Use of Arcturus Delivery Technology. On a Product-by-Product basis, in the event that the Exploitation of a Product in any given country within the Territory does not utilize the LUNAR Nanoparticle Delivery Technology Covered by either an Arcturus Patent and/or a Product-Specific Patent or another RNA delivery technology Covered by an Arcturus Patent, then the corresponding milestone payment(s) set forth in Section 7.7.1 and payable in such country with respect to such Product shall be reduced by […***…] percent ([…***…]%).

7.8 Royalties.

7.8.1 Royalty Rate. Ultragenyx shall pay to Arcturus with respect to all Products, royalties on Net Sales of such Products during the Royalty Term for each such Product, on a Product-by-Product and country-by-country basis. Such Net Sales for Products shall be aggregated for all Products with respect to the same Development Target in order to determine the royalty rate applicable to the corresponding incremental portion of such aggregate annual Net Sales, as set forth in the table below.

Aggregate Annual Net Sales	Royalty Rate
[…***…]	[…***…]%

[…***…]	[…***…]%
[…***…]	[…***…]%

7.8.2 Royalty Report and Payments. On a Product-by- Product and countryby-country basis, after the First Commercial Sale of the first Product and until expiration of the last applicable Royalty Term, Ultragenyx shall prepare and deliver to Arcturus royalty reports of the sale of Products by each Selling Party for each calendar quarter within […***…] days of the end of each such calendar quarter specifying in the aggregate and on a Product-by-Product and country-by-country basis, the following information with respect to such calendar quarter: (a) total gross amounts for Products sold or otherwise disposed of by such Selling Party; (b) amounts deducted in accordance with the definition of Net Sales from gross amounts to calculate Net Sales; (c) Net Sales; and (d) royalties payable. Royalties accrued during any given calendar quarter will be payable concurrently with submission of the royalty report for such calendar quarter.

7.8.3 Royalty Term. Ultragenyx's obligation to pay royalties with respect to a particular Product in a particular country shall commence upon the First Commercial Sale of such Product in such country and shall expire on a country-by-country basis on the later of (a) the date on which the Exploitation of such Product is no longer Covered by a Valid Claim, (b) the expiration of exclusivity provided by a supplementary protection certificate, orphan drug exclusivity, pediatric drug exclusivity or any form of statutory data exclusivity to Ultragenyx, its Affiliate or Sublicensee that provides marketing exclusivity for the Product in such country ("***Statutory Exclusivity***"), or (c) the […***…] anniversary of the First Commercial Sale of such Product in such country (the "***Royalty Term***").

7.8.4 Royalty Reductions.

(a) Reduction Post Patent Expiration. On a country-by-country and Product-by-Product basis, in the event that a Selling Party's sale of a Product is not Covered by a Valid Claim in such country but there is still Statutory Exclusivity, then the royalty rates set forth in Section 7.8.1 with respect to Net Sales for such Product in such country shall be reduced by […***…] percent ([…***…]%) of what would otherwise have been due in the absence of such reduction.

(b) Know-How Royalty. On a country-by-country and Product-by-Product basis, in the event that a Selling Party's sale of a Product is not Covered by a Valid Claim and there is no Statutory Exclusivity for such Product in such country, then the royalty

rates set forth in Section 7.8.1 with respect to Net Sales for such Product in such country shall be reduced by […***…] percent ([…***…]%) of what would otherwise have been due in the absence of such reduction and in the absence of the reduction set forth in Section 7.8.4(a) above.

(c) No Use of Arcturus Delivery Technology. On a Product-by-Product basis, in the event that a Selling Party's sale of Product does not utilize the LUNAR Nanoparticle Delivery Technology Covered by any Arcturus Patent or Product-Specific Patent or another RNA delivery technology Covered by an Arcturus Patent, then the royalty rates set forth in Section 7.8.1 with respect to Net Sales for such Product in such country shall be reduced by […***…] percent ([…***…]%) of what would otherwise have been due in the absence of such reduction.

(d) Third-Party Intellectual Property. Except for intellectual property that Covers RNA delivery technology utilized by Ultragenyx in the Exploitation of a Product in lieu of the LUNAR Nanoparticle Delivery Technology, in the event that Ultragenyx obtains a license from a Third Party under intellectual property that, in Ultragenyx's reasonable judgment, is necessary for the Exploitation of a Product, then Ultragenyx shall have the right, upon prior notice to Arcturus, on a Product-by-Product and country-by-country basis, to credit from any royalties due in respect of Net Sales of such Product […***…] percent ([…***…]%) of the royalties that Ultragenyx actually pays to such Third Party for the Exploitation of such Product in such country during a calendar quarter against royalties otherwise payable by Ultragenyx to Arcturus under Section 7.8 for such Product in such country in such calendar quarter, provided, however, that under no circumstances shall any royalty payment to Arcturus be reduced as a result of this Section 7.8.4(c) to less than […***…] percent ([…***…]%) of what would otherwise have been due in the absence of such reduction.

(e) Minimum Royalty Rate. The maximum aggregate royalty reductions with respect to any given Product as a result of this Section 7.8.4 shall not exceed […***…] percent ([…***…]%) of the corresponding royalty rate identified in Section 7.8.1.

7.9 Mutual Convenience of the Parties. The royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying royalties and other amounts required hereunder.

7.10 No Other Compensation. Neither Party will be obligated to pay any additional fees, milestone payments, royalties or other payments of any kind to the other hereunder. All payments made by Ultragenyx hereunder are nonrefundable and, unless expressly set forth otherwise, non-creditable.

7.11 Method of Payment. Unless otherwise agreed by the Parties, all payments due from Ultragenyx to Arcturus under this Agreement shall be paid in U.S. Dollars in immediately available funds by wire transfer or electronic funds transfer of immediately available funds to the following accounts:

[…***…]	[…***…]

*****Confidential Treatment Requested**

[…***…]	[…***…]

Arcturus may change the account listed above with […***…] days written notice to Ultragenyx.

7.12 Currency Conversion. In the case of sales outside the United States, payments received by a Selling Party will be expressed in the U.S. Dollar equivalent calculated on a quarterly basis in the currency of the country of sale and converted to their U.S. Dollar equivalent using the average rate of exchange over the applicable calendar quarter to which the sales relate, in accordance with GAAP and the then current standard methods of the applicable Selling Party, to the extent reasonable and consistently applied; *provided, however,* that if, at such time, the Selling Party does not use a rate for converting into U.S. Dollar equivalents that is maintained in accordance with GAAP, then it shall use a rate of exchange which corresponds to the rate of exchange for such currency reported in The Wall Street Journal, Internet U.S. Edition at www.wsj.com, as of the last day of the applicable reporting period (or, if unavailable on such date, the first date thereafter on which such rate is available). The relevant royalty report will identify the specific exchange rate translation methodology used for a particular country or countries.

7.13 Late Payments. In the event that any undisputed payment due hereunder (and any disputed payment where it is determined that that disputed portion was payable by Ultragenyx to Arcturus) is not made when due (subject to the payment dispute resolution procedure described in Section 7.4), the payment shall accrue interest beginning on the day following the due date thereof, calculated at an annual rate equal to […***…] percent ([…***…]%) per […***…]; *provided, however,* that in no event shall said annual interest rate exceed the maximum rate permitted by Law. Each such payment when made shall be accompanied by all interest so accrued.

7.14 Records and Audits. The Selling Party will keep complete and accurate records of the underlying revenue data relating to the calculations of Net Sales generated in the then current calendar year and during the preceding […***…] calendar years. Arcturus will keep complete and accurate records of the underlying expense data relating to any Collaborative Development Costs payable by Ultragenyx hereunder during the then current calendar year and during the preceding […***…] calendar years. Arcturus (or Ultragenyx with respect to any Collaborative Development Costs payable or incurred by Ultragenyx hereunder in accordance with the Budget) (the "***Auditing Party***") will have the right, […***…] at its own expense, to have a nationally recognized, independent, certified public accounting firm, selected by it and subject to the non-Auditing Party's prior written consent (which shall not be unreasonably withheld), review any such records of the other Party (and for Ultragenyx, including its Affiliates and Sublicensees) (the "***Audited Party***") in the location(s) where such records are maintained by the Audited Party upon reasonable written notice (which shall be no less than […***…] days'

*****Confidential Treatment Requested**

prior written notice) and during regular business hours and under obligations of strict confidence, for the sole purpose of verifying the basis and accuracy of the royalty payments made under Section 7.8 (or any Collaborative Development Costs paid or incurred) within the […***…] month period preceding the date of the request for review. No calendar year will be subject to audit under this Section 7.14 more than […***…]. The Audited Party will receive a copy of each such report concurrently with receipt by the Auditing Party. Should such inspection lead to the discovery of a discrepancy to the Auditing Party's detriment, the Audited Party will, within […***…] days after receipt of such report from the accounting firm, pay any undisputed amount of the discrepancy together with interest at the rate set forth in Section 7.13. The Auditing Party will pay the full cost of the review unless the underpayment of amounts due to the Auditing Party is greater than […***…] percent ([…***…]%) of the amount due for the entire period being examined, in which case the Audited Party will pay the cost charged by such accounting firm for such review. Should the audit lead to the discovery of a discrepancy to the Audited Party's detriment, the Audited Party may credit the amount of the discrepancy, without interest, against future payments payable to the Auditing Party under this Agreement, and if there are no such payments payable, then the Auditing Party shall pay to the Audited Party the amount of the discrepancy, without interest, within […***…] days of the Auditing Party's receipt of the report.

7.15 Taxes.

7.15.1 Withholding. In the event that any Law requires Ultragenyx to withhold taxes with respect to any payment to be made by Ultragenyx to Arcturus pursuant to this Agreement, Ultragenyx will notify Arcturus of such withholding requirement prior to making the payment to Arcturus and provide such assistance to Arcturus, including the provision of such standard documentation as may be required by a tax authority, as may be reasonably necessary in Arcturus's efforts to claim an exemption from or reduction of such taxes. Ultragenyx will, in accordance with such Law, withhold taxes from the amount due, remit such taxes to the appropriate tax authority, and furnish Arcturus with proof of payment of such taxes within […***…] days following the payment. If taxes are paid to a tax authority, Ultragenyx shall provide reasonable assistance to Arcturus to obtain a refund of taxes withheld, or obtain a credit with respect to taxes paid.

7.15.2 VAT. All payments due to Arcturus from Ultragenyx pursuant to this Agreement shall be paid exclusive of any value-added tax ("***VAT***") (which, if applicable, shall be payable by Ultragenyx upon receipt of a valid VAT invoice). If Arcturus determines that it is required to report any such tax, Ultragenyx shall promptly provide Arcturus with applicable receipts and other documentation necessary or appropriate for such report. For clarity, this Section 7.15.2 is not intended to limit Ultragenyx's right to deduct value-added taxes in determining Net Sales.

ARTICLE 8

INTELLECTUAL PROPERTY AND PATENT RIGHTS

8.1 Intellectual Property Ownership.

8.1.1 Background Technology. Each Party will own all right, title and interest in its Background Technology.

8.1.2 Collaboration Technology.

(a) Inventions. Except as provided in Section 8.l.2(b) and Section 8.l.2(c), (i) each Party shall own all Collaboration Know-How conceived, discovered, invented, created, made or reduced to practice or tangible medium solely by employees of such Party and all correlative Collaboration Patents, and (ii) the Parties shall jointly own all Joint Collaboration Technology and Joint Collaboration Patents. Subject to the licenses granted under this Agreement, each Party shall have the right to practice and exploit Joint Collaboration Technology and Joint Collaboration Patents without the duty of accounting to or any duty to seek consent from the other Party, and upon the reasonable request of either Party, the other Party shall execute documents that evidence or confirm the requesting Party's right to engage in such activities. This Agreement will be understood to be a joint research agreement under 35 U.S.C. 100(h) and 102(c), entered into for the performance of experimental, developmental, or research work in the field of the invention, for the purpose of researching, identifying and developing Compounds and Products under the terms set forth herein.

(b) Product-Specific Technology. Notwithstanding Section 8.l.2(a), Ultragenyx shall own all right, title and interest in and to all Collaboration Technology generated solely or jointly by the Parties that specifically relates to (i) the composition or formulation of a particular Compound or Product, or (ii) any method of using, making or administering a particular Compound or Product (the "***Product-Specific Technology***"). Know-How included in the Product-Specific Technology shall be deemed "***Product-Specific Know-How***" and Patents included in the Product-Specific Technology shall be deemed "***Product-Specific Patents***". Arcturus hereby assigns to Ultragenyx all of its rights and interest in and to all Product-Specific Technology. For clarity, the ownership of Product-Specific Patents by Ultragenyx pursuant to this Section 8.l.2(b) does not alter Ultragenyx's royalty obligations with respect to any ProductSpecific Patents as set forth in this Agreement. Ultragenyx may not license, assign, transfer or otherwise encumber any Product-Specific Patent in a manner where such action would have a material adverse effect on Arcturus' interests with respect to such Product-Specific Patent, or would conflict with Ultragenyx's obligations or Arcturus' rights under this Agreement, including with respect to any future rights of Arcturus in connection with Discontinued Targets or Terminated Targets. Subject to the terms and conditions of this Agreement, Ultragenyx grants Arcturus a nonexclusive, non-sublicensable (except to subcontractors as permitted herein) royalty-free license under the Product-Specific Patents solely to perform the Collaborative Development Plan.

(c) Improvements to Arcturus Platform Technology. Notwithstanding Section 8.1.2(a) and Section 8.1.2(b), Arcturus shall own all Improvements to Arcturus Platform Technology. Ultragenyx hereby assigns and shall assign to Arcturus any and all right, title and interest in and to any Improvement to the Arcturus Platform Technology, including any Patent Rights on such Improvements to Arcturus Platform Technology. Ultragenyx shall execute, and cause its Affiliates and its and their employees, agents and Subcontractors to execute (directly or through assignment to Ultragenyx and assignment by Ultragenyx to Arcturus), assignments to Arcturus of all right, title and interest in and to any such Improvement

to Arcturns Platform Technology and Patent Rights on such Arcturns Platform Technology. Any such Improvement to Arcturns Platform Technology and Patent Rights filed on such Arcturus Platform Technology shall be the sole and exclusive property of Arcturns and shall constitute Confidential Information of Arcturus.

8.1.3 Inventorship. All determinations of inventorship under this Agreement shall follow inventorship as determined according to United States Patent Law.

8.2 Patent Prosecution.

8.2.1 Ultragenyx Prosecuted Patents. Ultragenyx shall have the first right, authority and responsibility to prepare, file, prosecute (including any oppositions, interferences, reissue proceedings, reexaminations and post-grant proceedings) and maintain the Product-Specific Patents and all other Collaboration Patents owned by Ultragenyx, including the Joint Collaboration Patents (collectively, the "***Ultragenyx Prosecuted Patents***") in any jurisdiction in the Territory using counsel of its own choice, and will be solely responsible for all costs and expenses incurred by Ultragenyx in connection with such activities. Ultragenyx shall use Commercially Reasonable Efforts to prepare, file, prosecute and maintain the Ultragenyx Prosecuted Patents, and in any case shall take into account Arcturus' interests hereunder (including payments rights under Article 7 and potential future rights of Arcturus in connection with Discontinued Targets or Terminated Targets) in making decisions with respect to such Ultragenyx Prosecuted Patents. Ultragenyx shall provide Arcturus reasonable opportunity to review and comment on its filing and prosecution efforts relating to the Ultragenyx Prosecuted Patents reasonably prior to any submissions with applicable patent authorities. Ultragenyx shall promptly provide Arcturus with a copy of material communications from any patent authority in the Territory regarding the Ultragenyx Prosecuted Patents, and shall provide drafts of any material filings or material responses to be made to such patent authorities reasonably in advance of submitting such filings or responses so that Arcturus may have an opportunity to review and comment thereon. If Ultragenyx disagrees with any of Arcturus's comments, it shall consult with Arcturns in good faith to reach a mutually agreeable position. If Ultragenyx determines in its sole discretion to abandon, cease prosecution or not maintain any Ultragenyx Prosecuted Patents anywhere in the Territory, then Ultragenyx shall provide Arcturus written notice of such determination at least […***…] days before any deadline for taking action to avoid abandonment or other loss of rights (and shall clearly specify in such notice any pending deadlines) and shall provide Arcturus with the opportunity to prepare, file, prosecute and maintain such Ultragenyx Prosecuted Patent in the Territory at its sole cost and expense.

8.2.2 Arcturus Prosecuted Patents. If Arcturus takes over the prosecution of any Product-Specific Patents in accordance with Section 3.5.1 or Section 12.5.8, then Arcturus shall have the first right, authority and responsibility to prepare, file, prosecute (including any oppositions, interferences, reissue proceedings, reexaminations and post-grant proceedings) and maintain such Product-Specific Patents (collectively, the "***Arcturus Prosecuted Patents***") using counsel of its own choice, and will be solely responsible for all costs and expenses incurred by Arcturus in connection with such activities. Arcturus shall provide Ultragenyx reasonable opportunity to review and comment on its filing and prosecution efforts relating to the Arcturus Prosecuted Patents reasonably prior to any submissions with applicable patent

authorities. Arcturus shall promptly provide Ultragenyx with a copy of material communications from any patent authority in the Territory regarding the Arcturus Prosecuted Patents, and shall provide drafts of any material filings or material responses to be made to such patent authorities reasonably in advance of submitting such filings or responses so that Arcturus may have an opportunity to review and comment thereon. If Arcturus disagrees with any of Ultragenyx's comments, it shall consult with Ultragenyx in good faith to reach a mutually agreeable position. If Arcturus determines in its sole discretion to abandon, cease prosecution or not maintain any Arcturus Prosecuted Patent anywhere in the Territory, then Arcturus shall provide Ultragenyx written notice of such determination at least […***…] days before any deadline for taking action to avoid abandonment or other loss of rights (and shall clearly specify in such notice any pending deadlines) and shall provide Ultragenyx with the opportunity to prepare, file, prosecute and maintain such the Arcturus Prosecuted Patent in the Territory at its sole cost and expense.

8.2.3 Arcturus Patents. Arcturus has the sole right, but not the obligation, to prosecute and maintain all Arcturus Patents that are not Joint Collaboration Patents, at its sole cost and expense using counsel of its choice.

8.2.4 Joint Collaboration Patents. If the Parties make any Joint Collaboration Technology, the Parties shall promptly meet to discuss and determine, based on the advice of patent counsel selected by agreement of the Parties, whether to seek Joint Collaboration Patents thereon. If Ultragenyx decides to seek any Joint Collaboration Patents, Ultragenyx shall have the first right, but not the obligation, to prepare, file prosecute and maintain, at its expense, any Joint Collaboration Patents throughout the world using such jointly selected patent counsel. Ultragenyx shall provide Arcturus reasonable opportunity to review and comment on its filing and prosecution efforts relating to such Joint Collaboration Patents reasonably prior to any submissions with applicable patent authorities. Ultragenyx shall promptly provide Arcturus with a copy of material communications from any patent authority in the Territory regarding such Joint Collaboration Patents, and shall provide drafts of any material filings or material responses to be made to such patent authorities reasonably in advance of submitting such filings or responses so that Arcturus may have an opportunity to review and comment thereon. If Ultragenyx disagrees with any of Arcturus's comments, it shall consult with Arcturus in good faith to reach a mutually agreeable position. If Ultragenyx determines in its sole discretion to abandon, cease prosecution or not maintain any such Joint Collaboration Patents anywhere in the Territory, then Ultragenyx shall provide Arcturus written notice of such determination at least […***…] days before any deadline for taking action to avoid abandonment or other loss of rights (and shall clearly specify in such notice any pending deadlines) and shall provide Arcturus with the opportunity to prepare, file, prosecute and maintain such Joint Collaboration Patent in the Territory at its sole cost and expense.

8.3 Patent Term Extensions. The Parties will cooperate with each other in gaining Patent Right term extension where applicable to Products and in the case of any disagreement, Ultragenyx would have the final say as to term extension for any Patent Right claiming the composition or method of use of a Product.

8.4 Defense and Settlement of Third Party Claims.

8.4.1 Notice of Third Party Infringement Claim. During the Term, each Party shall bring to the attention of the other Party all information regarding potential infringement or any claim of infringement of Third Party intellectual property rights in connection with the development, manufacture, production, use, importation, offer for sale, or sale of Products in the Territory. The Parties shall discuss such information and decide how to handle such matter. Subject to Article 10, each Party shall be solely responsible for defending any claim, suit or action brought against it alleging infringement of Third Party intellectual property rights in connection with its activities under this Agreement. This Section 8.4.1 shall not be interpreted as placing on either Party a duty of inquiry regarding Third Party intellectual property rights.

8.4.2 Notice of Third Party Challenge. If a declaratory judgment action is brought naming either Party as a defendant and alleging invalidity of any of the Patent Rights contained in the Product-Specific Patents (a "***Third Party Challenge***"), the Party first having notice of the Third Party Challenge shall promptly notify the other Party, and the Parties shall promptly confer to consider the claim or assertion and the appropriate course of action.

8.4.3 Responsibility for Defense. With respect to a Development Target, following Ultragenyx's exercise of its option pursuant to Section 5.2 and so long as such license has not been terminated, Ultragenyx shall have the right to defend such Third Party Challenge. To the extent the Third Party Challenge relates to the Arcturus Patents and/or Product-Specific Patents that do not Cover the Exploitation of Products, then Arcturus shall have the right to defend such Third Party Challenge.

8.4.4 Settlement. Neither Party shall enter into any settlement of any Third Party Challenge that admits to the invalidity or unenforceability of any Patent Right Controlled by the other Party, and neither Party shall enter into any settlement of any Third Party Challenge that admits to the invalidity or unenforceability of any Patent Right within any Product-Specific Patent, or in either case otherwise affects the scope, validity or enforceability of such Patent Right, or incurs any financial liability on the part of any other Party or requires an admission of liability, wrongdoing or fault on the part of the other Party, in each case without such other Party's written consent. In any event, the other Party shall reasonably assist the defending Party and cooperate in any such litigation at the defending Party's request and expense. Additionally, if the defending Party is not the Party that Controls the Patent Right in question, then the other Party has the right to join any such action.

8.5 Infringement by Third Parties.

8.5.1 Enforcement of Product-Specific Patents.

(a) Notice of Infringement. Following Ultragenyx's exercise of its option pursuant to Section 5.2 with respect to a Development Target, if there is any infringement, threatened infringement, or alleged infringement of any Product-Specific Patent on account of a Third Party's manufacture, use, offer for sale, or sale of a product anywhere in the Territory (in each case, a "Product Infringement'), then each Party shall promptly notify the other Party in writing of any such Product Infringement of which it becomes aware, and shall provide evidence in such Party's possession demonstrating such Product Infringement; provided, however, that

this Section shall not require a Party to breach any contractual obligation of confidentiality owed to any Third Party.

(b) Right to Enforce Product Infringement. Following Ultragenyx's exercise of its option pursuant to Section 5.2 with respect to a Development Target, Ultragenyx shall have the first right, but not the obligation, to bring an appropriate suit or other action against any person or entity allegedly engaged in any such Product Infringement of the ProductSpecific Patent in the Territory (and to defend any related counterclaim, subject to Section 8.4.3 and Section 8.4.4), at Ultragenyx's expense. Ultragenyx shall keep Arcturus fully informed about such suit or action and shall not knowingly take any position with respect to, or compromise or settle, any such Product Infringement in any way that is reasonably likely to adversely affect the scope, validity or enforceability of the Product-Specific Patent. Ultragenyx shall have a period of […***…] days after its receipt or delivery of notice and evidence pursuant to Section 8.5.1(a), to elect to so enforce such Product-Specific Patent in the Territory (or to settle or otherwise secure the abatement of such Product Infringement). In the event Ultragenyx does not so elect (or settle or otherwise secure the abatement of such Product Infringement), it shall so notify Arcturus in writing, or if Ultragenyx does not enforce such Product-Specific Patent in the Territory during such […***…] day period, then in either case Arcturus shall have the right to commence a suit or take action to enforce any applicable Product-Specific Patent with respect to such Product Infiingement in the Territory, at Arcturus's expense.

(c) Cooperation. Each Party shall provide to the Party enforcing any such rights under this Section 8.5.1 reasonable assistance in such enforcement, at such enforcing Party's request and expense, including joining such action as a party plaintiff if required by applicable Laws to pursue such action and giving reasonable assistance and authority to control, file and prosecute the suit as necessary. The non-enforcing Party shall have the right, at its own expense, to be represented in any such action by counsel of its own choice. The enforcing Party shall keep the other Party regularly informed of the status and progress of such enforcement efforts, and shall reasonably consider the other Party's comments on any such efforts.

(d) Settlement. Without the prior written consent of the other Party, neither Party shall settle any claim, suit or action that it brought under this Section 8.5.1 that admits the invalidity or unenforceability of any Product-Specific Patent, requires abandonment or limits the scope of any such Product-Specific Patent or would limit or restrict the ability of either Party to sell Products anywhere in the Territory or admits any liability of or imposes any other restrictions or obligations on the other Party, without the written consent of such other Party.

(e) Expenses and Recoveries. A Party bringing a claim, suit or action under Section 8.5.1 against any person or entity engaged in a Product Infringement shall be solely responsible for any expenses incurred by such Party as a result of such claim, suit or action. If such Party recovers monetary damages from such Third Party in such suit or action, such recovery shall be allocated first to the reimbursement of any expenses incurred by the Parties in such litigation (including, for this purpose, a reasonable allocation of expenses of internal counsel), and any remaining amount shall be distributed as follows: (x) if Ultragenyx enforces, one hundred percent (100%) to Ultragenyx, provided such amount shall be included in

Net Sales for the purposes of determining royalties due to Arcturus pursuant to Section 7.8, and (y) if Arcturus enforces a Product Infringement, fifty percent (50%) to Arcturus and fifty percent (50%) to Ultragenyx.

8.5.2 Enforcement of Ultragenyx's Background Technology and Ultragenyx's Collaboration Patents. Ultragenyx shall have the sole right, but not the obligation, at its own expense and discretion to bring an appropriate suit or other action against any person or entity allegedly engaged in any infringement, threatened infringement or alleged infringement of all Patent Rights within Ultragenyx's Background Technology and all Collaboration Patents solely owned by Ultragenyx. All monetary damages recovered by Ultragenyx from such Third Party in such suit or action shall be retained by Ultragenyx.

8.5.3 Enforcement of Joint Collaboration Patents. If either Party becomes aware of any infringement, threatened infringement, or alleged infringement of any Joint Collaboration Patent by any Third Party, then that Party shall promptly notify the other Party in writing regarding such infringement and shall provide evidence in such Party's possession demonstrating such infringement. The Parties shall reasonably cooperate with each other regarding the enforcement of the Joint Collaboration Patents, and shall agree upon an allocation of recoveries received in any such enforcement action.

8.5.4 Enforcement of Arcturus Patents. If the Product corresponding to a Product Infringement is not covered by a Product-Specific Patent and the Product Infringement infringes an Arcturus Patent that covers the composition or an approved use of a Product, the Parties shall meet to discuss what action, if any, to take. Arcturus shall consider any request by Ultragenyx that Arcturus commence an enforcement action against a Product Infringement with respect to such Arcturus Patent.

ARTICLE 9

REPRESENTATIONS AND WARRANTIES

9.1 Mutual Warranties. As of the Effective Date, each of Ultragenyx and Arcturus represent and warrant that:

(a) it is duly organized and validly existing under the Law of the jurisdiction of its incorporation, and has full corporate power and authority to enter into this Agreement and to carry out the provisions hereof;

(b) it is duly authorized to execute and deliver this Agreement and to perfonn its obligations hereunder, and the individual executing this Agreement on its behalf has been duly authorized to do so by all requisite corporate action; and

(c) this Agreement is legally binding upon it and enforceable in accordance with its terms. The execution, delivery and performance of this Agreement by it does not conflict with any agreement, instrument or understanding, oral or written, to which it is a party or by which it may be bound, nor violate any material applicable Law.

9.2 **Additional Arcturus Warranties.** As of the Effective Date, Arcturus warrants to Ultragenyx that:

(a) Arcturus has full legal or beneficial title and ownership of, or an exclusive license to, Arcturus Patents listed on **Exhibit A**, and Arcturus has not granted any rights to any Third Party to such Arcturus Patents with respect to any Development Targets and/or Reserved Targets;

(b) Arcturus has not entered, and shall not enter, into any agreement with any Third Party that is in conflict with the rights granted to Ultragenyx under this Agreement, and has not taken and shall not take any action that would in any way prevent it from granting the rights granted to Ultragenyx under this Agreement;

(c) **Exhibit A** is a complete and accurate list of all Arcturus Patents existing as of the Effective Date;

(d) The Arcturus Patents are not subject to any liens or encumbrances. Except as expressly identified on **Exhibit A**, none of Arcturus Patents are in-licensed by Arcturus. No patent application or registration within Arcturus Patents is subject of any pending interference, opposition, cancellation or patent protest;

(e) Table A of **Exhibit A** lists all Third Party licenses and agreements pursuant to which Arcturus or its Affiliates has obtained license rights to Arcturus Patents and Arcturus Know-How, and Arcturus has shared with Ultragenyx complete and accurate copies of all such licenses and agreements;

(f) No Third Party has made any claim or allegation to Arcturus or its Affiliates in writing that a Third Party has any right or interest in or to Arcturus Patents listed on **Exhibit A**;

(g) To Arcturus's knowledge, the practice of Arcturus Technology does not infringe any Third Party Patent Rights or misappropriate any proprietary rights of any Third Party;

(h) To Arcturus's knowledge, no Third Party is infringing the Arcturus Patent Rights and no Third Party has misappropriated any Arcturus Know-How;

(i) There is no claim or litigation that has been brought or threatened by any Third Party alleging that Arcturus Patents are invalid or unenforceable; and

(j) Arcturus has not intentionally withheld any information in its control that is material to Ultragenyx's decision to enter into this Agreement. To Arcturus's knowledge as of the Effective Date, all information disclosed at any time prior to the Effective Date by Arcturus relating to the Arcturus Technology is true and accurate. Additionally, to Arcturus's knowledge as of the Effective Date, Arcturus has not failed and will not fail to disclose to Ultragenyx any material information known to Arcturus and in its possession and control that would be required to be disclosed in order to make the information relating to the Arcturus Technology that have been disclosed not misleading.

9.3 Additional Covenants. Each of Ultragenyx and Arcturus covenants to the other Party the following:

(a) it will conduct, and will cause its contractors to conduct, all preclinical and clinical studies for Products, and manufacturing of such products, in accordance with (i) all U.S. Laws and the Laws of the country in which such clinical studies are conducted, and (ii) the known or published standards of the FDA and the Regulatory Authority in such country.

(b) it will not knowingly make an untrue statement of a material fact to any Regulatory Authority with respect to Products (whether in any submission to such Regulatory Authority or otherwise), and will not knowingly fail to disclose a material fact required to be disclosed to any Regulatory Authority with respect to Products;

(c) in connection with its activities hereunder, it shall comply with all applicable (i) U.S. Laws prohibiting the re-export, directly or indirectly, of certain controlled U.S.-origin items without a license to parties located in certain countries or appearing on certain U.S. Government lists of restricted parties; (ii) U.S. Laws prohibiting participation in non-U.S. boycotts that the United States does not support; and (iii) U.S. Laws prohibiting the sale of products to parties from any country subject to U.S. economic sanctions or who are identified on related U.S. Government lists of restricted parties; and

(d) its owners, directors, officers, employees, and any agent, representative, subcontractor or other Third Party acting for or on such its behalf, shall not, directly or indirectly, offer, pay, promise to pay, or authorize such offer, promise or payment, of anything of value, to any Third Party for the purposes of obtaining or retaining business through any improper advantage in connection with this Agreement, or that would otherwise violate any applicable Laws, rules and regulations concerning or relating to public or commercial bribery or corruption.

9.4 Ultragenyx Warranty. Ultragenyx has not entered, and shall not enter, into any agreement with any Third Party that is in conflict with rights granted to Arcturus under this Agreement, and has not taken and shall not take any action that would in any way prevent it from granting the rights granted to Arcturus under this Agreement.

9.5 Disclaimer. EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS ARTICLE 9, NEITHER PARTY MAKES ANY REPRESENTATIONS OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY, QUALITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR VALIDITY OF PATENT CLAIMS. NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION MADE OR WARRANTY GIVEN BY EITHER PARTY THAT EITHER PARTY WILL BE SUCCESSFUL IN OBTAINING ANY PATENT RIGHTS, OR THAT ANY PATENTS WILL ISSUE BASED ON A PENDING APPLICATION. WITHOUT LIMITING THE RESPECTIVE RIGHTS AND OBLIGATIONS OF THE PARTIES EXPRESSLY SET FORTH HEREIN, EACH PARTY SPECIFICALLY DISCLAIMS ANY GUARANTEE THAT THE PRODUCTS WILL BE SUCCESSFUL, IN WHOLE OR IN PART.

ARTICLE 10

INDEMNIFICATION

10.1 Indemnity.

10.1.1 By Ultragenyx. Ultragenyx will indemnify, hold harmless and defend Arcturus, its Affiliates and their respective directors, officers, employees and agents (the "***Arcturus Indemnified Parties***") against any and all losses, damages, liabilities, judgments, fines, amounts paid in settlement, expenses and costs of defense (including reasonable attorneys' fees and witness fees) ("***Losses***") resulting from any claim, action or proceeding brought or initiated by a Third Party ("***Third Party Claim***") against an Arcturus Indemnified Party to the extent that such Third Party Claim arises out of: (a) the gross negligence or willful misconduct of Ultragenyx or any Ultragenyx Indemnified Party in connection with its activities under this Agreement, (b) the material breach of the representations, warranties and covenants made under this Agreement by Ultragenyx, or (c) the Exploitation of any Product by or on behalf of Ultragenyx, its Affiliates, or their respective Sublicensees (including from product liability and intellectual property infringement claims); except, in each case, to the extent such Losses result from clause (a) or (b) of Section 10.1.2.

10.1.2 By Arcturus. Arcturus will indemnify, hold harmless and defend Ultragenyx, its Affiliates and their respective directors, officers, employees and agents (the "***Ultragenyx Indemnified Parties***") against any and all Losses resulting from any Third Party Claim against an Ultragenyx Indemnified Party to the extent that such Third Party Claim arises out of: (a) the gross negligence or willful misconduct of Arcturus or any Arcturus Indemnitee or their subcontractors in connection with its activities under this Agreement, (b) the material breach of the representations, warranties and covenants made under this Agreement by Arcturus, or (c) the Exploitation by Arcturus of Products to Discontinued Targets or Terminated Targets; except, in each case, to the extent such Losses result from clause (a) or (b) of Section 10.1.1.

10.1.3 Procedure. Promptly after receipt by any of the Ultragenyx Indemnified Parties or the Arcturus Indemnified Parties (together or individually, an "***Indemnified Party***") of notice of any pending or threatened Third Party Claim for which the Indemnified Party intends to seek indemnity hereunder (an "***Indemnity Claim***"), such Indemnified Party shall give written notice of the same to the other party (the "***Indemnifying Party***") (provided, however, that any failure to promptly notify shall not excuse any obligation of the Indemnifying Party except to the extent it is actually prejudiced thereby). The Indemnifying Party shall be entitled to assume the defense thereof, with counsel selected by the Indemnifying Party and reasonably satisfactory to the Indemnified Party. The Indemnifying Party shall not be liable for any damages with respect to any Indemnity Claim that is settled or compromised by the Indemnified Party without the Indemnifying Party's prior written consent. No offer of settlement, compromise or settlement by the Indemnifying Party shall be binding on an Indemnified Party without the Indemnified Party's prior written consent, unless such settlement or compromise (a) fully releases the Indemnified Party without any liability, loss, cost or obligation, and (b) admits no liability, wrongdoing or other admission against interest on the part of the Indemnified Party. In any such proceeding, the Indemnified Party shall have

the right to retain its own counsel at its own cost and expense. In the event that the Parties cannot agree as to the application of Sections 10.1.1 and 10.1.2 to any Loss or Third Party Claim, the Parties may conduct separate defenses of such Third Party Claim. In such case, each Party further reserves the right to claim indemnity from the other in accordance with Sections 10.1.1 and 10.1.2 upon resolution of such underlying Third Party Claim.

10.2 LIMITATION OF DAMAGES. IN NO EVENT SHALL EITHER PARTY BE LIABLE HEREUNDER TO THE OTHER PARTY FOR ANY PUNITIVE, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST REVENUE, LOST PROFITS, OR LOST SAVINGS) HOWEVER CAUSED AND UNDER ANY THEORY, EVEN IF IT HAS NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. THE LIMITATIONS SET FORTH IN THIS SECTION 10.2 SHALL NOT APPLY WITH RESPECT TO (A) ANY BREACH OF ARTICLE 11 OR (B) THE INTENTIONAL MISCONDUCT OR GROSS NEGLIGENCE OF A PARTY. NOTHING IN THIS SECTION 10.2 IS INTENDED TO LIMIT OR RESTRICT THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF A PARTY UNDER THIS ARTICLE 10 WITH RESPECT TO ANY DAMAGES PAID BY THE OTHER PARTY TO A THIRD PARTY IN CONNECTION WITH A THIRD PARTY CLAIM.

10.3 Insurance. Each of the Parties will, at their own respective expense (and not subject to cost sharing hereunder) procure and maintain during the Term, insurance policies adequate to cover their obligations hereunder and consistent with the normal business practices of prudent biopharmaceutical companies of similar size and scope (or reasonable self-insurance sufficient to provide materially the same level and type of protection). Such insurance will not create a limit to either Party's liability hereunder. Each Party shall provide the other with written notice at least […***…] days prior to the cancellation, non-renewal or material change in such insurance or self-insurance which materially adversely affects the rights of the other Party hereunder.

ARTICLE 11

CONFIDENTIALITY

11.1 Confidential Information.

11.1.1 Confidential Information. Each Party (" ***Disclosing Party***") may disclose to the other Party ("***Receiving Party***"), and Receiving Party may acquire during the course and conduct of activities under this Agreement, certain proprietary or confidential information of Disclosing Party in connection with this Agreement. The term "***Confidential Information***" will mean all ideas and information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, which are transferred, disclosed or made available by Disclosing Party or at the request of Receiving Party, including any of the foregoing of Third Parties. All Know-How and Patents Controlled by a Party shall be deemed such Party's Confidential Information, and all Arcturus Materials shall be deemed Arcturus' Confidential Information. Disclosure of Confidential Information under this Agreement, including the transfer of material between the

*****Confidential Treatment Requested**

Parties or the sublicensees and contractors, shall be a private disclosure and not a commercial sale of the material.

11.1.2 Restrictions. During the Term and for […***…] years thereafter, Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information (but in no event less than a commercially reasonable degree of care). Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent, to the extent and only to the extent reasonably necessary, to Receiving Party's Affiliates and its and their employees, subcontractors, consultants or agents who have a need to know such Confidential Information in order to perform its obligations and exercise its rights under this Agreement and who are required to comply with the restrictions on use and disclosure in this Section 11.1.2. Receiving Party will use diligent efforts to cause those entities and persons to comply with the restrictions on use and disclosure in this Section 11.1.2. Receiving Party assumes responsibility for those entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

11.1.3 Exceptions. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to the extent that Receiving Party can demonstrate that the Disclosing Party's Confidential Information: (a) was known to Receiving Party or any of its Affiliates prior to the time of disclosure; (b) is or becomes public knowledge through no wrongful act of Receiving Party or any of its Affiliates; (c) is obtained by Receiving Party or any of its Affiliates from a Third Party under no obligation of confidentiality to Disclosing Party; or (d) has been independently developed by employees, subcontractors, consultants or agents of Receiving Party or any of its Affiliates without the use of Disclosing Party's Confidential Information, as evidenced by contemporaneous written records.

11.1.4 Permitted Disclosures. Receiving Party may disclose Disclosing Party's Confidential Information to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

(a) in order to comply with applicable Law (including any securities law or regulation or the rules of a securities exchange) or with a legal or administrative proceeding;

(b) in connection with prosecuting or defending litigation, Regulatory Approvals and other regulatory filings and communications, and filing, prosecuting and enforcing Patent Rights in connection with Receiving Party's rights and obligations pursuant to this Agreement; and

(c) in connection with exercising its rights hereunder, to its Affiliates; potential and future collaborators, licensees or sublicensees and vendors; potential and permitted acquirers or assignees; and potential investment bankers, investors and lenders;

*****Confidential Treatment Requested**

provided, however, that (1) with respect to Sections 11.1.4(a) or 11.l.4(b), where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant thereto sufficiently prior to making such disclosure so as to allow Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to Section 11.1.4(c), each of those named people and entities are required to comply with the restrictions on use and disclosure in Section 11.1.2 (other than investment bankers, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

11.2 Disclosure of Terms of Agreement. Neither Party may disclose the terms of this Agreement except (a) in confidence to its legal and financial advisors to the extent such disclosure is reasonably necessary in connection with such Party's activities in connection with this Agreement, (b) to any bona fide potential or actual investor, acquirer, merger partner, licensee, or other financial or commercial partner for the sole purpose of evaluating an actual or potential investment, license, acquisition or other business relationship; provided that in each case, the disclosees are bound by written obligations of confidentiality; or (c) to the extent required pursuant to applicable securities laws or regulations, including those of the Securities and Exchange Commission, provided that the Party filing this Agreement shall seek confidential treatment for the terms of the Agreement to the extent permitted by laws and regulations as determined by the filing Party.

11.3 Press Releases.

11.3.1 In the event either Party (the "***Issuing Party***") desires to issue a press release or other public statement disclosing information relating to this Agreement or the transactions contemplated hereby or the terms hereof, the Issuing Party will provide the other Party (the "***Reviewing Party***") with a copy of the proposed press release or public statement (the "***Press Release***"). The Issuing Party will specify with each such Press Release, taking into account the urgency of the matter being disclosed, a reasonable period of time within which the Receiving Party may provide any comments on such Press Release (but in no event less than five (5) business days). If the Receiving Party provides any comments, the Parties will consult on such Press Release and work in good faith to prepare a mutually acceptable Press Release. Either Party may subsequently publicly disclose any information previously contained in any Press Release. This Section shall not limit Ultragenyx, in its sole discretion, from making disclosures relating to the development or commercialization of a Product, including the results of research and any clinical trial conducted by Ultragenyx or any health or safety matter related to a Product.

11.3.2 The Parties hereby agree that a joint press release or separate press releases shall be issued within ten (10) days of the signing of this Agreement that announce(s) this Agreement, with content to be mutually agreed upon by the Parties in good faith.

11.4 Publications. Arcturus will have the sole right to publish and make scientific presentations with respect to Arcturus Technology, and to issue press releases (except with respect to the terms of this Agreement, which is governed by Section 11.2) and make other public disclosures regarding any such Arcturus Technology, and Ultragenyx will not do any of the foregoing without Arcturus's prior written consent, except as required by Law; *provided,*

however, that any publication or presentation to be made by Arcturus that names Ultragenyx or discloses any Compound and/or Product (or any information specific to such Compound or Product) will require the prior consent of Ultragenyx, not to be unreasonably withheld. Ultragenyx will have the sole right to publish and make scientific presentations with respect to Products (but not specifically referencing or discussing Arcturus Technology), and to issue press releases (except with respect to the terms of this Agreement, which is governed by Section 11.2) or make other public disclosures regarding any such Products, and Arcturus will not do any of the foregoing without Ultragenyx's prior written consent, except as required by Law. The Party that is entitled hereunder to make a publication or presentation (the "***Publishing Party***") will deliver to the other Party (the "***Non-Publishing Party***") a copy of any proposed written publication or outline of presentation to be made by the Publishing Party in advance of submission for publication or presentation at least […***…] days in advance of submission (or, where a copy of such publication or presentation is not available at such time, a draft or outline of such publication or a description of such presentation), and the Non-Publishing Party will have the right, upon notice to the Publishing Party to: (i) require a delay in submission of not more than […***…] days to enable patent applications protecting any product; and (ii) prohibit disclosure of any of its Confidential Information in any such proposed publication or presentation. If there is any dispute between the Parties with regard to a proposed publication, presentation or other communication regarding this Agreement, such dispute shall be referred to the JSC for resolution.

11.5 Relationship to the Confidentiality Agreement. This Agreement supersedes that certain Confidential Disclosure Agreement between the Parties dated February 11, 2015; *provided, however,* that all "***Confidential Information***" disclosed or received by the Parties thereunder will be deemed "***Confidential Information***" hereunder and will be subject to the terms and conditions of this Agreement.

11.6 Attorney-Client Privilege. Neither Party is waiving, nor will be deemed to have waived or diminished, any of its attorney work product protections, attorney-client privileges or similar protections and privileges recognized under the applicable Law of any jurisdiction as a result of disclosing information pursuant to this Agreement, or any of its Confidential Information (including Confidential Information related to pending or threatened litigation) to the receiving Party, regardless of whether the disclosing Party has asserted, or is or may be entitled to assert, such privileges and protections. The Parties may become joint defendants in proceedings to which the information covered by such protections and privileges relates and may determine that they share a common legal interest in disclosure between them that is subject to such privileges and protections, and in such event, may enter into a joint defense agreement setting forth, among other things, the foregoing principles but are not obligated to do so.

ARTICLE 12

TERM & TERMINATION

12.1 Term. The term of this Agreement (the "***Term***") shall commence on the Effective Date, and unless terminated earlier as provided in this Article 12, shall continue in full force and effect on a Development Target-by-Development Target basis until expiration of the last-to-expire Royalty Term for any Product with respect to such Development Target in the

Territory. Upon expiration of this Agreement with respect to a particular Development Target, the licenses to Arcturus Know-How granted to Ultragenyx by Arcturus under this Agreement to Exploit Products with respect to such Development Target shall be fully paid-up, irrevocable and exclusive.

12.2 Termination for Breach.

12.2.1 Subject to Section 12.2.2, if either Ultragenyx or Arcturus is in material breach or default of any of its obligations hereunder, the non-breaching Party may give written notice to the breaching Party reasonably describing the events or circumstances related to the alleged breach or default, and in the event the breaching Party fails to cure such material breach or default within ninety (90) days after receipt of such notice, the non-breaching Party shall have the right to terminate this Agreement by giving written notice to the breaching Party to such effect. Notwithstanding the foregoing, a Party shall have the right to terminate this Agreement pursuant to this Section 12.2.1: (a) with respect to an individual Target only, if the other Party's material breach pertains only to such Target, or (b) in its entirety only if such material breach fundamentally frustrates the objectives or transactions contemplated by this Agreement taken as a whole.

12.2.2 If the alleged breaching Party disputes in good faith the existence or materiality of a breach specified in a notice provided by the other Party in accordance with Section 12.2.1, and such alleged breaching Party provides the other Party notice of such dispute within such ninety (90) day period, then the non-breaching Party shall not have the right to terminate this Agreement under Section 12.2.1 unless and until (i) the dispute resolution process in Section 13.1 has finally determined that the alleged breaching Party has materially breached the Agreement and (ii) such Party fails to cure such breach within sixty (60) days following such final decision; provided that with respect to a determination that a Party has failed to use Commercially Reasonable Efforts in accordance with this Agreement, such breaching Party shall not have such additional cure period under clause (ii). It is understood and agreed that during the pendency of such dispute, all of the terms and conditions of this Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder.

12.3 Ultragenyx Termination. On a Target-by-Target basis, Ultragenyx will have the right to terminate this Agreement with respect to such Target upon sixty (60) days written notice to Arcturus.

12.4 Termination for Patent Challenges. If Ultragenyx or its Affiliate or Sublicensee commences or otherwise, directly or indirectly, pursues (or assists Third Parties to do so) any Challenge of any Patent Right included in the Arcturus Patents, Arcturus shall have the right to terminate the licenses granted to Ultragenyx with respect to such Patent Right being Challenged upon sixty (60) days written notice to Ultragenyx. If Arcturus or its Affiliate or sublicensee commences or otherwise, directly or indirectly, pursues (or assists Third Parties to do so) any Challenge of any Product-Specific Patents or any Patent Rights controlled by Ultragenyx and licensed to Arcturus under this Agreement, Ultragenyx shall have the right to terminate the licenses granted to Arcturus with respect to such Patent Right being Challenged upon sixty (60) days written notice to Arcturus. For the purpose of this Section, "***Challenge***"

means any challenge to the validity or enforceability of the applicable Patent Right, including by (i) filing a declaratory judgment action in which the applicable Patent Right is alleged to be invalid or unenforceable, (ii) citing prior art pursuant to 35 U.S.C. §301, filing a request for reexamination of the applicable Patent Right, or provoking or becoming party to an interference with the applicable Patent Right pursuant to 35 U.S.C. §135 or (iii) filing or commencing any reexamination, opposition, cancellation, nullity or similar proceedings against the applicable Patent Right, or petitioning for any form of administrative or judicial (or arbitration) review of the applicable Patent Right, including post-grant review, Inter Partes Review, or opposition proceedings.

12.5 Effect of Termination With Respect to Targets. Upon any early termination (i.e., not upon expiration) of this Agreement in its entirety, or with respect to one or more Targets (such Target(s), the "***Terminated Targets***"), in addition to any other remedies available at law or in equity:

12.5.1 all licenses granted to Ultragenyx under this Agreement with respect to such Terminated Targets will terminate;

12.5.2 at Ultragenyx's expense, unless such termination is by Ultragenyx due to material breach by Arcturus pursuant to Section 12.2, in which case at Arcturus's request and at its expense, Ultragenyx shall promptly and diligently wind down, according to good clinical practice, any clinical trials that are ongoing for Products with respect to the Terminated Targets at the time of notice of such termination;

12.5.3 As promptly as practicable after receiving Arcturus's written request leading up to a termination of a Terminated Target, Ultragenyx will use commercially reasonable efforts to prepare a list of all agreements that meet the descriptions set forth in this Section 12.5.3 and in Section 12.5.4. Upon request of Arcturus, Ultragenyx will promptly assign to Arcturus all of Ultragenyx's right, title and interest in and to any agreements between Ultragenyx and Third Parties that specifically pertain to the Development or Commercialization of a Terminated Product and that are assignable by Ultragenyx, subject to assumption by Arcturus of all liabilities and obligations accruing thereunder thereafter including any fees and costs under such agreements and/or relating to such assignment;

12.5.4 For any other Third Party agreement that is necessary or reasonably useful for the Development, Manufacture and/or Commercialization of the Terminated Products, upon request of Arcturus, Ultragenyx will use commercially reasonable efforts to extend the benefits to Arcturus, until the sooner of: (a) the end of the nine (9)-month period after the effective date of such termination, and (b) the date when Arcturus enters into a direct agreement with such Third Party, subject to assumption by Arcturus of all obligations thereunder after the effective date of such termination, including any fees and costs under such agreements and/or relating to such extension of benefits to Arcturus;

12.5.5 Ultragenyx shall transfer to Arcturus all trademarks and logos, and all goodwill thereof, that are specific to Terminated Products and Controlled by Ultragenyx, including as part of any registrations for such Product, all at Arcturus's cost and expense;

12.5.6 In the event of termination with respect to a Terminated Target prior to completion of the applicable Collaborative Development, Arcturus shall wind down its activities under the applicable Collaborative Development Plan and shall use commercially reasonable efforts to reallocate its resources to other Collaborative Development activities under this Agreement or to other internal programs or Third Party funded work. Ultragenyx shall pay to Arcturus (i) the FTE Costs for the number of FTEs actually incurred by Arcturus in winding down its activities under the applicable Collaborative Development Plan during the ninety (90) day period beginning on Arcturus' receipt of notice of termination (or the six (6) month period beginning on Arcturus' receipt of notice of termination if […***…] or more Targets are terminated prior to completion of the applicable Collaborative Development Plans within a six (6) month period), and (ii) any committed Out-of-Pocket Costs under the applicable Collaborative Development Plan that cannot reasonably be cancelled, such payment obligation being subject to reduction to the extent Arcturus is able to reasonably reallocate any such FTEs and/or Out-of-Pocket Costs to other internal programs or Third Party-funded work prior to the end of such remaining period. Arcturus will use Commercially Reasonable Efforts to reallocate such FTEs;

12.5.7 Ultragenyx shall grant (and hereby agrees that such license shall automatically take effect upon such termination) to Arcturus an exclusive, worldwide, royaltybearing, perpetual license, with the right to sublicense through multiple tiers, under all: (i) Product-Specific Technology; (ii) Collaboration Technology; and (iii) other Patent Rights and Know-How that as of the effective date of such termination had been practiced or used by Ultragenyx under this Agreement, in each case to the extent Controlled by Ultragenyx and/or its Affiliates, in each case to Exploit Compounds and Products (where the original Compound or Product exists as of the date of such termination with respect to the Terminated Target) ("***Terminated Products***");

12.5.8 If mutually agreed by the Parties, (i) Ultragenyx shall transfer to Arcturus the responsibility for the prosecution and maintenance of all Product-Specific Patents that specifically pertain to Compounds and/or Products with respect to the Terminated Target, and Arcturus shall perform such prosecution and maintenance activities in accordance with Section 8.2.2 and (ii) Arcturus shall have the first right to enforce such Product-Specific Patents in a Product Infringement with respect to any Terminated Products in the manner similar to Ultragenyx's enforcement rights described in Section 8.

12.5.9 Arcturus shall pay Ultragenyx royalties on Net Sales of Terminated Products, on a country-by-country basis, until the expiration of the last Valid Claim of the Product-Specific Patents or Patent Rights licensed by Ultragenyx to Arcturus under Section 12.5.8 covering such Terminated Product in such country at the following rates: (i) […***…] percent ([…***…]%) if the applicable Target becomes a Terminated Target prior to the first Optimized Lead Designation for such Terminated Product; (ii) […***…] percent ([…***…]%) if the applicable Development Target becomes a Terminated Target after the first Optimized Lead Designation for such Terminated Product and prior to the first PCC Designation of such Terminated Product; (iii) […***…] percent ([…***…]%) if the applicable Development Target becomes a Terminated Target after the first PCC Designation of such Terminated Product and prior to completion of a Phase 1 Clinical Trial

for such Terminated Product; (iv) […***…] percent ([…***…]%) if the applicable Development Target becomes a Terminated Target after completion of a Phase 1 Clinical Trial for such Terminated Product and prior to completion of a Pivotal Trial for such Terminated Product; and (v) […***…] percent ([…***…]%) if the applicable Development Target becomes a Terminated Target after completion of a Pivotal Trial for such Terminated Product. For the purposes of this Section 12.5.8, the definition of " Net Sales" and "First Commercial Sale" shall apply mutatis mutandis to sales of any Terminated Product sold by Arcturus, its Affiliates or sublicensees and the definition of "***Valid Claim***" shall apply *mutatis mutandis* to claims of the Patent Rights licensed to Arcturus pursuant to Section 7 and Sections 7.13, 7.14 and 7.15 shall apply to payments to Ultragenyx, applied *mutatis mutandis*;

12.5.10 Ultragenyx shall promptly transfer to Arcturus all available data (including material clinical and preclinical data), information, and Regulatory Filings, INDs and Regulatory Approvals pertaining to Compounds and Products pertaining to the Terminated Target that were in active Development or had been Commercialized at or before the time of termination and in the event of any failure to obtain assignment, Ultragenyx will consent and grant to Arcturus the right to access and reference (without any further action required on the part of Ultragenyx, whose authorization to file this consent with any Regulatory Authority is hereby granted) any such items and information), and Ultragenyx shall transfer to Arcturus all (or, as requested by Arcturus, a specified portion of) available quantities of Compounds and Products pertaining to the Terminated Target at a price equal to Ultragenyx's fully burdened cost of those supplies. The Parties shall discuss and establish appropriate arrangements with respect to safety data exchange with respect to the Terminated Target;

12.5.11 Ultragenyx shall, for […***…] days after the effective date of termination, at Arcturus's written request, reasonably assist at its own expense in the orderly and prompt transition of sponsorship and management of clinical trials then being conducted to Arcturus with respect to Products pertaining to the Terminated Targets;

12.5.12 If Ultragenyx was manufacturing, or having manufactured on its behalf, any Product, or the Compounds contained therein, pertaining to the Terminated Target prior to termination, then at Arcturus's request and upon commercially reasonable pricing terms, until the earlier of: (i) such time as Arcturus has secured another source of Compound or Product pertaining to the Terminated Target that is able to meet Arcturus's Product quality and quantity requirements; and (ii) […***…] months after such termination, Ultragenyx shall use commercially reasonable efforts to supply, or cause to be supplied, to Arcturus such quantities of Product (or Compound contained therein) pertaining to the Terminated Target as Arcturus may reasonably require for the Exploitation of such Products in the Licensed Field, subject to payment by Arcturus of the agreed upon percentage above Ultragenyx's fully-burdened cost of such supplies; provided that Arcturus shall use commercially reasonable efforts to secure another source of supply as soon as reasonably practicable;

12.5.13 Upon Arcturus' request and expense, if a validated manufacturing process for the Terminated Target is in effect and Controlled by Ultragenyx, transfer such manufacturing process for such Terminated Target to Arcturus or its designee, and cooperate with Arcturus to effect the transition of such manufacturing process; and

12.5.14 Ultragenyx will not be required to initiate or continue, any clinical trial as to any Compound or Product pertaining to the Terminated Target in the event of a

termination of the Agreement. If the Parties agree to transition any clinical trials to Arcturus, Arcturus shall reimburse Ultragenyx for any costs incurred by Ultragenyx in transitioning such clinical trials to Arcturus, and Arcturus shall be responsible for reimbursing Ultragenyx […***…]% of the costs incurred by Ultragenyx prior to such transition in connection with the conduct of such clinical trials. Should Ultragenyx be obligated to any Third Party to pay milestones or royalties with respect to any Compound or Product then, prior to Ultragenyx granting a license to the same to Arcturus hereunder, Arcturus shall agree in writing to pay to Ultragenyx all royalties and milestone payments that become due by Ultragenyx to the Third Party on account of use by Arcturus or its licensee.

12.6 Accrued Rights and Obligations; Survival. Termination of this Agreement for any reason shall not release either Party from any liability which, at the time of such termination, has already accrued to the other Party or which is attributable to a period prior to such termination, nor preclude either Party from pursuing any rights and remedies it may have hereunder or at law or in equity which accrued or are based upon any event occurring prior to such termination. The provisions of Articles 1 (to the extent defined terms are contained in the following surviving Articles and Sections), 11 (Confidentiality) and 13 (Miscellaneous), and Section 3.5 (Discontinued Targets), 7.8 (Royalties, solely to the extent accrued during the Term with respect to Ultragenyx's payment obligations, or as pertaining to Arcturus's payment obligations under Section 12.5.9), 7.13 (Late Payments, solely to the extent accrued during the Term with respect to Ultragenyx's payment obligations, or as pertaining to Arcturus's payment obligations under Section 12.5.9, solely to the extent accrued during the Term with respect to Ultragenyx's payment obligations, or as pertaining to Arcturus's payment obligations under Section 12.5.9), 7.14 (Records and Audits, solely to the extent accrued during the Term with respect to Ultragenyx's payment obligations, or as pertaining to Arcturus's payment obligations under Section 12.5.9), 7.15 *Taxes, solely to the extent accrued during the Term with respect to Ultragenyx's payment obligations, or as pertaining to Arcturus's payment obligations under Section 12.5.9), 8.1 (Intellectual Property Ownership), 9.5 (Disclaimer), 10.1 (Indemnity), 10.2 (Limitation of Damages), 12.5 (Effect of Termination With Respect to Targets), and 12.6 (Accrued Rights and Obligations; Survival), shall survive expiration or termination of this Agreement for any reason.

ARTICLE 13

MISCELLANEOUS

13.1 Dispute Resolution. It is the objective of the Parties to establish procedures to facilitate the resolution of disputes arising under this Agreement in an expedient manner by mutual cooperation and without resort to litigation. In the event of any disputes, controversies or differences which may arise between the Parties out of or in relation to or in connection with this Agreement, including any alleged failure to perform, or breach, of this Agreement, or any issue relating to the interpretation, application, enforcement, termination or validity of this Agreement (each, a "***Dispute***"), then upon the request of either Party by written notice, the Parties agree to first meet and discuss in good faith a possible resolution thereof, which good faith efforts shall include at least one in-person meeting between the Parties' respective Designated Executive Officers. If the matter is not resolved within […***…] days following the written request for

*****Confidential Treatment Requested**

discussions, either Party may then invoke the alternative dispute resolution provisions set forth in **Exhibit E**.

13.2 Governing Law. This Agreement and its effect are subject to and shall be construed and enforced in accordance with the law of the State of California, without regard to its conflicts of laws, except as to any issue which depends upon the validity, scope or enforceability of any Patent, which issue shall be determined in accordance with the laws of the country in which such patent was issued, and except with respect to any issue of inventorship of any Collaboration Technology, which shall be determined in accordance with U.S. federal law.

13.3 Entire Agreement; Amendment. This Agreement and all Exhibits attached to this Agreement and each Collaborative Development Plan, constitute the entire agreement between the Parties as to the subject matter hereof. All prior and contemporaneous negotiations, representations, warranties, agreements, statements, promises and understandings with respect to the subject matter of this Agreement are hereby superseded and merged into, extinguished by and completely expressed by this Agreement. None of the Parties shall be bound by or charged with any written or oral agreements, representations, warranties, statements, promises or understandings not specifically set forth in this Agreement. No amendment, supplement or other modification to any provision of this Agreement shall be binding unless in writing and signed by all Parties.

13.4 Successors and Assigns. Neither this Agreement nor any of the rights or obligations created herein may be assigned by either Party, in whole or in part, without the prior written consent of the other Party, not to be unreasonably withheld or delayed except that either Party shall be free to assign this Agreement (a) to an Affiliate of such Party, provided that such Party shall remain liable and responsible to the other Party for the performance and observance of all such duties and obligations by such Affiliate, or (b) in connection with any merger, sale of such Party or sale of all or substantially all of the assets or stock of the Party that relate to this Agreement, without the prior consent of the non-assigning Party. This Agreement shall bind and inure to the benefit of the successors and permitted assigns of the Parties hereto. Any assignment of this Agreement in contravention of this Section 13.4 shall be null and void.

In the event that either Arcturus or Ultragenyx is acquired in a Change of Control Transaction by a Third Party (such Third Party, hereinafter referred to as an "***Acquirer***"), then the intellectual property of such Acquirer held or developed by such Acquirer prior to or after such acquisition (other than intellectual property developed by such Acquirer in the course of conducting the acquired Party's activities under this Agreement) shall be excluded from the Arcturus Technology, and any technology licensed by Ultragenyx to Arcturus under this Agreement, as applicable (each, as applicable, the "***Acquired Party's IP***"), and such Acquirer (and Affiliates of such Acquirer which are not controlled by (as defined under the Affiliate definition in Article 1) the acquired Party) shall be excluded from the Affiliate definition solely for purposes of the Acquired Party's IP. For clarity, any intellectual property developed by an Acquirer in the course of conducting the acquired Party's activities under this Agreement shall be included within such Acquired Party's IP to the extent such intellectual property would have been so included had it been developed by such acquired Party. For further clarity, the Acquirer has sole discretion as to whether it will contribute its intellectual property or know-how to the acquired Party's activities and such Acquired Party's IP.

13.5 Section 365(n) of the Bankruptcy Code. All rights and licenses granted under or pursuant to any section of this Agreement are, and shall otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of rights to "intellectual property" as defined under Section 101(35A) of the U.S. Bankruptcy Code to the extent permitted thereunder. The Parties shall retain and may fully exercise all of their respective rights and elections under the U.S. Bankruptcy Code. Upon the bankruptcy of any Party, the nonbankrupt Party shall further be entitled to a complete duplicate of (or complete access to, as approp1iate) any such intellectual property, and such, if not already in its possession, shall be promptly delivered to the non-bankrupt Party, unless the bankrupt Party elects to continue, and continues, to perform all of its obligations under this Agreement.

13.6 Independent Contractors. The relationship between Arcturus and Ultragenyx created by this Agreement is solely that of independent contractors. This Agreement does not create any agency, distributorship, employee-employer, partnership, joint venture or similar business relationship between the Parties. Neither Party is a legal representative of the other Party, and neither Party can assume or create any obligation, representation, warranty or guarantee, express or implied, on behalf of the other Party for any purpose whatsoever. Each Party shall use its own discretion and shall have complete and authoritative control over its employees and the details of performing its obligations under this Agreement.

13.7 Notice. All notices or communication required or permitted to be given by either Party hereunder shall be deemed sufficiently given if delivered in person, mailed by registered mail or certified mail, return receipt requested, or sent by overnight courier, such as Federal Express, to the other Party at its respective address set forth below or to such other address as one Party shall give notice of to the other from time to time hereunder. Mailed notices shall be deemed to be received on the third (3rd) business day following the date of mailing. Notices sent by overnight courier shall be deemed received the day delivered by the courier (provided it maintains a record tracking the date of delivery). Notices delivered in person shall be deemed received as of the date of delivery.

If to Ultragenyx:	Ultragenyx Pharmaceutical Inc. 60 Leveroni Court Novato, CA 94949 Attn: Chief Business Officer
If to Arcturus:	Arcturus Therapeutics, Inc. 10628 Science Center Drive, Suite 200 San Diego, CA 92121 Attn: Chief Executive Officer

13.8 Compliance With Law; Severability. Nothing in this Agreement shall be construed to require the commission of any act contrary to Law. If any one or more provisions of this Agreement is held to be invalid, illegal or unenforceable, the affected provisions of this Agreement shall be curtailed and limited only to the extent necessary to bring it within the applicable legal requirements and the validity, legality and enforceability of the remaining provisions of this Agreement shall not in any way be affected or impaired thereby.

13.9 Non-Use of Names. Ultragenyx shall not use the name, trademark, logo, or physical likeness of Arcturus or any of its officers, directors or employees, or any adaptation of any of them, in any advertising, promotional or sales literature, without Arcturus's prior written consent. Ultragenyx shall require its Affiliates to comply with the foregoing. Arcturus shall not use the name, trademark, logo, or physical likeness of Ultragenyx or any of its officers, directors or employees, or any adaptation of any of them, in any advertising, promotional or sales literature, without Ultragenyx's prior written consent.

13.10 Waivers. A Party's consent to or waiver, express or implied, of any other Party's breach of its obligations hereunder shall not be deemed to be or construed as a consent to or waiver of any other breach of the same or any other obligations of such breaching Party. A Party's failure to complain of any act, or failure to act, by the other Party, to declare the other Party in default, to insist upon the strict performance of any obligation or condition of this Agreement or to exercise any right or remedy consequent upon a breach thereof, no matter how long such failure continues, shall not constitute a waiver by such Party of its rights hereunder, of any such breach, or of any other obligation or condition. A Party's consent in any one instance shall not limit or waive the necessity to obtain such Party's consent in any future instance and in any event no consent or waiver shall be effective for any purpose hereunder unless such consent or waiver is in writing and signed by the Party granting such consent or waiver.

13.11 Headings; Exhibits. Article and Section headings used herein are for convenient reference only, and are not a part of this Agreement. All Exhibits are incorporated herein by this reference.

13.12 Interpretation. Except where the context otherwise requires, wherever used, the singular shall include the plural, the plural the singular, the use of any gender shall be applicable to all genders and the word "***or***" is used in the inclusive sense (and/or). The term "***including***" as used herein shall mean including, without limiting the generality of any description preceding such term. All references to a "***business day***" or "***business days***" in this Agreement means any day other than a day which is a Saturday, a Sunday or any day banks are authorized or required to be closed in the United States. The language in all parts of this Agreement shall be deemed to be the language mutually chosen by the Parties. The Parties and their counsel have cooperated in the drafting and preparation of this Agreement, and this Agreement therefore shall not be construed against any Party by virtue of its role as the drafter thereof.

13.13 Counterparts. This Agreement may be executed in counterparts by a single Party, each of which when taken together shall constitute one and the same agreement, and may be executed through the use of facsimiles or .pdf documents.

[Signature page follows]

In Witness Whereof, the Parties have executed this Agreement as of the date first set forth above.

Ultragenyx Pharmaceutical Inc.		**Arcturus Therapeutics, Inc.**	
By:	/s/ Emil Kakkis	By:	/s/ Joseph E. Payne
Name:	Emil Kakkis	Name:	Joseph E. Payne
Title:	CEO	Title:	President & CEO

Exhibit List

Exhibit A – Arcturus Patents

Exhibit B – Development Targets

Exhibit C – Reserved Targets

Exhibit D – Collaborative Development Plans

Exhibit E – Dispute Resolution

Exhibit F – Ultragenyx Pipeline Targets

Exhibit A

Arcturus Patents

[…***…]

*****Confidential Treatment Requested**

Exhibit B

Development Targets

[…***…]

*****Confidential Treatment Requested**

Exhibit C

Reserved Targets

[…***…]

*****Confidential Treatment Requested**

Exhibit D

Collaborative Development Plans

[…***…]

*****Confidential Treatment Requested**

Exhibit E

Dispute Resolution

1. The alternative dispute resolution shall be conducted as binding arbitration by a panel of […***…] persons experienced in the pharmaceutical business in accordance with the JAMS Rules. Within […***…] days after initiation of an arbitration, each Party shall select one person to act as arbitrator and the two Party-selected arbitrators shall select a third arbitrator within […***…] days of their appointment. If the arbitrators selected by the Parties are unable or fail to agree upon the third arbitrator, the third arbitrator shall be appointed by the JAMS. The place of arbitration shall be San Francisco, California, and all proceedings and communications shall be in English.

2. Either Party may apply to the arbitrators for interim injunctive relief until the arbitration award is rendered or the controversy is otherwise resolved. Either Party also may, without waiving any remedy under this Agreement, seek from any court having jurisdiction any injunctive or provisional relief necessary to protect the rights or property of that Party pending the arbitration award. The arbitrators shall have no authority to award any damages excluded by Section 10.2. Each Party shall bear its own costs and expenses and attorneys' fees and an equal share of the arbitrators' fees and any administrative fees of arbitration.

3. Except to the extent necessary to confirm an award or as may be required by law, neither a Party nor an arbitrator may disclose the existence, content, or results of an arbitration without the prior written consent of both Parties. In no event shall an arbitration be initiated after the date when commencement of a legal or equitable proceeding based on the dispute, controversy or claim would be barred by the applicable statute of limitations under the laws of the State of California.

4. The Parties agree that, in the event of a good faith dispute over the nature or quality of performance under this Agreement, neither Party may unilaterally terminate this Agreement until final resolution of the dispute through arbitration or other judicial determination. The Parties further agree that any payments made pursuant to this Agreement pending resolution of the dispute shall be refunded if an arbitrator or court determines that such payments are not due.

5. During the pendency of any arbitration the Parties shall continue to perform their respective obligations under this Agreement. To the extent that such performance involves any matter which is the subject of the dispute, claim or controversy being arbitrated, the Parties shall continue performance of such matter under this Agreement in such a manner as to the fullest extent possible maintain the status quo of the Parties with respect to the disputed matter.

*****Confidential Treatment Requested**

Exhibit F

Ultragenyx Pipeline Targets

[…***…]

*****Confidential Treatment Requested**

FIRST AMENDMENT
TO
RESEARCH COLLABORATION AND LICENSE AGREEMENT

This **First Amendment to Research Collaboration and License Agreement** (this "**First Amendment**") is effective as of October 17, 2017 ("**First Amendment Effective Date**"), by and between **Ultragenyx Pharmaceutical Inc.**, a Delaware corporation having an address at 60 Leveroni Court, Novato, CA, 94949 ("**Ultragenyx**") and **Arcturus Therapeutics, Inc.**, a Delaware corporation having an address at 10628 Science Center Drive, Suite 200, San Diego, CA 92121 ("**Arcturus**"), and amends that certain Research Collaboration and License Agreement between the Parties, dated October 26, 2015 (the "**Original Agreement**").

The Parties, for their mutual benefit, now wish to amend the Original Agreement. Capitalized terms herein used which are not herein defined shall have the respective meanings ascribed to them in the Original Agreement. All references to the term "Agreement" in the Original Agreement shall be deemed to include all of the terms and conditions of this First Amendment.

NOW, THEREFORE, in consideration of good and valuable consideration the receipt and sufficiency of which is hereby acknowledged and of the mutual agreements made herein, the Parties agree as follows:

1. Amendments. The Parties agree to amend the Original Agreement as follows:

(a) Extension of Reserved Target Exclusivity Period. The Parties desire to extend the duration of the Reserved Target Exclusivity Period by one (1) year. Accordingly, the words "*second (2nd)*" in the second sentence of Section 3.3.3 of the Original Agreement are hereby deleted and replaced with the words "*third (3rd)*". In consideration for this extension of the Reserved Target Exclusivity Period, Ultragenyx will pay to Arcturus a one-time payment of […***…]* within fifteen (15) days after the First Amendment Effective Date.

(b) Arcturus Patents. The following is hereby inserted at the end of Section 8.2.3: "*Arcturus shall provide Ultragenyx reasonable opportunity to review and comment on its filing and prosecution efforts of pending Arcturus Patents that relate to UNA Oligomer Chemistry and that have disclosures and/or claims which Cover a Product. Arcturus shall consider Ultragenyx's comments in good faith*."

2. Counterparts. This First Amendment may be executed in counterparts, each of which will be considered an original, but all of which together will constitute the same instrument. Once signed, any reproduction of this First Amendment made by reliable means (e.g., photocopy, portable document format (PDF) or facsimile) is considered an original.

3. No Other Amendments. Except as herein set forth, the Original Agreement has not been modified and, as amended by this First Amendment, remains in full force and effect.

[Signatures on Following Page]

***Confidential Treatment Requested

In Witness Whereof, the duly authorized representatives of the Parties have executed this First Amendment effective as of the First Amendment Effective Date.

Ultragenyx Pharmaceutical Inc.		**Arcturus Therapeutics, Inc.**	
By:	/s/ Emil Kakkis	By:	/s/ Joseph E. Payne
Name:	Emil Kakkis	Name:	Joseph E. Payne
Title:	CEO	Title:	President & CEO

SECOND AMENDMENT
TO
RESEARCH COLLABORATION AND LICENSE AGREEMENT

This **Second Amendment To Research Collaboration And License Agreement** (the "**Second Amendment**") is effective as of April 20, 2018 ("**Second Amendment Effective Date**"), by and between **Ultragenyx Pharmaceutical Inc.**, a Delaware corporation having an address at 60 Leveroni Court, Novato, CA, 94949 ("**Ultragenyx**") and **Arcturus Therapeutics, Inc.**, a Delaware corporation having an address at 10628 Science Center Drive, Suite 250, San Diego, CA 92121 ("**Arcturus**"), and amends that certain Research Collaboration and License Agreement between the Parties, dated October 26, 2015, as amended on October 17, 2017 (the "**License Agreement**").

The Parties, for their mutual benefit, now wish to amend the License Agreement. Capitalized terms used herein which are not defined shall have the respective meanings ascribed to them in the License Agreement. All references to the term "Agreement" in the License Agreement shall be deemed to include all of the terms and conditions of this Second Amendment.

NOW, THEREFORE, in consideration of good and valuable consideration the receipt and sufficiency of which is hereby acknowledged and of the mutual agreements made herein, the Parties hereby agree as follows:

1. Reserve Target Exclusivity

(a) Section 3.3.3 of the License Agreement is hereby deleted in its entirety and replaced with the following:

" **3.3.3 Reserved Target Exclusivity.** With respect to each Reserved Target, during the Reserved Target Exclusivity Period, Arcturus shall not conduct or participate in, or advise, assist or intentionally enable any Third Party to conduct or participate in the preclinical or clinical development, manufacture or commercialization of (a) any product containing mRNA, including Modified mRNA, or UNA Oligomer with respect to such Reserved Target, or (b) without offering Ultragenyx the right of first negotiation described in Section 3.3.3(a), any other RNA Product or a product utilizing the LUNAR Delivery Technology with respect to such Reserved Target. The foregoing restriction shall expire on the earlier of (i) […***…], or (ii) […***…] (such period for each Reserved Target, the "***Reserved Target Exclusivity Period***"), provided, that the Reserved Target Exclusivity Period may be extended, upon written notice to Arcturus, on a Reserved Target-by-Reserved Target basis for up to […***…] additional […***…] year period(s) by paying the Exclusivity Extension Fee pursuant to Section 7.3. For clarity, Section 3.3.1 and not this Section 3.3.3 shall apply to any Reserved Target that becomes a Development Target pursuant to Section 3.1.2 or Section 3.1.3.

(a) Right of First Negotiation. On a Reserved Target-by-Reserved Target basis, during the corresponding Reserved Target Exclusivity Period, Arcturus hereby grants Ultragenyx an exclusive right of first negotiation to obtain an exclusive license to Exploit RNA Products or a product utilizing the LUNAR Delivery Technology with respect to such Reserved Target within the Territory (each, a "***Reserved Target ROFN***") as further described herein. Arcturus shall provide written notice to Ultragenyx promptly upon Arcturus' decision to seek a

partner for the research, development and/or commercialization of any RNA Product or a product utilizing the LUNAR Delivery Technology with respect to such Reserved Target ("***Reserved Target ROFN Notice***"). Ultragenyx shall have […***…] days from its receipt of the Reserved Target ROFN Notice to notify Arcturus if Ultragenyx desires to exercise its Reserved Target ROFN with respect to such Reserved Target and upon such notice from Ultragenyx, Arcturus and Ultragenyx will negotiate such rights in good faith for a period of […***…] days (the "***Reserved Target ROFN Negotiation Period***"). If, at the end of the Reserved Target ROFN Negotiation Period, Arcturus and Ultragenyx are unable to reach agreement on such terms, or if Ultragenyx does not notify Arcturus of its interest in such Reserved Target during such […***…] day period, Arcturus shall be free to grant a license or enter into any other arrangement with a Third Party to Exploit RNA Products or a product utilizing the LUNAR Delivery Technology with respect to such Reserved Target."

2. COLLABORATIVE DEVELOPMENT

(a) Section 4.1 of the License Agreement is hereby deleted in its entirety and replaced with the following:

"**4.1 Collaborative Development Plan**. The JSC shall establish a Collaborative Development Plan with respect to each Development Target (including the allocation of activities between the Parties), as well as the corresponding Budget and timeline of activities. The Collaborative Development Plans and Budgets for the Development Targets as of the Effective Date are attached hereto as **Exhibit D**. The Parties intend that the Collaborative Development Plan shall address activities prior to the first PCC Designation of the first Product candidate with respect to such Target. Each Collaborative Development Plan shall set forth the Opt-In Data Package. "***Opt-In Data Package***" means the data and materials to be provided by Arcturus to Ultragenyx for the purpose of enabling Ultragenyx to make an informed decision regarding its option, which data and materials shall be described in each Collaborative Development Plan, as may be updated from time to time by the JSC."

3. FINANCIAL TERMS

(a) Option Exercise Fee. Section 7.6 of the License Agreement is hereby deleted in its entirety and replaced with the following:

" **7.6 Option Exercise Fee.** For each Development Target for which Ultragenyx exercises its option under Section 5.2, within […***…] days after such option exercise, Ultragenyx shall pay Arcturus a one-time, non-refundable, non-creditable option exercise fee, in the amount of: (a) […***…] USD ($[…***…]) for each of the first […***…] Development Targets for which Ultragenyx exercises such option, if any; (b) […***…] USD ($[…***…]) for the […***…] Development Target for which Ultragenyx exercises such option, if any; (c) […***…] USD ($[…***…]) for the […***…] Development Target for which Ultragenyx exercises such option, if any; (d) […***…] USD ($[…***…]) for the […***…] through […***…] Development Target for which Ultragenyx exercises such option, if any. On a Development Target-by-Development Target basis, in the event that the Exploitation of Products with respect to such Development Target does not utilize (x) the LUNAR Nanoparticle Delivery Technology Covered by either an Arcturus Patent and/or a Product-Specific Patent, (y)

another RNA delivery technology Covered by an Arcturus Patent, or (z) a Nucleic Acid Chemistry Technology Covered by an Arcturus Patent […***…], then in each case the option exercise fee with respect to such Development Target shall be reduced by […***…] percent ([…***…]%). "***Nucleic Acid Chemistry Technology***" means technologies related to the chemical and enzymatic modification of nucleobases and does not include improvements related to codon-optimization, modification of the 5' cap structure, use of alternative 5' or 3' sequences, modification of the 5' untranslated region or 3' untranslated region, or variations in polyA tail sequence or length."

(b) Milestones. Section 7.7.3 of the License Agreement is hereby deleted in its entirety and replaced with the following:

" **7.7.3 No Use of Arcturus Delivery Technology or Nucleic Acid Chemistry Technology**. On a Product-by-Product basis, in the event that the Exploitation of a Product in any given country within the Territory does not utilize (a) the LUNAR Nanoparticle Delivery Technology Covered by either an Arcturus Patent and/or a Product-Specific Patent, (b) another RNA delivery technology Covered by an Arcturus Patent, or (c) a Nucleic Acid Chemistry Technology Covered by an Arcturus Patent […***…], then in each case the corresponding milestone payment(s) set forth in Section 7.7.1 and 7.7.2 payable in such country with respect to such Product shall be reduced by […***…] percent ([…***…]%)."

(c) Royalties. Section 7.8.4(c) of the License Agreement is hereby deleted in its entirety and replaced with the following:

" **(c) No Use of Arcturus Delivery Technology or Nucleic Acid Chemistry Technology that results in an increase in mRNA half-life**. On a Product-by-Product basis, in the event that a Selling Party's sale of Product does not utilize (a) the LUNAR Nanoparticle Delivery Technology Covered by any Arcturus Patent or Product-Specific Patent, (b) another RNA delivery technology Covered by an Arcturus Patent, or (c) a Nucleic Acid Chemistry Technology Covered by an Arcturus Patent […***…], then in each case the royalty rates set forth in Section 7.8.1 with respect to Net Sales for such Product in such country shall be reduced by […***…] percent ([…***…]%) of what would otherwise have been due in the absence of such reduction."

4. MISCELLANEOUS

(a) No Other Amendments. Except as herein set forth, the License Agreement has not been modified and, as amended by this Second Amendment, remains in full force and effect.

(b) Entire Agreement. The License Agreement as modified by this Second Amendment is both a final expression of the Parties' agreement and a complete and exclusive statement with respect to its subject matter. They supersede all prior and contemporaneous agreements and communications, whether written or oral, of the Parties regarding this subject matter.

(c) Severability. If any one or more provisions of this Second Amendment is held to be invalid, illegal, or unenforceable, the affected provisions of this Agreement shall be curtailed and limited only to the extent necessary to bring it within the applicable legal requirements and the validity, legality, and enforceability of the remaining provisions of this Agreement shall not in any way be affected or impaired thereby.

*****Confidential Treatment Requested**

(d) Counterparts. This Second Amendment may be executed in counterparts, each of which will be considered an original, but all of which together will constitute the same instrument. Once signed, any reproduction of this Second Amendment made by reliable means (e.g., photocopy, portable document format (PDF) or facsimile) is considered an original.

{SIGNATURES ON FOLLOWING PAGE}

In Witness Whereof, the duly authorized representatives of the Parties have executed this Second Amendment effective as of the Second Amendment Effective Date.

Ultragenyx Pharmaceutical Inc.		**Arcturus Therapeutics, Inc.**	
By:	/s/ Thomas Kassberg	By:	/s/ Mark Herbert
Name:	Thomas Kassberg	Name:	Mark Herbert
Title:	Chief Business Officer	Title:	Interim President

Exhibit 4.11

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

CFFT FINAL 5/16/17

May 16, 2017

Padmanabh Chivukula, PhD
Arcturus Therapeutics, Inc.
10628 Science Center Dr., Suite 200 San Diego, CA 92121

Development Program:	Nebulized LUNAR-formulated CFTR mRNA
Amount of Award:	$3,177,983
Name of Awardee:	Arcturus Therapeutics, Inc. ("Arcturus")

Dear Dr. Chivukula:

We are pleased to inform you that Cystic Fibrosis Foundation Therapeutics, Inc. ("CFFT") is hereby issuing an award for the Development Program described in Exhibit A and disbursed in accordance with Exhibit B up to the amount indicated above (the "Award"). Arcturus shall be responsible for the payment of all of the remaining costs required to complete the Development Program and for costs associated with continuing CRE necessary to further develop and commercialize the Product. Each party's obligations hereunder will commence and apply upon the execution of this Agreement. The Award is in furtherance of CFFT's charitable mission to cure and mitigate the effects of Cystic Fibrosis. CFFT has determined that without the Award, the Development Program will likely not occur or be substantially delayed. The Award is subject to the following terms, conditions and policies of this Letter Agreement ("Agreement"):

1. Disbursement of Award; CFFT Know-How; Reports.

(a) The Award will be disbursed by CFFT to Arcturus in accordance with the Milestone Payment Schedule set forth in Exhibit B. Any CFFT funds not expended on the Development Program must be returned to CFFT, and upon such return, the amounts of such returned funds will not be included as part of the "Award" for purposes of calculating any royalties or other amounts owed by Arcturus to CFP1 pursuant to Paragraph 2(b).

(b) To the extent CFFT provides or makes available any information, expertise, know-how or other intellectual property related to cystic fibrosis or the treatment, prevention, or cure thereof ("CFFT Know-How") to Arcturus, CFFT hereby grants to Arcturus a non-exclusive, transferable, sublicensable (through multiple tiers), worldwide right and license under all of CFFT's rights in such CFFT Know-How to assist

Arcturus to research, develop, commercialize, make, have made, use, sell, have sold, offer for sale, import, export and otherwise exploit the Product.

(c) During the Development Program, Arcturus agrees to provide CFFT and the Project Advisory Group ("PAG") specified below with a reasonably detailed, written report every […***…]* months, summarizing progress toward achieving the goals of the Development Program. In addition, Arcturus shall prepare and deliver to CFFT a closing report within […***…] days after the completion of the Development Program. Arcturus shall continue to report to CFFT […***…] through the PAG (as hereafter provided for) on the progress of its development activities regarding the Product until the earlier of first commercial sale of the Product or such research efforts are abandoned by Arcturus, its Affiliates and its sublicensees, solely as a result of scientific failure. Arcturus shall also provide CFFT with prompt notice of the closing of a Disposition Transaction and of any material adverse event affecting Arcturus.

2. Royalties. In consideration of CFFT's Award under this Agreement and CFFT's license and transfer of intellectual property and CFFT Know-How pursuant to this Agreement, Arcturus agrees to pay to CFFT royalties as follows:

(a) Arcturus shall pay a one-time royalty to CFFT in an amount equal to the Royalty Cap. Such amount shall be paid in […***…] installments: the first within […***…] of the first anniversary of the first commercial sale of the Product (the "Initial Payment Date"); and the remaining installments on or before the […***…] and […***…] anniversaries of the Initial Payment Date.

(b) In addition to the royalty payable pursuant to subparagraph (a) above, Arcturus shall pay to CFFT a one-time royalty equal to the Actual Award upon each of the following occurrences: (i) within […***…] days after which aggregate Net Sales of the Product exceed $[…***…], and (ii) within […***…] days after which aggregate Net Sales of the Product exceed $[…***…].

(c) In the event of a license, sale or other transfer of the Product or Arcturus Development Program Technology in the Field (excluding Net Sales) or a Change of Control Transaction (collectively, a "Disposition Transaction"), Arcturus shall pay to CFFT a payment equal to […***…] percent ([…***…]%) of any license or purchase price payments actually received by Arcturus or its shareholders up to the amount of the Royalty Cap (the "Disposition Payment"). Such payment shall be made within […***…] days after any transactions giving rise to such payment. Notwithstanding the payment of the Disposition Payment, the obligation to pay CFFT royalties specified in subparagraphs (a) and (b) shall survive ("Surviving Royalties"), provided that the royalty specified in subparagraph (a) shall be reduced by the Disposition Payment. Arcturus and any third party transferee in such Disposition Transaction shall be jointly and severally liable for the Surviving Royalties, and any Disposition Transaction shall be null and void unless the third party transferee in such transaction expressly assumes the joint and several obligation for the Surviving Royalties.

*** *** Confidential Treatment Requested**

3. Commercially Reasonable Efforts. Arcturus shall use Commercially Reasonable Efforts to conduct the Development Program during the term of this Agreement. After the Development Program is completed, Arcturus or its licensee, sublicensee, assignee or successor shall exercise Commercially Reasonable Efforts to continue to develop the Product.

4. Program Advisory Group ("PAG").

(a) Arcturus and CFFT shall form a PAG. The PAG serves the function of allowing CFFT to oversee the use of the Award funds and to ensure that such funds are used solely in furtherance of CFFT's tax-exempt mission, which is to promote the cure and/or mitigation of cystic fibrosis. The PAG shall terminate and cease to exist on the earlier of the commercialization of the Product or the termination of this Agreement. The PAG shall consist of two (2) individuals appointed by Arcturus and two (2) individuals appointed by CFFT. One of such individuals from Arcturus and CFFT, respectively, shall be the principal liaison to the Development Program. A party may replace the individuals appointed by such party and designate a different individual as the principal liaison upon written notice to the other party.

(b) The role of the PAG shall be to determine, discuss and propose amendments to the Development Program and budget, to determine whether payment milestones have been achieved, and provide recommendations on other issues raised by either party relating to the Development Program, provided that no change to the Development Program shall be made without the written agreement of both parties. After completion of the Development Program, the role of the PAG shall be solely to review annual reports pursuant to Section 1(c).

(c) Each party shall be responsible for its own expenses in connection with attending and participating in the PAG.

5. Interruption License. Arcturus hereby grants the Interruption License to CFFT, which Interruption License shall be effective as provided below. Upon written notice from CFFT following an Interruption (the "Interruption Notice"), Arcturus shall elect, within […***…]* days of such Interruption Notice, one of the following options by notice to CFFT:

(a) Arcturus shall reasonably demonstrate, in the form of a written progress report, that an Interruption has not occurred, or that Arcturus, an Affiliate thereof, or a licensee or sublicensee of either of the foregoing is exercising Commercially Reasonable Efforts to research, develop or commercialize the Product;

(b) Arcturus shall provide CFFT with notice within such […***…] day-period that Arcturus, an Affiliate thereof, or a licensee or sublicensee of either of the foregoing, has plans to resume Commercially Reasonable Efforts to develop or commercialize the Product and resumes such Commercially Reasonable Efforts within the […***…] day period following such notice;

*** *** Confidential Treatment Requested**

(c) The Interruption License shall become effective, as set forth below; or

(d) Arcturus may elect in lieu of the Interruption License, within […***…]* days of the Interruption Notice (but only if and when the Interruption License would otherwise have become effective), to pay to CFFT the greater of (A) […***…] times the Actual Award, and (B) […***…] of the Actual Award […***…] up to the time of such election (the "Interruption Payment"); and in the event of such election and payment, this Paragraph 5 shall otherwise no longer be applicable.

The failure of the drug due to safety issues or lack of sufficient efficacy in the Field or regulatory restrictions shall not be considered an Interruption.

If Arcturus has elected (a) or (b) above within […***…] days of the Interruption Notice, the Interruption Notice shall be deemed satisfied and be of no further force or effect unless CFFT notifies Arcturus within […***…] days after receipt of Arcturus's progress report under (a) above or provides notice under (b) above that CFFT disputes such progress report or notice, as the case may be. If CFFT provides timely notice of its dispute, the parties shall resolve such dispute in accordance with the dispute resolution provision of this Agreement.

If Arcturus has elected (a) or (b) above, CFFT has disputed such election, the resolution of the dispute is concluded and the final outcome of such dispute resolution is that such election was defective, Arcturus shall be deemed to have made the election specified in (c) above. If Arcturus has made (or is deemed to have made) the election specified in (c) above, the Interruption License shall be effective upon such election (or deemed election) (such date, the "Interruption License Effective Date"). The Interruption License shall be an exclusive (even as to Arcturus), worldwide license to CFFT under the Arcturus Development Program Technology solely to the extent necessary to manufacture, have manufactured, license, use, sell, offer to sell, and support the Product in the Field. Arcturus shall not grant a security interest in any Arcturus Development Program Technology that is or will be covered by the Interruption License. Arcturus shall deliver to CFFT, within […***…] days after the Interruption License Effective Date, a copy of all materials and data in its possession or control constituting Arcturus Development Program Technology, to the extent required by CFFT to make, use, or sell the Product in the Field. For the avoidance of doubt, Arcturus shall retain all rights to the Arcturus Development Program Technology for use outside of the Field. In the event that Arcturus assigns all of or certain of its rights and obligations to develop and commercialize the Product at any time to a third party, such third party shall be subject to the obligations of the Interruption License. The Interruption License shall be deemed to constitute intellectual property as defined in Section 365(n) of the U.S. Bankruptcy Code; provided, however, that nothing in this Agreement shall be deemed to constitute a present exercise of such rights and elections. Arcturus agrees that CFFT, as a licensee of such rights, shall retain and may exercise all of its rights and elections under the U.S. Bankruptcy Code.

If Arcturus elects (d) above and subsequently resumes Commercially Reasonable Efforts with respect to a Product, the royalties specified in Paragraph 2 shall survive, but shall be reduced by the Interruption Payment.

*** *** Confidential Treatment Requested**

6. Indemnification.

(a) Arcturus shall indemnify, defend and hold harmless CFFT, its Affiliates, and their respective directors, officers, employees, consultants, committee members, volunteers, agents and representatives and their respective successors, heirs and assigns (each, an "CFFT Indemnitee"), from and against any and all claims, suits and demands of third parties and losses, liabilities, damages for personal injury, property damage or otherwise, costs, penalties, fines and expenses (including court costs and the reasonable fees of attorneys and other professionals) payable to such third parties arising out of, and relating to any such third party claims resulting from:

(i) the conduct of the Development Program by Arcturus or its Affiliates or their respective directors, officers, employees, consultants, agents, representatives, licensees, sublicensees, subcontractors and/or investigators (each, an "Arcturus Party") under this Agreement and/or pursuant to one or more agreements between Arcturus and any Arcturus Party, or any actual or alleged violation of law resulting therefrom;

(ii) Arcturus's or its Affiliates' development, manufacture, or commercialization of the Product developed in whole or in part as a result of the Development Program;

(iii) any claim of infringement or misappropriation with respect to the conduct of the Development Program by or on behalf of Arcturus or its Affiliates, or Arcturus's or its Affiliates' third party licensees' or sublicensees' manufacture, use, sale, or import of the Product developed in whole or in part as a result of the Development Program; and

(iv) any tort claims of personal injury (including death) relating to or arising out of any such injury sustained as the result of, or in connection with, the conduct of the Development Program by or on behalf of Arcturus or its Affiliates, or Arcturus's or its Affiliates' third party licensees' or sublicensees' (other than CFFT or any of CFFT's licensees or sublicensees) development, manufacture, or commercialization of the Product developed in whole or in part as a result of the Development Program; in each case except to the extent the claim, suit, demand, liability, damage, or loss results from the negligence, willful misconduct or other fault of a CFFT Indemnitee.

(b) CFFT will indemnify, defend and hold harmless Arcturus, its Affiliates and their respective directors, officers, employees, consultants, agents and representatives and their respective successors, heirs and assigns ("Arcturus Indemnitees") from and against any and all claims, suits and demands of third parties and losses, liabilities, damages for personal injury, property damage or otherwise, costs, penalties, fines and expenses (including court costs and the reasonable fees of attorneys and other professionals) payable to such third parties arising out of, resulting from, or relating to any exercise of any rights under the Interruption License by or on behalf of CFFT, any designee, assignee or successor in interest thereto, or any licensee or

sublicensee of any of the foregoing, except to the extent the claim, suit, demand, liability, damage or loss results from the negligence or willful misconduct of an Arcturus Indemnitee after the Interruption License Effective Date.

(c) A party entitled to indemnification under this Paragraph 6 (the "Indemnified Party") will promptly notify the other party (the "Indemnifying Party") of any claims, suits, demands, losses, liabilities, damages costs, penalties, fines, or expenses subject to indemnification under this Paragraph 6 of which it is made aware. The Indemnified Party will cooperate, and exert efforts to cause other Indemnified Parties to cooperate, in assisting the Indemnifying Party in presenting a defense, if requested to do so. The Indemnifying Party shall have sole control to select defense counsel, direct the defense of any such complaint or claim, and the right to settle claims at the Indemnifying Party's sole expense, provided that any such settlement does not incur non-indemnified liability for or admit fault by any Indemnified Party. In the event a claim or action is or may be asserted, the Indemnified Party shall have the right to select and to obtain representation by separate legal counsel. If the Indemnified Party exercises such right, all costs and expenses incurred for such separate counsel shall be borne by the Indemnified Party. No Indemnified Party shall settle or enter into any voluntary disposition of any matter subject to indemnification under this Paragraph 6 without the prior written consent of the Indemnifying Party, such consent not to be unreasonably withheld.

7. Insurance. Arcturus shall maintain at its own expense, with a reputable insurance carrier, coverage for Arcturus, its Affiliates, and their respective employees written on a per occurrence basis commensurate with a reasonable assessment of the risks associated with the development efforts being conducted by Arcturus, the following policies: Commercial general liability insurance, including contractual liability as respects this Agreement for bodily injury and property damage and, no later than the first use administration of the Product to a human subject, the Product liability and clinical trials liability.

Maintenance of such insurance coverage will not relieve Arcturus of any responsibility under this Agreement for damage in excess of insurance limits or otherwise. On or prior to the effective date of this Agreement ("Agreement Effective Date"), Arcturus shall provide CFFT with an insurance certificate from the insurer(s), broker(s) or agent(s) (hereinafter collectively the "Insurance Providers") evidencing the applicable insurance coverage. At its request, CFFT may review Arcturus' s insurance coverage with relevant Arcturus personnel no more than […***…]* per year.

8. Intellectual Property Rights. All inventions, data, know-how, information, results, analyses, and other intellectual property rights resulting from the Development Program shall, as between the parties, be owned by Arcturus and the preparation, filing and maintenance of all patents resulting from the Development Program shall, as between the parties, be the sole responsibility, and under the sole control, of Arcturus. Subject to Paragraph 5, CFFT hereby assigns and transfers to Arcturus all of CFFT's right, title, and interest in and to all inventions and other intellectual property resulting from the Development Program, CFFT's access to, or

*** *** Confidential Treatment Requested**

knowledge or use of, any Arcturus Development Program Technology, the Product, or confidential or proprietary information of Arcturus, and all intellectual property rights related to any of the foregoing, free and clear of all liens, claims, and encumbrances.

9. Termination of Agreement.

(a) Either party may terminate this Agreement for cause, without prejudice to any other remedies available to the terminated party with respect thereto, by providing the other party with written notice of such cause and intent to terminate; provided, however, that the other party shall have thirty (30) days following the receipt of written notice to cure such cause. For this Paragraph 9, "cause" shall mean (i) a party's material breach of its covenants or obligations under this Agreement, (ii) a bankruptcy or similar filing by a party or a proceeding under the applicable bankruptcy laws or under any dissolution or liquidation law or statute now or hereafter in effect and filed against such party or all or substantially all of its assets if such filing is not dismissed within […***…]* days after the date of its filing, or (iii) Arcturus's material failure to achieve any Milestone within […***…] days of its anticipated achievement day.

(b) The following provisions shall survive the termination of this Agreement: Paragraphs 2, 5, 6, 7, 8, 9, 10, 11, and 12.

10. Audits. At the request of CFFT, from time to time, Arcturus shall permit CFFT, upon reasonable notice, to audit and examine such books and records of Arcturus as may be necessary for verifying Arcturus's expenditures of the Award and the payment of royalties, if any, but no more frequently than […***…]. All non-public information made available by Arcturus as part of any such audit, as part of any other reports (whether written or non-written), or otherwise under this Agreement (including, but not limited to, in connection with the PAG) shall be regarded as Arcturus's confidential information and CFFT hereby covenants that, except to the extent required by law (provided that CFFT promptly notifies Arcturus of such requirement and permits Arcturus to seek, and reasonably cooperates with Arcturus at Arcturus's expense in seeking, a protective order therefor or other confidential treatment thereof), it shall not use any such information for any purpose other than determining whether Arcturus has complied with its obligations hereunder (provided that CFFT may also use information provided through the PAG to further the purposes of the PAG hereunder) or, in the event of the grant of the Interruption License, the exercise thereof, or disclose any such information to any third party.

11. Miscellaneous.

(a) Governing Law. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Maryland.

(b) Dispute Resolution.

*** *** Confidential Treatment Requested**

(i) In the event of any dispute, claim or controversy arising out of, relating to or in any way connected to the interpretation of any provision of this Agreement, the performance of either party under this Agreement or any other matter under this Agreement, including any action in tort, contract or otherwise, at equity or law (a "Dispute"), either party may at any time provide the other party written notice specifying the terms of such Dispute in reasonable detail. As soon as practicable after receipt of such notice, an officer of each party shall meet at a mutually agreed upon time and location to engage in good faith discussions for the purpose of resolving such Dispute. If the Dispute is not resolved within […***…]* days of such notice, either party may institute arbitration in accordance with (ii) below.

(ii) In the event any Dispute is not resolved in accordance with (i) above, such Dispute shall be resolved by final and binding arbitration. Whenever a party decides to institute arbitration proceedings, it shall give written notice to that effect to the other party. Arbitration shall be held in Washington, D.C., according to the then-current commercial arbitration rules of the Center for Public Resources ("CPR"), except to the extent such rules are inconsistent with this subparagraph. The arbitration will be conducted by one (1) independent, neutral arbitrator who shall be mutually acceptable to both parties, such acceptance not to be unreasonably withheld, and who shall be appointed in accordance with CPR rules. If the parties are unable to mutually agree on such an arbitrator, then the arbitrator shall be appointed in accordance with CPR rules. Any arbitrator chosen hereunder shall have educational training and industry experience sufficient to demonstrate a reasonable level of relevant scientific, financial, medical and industry knowledge. Within […***…] days of the selection of the arbitrator, each party shall submit to the arbitrator a proposed resolution of the Dispute that is the subject of the arbitration (the "Proposals"). The arbitrator shall thereafter select one of the Proposals so submitted as the resolution of the Dispute, but may not alter the terms of either Proposal and may not resolve the Dispute in a manner other than by selection of one of the submitted Proposals. If a party fails to submit a Proposal, the arbitrator shall select the Proposal of the other party as the resolution of the Dispute. The arbitrator shall agree to render its opinion within […***…] days of the final arbitration hearing. No arbitrator shall have the power to award punitive damages regardless of whether any such damages are contained in a Proposal, and such award is expressly prohibited. The proceedings and decisions of the arbitrator shall be confidential, final and binding on all of the parties. Judgment on the award so rendered may be entered in any court having jurisdiction thereof. The parties shall share the costs of arbitration according to the decision of the arbitrator. Nothing in this subparagraph will preclude either party from seeking equitable or injunctive relief, or interim or provisional relief, from a court of competent jurisdiction, including a temporary restraining order, preliminary injunction, or any other form of permanent or interim equitable or injunctive relief, concerning a dispute either prior to or during any arbitration.

(c) This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed to be an original, but all of which together shall constitute one and the same Agreement. Facsimile and other electronically scanned signatures shall have the same effect as their originals.

*** *** Confidential Treatment Requested**

(d) All communications between the parties with respect to any of the provisions of this Agreement will be sent to the addresses set out below, or to such other addresses as may be designated by one party to the other by notice pursuant hereto, by prepaid, certified air mail (which shall be deemed received by the other party on the seventh (r) business day following deposit in the mail), or other electronic means of communication (each of which shall be deemed received when transmitted), with confirmation by first class letter, postage pre-paid, given by the close of business on or before the next following business day:

if to CFFT, at:

Preston W. Campbell, III, M.D.
6931 Arlington Rd.
Suite 200
Bethesda, Maryland 20814
Phone: 301-907-2689
Fax: 301-907-2699
Email: pwc@cff.org

with a copy to:

Schaller & Lubitz, PLLC
6931 Arlington Rd., Suite 200
Bethesda, Maryland 20814
Attn: Kenneth I. Schaner, Esq.
Phone: 240-482-2848
Fax: 202-470-2241
E-mail: ken@schanerlaw.com

if to Arcturus, at:

Padmanabh Chivukula, PhD
Arcturus Therapeutics, Inc.
10628 Science Center Dr., Suite 200
San Diego, CA 92121
Phone: 858-900-2662
Email: pad@arcturusrx.com

With a copy to:

Mark Herbert
Arcturus Therapeutics, Inc.
10628 Science Center Dr., Suite 200
San Diego, CA 92121
Phone: 858-900-2663
Email: mark@arcturusrx.com

(e) The paragraph headings are for convenience only and will not be deemed to affect in any way the language of the provisions to which they refer.

(f) Arcturus will not, by amendment of its organizational or governing documents, or through reorganization, recapitalization, consolidation, merger, dissolution, sale, transfer or assignment of assets, issuance of securities, or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms, provisions, covenants or agreements of this Agreement.

(g) This Agreement may not be assigned by any party without the consent of the other party, except that either party may assign this Agreement without such consent to an Affiliate of such party or in connection with the transfer, whether by sale of assets, merger or otherwise, of all or substantially all of the assets or business of such party to which this Agreement relates. Any assignment that is not in accordance with this subparagraph 11(g) will be null and void ab initio.

(h) Nothing herein contained shall be deemed to create an agency, joint venture, amalgamation, partnership or similar relationship between CFFT and Arcturus. Notwithstanding any of the provisions of this Agreement, neither party to this Agreement shall at any time enter into, incur, or hold itself out to third parties as having authority to enter into or incur, on behalf of the other party, any commitment, expense, or liability whatsoever, and all contracts, expenses and liabilities in connection with or relating to the obligations of each party under this Agreement shall be made, paid, and undertaken exclusively by such party on its own behalf and not as an agent or representative of the other.

(i) Each party shall submit any proposed press release or other public announcement, other than an academic, scholarly, or scientific publication, concerning the terms of this Agreement or this Award to the other party prior to its public release, except to the extent any such release or announcement is required by law, rule, or regulation or the rules of any securities exchange. CFFT' s support for the Development Program shall be acknowledged in any publications by Arcturus related to the Development Program.

(j) The parties agree that they intend to advance the body of general scientific knowledge of cystic fibrosis and its potential therapies and cures and the parties acknowledge that Arcturus intends to, as commercially and scientifically reasonable based on the results of the Development Program, publish the results of the Development Program in a scientific peer-reviewed publication on a timely basis and provide CFFT with copies of at least one public forum presentation annually.

(k) In accordance with the U.S. Department of the Treasury Anti-Terrorist Financing Guidelines. Arcturus shall take reasonable steps to ensure that the payments received from CFFT are not distributed to terrorists or their support networks or used for activities that support terrorism or terrorist organizations and Arcturus shall periodically apprise CFFT of the steps taken to meet this goal. Arcturus certifies that it is in compliance with all laws, statutes and regulations restricting U.S. persons from dealing with any individuals, entities, or groups subject to Office of Foreign Assets Control (OFAC) sanctions.

(l) Arcturus shall provide CFFT on the Agreement Effective Date with a description of its other sources of support and update that description from time to time during the Development Program.

(m) Arcturus shall provide CFFT with a copy of its public filings, such as annual reports, with governmental units from time to time during the Development Program.

12. Definitions.

(a) Unless otherwise defined in this letter, the following shall apply:

- "Actual Award" means the total amount of the Award actually paid to Arcturus.
- "Affiliate" shall mean, with respect to a party, any entity, which directly or indirectly controls, is controlled by, or is under common control with, such party. For these purposes, "control" shall refer to (a) the ownership, directly or indirectly, of at least fifty percent (50%) of the voting securities or other ownership interest of an entity; or (b) the possession, directly or indirectly, of the power to direct the management or policies of an entity, whether through the ownership of voting securities, by contract or otherwise.
- "Arcturus Development Program Technology" shall mean all technology, in whole or in part, discovered, developed, or controlled, by Arcturus or its Affiliates, as a result of the Development Program under this Agreement in the Field (solely for purposes of the Interruption License), including, without limitation, technology owned or controlled by Arcturus prior to Arcturus's performance of the Development Program under this Agreement to the extent necessary in the performance of the Development Program under this Agreement. Without limitation, Arcturus Development Program Technology shall include data, technical information, source codes, know-how, inventions (whether or not patented), trade secrets, laboratory notebooks, and processes and methods.
- "Change of Control Transaction" shall mean the consummation of a transaction, whether in a single transaction or in a series of related and substantially contemporaneous transactions, constituting (i) a merger, share exchange or other reorganization, (ii) the sale by one or more stockholders of a majority of the voting power of Arcturus, or (iii) a sale of all or substantially all of the assets of Arcturus (or that portion of its assets related to the subject matter of this Agreement), in which the stockholders of Arcturus immediately prior to such transaction do not own a majority of the voting power of the acquiring, surviving or successor entity, as the case may be; provided that a Change of Control shall not include a bona fide financing transaction for the benefit of Arcturus (i.e., in which Arcturus raises capital for general working or business purposes) in which voting control of Arcturus transfers to one or more persons or entities who acquire shares of Arcturus, and the existing Arcturus shareholders receive no consideration directly or indirectly in connection with the transaction.
- "Commercially Reasonable Efforts" or "CRE" shall mean the level of effort, expertise and resources that is substantially and materially consistent with industry standards for companies of similar size and financial resources to research, develop and commercialize the Product, provided such research, development and commercialization is technically feasible, devoting the degree of attention and diligence to

such efforts that is substantially and materially consistent with industry standards for a product at a comparable stage in development, with similar market potential, and taking into account, without limitation, issues of safety and efficacy, proprietary position, the competitive environment, the regulatory environment, and other relevant scientific, technical and commercial factors, and for companies of similar size and financial resources.

- "Disposition Payment" shall have the meaning set forth in Paragraph 2(c).
- "Disposition Transaction" shall have the meaning set forth in Paragraph 2(c).
- "Field" shall mean the treatment of cystic fibrosis and other pulmonary diseases.
- "Interest" shall mean the prime rate applicable during the relevant time period, as published in the *Wall Street Journal*, plus […***…]* percentage points.
- "Interruption" shall mean the cessation of Commercially Reasonable Efforts to develop a Product for more than […***…] consecutive days at any time before the first commercial sale of the Product. For clarity, delays resulting from events outside of Arcturus's reasonable control (e.g., technical difficulties, shortages of supplies or materials, delays in preclinical or clinical studies or regulatory processes, etc.) will not be deemed cessation of Commercially Reasonable Efforts.
- "Interruption Payment" shall have the meaning set forth in Paragraph 5(d).
- "Net Sales" shall mean, for any period, the gross amount received for sales of the Product in the Field by Arcturus or any Arcturus Affiliate, sublicensee or transferee as applicable (a "Selling Person"), to a non-Affiliate of the Selling Person, less the following deductions, in each case to the extent specifically related to the Product and taken by the Selling Person or otherwise paid for or accrued by the Selling Person ("Permitted Deductions"):

  trade, cash, promotional and quantity discounts and inventory management fees paid to wholesalers;

  tariffs, duties, excises and taxes on sales (including sales or use taxes or value added taxes) to the extent imposed upon and paid directly with respect to such sales (and excluding national, sales or local taxes based on income);

  freight, insurance, packing costs and other transportation charges allocated to the sale;

  invoiced amounts that are written off as uncollectible in accordance with Selling Person's accounting policies, consistently applied;

  amounts repaid or credits taken by reason of damaged goods, rejections, defects, expired dating, recalls or returns or because of retroactive price reductions, billing errors, or trial prescriptions;

  charge back payments, rebates and discounts granted to (i) managed healthcare organizations, (ii) federal, state or provincial or local governments or other agencies, (iii) purchasers and

*** *** Confidential Treatment Requested**

reimbursers or (iv) trade customers, including wholesalers and chain and pharmacy buying groups;

discounts paid under state legislated or seller-sponsored discount prescription drug programs or reductions for coupon and voucher programs; and

documented custom duties actually paid by the Selling Person.

Sales of the Product between or among Arcturus and its Affiliates and sublicensees for resale, or for use in the production or manufacture of the Product, shall not be included within Net Sales; provided, however, that any subsequent sale of the Product (or any Product produced or manufactured using the Product) by Arcturus or its Affiliate or sublicensee or transferee to another non-Affiliate third party shall be included within Net Sales. Net Sales shall exclude any sale or other distribution for use in a clinical trial or other development activity, for compassionate or named-patient use or for test marketing.

- "Product" shall mean native or chemically modified ribonucleotide sequence of cystic fibrosis transmembrane conductance regulator in any form, dosage or preparation in finished form, and any derivative or combination product, or any successor product containing Arcturus Development Program Technology for use in the Field.
- "Royalty Cap" shall mean six (6) times the Actual Award.
- "Surviving Royalties" shall have the meaning set forth in Paragraph 2(c).

We are pleased to make the Award described in this Agreement. Please indicate your agreement to the terms set forth in this Agreement by signing below.

Sincerely,

Cystic Fibrosis Foundation Therapeutics, Inc.

By: /s/ Preston Campbell, III

Name: Preston Campbell, III, M.D.

Title: President and CEO

Date: 5/25/17

Agreed:

Arcturus Pharmaceuticals, Inc.

By: /s/ Pad Chivukula

Name: Dr. Pad Chivukula

Title: CSO and COO

Date: May 26, 2017

Exhibit A

Development Program Plan and Budget — see Attachment A

Exhibit B

Payment Schedule

[…*…]***

Payments to be made by CFFT are due […***…] days upon receipt from Arcturus of the corresponding invoice and supporting documentation verifying occurrence of such milestone and PAG verification.

*** *** Confidential Treatment Requested**

Attachment A

RESEARCH PLAN

[…***…]*

*** *** Confidential Treatment Requested**

[…***…]*

*** *** Confidential Treatment Requested**

RESEARCH PLAN

[…***…]*

/s/ S. Murphy 3/20/17

/s/ CSO 3/20/17

*** *** Confidential Treatment Requested**

Timeline

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

Significance

[…***…]*

*** *** Confidential Treatment Requested**

Experimental Design, Methods, and Milestones

[…***…]*

*** *** Confidential Treatment Requested**

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

Consultant Arrangements and Collaborations

[…***…]*

*** *** Confidential Treatment Requested**

[…***…]*

*** *** Confidential Treatment Requested**

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* ***** Confidential Treatment Requested**

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* ***** Confidential Treatment Requested**

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* ***** Confidential Treatment Requested**

[…***…]*

* *** Confidential Treatment Requested

[…***…]*

* *** Confidential Treatment Requested

Exhibit 4.12

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

EXECUTION COPY

DEVELOPMENT AND OPTION AGREEMENT

by and between

CUREVAC AG

and

ARCTURUS THERAPEUTICS INC.

dated

1 January 2018

Table of Contents

List of Exhibits

Exhibit 1.3 Patents and Know-How in the Arcturus Background Technology

Exhibit 1.5 Arcturus LMD Technology

Exhibit 1.34 Exclusive License Agreement

Exhibit 1.61 Non-Exclusive License Agreement

Exhibit 3.1(a) Work Plan

Exhibit 4.2 Target Reservation Request Form

Development and Option Agreement

This Development and Option Agreement (this "Agreement"), dated as of 1 January 2018 (the "Effective Date"), is made by and between CureVac AG, a German stock corporation with offices at Paul-Ehrlich-Strasse 15, 72076 Tübingen, Germany ("CureVac"), and Arcturus Therapeutics Inc., a Delaware corporation with offices at 10628 Science Center Drive # 200, San Diego, CA 92121, USA ("Arcturus"). Each of CureVac and Arcturus may be referred to herein as a "Party" or together as the "Parties".

WHEREAS, Arcturus has expertise and intellectual property relating to the development of LMD Technologies that embody or incorporate delivery systems (and components thereof) for molecular therapeutics based on or incorporating lipid-enabled and unlocked nucleomonomer agents for delivery of nucleic acids as specified in Exhibit 1.5, the Arcturus LMD Technology (as defined below); and

WHEREAS, CureVac has expertise and intellectual property relating to mRNA Constructs (as defined below); and

WHEREAS, the Parties believe that certain proprietary Arcturus LMD Technology (as defined below) could be useful for the formulation and delivery of CureVac's proprietary mRNA Constructs; and

WHEREAS, the Parties are interested in evaluating the development of products incorporating Arcturus LMD Technology and CureVac Technology (as defined below), and Arcturus wishes to grant to CureVac, and CureVac wishes to obtain, an option to obtain a license under the Arcturus LMD Technology to develop and commercialize one or more specific products of CureVac, all in accordance with the terms and conditions set forth below.

WHEREAS, the Parties intend to also co-develop an ornithine transcarbamylase ("OTC") deficiency product and possibly other products under a contemporaneously executed co-development and co-commercialization agreement ("Co-Development Agreement").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

ARTICLE 1

Definitions

The following terms and their correlatives will have the following meanings:

1.1 "Affiliate" of a person or entity means any other entity which (directly or indirectly) is controlled by, controls or is under common control with such person or entity. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to an entity will mean (i) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast at least fifty percent (50%) of the votes in the election of directors or (ii) in the case of a non-corporate entity, direct or indirect ownership of at least fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity, provided that if local Law restricts foreign ownership, control will be established by direct or indirect

ownership of the maximum ownership percentage that may, under such local Law, be owned by foreign interests. […***…].

1.2 "Agreement" has the meaning set forth in the Preamble.

1.3 "Arcturus Background Technology" means any and all LMD Technology for delivering RNA therapeutics that is Controlled by Arcturus or any of its Affiliates as of the Effective Date or during the Term, including the LUNAR™ platform, but excluding any Arcturus Program Know-How and Arcturus Program Patents, and necessary or useful for the research, development, manufacturing and commercialization of Licensed Products. The Patents and Know-How comprised in the Arcturus Background Technology as of the Effective Date are listed in **Exhibit 1.3** attached hereto.

1.4 "Arcturus Indemnitees" has the meaning set forth in Section 8.7(b).

1.5 "Arcturus Lipid-Mediated Delivery Technology" or "Arcturus LMD Technology" means Arcturus Background Technology and Arcturus Program Technology.

1.6 "Arcturus Program Know-How" means any and all Program Know-How owned by Arcturus in accordance with Section 6.2, including Arcturus' right and interest in any Jointly-Owned Program Know-How (as defined in Section 6.2(c)).

1.7 "Arcturus Program Patents" means any and all Patents that claim any of the Arcturus Program Know-How, including Arcturus' right and interest in any Jointly-Owned Program Patents (as defined in Section 6.2(c)).

1.8 "Arcturus Program Technology" means the Arcturus Program Know-How and the Arcturus Program Patents.

1.9 "Arcturus Work Plan Leader" has the meaning set forth in Section 2.2.

1.10 "Business Day" means a day other than a Saturday, Sunday, or bank or other public holiday in San Diego, California, USA or Tübingen, Germany or Boston, Massachusetts, USA.

1.11 "Calendar Quarter" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

1.12 "Change of Control" shall be deemed to have occurred if during the Term (i) any person or entity is or becomes the "beneficial owner", directly or indirectly, of shares of capital stock or other interests (including partnership interests) of Arcturus' then outstanding and normally entitled (without regard to the occurrence of any contingency) to vote in the election of the directors, managers or similar supervisory positions of Arcturus representing fifty percent (50%) or more of the total voting power of all outstanding classes of voting stock of Arcturus or has the power, directly or indirectly, to elect a majority of the members of Arcturus' board of directors, or similar governing body; or (ii) Arcturus enters into a merger, consolidation or similar transaction with another person or entity; or (iii) Arcturus sells or transfers to any Third Party, in one (1) or more related transactions, properties or assets representing all or substantially all of Arcturus' consolidated total assets to which this

Agreement relates; or (iv) the holders of capital stock of Arcturus approve a plan or proposal for the liquidation or dissolution of Arcturus; *provided, however*, that

(a) subsections (i) to (iii) shall only apply if the person or entity or Third Party acquiring control is (i) a pharmaceutical company which has experience in developing and/or commercializing pharmaceutical products (*i.e.*, is a strategic, not financial investor or partner) or (ii) a competitor, i.e., a company in the business of mRNA development, manufacturing and/or commercialization and

(b) a bona fide financing transaction with Third Parties that does not otherwise meet the requirements of subsection (a) shall not constitute a Change of Control.

1.13 "Co-Development Agreement" has the meaning set forth in the Preamble.

1.14 "Concurrent Reserved List Limits" has the meaning set forth in Section 4.2(d).

1.15 "Confidential Information" of a Party means all proprietary Know-How, unpublished patent applications and other non-public information and data of a financial, commercial, business, operational, scientific or technical nature of such Party that is disclosed by or on behalf of such Party or any of its Affiliates or otherwise made available to the other Party or any of its Affiliates, whether made available orally, in writing or in electronic form in connection with this Agreement, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in connection with this Agreement. In addition, any non-public information related to this Agreement or the Products hereunder and disclosed by a Party to the other Party (or their respective Affiliates) under the Confidentiality Agreement will be deemed such Party's Confidential Information hereunder. Program Know-How will be considered the Confidential Information of the Party (or Parties) owning such Program Know-How, and Jointly-Owned Program Know-How will be considered Confidential Information of both Parties.

1.16 "Confidentiality Agreement" means that certain Confidentiality Agreement between the Parties dated as of […***…].

1.17 "Contract Year" will refer to the twelve (12)-month period beginning with the Effective Date and on each anniversary thereafter.

1.18 "Control" or "Controlled" means, with respect to Technology, that a Party owns or has a license to use and practice the respective Patent or Know-How without violating the terms of any agreement with any Third Party.

1.19 "CTA" means a clinical trial application.

1.20 "CureVac Background Technology" means any and all mRNA Technology that is Controlled by CureVac or any of its Affiliates as of the Effective Date or during the Term, but excluding any CureVac Program Know-How and CureVac Program Patents, and necessary or useful for the research, development, manufacturing and commercialization of a Licensed Product.

1.21 "CureVac Indemnitees" has the meaning set forth in Section 8.7(a).

1.22 "CureVac Program Know-How" means any and all Program Know-How owned by CureVac in accordance with Section 6.2, including CureVac's right and interest in any Jointly-Owned Program Know-How.

1.23 "CureVac Program Patents" means any and all Patents that claim any of the CureVac Program Know-How, including CureVac's right and interest in any Jointly-Owned Program Patents (as defined in Section 6.2(c)).

1.24 "CureVac Program Technology" means the CureVac Program Know-How and the CureVac Program Patents.

1.25 "CureVac Technology" means, collectively, CureVac Background Technology and CureVac Program Technology.

1.26 "CureVac Work Plan Leader" has the meaning set forth in Section 2.2.

1.27 "Diligent Efforts" means, with respect to the efforts to be expended by each Party with respect to any activity set forth in the Work Plan, active and sustained efforts as such Party would normally use to accomplish a similar task or obligation under similar circumstances to conduct the applicable activity, or to attempt to achieve the applicable requirement or goal, in a reasonable manner that is consistent with the achievement of the goals set forth in the Work Plan (including the level of FTE funding and budget for out-of-pocket and Third Party contractors set forth therein) and the terms of this Agreement.

1.28 "Disclosing Party" has the meaning set forth in Section 7.1.

1.29 "DNA Sequence" means any sequence of DNA intended to be inserted or copied into a DNA Target as set forth on **Exhibit 4.2**.

1.30 "DNA Target" means a defined coding and/or non-coding sequence (e.g., a gene) within the genome of a human or animal cell or virus and/or variants thereof.

1.31 "DNA Editing Protein" means a Target encoded by an mRNA that upon delivery to a cell is intended to Gene Edit a human, animal or virus coding or non-coding sequence within the genome of the human or animal cell or virus.

1.32 "Dual Improvement Technology" is an Improvement to both the Arcturus Background Technology and the CureVac Background Technology at the time such Improvement is discovered, created, conceived, developed or reduced to practice.

1.33 "Effective Date" has the meaning set forth in the Preamble.

1.34 "Escrow Agent" shall be the agent selected by Arcturus in good faith to maintain in confidence the Restricted Target List and to respond to CureVac's Target Notices on behalf of Arcturus.

1.35 "Exclusive License Agreement" means an exclusive license agreement in the form attached hereto as **Exhibit 1.34**.

1.36 "Executive Officers" has the meaning set forth in Section 2.3(d).

1.37 "Formulated Product(s)" means a product (including Licensed Products) manufactured by or on behalf of Arcturus in accordance with the Work Plan that incorporate CureVac mRNA Constructs formulated with Arcturus Lipid-Mediated Delivery Technology.

1.38 "FTE" means a full-time person, or more than one person working the equivalent of a full-time person, where "full-time" is determined by the standard practices in the biopharmaceutical industry in the geographic area in which such personnel are working, consisting of a total of 1880 hours per year of Work directed to the Work Plan or work pursuant to this Agreement. Any person who devotes less than 1880 hours per year on the applicable activities shall be treated as an FTE on a pro-rated basis, based upon the actual number of hours worked by such person on such activities, divided by 1880. Any person who devotes more than 1880 hours per year on the applicable activities shall be treated as one (1) FTE, i.e., in no event shall one person be counted as more than one FTE. FTE activities shall include the performance of the Work and scientific management oversight, as reasonably required, but, for clarity, exclude (i) the work of general corporate or administrative personnel, overhead (including facilities costs), insurances and similar costs and (ii) the manufacture of Formulated Product for research and clinical activities as set forth in the Work Plan.

1.39 "FTE Costs" means an initial rate of […***…] Dollars ($[…***…]) per FTE per year, which shall apply through […***…]. Thereafter, the FTE Rate shall be changed bi-annually at the end of each second calendar year to reflect any percentage increase or decrease (as the case may be) in the Consumer Price Index in the U.S. (index for all items) ("**CPI**") (based on the change in the CPI from the most recent index available as of the Effective Date to the most recent index available as of the date of the calculation of such revised FTE Cost rate).

1.40 "Gene Edit" means to correct, modify, insert, delete, activate, inactivate or repair a coding or non-coding sequence within the genome of a human or animal cell or virus and "Gene Editing" has the corresponding meaning.

1.41 "Guide RNA" means a modified or unmodified RNA sequence intended to direct a DNA Editing Protein to a specific DNA Target.

1.42 "Improvement" means, with respect to the Arcturus Background Technology and/or the CureVac Background Technology any change, modification, variation or revision of such Technology, whether patentable, copyrightable or not.

1.43 "Initial Term" has the meaning set forth in Section 9.1(a).

1.44 "IND" means an investigational new drug.

1.45 "Indemnified Party" has the meaning set forth in Section 8.7(c).

1.46 "Indemnification Claim Notice" has the meaning set forth in Section 8.7(c).

1.47 "IP Subcommittee" has the meaning set forth in Section 6.4.

1.48 "JDC" has the meaning set forth in Section 2.3(a).

1.49 "JDC Deadlock" has the meaning set forth in Section 2.3(d).

1.50 "Jointly-Owned Program Patents" has the meaning set forth in Section 6.2(c).

1.51 "Know-How" means all commercial, technical, scientific and other know-how and information, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols), in all cases, provided it is confidential and proprietary, and regardless of whether patentable, in written, electronic or any other form now known or hereafter developed.

1.52 "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments, or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.53 "License Agreement" means an Exclusive License Agreement or Non-Exclusive License Agreement.

1.54 "Licensed Product" means […***…] product comprised of (i) Lipid-mediated delivery systems, which are covered by Arcturus Lipid-Mediated Delivery Technology; and containing (ii) one or more mRNA Constructs as the active pharmaceutical ingredient(s) intended to express a Target which is subject to a License Agreement. In case of two or more mRNA Constructs these constructs may be contained in the same or separate LMDs. Licensed Product includes mRNA-LMD products which are administered jointly or separately, and mRNA-LMD products which are administered simultaneously or sequentially as a combination medicinal product or treatment. For Gene Editing purposes, a Licensed Product may contain other RNA(s) (i.e., Guide RNA(s)) and/or DNA Sequence(s) which can be delivered together or separately (combined in one LMD or delivered in separate LMDs), in addition to the one or more mRNA Constructs intended to express the DNA Editing Protein.

1.55 "LMD Technology" means Technology that claims, embodies or incorporates delivery systems (and components thereof) based on or incorporating lipid-mediated delivery (LMD) systems.

1.56 "Losses" has the meaning set forth in Section 8.7(a).

1.57 "Material Transfer Agreement" means the Material Transfer Agreement dated […***…], as amended from time to time.

1.58 "Materials" means any tangible chemical or biological material, including any compounds, LMD, DNA, RNA (including mRNA), clones, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How, Controlled by a Party.

1.59 "Maximum Target" has the meaning set forth in Section 4.2(d).

1.60 "mRNA Construct" means any mRNA construct for the expression of a protein, including the sequence of such construct (which potentially comprises one (1) or more of a cap, 5' UTR, the associated open reading frame, 3'UTR and a poly A tail), the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such construct.

1.61 "mRNA Technology" means Technology that claims, embodies or incorporates expression systems (and components thereof), based on or incorporating mRNA.

1.62 "Non-Exclusive License Agreement" means a form Non-Exclusive License Agreement to be negotiated by the Parties within […***…] days following the execution of this Agreement, on the basis of the terms and conditions of the Exclusive License Agreement and taking into account the specific circumstances of a non-exclusive licensing Option exercise by CureVac. Such form Non-Exclusive License Agreement shall be incorporated by reference into this Agreement as **Exhibit 1.61**.

1.63 "Non-Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of equal to or more than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Non-Rare Disease Target.

1.64 "Option" has the meaning set forth in Section 5.1

1.65 "Option Exercise Fee" has the meaning set forth in Section 5.3.

1.66 "Option Notice" has the meaning set forth in Section 5.1.

1.67 "Option Period" has the meaning set forth in Section 5.1.

1.68 "Patent(s)" means an (i) issued patent, a patent application, and a future patent issued from any such patent application, (ii) a future patent issued from a patent application filed in any country worldwide which claims priority from a patent or patent application of (i), and (iii) any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, utility models, supplementary protection certificates and renewals based on any patent or patent application under (i) or (ii), but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder).

1.69 "Pre-Existing Restrictions" means, with respect to a Target on the Restricted Target List pursuant to Section 4.2(a), that Arcturus or its Affiliates have granted to a Third Party with respect to a Target a non-exclusive, co-exclusive or an exclusive license or option pursuant to a *bona fide* written agreement that is in effect at the time of a request by CureVac pursuant to Section 4.2.

1.70 "Program" means each program of activities using Arcturus LMD Technology and CureVac Technology for the development of a Licensed Product incorporating CureVac's mRNA Constructs that the Parties engage in under this Agreement pursuant to the Work Plan. "Programs" shall mean several or all of these programs, as the context admits.

1.71 "Program Improvement Technology" means Program Technology which constitutes an Improvement to either Party's or both Parties' Technology at the time such Improvement is discovered, created, conceived, developed or reduced to practice. Program Improvement Technology will be either Sole Improvement Technology of a Party or Dual Improvement Technology of the Parties. For the avoidance of doubt, Program Improvement Technology will not include any Improvement arising out of a Party's independent research and development efforts or collaborations with Third Parties, in each case conducted outside

of the Program; *provided* that such Improvement is not developed based upon, using or with reference to the Technology, Confidential Information or Material of the other Party.

1.72 "Program Know-How" means all Know-How, including Know-How embodied in Materials, created, conceived, developed or reduced to practice in connection with activities performed pursuant to the Work Plan or using Formulated Product as set forth in the Work Plan under this Agreement (whether solely by or on behalf of one Party or jointly by or on behalf of the Parties).

1.73 "Program Technology" means all Program Know-How and all Patents directed to or disclosing such Program Know-How.

1.74 "Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of less than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Rare Disease Target.

1.75 "Receiving Party" has the meaning set forth in Section 7.1.

1.76 "Records" has the meaning set forth in Section 3.3(a).

1.77 "Reserved Target" means a Target with respect to which CureVac shall have delivered to the Escrow Agent a Target Notice and in response thereto the Escrow Agent shall have delivered to CureVac a Target Response Notice under Section 4.2(c)(i) for such Target to become a Reserved Target. A Reserved Target that is replaced pursuant to Section 4.2 will no longer be deemed a Reserved Target.

1.78 "Reserved Target List" means collectively, the list of all Reserved Targets.

1.79 "Restricted Target List" has the meaning set forth in Section 4.2(a).

1.80 "Sole Improvement Technology" means, without regard to inventorship, an Improvement to one Party's Technology that is not also an Improvement to the other Party's Technology at the time such Improvement is discovered, created, conceived, developed or reduced to practice. For clarity, Sole Improvement Technology of a Party shall exist only with respect to activities of the Parties pursuant to this Agreement (i.e., not to any Improvement or Technology independently developed by one Party without the use of Technology of the respective other Party).

1.81 "Solely-Owned Program Know-How" has the meaning set forth in Section 6.2(c).

1.82 "Solely-Owned Program Patents" has the meaning set forth in Section 6.2(c).

1.83 "Solely-Owned Program Technology" has the meaning set forth in Section 6.2(c).

1.84 "Target" means

(a) up to N proteins (N = […***…]), including all possible combinations resulting from removing one of the N proteins (N minus […***…] proteins), together with all variants of such proteins, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof; provided,

however, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring protein; and

(b) […***…] antigens of a given pathogen, including […***…] antigen and any combination of such antigens, together with all variants of such antigens, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof provided, however, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring antigen; and

(c) a DNA Target, provided, however, that the first DNA Target for each DNA Editing Protein would not count as a Target. Each subsequent DNA Target for this DNA Editing Protein would count as a Target. For clarity, a DNA Editing Protein would be defined as a Target under (a) above and count as a single Target.

If a given protein, *e.g.*, an antibody or enzyme, comprises separated amino acid chains which might be delivered by separated mRNA Constructs, such protein would be defined as one Target.

1.85 "Target Notice" has the meaning set forth in Section 4.2(b).

1.86 "Target Reservation Request Form" has the meaning set forth in Section 4.2 (b).

1.87 "Target Response Notice" has the meaning set forth in Section 4.2(c).

1.88 "Technology" means collectively Patents and Know-How.

1.89 "Term" has the meaning set forth in Section 9.1.

1.90 "Third Party" means any person or entity other than CureVac, Arcturus and their respective Affiliates.

1.91 "Third Party Claims" has the meaning set forth in Section 8.7(a).

1.92 "Work Plan" has the meaning set forth in Section 3.1(a).

1.93 "Work Plan Leaders" has the meaning set forth in Section 2.2.

1.94 "Work" means the activities to be performed by Arcturus pursuant to the Work Plan.

ARTICLE 2

Fee and Governance

2.1 **One-Time Fee.** In consideration for the rights granted by Arcturus to CureVac hereunder, including the right to reserve Targets in accordance with Section 4 below, within

thirty (30) days as of the Effective Date, CureVac shall pay to Arcturus a one-time non-refundable fee of […***…].

2.2 Management. Management of the Program activities will be under the responsibility of the individual designated in writing within […***…] days of the Effective Date for Arcturus (the "Arcturus Work Plan Leader") and of the individual designated in writing within […***…] days of the Effective Date for CureVac (the "CureVac Work Plan Leader", and together with the Arcturus Work Plan Leader, the "Work Plan Leaders"). Each Work Plan Leader will be the primary point of contact for the other Party on all matters relating to the Program activities.

2.3 Joint Development Committee.

(a) ***Development Committee.*** As soon as practicable, the Parties will establish a Joint Development Committee, comprised of up to […***…] representatives of CureVac and up to […***…] representatives of Arcturus (the "JDC"). One such representative from each Party will be such Party's Work Plan Leader. Each Party may replace its Work Plan Leader and other JDC representatives at any time upon written notice to the other Party, provided, however, that each Party shall use Diligent Efforts to ensure continuity on the JDC. With the consent of the other Party (which will not be unreasonably withheld, delayed or conditioned), each Party may invite non-voting employees and consultants to attend meetings of the JDC, subject to their agreement to be bound to the same extent as a permitted subcontractor under Section 3.4.

(b) ***Meetings.*** While in existence, the JDC will meet each Calendar Quarter by teleconference, videoconference or in person and, at a minimum, one of such meetings each calendar year will be in person (which in-person meeting will be held on an alternating basis in Tubingen, Germany and in San Diego, CA), unless agreed otherwise by the JDC representatives. The JDC will have a quorum if at least one (1) representative of each Party is present or participating. Each Party will be responsible for all of its own expenses of participating in the committee meetings. The Parties will endeavor to schedule meetings of the JDC at least […***…] months in advance. The Parties will alternate in preparing the meeting agenda, and the Party that was responsible for preparing the meeting agenda will prepare and circulate for review and approval by the other Party written minutes of such meeting within […***…] days after such meeting. The Parties will agree on the minutes of each meeting promptly, but in no event later than the next meeting of the JDC.

(c) ***Responsibilities.*** The JDC will oversee and supervise the overall performance of the Work Plan, prepare and maintain minutes of meetings and provide a forum for discussion of the Programs and Work Plans, and within such scope will:

(i) review the efforts of the Parties and allocate those resources under the Work Plan committed by the Parties hereunder;

(ii) revise and approve any revisions to the Work Plan regularly and in any event at least […***…] days before the start of each Calendar Quarter during the Term;

(iii) coordinate the activities of the Parties under the Work Plan and oversee the implementation thereof;

(iv) form such other committees as the JDC may deem appropriate, provided that such committees may make recommendations to the JDC but may not be delegated JDC decision-making authority;

(v) address such other matters relating to the activities of the Parties under this Agreement as either Party may bring before the JDC, including any matters that are delegated to the JDC to decide as provided in this Agreement, such as CureVac's consent to subcontractors; and

(vi) attempt to resolve any disputes on an informal basis.

(d) ***Decision-making.*** The JDC will make decisions only by unanimous consent, with each Party having only one vote by its representatives (regardless of the number of each such representatives present from a Party). In the event the JDC is unable to reach agreement as to a matter within the JDC's jurisdiction (such event, a "JDC Deadlock"), upon the written request of a Party, such matter will be referred to a senior executive of each Party (the "Executive Officers") (or their designees, which designee is required to have decision-making authority on behalf of such Party), who will attempt in good faith to resolve such JDC Deadlock by negotiation and consultation for a […***…]-day period following receipt of such written notice. If, despite such efforts, agreement on a particular matter cannot be reached by the Executive Officers within such […***…]-day period, then CureVac shall have the final decision-making authority with respect to such JDC Deadlock, provided, however, that

(i) CureVac's final decision-making authority shall not apply if CureVac proposes (a) to amend the Work Plan to materially accelerate, decelerate, increase, add or remove planned activities to be performed by Arcturus thereunder, including significantly reducing or eliminating Arcturus' responsibilities for an activity thereunder; (b) to materially change the Arcturus resources required to perform the Work Plan activities, including the timing of such resources; or (c) to require allocation by Arcturus of FTEs materially greater than or less than those provided for in the Work Plan. For purposes of this Section 2.3(d), the term "materially" shall mean, in relation to resources and FTE amounts set forth in the Work Plan, […***…] percent ([…***…]%) or more of the relevant resource or FTE, and

(ii) In the event that CureVac desires Work with respect to which it does not have final decision-making authority pursuant to Section 2.3(d)(i) or is otherwise materially outside of the Work Plan with respect to a Program, Arcturus shall consider any proposal from CureVac in writing in good faith.

(e) ***Limits on JDC Authority*****.** Each Party will retain the rights, powers and discretion granted to it under this Agreement and no such rights, powers, or discretion will be delegated to or vested in the JDC unless such delegation or vesting of rights is expressly provided for in this Agreement or the Parties expressly so agree in writing. The JDC will not have the power to amend, modify or waive compliance with this Agreement (other than as expressly permitted hereunder). Notwithstanding anything herein to the contrary, the JDC will not have the power to require any Party to perform

any activities that are materially greater in scope or more costly than those provided for in the Work Plan then in effect or otherwise under this Agreement.

ARTICLE 3

The Program

3.1 **Programs Generally**. The Parties will jointly conduct each Program. It is intended that Arcturus will be responsible for the lipid chemistry and LMD formulation using the Arcturus LMD Technology, and for characterization work, CureVac will be responsible for mRNA Construct development, and Arcturus and CureVac will each undertake preclinical studies as allocated in each Work Plan.

(a) ***Work Plan Preparation*****.** The development activities to be undertaken by the Parties with respect to a Program will be described in a detailed written development plan (the "Work Plan"). The initial Work Plan includes a description of activities undertaken by the Parties under the Material Transfer Agreements and prior to the execution of this Agreement. The initial Work Plan, which will cover the initial twelve (12) months of the Program, is attached hereto as **Exhibit 3.1(a)**.

(b) ***Work Plan Contents*****.** Each Work Plan will include (i) all activities to be undertaken by each Party with respect to a Program, including Arcturus' manufacture and supply of Formulated Product, (ii) a detailed budget of the FTE activities, FTE Costs and out-of-pocket costs to be incurred by Arcturus for which CureVac will reimburse Arcturus in connection with the performance of the Work, (iii) the Materials to be provided by one Party to the other, (iv) forecasting and ordering procedures for the Formulated Product, and (v) the projected timelines for completion of all activities set forth therein. The goal of each Work Plan and related Program will be to evaluate and produce tailored Arcturus LMD Technology formulations that are safe and efficacious for delivery of CureVac's mRNA Constructs and to advance the development of such mRNA-LMD formulations against a Target. Each Program will include activities with respect to Reserved Targets but may also include activities with respect to Targets that are not on the CureVac Reserved Target List. As defined

in the Work Plan, CureVac will perform up to […***…] pivotal animal studies to make a go/ no go decision for a particular LMD composition for a given Target.

(c) ***Amendments to the Work Plan*****.** Each Work Plan will be reviewed as necessary at each meeting of the JDC, and at any other time upon the request of either Party, and will be modified in accordance with the objectives defined in Section 3.1(b) and as appropriate at the direction of the JDC to reflect material scientific (and other) developments. Each Calendar Quarter, the JDC will update the Work Plans to cover the subsequent six (6) months of the Program in detail. In all events, the Work Plan will be consistent and not conflict with the terms of this Agreement, and in the event of any conflict between the Work Plan and this Agreement, the terms of this Agreement will control.

(d) ***Obligations Under the Work Plans***. During the Term, each Party will use Diligent Efforts and perform the Work in a professional manner and in accordance with the Work Plan, and each Party will use Diligent Efforts to meet the objectives and

timelines set forth therein. It is understood that the activities and goals of the Work Plan are experimental and that successful results cannot be guaranteed. The Parties will otherwise conduct the Program on the terms and conditions set forth in this Agreement and in accordance with the Work Plan. Each Party will cooperate with and provide reasonably requested non-financial support to the other Party in such other Party's performance of its responsibilities under the Work Plan. The Parties will use Diligent Efforts to develop LMD formulations which do not infringe Third Party Technology. In addition to the reporting obligations set forth in Section 3.3(b), each Party will keep the other Party reasonably informed of such Party's activities under the Program and will reasonably consult with such other Party and consider such other Party's comments and advice with respect to all material decisions relating to such activities in good faith.

(e) ***Supply of Formulated Products*****.** Arcturus will use Diligent Efforts to manufacture and supply CureVac with Formulated Product as set forth in the Work Plan.

(f) ***Technology Transfer to Contract Manufacturing Organization.*** Following CureVac's exercise of an Option and entry into a License Agreement, Arcturus will use Diligent Efforts to transfer the formulation process for the Licensed Products that are intended to express the intended Target to a reputable and competent GMP manufacturer selected by CureVac and reasonably acceptable to Arcturus. Arcturus and CureVac will agree on a technology transfer or other means to support availability of Licensed Products as part of the License Agreement. Specifically, the License Agreement will provide that upon written request by CureVac, Arcturus will conduct a technology transfer to CureVac and/or its designee(s). Such designee(s) may be an Affiliate, sublicensee or Third Party manufacturers, and which Third Party manufacturers may also be a backup manufacturer or a second manufacturer of Licensed Products as required for the applicable transferee of the then-current process.

3.2 **FTEs.**

(a) ***Generally.*** Arcturus will perform the Work under the Work Plan, and as part of the Program CureVac will fund up to […***…] scientists per year at Arcturus to perform the Work as defined and in accordance with the Work Plan for a period of up to […***…] months at the FTE Costs. The Parties may agree to extend the performance of Work by Arcturus for an additional year.

(b) ***FTEs.*** Arcturus shall ensure that those individuals selected by Arcturus to perform the Work and Services and otherwise support the activities to be undertaken by Arcturus pursuant to the Work Plan will have sufficient scientific expertise, skill, training and competency to perform the proposed work and have similar skills, training and competency as those FTEs employed by Arcturus to perform work on Arcturus' internal programs and for Third Parties. In the event that CureVac has concerns regarding the selection of an individual to perform the Work or other activities under this Agreement, the Parties will discuss such concerns in good faith.

(c) ***Reimbursement.*** CureVac will reimburse Arcturus on a Calendar Quarter-by-Calendar Quarter basis for FTE Costs incurred to conduct the Work Plan in accordance with the Work Plan or pre-agreed by the JDC. Arcturus will send a reasonably detailed invoice to CureVac no later than […***…] days after the end of each Calendar Quarter, which invoice shall include a summary of all activities by the

name of each FTE, number of hours devoted by each such FTE, and activity performed by each such FTE during such Calendar Quarter. CureVac agrees to pay undisputed amounts in each such invoice within […***…] days of CureVac's receipt thereof. Any amounts subject to dispute shall be reviewed by the JSC and if not resolved within […***…] days, shall be subject to Section 10.1.

3.3 Program Records, Reports; Materials and Formulated Product.

(a) ***Records.*** Each Party will maintain, or cause to be maintained, records of its activities under a Program in sufficient detail and in good scientific manner appropriate for scientific, Patent and regulatory purposes, which will properly reflect all work included in a Program ("Records") for a period of at least […***…] years after the creation of such Records. CureVac will have the right to receive a copy of any such Records maintained by Arcturus which shall be used subject to the terms of this Agreement. Arcturus will have the right to receive a copy of any such Records maintained by CureVac to the extent such Records are required by Arcturus to exercise its rights or perform its obligations under this Agreement.

(b) ***Program Reports.*** During the Term, each Party will furnish to the JDC a summary written report within […***…] days after the end of each Calendar Quarter describing its progress under the Work Plan as part of a Program. Within […***…] days following expiration or earlier termination of this Agreement, each Party will furnish to the JDC a final summary written report. Arcturus shall promptly provide all additional information with respect to the Arcturus LMD Technology that is reasonably requested by CureVac and necessary or useful for CureVac to determine whether to exercise an Option with respect to any Target.

(c) ***Materials and Formulated Product.***

(i) The Parties will, during the Term, furnish to each other Materials which comprise, embody or incorporate CureVac Technology or Arcturus LMD Technology only as expressly set forth in the Work Plan.

(ii) Arcturus will furnish to CureVac the quantities of Formulated Product as set forth in the Work Plan. In the event requested in writing by CureVac, to furnish additional Formulated Product of up to […***…]% in excess of the total quantities set forth in the Work Plan for a Program, Arcturus shall use Diligent Efforts to supply such quantities. Arcturus shall consider in good faith furnishing additional quantities which may be required in the performance of the Program pursuant to any separate request by CureVac.

(iii) In addition, each Party will, upon the other Party's reasonable written request, furnish to such other Party other samples of Materials which comprise, embody or incorporate CureVac Technology or Arcturus LMD Technology that are in such Party's Control and are reasonable (both in quantity and identity) and useful for the other Party to carry out its responsibilities under the Work Plan, provided (A) such Materials are reasonably and readily available in excess of the providing Party's own requirements, and (B) supply of such Materials will not, in the providing Party's reasonable judgment, (1) conflict with the

providing Party's internal or Third Party research programs, (2) conflict with the providing Party's internal policies regarding such Materials or (3) violate any agreement to which the providing Party is a party.

(iv) Each Party will use such Materials only in accordance with the Work Plan and otherwise in accordance with the terms and conditions of this Agreement, and the provision of Materials hereunder by either Party will not constitute any grant, option or license under any Patents or Know-How, except as expressly set forth herein. In any event, all Materials delivered to the receiving Party will remain the sole property of the providing Party and will be used in compliance with all applicable Laws. The Materials supplied under this Agreement will be used with prudence and appropriate caution in any experimental work, because not all of their characteristics may be known. In the event that the Parties enter into a License Agreement with respect to a Program, the Materials may be retained subject to such License Agreement.

(v) Except with the prior written consent of the supplying Party, the Party receiving any Materials will not distribute or otherwise allow the release of Materials to any Third Party, except, with respect to either Party, to any permitted subcontractors under Section 3.4 and, with respect to CureVac, to any Third Party licensee or assignee or potential licensee or assignee of CureVac Technology in accordance with this Agreement.

3.4 **Permitted Subcontracting.** Either Party may subcontract its activities to be performed under the Work Plan to a Third Party, provided that (i) Arcturus shall obtain, through the JSC, consent by CureVac for such subcontracting, such consent not to be unreasonably withheld, delayed or conditioned, and (ii) CureVac shall inform Arcturus about any subcontracting (including the identity of the subcontracting party and work to be performed) without undue delay, and in any event within […***…] Business Days of entry into the subcontracting agreement. Any such subcontracting Party will have entered into a written agreement with the subcontractor that

(a) includes terms and conditions protecting and limiting use and disclosure of Confidential Information and Materials and Know-How at least to the same extent as under this Agreement, and the subcontracting Party shall use Diligent Efforts to ensure compliance with the obligations of Confidentiality (including return or destruction on termination) as set forth in Article 7,

(b) provides for reasonable auditing rights, with regard to the work provided by the Third Party subcontractor, of the subcontracting Party and third parties authorized by the subcontracting Party, and

(c) requires such Third Party subcontractor and its personnel to assign to the subcontracting Party all right, title and interest in and to any Patents and Know-How and Materials created, conceived, developed or reduced to practice in connection with the performance of subcontracted activities pursuant to this Agreement, consistent with the requirements of Section 6, provided, however, that in the event of a subcontracting or sublicensing to a collaboration partner of CureVac, CureVac shall obtain at least a customary non-blocking, back-license of Improvements to Arcturus Background IP

generated by or jointly with such collaborators of CureVac, i.e., a non-exclusive, royalty-free, and sublicensable license under the applicable Know-How and Patents generated (if any).

3.5 Program Licenses.

(a) ***By Arcturus.*** Subject to the terms and conditions of this Agreement, Arcturus hereby grants to CureVac a worldwide, non-exclusive license under the Arcturus LMD Technology, including the right to grant sublicenses, limited in accordance with this Section 3.5, to research and pre-clinically develop (including the right to manufacture for such purposes), but expressly without the right to clinically develop or commercialize (including the right to manufacture for such purpose) except with the prior written consent of Arcturus) and in any event solely to the extent necessary:

(i) to enable CureVac, Affiliates of CureVac and subcontractors selected in accordance with Section 3.4 to perform CureVac's activities set forth in the Work Plan,

(ii) to conduct research projects with academic partners (any such agreements of which (i) shall include back-licenses or grants of rights by the academic partner to Patents and Know-How (other than data) to meet the requirements of Section 6 and (ii) will not require Arcturus to enter into a license agreement with or make payments to such academic partner in order for Arcturus to use and exploit the Arcturus Background Technology), and

(iii) to permit, under confidentiality and non-use restrictions in accordance with this Agreement, to Third Party collaborators of CureVac who license or intend to license CureVac Technology to explore the Arcturus LMD Technology (any such agreements of which shall include back-licenses by the Third Party collaborator to Patents and Know-How (other than data) consistent with the requirements of Section 6).

(b) ***By CureVac.*** Subject to the terms and conditions of this Agreement, CureVac hereby grants to Arcturus a worldwide, non-exclusive license under CureVac Technology, solely to the extent necessary to enable Arcturus to perform its activities set forth in the Work Plan and for no other purpose. The foregoing license shall not include the right to grant sublicenses, except to permitted subcontractors in accordance with Section 3.4.

(c) ***No Other Licenses.*** No license or right is or will be created or granted hereunder by implication, estoppel or otherwise. All licenses and rights are or will be granted only as expressly provided in this Agreement.

ARTICLE 4

Reserved Targets

4.1 **Generally.** CureVac will select the Targets that will be the subject of the Works to be performed as part of a Program from the Reserved Target List. CureVac shall have the right, but not the obligation, to reserve Targets (or replace a Reserved Target with a new Target) in accordance with this Article 4.

4.2 **Restricted Target List.**

(a) ***Pre-existing Restrictions.*** Arcturus shall maintain at the Escrow Agent an updated monthly (as of the final day of each month) list of Targets that are subject to Pre-Existing Restrictions (the "Restricted Target List"). The Restricted Target List will identify whether the Pre-Existing Restrictions are exclusive, non-exclusive or co-exclusive. Arcturus represents, warrants and covenants to CureVac that (i) the Restricted Target List is and will at all times be accurate in accordance with this Section 4.2(a); and (ii) Arcturus or the Escrow Agent will not add any Reserved Targets to the Restricted Target List or grant to any Third Party any licenses or options under the Arcturus LMD Technology with respect to the then current Reserved Target List that would preclude Arcturus from entering into a License Agreement with respect to such Reserved Target as set forth herein.

(b) ***Target Notices***.

(i) If CureVac desires to include a Target as a Reserved Target hereunder, CureVac will notify the Escrow Agent in writing (with contemporaneous information in writing to Arcturus about the notification to the Escrow Agent) of the Targets for potential inclusion on the Reserved Target List, which notice will provide (i) the information on the Target Reservation Request Form attached hereto as **Exhibit 4.2**; and (ii) the identity of each Reserved Target (if any) that CureVac desires to remove as a Reserved Target (each such notice, a "Target Notice"). For clarity, the Target Notices shall not include more Targets than the Maximum Targets then available (taking into consideration any removed Targets previously reserved) and shall be deemed to be a request for an exclusive license at the outset unless there is a Pre-Existing Restriction. For clarity, CureVac's rights to enter into a Non-Exclusive License Agreement shall apply only if the Pre-Existing Restriction permits a non-exclusive license right to such proposed Reserved Target.

(ii) Notwithstanding the formal Target reservation mechanism described herein, Arcturus and the Escrow Agent will in good faith respond to any interim requests (not to exceed […***…] per month) on whether certain Targets can be reserved as Reserved Targets prior to the monthly consideration date, in order to assist CureVac in planning of development projects. For clarity, the interim requests shall not include more Targets than the Maximum Targets then available (taking into consideration any removed Targets previously reserved). In case of an interim request, the Escrow Agent (i) will request from Arcturus an update of the Reserved Target List, such update to be provided by Arcturus to the Escrow Agent within […***…] Business Days of the request, and (ii) provide CureVac with a Target Response Notice in accordance with subsection (c).

(c) ***Target Response Notices.***

(i) The Escrow Agent, on behalf of Arcturus, will review each Target Notice provided by CureVac hereunder to determine whether or not any such proposed Target is on the Restricted Target List and if listed, the applicable Pre-Existing Restriction as of the date of such Target Notice. Within […***…] days of the Escrow Agent's receipt of a Target Notice, the Escrow Agent will provide CureVac with written notice that includes the information set forth in subsection (c)(ii) and (iii) (each such notice, a "Target Response Notice").

(ii) If, as of the date of CureVac's Target Notice for a Target, such Target is on the Restricted Target List and is listed as being subject to Pre-Existing Restrictions that restrict Arcturus from granting the applicable license (i.e., an exclusive or non-exclusive license in accordance with a License Agreement) to CureVac under the Arcturus LMD Technology with respect to such Target, then such Target shall not be available to become a Reserved Target. The Target Response Notice issued for such Target will certify to CureVac that such Target is on the Restricted Target List and is listed as being subject to Pre-Existing Restrictions that restrict Arcturus from granting the applicable license.

If, as of the date of CureVac's Target Notice for a Target, such Target is not listed on the Restricted Target List, then such Target will become a Reserved Target and will be added to the Reserved Target List subject to the Concurrent Reserved List Limits set forth in subsection (d) below. To the extent that the Pre-Existing Restriction is non-exclusive, then such Target may be added by CureVac to Reserved Target List, but CureVac shall only have the option to enter into a Non-Exclusive License Agreement.

(d) ***Concurrent Reserved List Limits and Removal of Targets.*** The following concurrent reserved list limits will apply to all Reserved Targets ("Concurrent Reserved List Limits").

(i) Reserved Targets and Removal thereof. CureVac may select Reserved Targets up to the totals allowed for in subparagraph (ii) below, in accordance with the process specified in Sections 4.2(b) and (c). CureVac shall have the right to remove a Target or replace a Target on the Reserved Target List with another Target, in accordance with the process specified in Section 4.2(b), provided (A) the total number of Targets on the Reserved Target List does not exceed the Maximum Targets at any one time; and (B) a newly nominated Target is not on the Restricted Target List. Any abandoned Target(s) revert(s) back to Arcturus.

(ii) Maximum Number Reserved Targets. CureVac will have the right to select up to […***…] Targets at any one time to be placed on the Reserved Target List as exclusive Reserved Targets; provided that the […***…] total shall be reduced by each exercise of an Option (the "Maximum Targets") (e.g., […***…], with

such reduction in the total Targets applying from and after the date of exercise of an Option.

(iii) For clarification, the selection of any program under the Co-Development Agreement shall not constitute the selection of a Target in accordance with this Section 4.2. If one of the Reserved Targets is selected for co-development under the Co-Development Agreement, such Reserved Target shall be removed from the Reserved Target List with the effect that CureVac shall be entitled to nominate a new Target in accordance with this Section 4.2.

4.3 **Expiration of Pre-Existing Restrictions.** If any Pre-Existing Restrictions identified in a Target Response Notice that precluded Arcturus from granting CureVac a license (whether or not CureVac has elected to designate such Target on the Reserved Target List on a non-exclusive basis subject to the Pre-Existing Restriction) under the Arcturus LMD Technology later expire or otherwise are modified or terminate such that Arcturus is no longer precluded under the terms of the applicable Third Party agreement from granting a license to CureVac with respect to such Target, the Escrow Agent will notify CureVac of such event and CureVac will have an exclusive option, for a period of […***…] days following delivery of notice to CureVac, to add (or extend its rights as identified by the Escrow Agent with respect to) such Target to the Reserved Target List as a Reserved Target in accordance with Section 4.2(c), subject to the Concurrent Reserved List Limits. For clarity, CureVac will at all times thereafter have the right to provide a Target Notice for such Target to the Escrow Agent pursuant to Section 4.2(b) but such Target Notice will be subject to any intervening Pre-Existing Restrictions.

4.4 **Escrow Agent.** Arcturus shall ensure that the Escrow Agent meets the requirements set forth herein. All costs and expenses incurred through the Escrow Agent will be borne by Arcturus.

ARTICLE 5

CureVac License Options

5.1 **Option**.

(a) From the period commencing on the Effective Date and ending on the expiration of the Term (the "Option Period"), CureVac will have a total of […***…] options (each, an "Option"), on a Reserved Target-by-Reserved Target basis, to enter into a maximum of […***…] licenses under the Arcturus LMD Technology with respect to the development, manufacture and commercialization of Licensed Products containing mRNA Constructs intended to express such Reserved Target in the form of the License Agreement, *provided*, *however*, that

(i) to the extent the Reserved Target is only available on a non-exclusive basis, the Parties shall enter into a Non-Exclusive License Agreement, and

(ii) the appendices to the License Agreement are to be prepared or updated for each specific Target, in accordance with the terms of this Agreement.

(b) CureVac may exercise each such Option by providing to Arcturus, prior to the expiration of the Term, irrevocable written notice of Option exercise, setting forth the particular Reserved Target which is intended to be expressed by the Licensed Products (each such notice, an "Option Notice"). A separate Option Notice and Option Exercise Fee will be required for each License Agreement with respect to which CureVac exercises an Option pursuant to this Section 5.1, and CureVac will pay to Arcturus the Option Exercise Fee for each such License Agreement as set forth in Section 5.3. If not exercised prior to the expiration of the Term, the Options granted to CureVac under this Article 5 will terminate in full and will no longer be exercisable. In the event that CureVac terminates a license(s) during the Term, the Target(s) subject to the license(s) will be removed from the Reserved Target List and the number of remaining Options and/or License Agreements shall be reduced by one (1) (i.e., the exercise of an Option reduces the total number of Options remaining by one regardless of whether CureVac elects to continue such License Agreement in effect).

(c) In the event that CureVac terminates a License Agreement during the Term, no additional or replacement Options shall be granted or reinstated and the Target(s) subject to such license(s) will no longer be available as a Target pursuant to this Agreement.

5.2 **CureVac's Exercise of Option.** As soon as practicable following CureVac's delivery of an Option Notice to Arcturus but in any event within […***…] Business Days, CureVac and Arcturus will enter into a License Agreement with respect to the Reserved Target for which such Option Notice is provided, provided, however, that if the Parties fail to prepare the appendices to the License Agreement in accordance with Section 5.1(a)(ii) within […***…] Business Days following CureVac's delivery of an Option Notice to Arcturus, the License Agreement with respect to the Reserved Target shall nevertheless enter into force (including payment obligations of CureVac in accordance with the terms of the License Agreement) and the Parties shall complete the appendices as soon as practicable thereafter.

5.3 **Option Exercise Fee.** If CureVac exercises its Option for a Rare Disease Target pursuant to Section 5.1, CureVac shall pay an Option Exercise Fee of […***…]; and if CureVac exercises its Option for a Non-Rare Disease Target pursuant to Section 5.1, CureVac shall pay an Option Exercise Fee of […***…], hereinafter both the "Option Exercise Fee". Within […***…] Business Days after exercise of the Option for Licensed Product(s), Arcturus will issue an invoice to CureVac for the Option Exercise Fee. Each such payment will be subject to entry into the License Agreement and due within […***…] days after CureVac's receipt of such invoice from Arcturus.

5.4 **Co-Development Agreement.** For clarification, the selection of any program under the Co-Development Agreement shall not constitute the exercise of an Option in accordance with this Section 5, and, accordingly, no Option Exercise Fee will be payable and any paid Option Exercise Fee shall credited against any other payments by CureVac applied first to any outstanding payment obligations to Arcturus, and to the extent any remaining amounts remain creditable, then to the next due future payment obligations.

5.5 **Enablement.** Arcturus will (a) with respect to any Reserved Targets, during the Term remain entitled to grant to CureVac the licenses to the Patents and the Know-How within the Arcturus Background Technology under a License Agreement, and (b) subject to the unrestricted rights of Arcturus and its Affiliates to grant to a Third Party a non-exclusive, co-

exclusive or an exclusive license or option with respect to a Target, use reasonable efforts to allow the potential for License Agreements to be available for Targets identified by CureVac to Arcturus for research and for election to become a Reserved Target pursuant to this Agreement during the Term.

ARTICLE 6

Background Technology; Ownership of Program Technology

6.1 **Disclosure of Program Know-How.** Each Party will promptly (and at least on a Calendar Quarterly basis) disclose to the other Party any Program Know-How that is created, conceived or reduced to practice by or on behalf of such Party and owned by the other Party pursuant to Section 6.2(c), and will provide such documentation regarding the Program Know-How as such other Party may reasonably request.

6.2 **Ownership.**

(a) ***CureVac Background Technology***. As between the Parties, CureVac will continue to own all right, title and interest in and to the CureVac Background Technology.

(b) ***Arcturus Background Technology***. As between the Parties, Arcturus will continue to own all right, title and interest in and to the Arcturus Background Technology.

(c) ***Program Technology*.**

(i) Except as set forth in subsections (iii) and (iv) below, each Party will solely own all right, title and interest in and to all Program Technology that is discovered, created, conceived, developed or reduced to practice solely by or on behalf of such Party ("Solely-Owned Program Know-How"), and all Patents arising therefrom that claim such Solely-Owned Program Know-How ("Solely-Owned Program Patents" and together with the Solely-Owned Program Know-How, the "Solely-Owned Program Technology") and all right, title and interest in and to all Solely-Owned Technology will automatically vest solely in such Party. For clarity, Solely-Owned Program Technology shall not exist with respect to any Dual Improvement Technology and in the event of any conflict, such Know-How and Patents shall be deemed Dual Improvement Technology.

(ii) Except as set forth in subsections (i) above and (iii) below, the Parties will jointly own in equal share any and all Program Technology that is not Sole Improvement Technology or that is Dual Improvement Technology ("Jointly-Owned Program Technology"). All Know-How in Jointly-Owned Program Technology shall be referred to as "Jointly-Owned Program Know-How" and all Patents in Jointly-Owned Program Technology shall be referred to as "Jointly-Owned Program Patents". Each Party will have an undivided one-half interest in and to such Jointly-Owned Program Technology.

Arcturus will have a right to grant licenses (with the right to grant sublicenses through multiple tiers) to CureVac's share in such Jointly-Owned Program Technology to exercise and exploit the Arcturus LMD Technology, *provided, however*, that

(A) Arcturus shall not have the right to grant licenses to Jointly-Owned Program Know-How and Jointly-Owned Program Patents with respect to mRNA Constructs or DNA Targets to a Third Party

(x) prior to and within the first […***…] immediately following the filing of the respective Jointly-Owned Program Patent without CureVac's prior written consent and

(y) during […***…] after the period specified in (a), without offering to CureVac the first right to obtain such license(s) on substantially similar financial and other terms and conditions agreed with the Third Party, such right to be exercised by CureVac within […***…] days following CureVac's receipt of a written notification from Arcturus about its intention to grant such license(s) to a Third Party, such notification to include the material financial and other terms and conditions of such license and other material information relevant for such license(s); and

(B) CureVac will have a right to grant licenses (with the right to grant sublicenses through multiple tiers) to Arcturus' share in such Jointly-Owned Program Technology to exercise or exploit the CureVac Technology and the Program Technology, which license grant may be exclusive with respect to a Licensed Product only pursuant to a License Agreement,

i.e., subject to (A) and (B) above, neither Party is to be blocked or limited in the use of or rights to license and sublicense its own Technology by Jointly-Owned Program Technology; the Parties agree that the licenses (as between the Parties) to the respective other Party's share in such Jointly-Owned Program Technology shall be perpetual, irrevocable, non-exclusive, cost-free license, subject to the licenses hereunder or under any License Agreement.

The Jointly-Owned Program Technology shall be assignable only (A) with the applicable, rights, restrictions and obligations in this Agreement and (B) subject to notification from the assigning Party to the other Party about the assignment and a written confirmation from the assignee to be bound by the applicable, rights, restrictions and obligations in this Agreement with respect to the assigned Jointly-Owned Program Technology. In any event, the ownership rights in Jointly-Owned Program Technology remain subject to the licenses hereunder or under any License

Agreement, other intellectual property rights of the other Party and the other terms and conditions of this Agreement.

To the extent any Jointly-Owned Program Technology is discovered, created, conceived, developed or reduced to practice solely or predominantly by or on behalf of one Party, then such Party, for itself and on behalf of its and its Affiliates' employees, subcontractors (subject to Section 3.4), consultants and agents, hereby assigns, a share of its interest in and to such Jointly-Owned Program Technology to the other Party, so that each Party owns an undivided one-half interest.

(iii) Notwithstanding subsections (i) and (ii) above,

(A) Arcturus will solely own any Program Improvement Technology that is Sole Improvement Technology to any Arcturus Background Technology, regardless of the Party or Parties such Sole Improvement Technology was discovered, created, conceived, developed or reduced to practice by or on behalf of, and CureVac, for itself and on behalf of its and its Affiliates' employees, subcontractors (subject to Section 3.4), consultants and agents, hereby assigns all of its rights, title and interest in such Sole Improvement Technology to Arcturus.

(B) CureVac will solely own any Program Improvement Technology that is Sole Improvement Technology to any CureVac Background Technology, regardless of the Party or Parties such Sole Improvement Technology was discovered, created, conceived, developed or reduced to practice by or on behalf of, and Arcturus, for itself and on behalf of its and its Affiliates' employees, subcontractors (subject to Section 3.4), consultants and agents, hereby assigns, all of its rights, title and interest in such Sole Improvement Technology to CureVac.

(C) For clarity, nothing herein shall prevent (1) Arcturus from independently developing, owning and using outside of a Program any Know-How that is similar or related to any CureVac Technology, and (2) CureVac from independently developing, owning and using outside of a Program any Know-How that is similar or related to any Arcturus LMD Technology, provided that in each case such Know-How is not developed based upon, using or with reference to CureVac Technology or Arcturus LMD Technology, respectively. All of the respective independently developed intellectual property pursuant to this Section (iii)(C) shall be deemed Arcturus Background Technology and CureVac Background Technology, respectively.

(iv) ***Dual Improvements***. To the extent that a particular item of Program Technology constitutes Dual Improvement Technology, the Parties shall discuss in good faith whether any such Dual Improvement Technology can be divided, assigned and owned in accordance with

subsection (iii) (A) and (B) above, or made subject to separate Patent filings to be assigned accordingly; and to the extent no such division is possible, the Dual Improvement Technology shall be treated as Jointly-Owned Program Technology in accordance with Section 6.2(c)(ii).

(v) Each Party hereby agrees to take, upon the request of the other Party, any reasonable action to implement and give effect to the assignments and grants that the Parties intended, or a Party agreed to make, in this Section 6.2(c), including, without limitation, executing any assignment document and other documentation, provide any testimony, and provide any other assistance.

6.3 Inventorship.

(a) Inventorship determination for all Program Technology, including Patents worldwide arising from any Program Know-How, will be made in accordance with applicable patent laws. Notwithstanding the previous sentence, ownership determinations for all Program Technology, as between the Parties, will be made in accordance with Section 6.2(c).

(b) Each Party will ensure that each employee, consultant and each subcontractor conducting any activities under this Agreement on behalf of such Party will be subject to written agreements to assign to such Party all of its right, title and interest in and to the Program Technology so that such Party can comply with its obligations with respect to the ownership allocation of the Program Technology as set forth above. In addition, each Party shall be solely responsible for payments that may be required to any of such Party's employees or consultants and subcontractors in connection with or with respect to such agreements, including moral rights payments.

6.4 Prosecution and Maintenance.

(a) ***IP Subcommittee.*** The JDC shall establish a subcommittee regarding the Arcturus Background Technology and the Program Technology ("**IP Subcommittee**"). Sections 2.3(a) and (b) shall apply accordingly to the IP Subcommittee. In particular, in the IP Subcommittee, each Party shall

(i) promptly notify the other Party with respect to all developments regarding the Arcturus Background Technology and the Program Technology significant for the development under any Work Plan and/or all developments that would reasonably be considered to negatively impact the rights of CureVac pursuant to this Agreement or any License Agreement,

(ii) provide to the other Party information about the status of and the general strategy in relation to Patents with respect to Programs included in the Arcturus Background Technology, CureVac Background Technology and Program Technology as may be applied to any Program or potential Licensed Product in order to enable the other Party to provide input regarding the strategy for the prosecution of such Patents with a view to enabling potential Licensed Products and/or enhancing

the potential strength of the Arcturus Background Technology and Program Technology generally, and

(iii) to directly or through appropriately qualified designees, consult with the prosecuting Party and its counsel regarding prosecution and maintenance of any such Patents as may be applied to any Program or potential Licensed Products without the requirement of a meeting of the IP Subcommittee, it being understood that in such consultation the prosecuting Party shall take the other Party's comments reasonably into account, *provided, however*, that the prosecuting Party will have the right to make the final determination in the event of any disagreement between the Parties related to any decision in connection with the filing, prosecution and maintenance of such Patents.

For clarity, the discussions regarding the general strategy and any particular Patents shall not require either Party to disclose the confidential information of any Third Party whose rights, information or data may be implicated in any such Patents or Know-How.

(b) ***CureVac Patents.*** As between the Parties, CureVac shall have the sole right, but not the obligation, to file, prosecute, and maintain (at its sole expense) Patents within CureVac Background Technology and Sole Improvement Technology to any CureVac Background Technology (collectively "**CureVac Sole Patents**") at its sole expense.

(c) ***Arcturus Patents.***

(i) Subject to the remainder of this Section 6.4 and to any License Agreement, as between the Parties, Arcturus shall have the sole right, but not the obligation, to file, prosecute, and maintain (at its sole expense) Patents within Arcturus Background Technology and Sole Improvement Technology to any Arcturus Background Technology (collectively "**Arcturus Sole Patents**") at its sole expense.

(ii) In relation to Patents within Sole Improvement Technology with respect to which CureVac has delivered an Option Notice, if Arcturus intends to abandon such Patent, it shall notify CureVac sufficiently in advance, and subject to any License Agreement, CureVac shall have the right to take over ownership of and prosecute, maintain such Patent at its sole expense, which Patent shall then be considered a CureVac Program Patent.

(iii) Arcturus shall, during the Term, based on information with respect to Targets and Reserved Targets disclosed by CureVac to Arcturus and existing Programs, use Diligent Efforts to enable the rights to the Options (and License Agreements) available to CureVac pursuant to this Agreement; provided that nothing herein shall limit the rights of Arcturus and Affiliates to grant to a Third Party a non-exclusive, co-exclusive or an exclusive license or other option with respect to any Target that is not a Reserved Target or otherwise subject to a License Agreement.

(d) ***Jointly-Owned Program Patents***. Subject to the remainder of this Section 6.4 and to any License Agreement, CureVac will have the first right, but not the obligation to file, prosecute, and maintain Jointly-Owned Program Patents, and the Parties shall share equally all costs incurred by CureVac in connection with such efforts. CureVac shall, regarding the Jointly-Owned Program Patents,

(i) promptly notify Arcturus in writing with respect to all significant developments,

(ii) provide Arcturus with drafts of each material filing (including without limitation draft patent applications and responses to office actions and similar filings) for all such Patents,

(iii) provide to Arcturus all other material submissions and correspondence with any patent authorities regarding such Patents, in sufficient time in advance of the anticipated filing date (not to be less than […***…] days) to allow for review and comment by Arcturus

(iv) provide Arcturus and its counsel with an opportunity to consult with CureVac and its counsel regarding prosecution and maintenance of any such Jointly-Owned Program Patents, and shall, prior to filing, revise such documents to reflect Arcturus's reasonable comments, provided that CureVac will have the right to make the final determination in the event of any disagreement between the Parties

related to any decision in connection with the filing, prosecution and maintenance of such Jointly-Owned Program Patents.

(v) If CureVac intends to abandon such Jointly-Owned Program Patent, it shall notify Arcturus sufficiently in advance, and subject to any License Agreement, Arcturus shall have the right to take over ownership of and prosecute, maintain such Patent at its sole expense, which Patent shall then be considered an Arcturus Sole Patent.

(e) ***Information Regarding Arcturus Patents***. Arcturus will provide semi-annual updates on the status of the Arcturus Sole Patents with respect to any Programs and Reserved Targets during the Term.

(f) ***Cooperation.*** Each Party will reasonably cooperate with the other Party in the prosecution and maintenance of the Patents within the Program Technology. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants to execute all documents, as reasonable and appropriate so as to enable the prosecution and maintenance of any such Patents in any country.

6.5 **Patent Enforcement and Defense.**

(a) ***Notice.*** To the extent not in breach of an obligation of confidentiality,

(i) Arcturus will promptly notify, in writing, CureVac upon learning of any actual or suspected infringement of any CureVac Sole Patents and Jointly-Owned Program Patents by a Third Party, or of any claim of

invalidity, unenforceability, or non-infringement of any such Patents, and will, along with such notice, supply CureVac with any evidence in its possession pertaining thereto, and

(ii) CureVac will promptly notify Arcturus, in writing, upon learning of any actual or suspected infringement of any Arcturus Sole Patents by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any such Patents, and will, along with such notice, supply Arcturus with any evidence in its possession pertaining thereto.

(b) ***Enforcement.*** As between the Parties and subject to any License Agreement,

(i) Arcturus will have the sole right, but not the obligation, to seek to abate any infringement of the Arcturus Sole Patents by a Third Party, or to file suit against any such Third Party for such infringement, *provided* that Arcturus shall bear all the expense of such suit or abatement of infringement, and

(ii) CureVac will have the sole right, but not the obligation, to seek to abate any infringement of the CureVac Sole Patents and Jointly-Owned Program Patents by a Third Party, or to file suit against any such Third Party for such infringement; *provided* that CureVac shall bear all the expense of such suit or abatement of infringement.

(c) ***Defense*****.** As between the Parties and subject to any License Agreement, Arcturus will have the sole right, but not the obligation, to defend against a declaratory judgment action or other action challenging any Arcturus Sole Patents and Jointly-Owned Program Patents; *provided* that Arcturus shall bear all the expense of such defense. As between the Parties and subject to any License Agreement, CureVac will have the sole right, but not the obligation, to defend against a declaratory judgment action or other action challenging the CureVac Patents; *provided* that CureVac shall bear all the expense of such defense.

(d) ***Withdrawal, Cooperation and Participation*****.** With respect to any infringement or defensive action identified above in this Section 6.5 which may be controlled by either CureVac or Arcturus, and subject to any License Agreement:

(i) If the controlling Party ceases to pursue or withdraws from such action, it will promptly notify the other Party (in good time to enable the other Party to meet any deadlines by which any action must be taken to preserve any rights in such infringement or defensive action) and such other Party may substitute itself for the withdrawing Party, shall be granted the right and standing to sue in the other Party's name, and proceed under the terms and conditions of this Section 6.5.

(ii) The non-controlling Party will cooperate with the Party controlling any such action (as may be reasonably requested by the controlling Party), including (A) providing access to relevant documents and other evidence, (B) making its and its Affiliates and licensees and sublicensees and all of their respective employees, subcontractors,

consultants and agents available at reasonable business hours and for reasonable periods of time, but only to the extent relevant to such action, and (C) if necessary, by being joined as a party, subject for this clause (C) to the controlling Party agreeing to indemnify such non-controlling Party for its involvement as a named party in such action and paying those reasonable, documented, out-of-pocket costs and expenses paid to outside legal counsel, and filing and maintenance expenses, actually and reasonably incurred by a Party in prosecuting and maintaining Patents and enforcing and defending them, incurred by such Party in connection with such joinder. The Party controlling any such action will keep the other Party updated with respect to any such action, including providing copies of all documents received or filed in connection with any such action.

(iii) Each Party will have the right to participate or otherwise be involved in any such action controlled by the other Party, in each case at the participating (i.e., non-controlling) Party's sole cost and expense. If a Party elects to so participate or be involved, the controlling Party will provide the participating Party and its counsel with an opportunity to consult with the controlling Party and its counsel regarding the prosecution of such action (including reviewing the contents of any correspondence, legal papers or other documents related thereto), and the controlling Party will take into account reasonable requests of the participating Party regarding such enforcement or defense.

(e) ***Settlement*****.** Neither Party will settle or consent to an adverse judgment in any action described in this Section 6.5 and controlled by such Party, including any judgment which affects the scope, validity or enforcement of any Patents owned by the other Party, without the prior written consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned).

(f) ***Damages*****.** Unless otherwise agreed by the Parties, all monies recovered upon the final judgment or settlement of any action which may be controlled by either CureVac or Arcturus and described in Section 6.5 in each case will be used first to reimburse the controlling Party, then the non-controlling Party, for each of their out-of-pocket costs and expenses relating to the action, with the balance of any such recovery to be retained by the controlling Party.

6.6 ***Updates*****.** Arcturus shall inform CureVac within […***…] Business Days in writing of any significant developments with respect the Arcturus Program Technology that would reasonably be considered to negatively impact the rights of CureVac pursuant to this Agreement or any License Agreement.

ARTICLE 7

Confidentiality

7.1 **Confidential Information**. Each Party ("Disclosing Party") may disclose to the other Party ("Receiving Party"), and Receiving Party may acquire during the course and conduct of activities under the Agreement, certain Confidential Information of Disclosing Party

in connection with this Agreement. Notwithstanding the foregoing, either Party may use and disclose Jointly-Owned Program Technology in connection with such Party's permitted exploitation of such Technology, provided that the recipient is bound by confidentiality obligations corresponding to the obligations under this Agreement with respect to the subject matter of this Agreement.

7.2 **Restrictions.** During the Term and for […***…] years thereafter, Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, but in no event less than reasonable care. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this Agreement or any License Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent to Receiving Party's Affiliates, and each of their employees, subcontractors (subject to Section 3.4) and consultants or agents who have a need to know such Confidential Information in order to perform its obligations and exercise its rights under this Agreement or any License Agreement and who are under written obligation to comply with the restrictions on use and disclosure that are no less restrictive than those set forth in this Article 7. Receiving Party assumes responsibility for such entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

7.3 **Exceptions.** Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to a specific portion of the Disclosing Party's Confidential Information to the extent that Receiving Party can demonstrate that such portion: (i) was known to Receiving Party or any of its Affiliates prior to the time of disclosure by the Disclosing Party without obligation of confidentiality; (ii) is or becomes public knowledge through no fault or omission of Receiving Party or any of its Affiliates; (iii) is obtained on a non-confidential basis by Receiving Party or any of its Affiliates from a Third Party who to Receiving Party's knowledge is lawfully in possession thereof and under no obligation of confidentiality to Disclosing Party; or (iv) has been independently developed by or on behalf of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information as documented by the internal records of the Receiving Party.

7.4 **Permitted Disclosures.** The Receiving Party may only use any such Confidential Information for the purposes of performing its obligations or exercising its rights under this Agreement. Notwithstanding the obligations set forth in Sections 7.1 and 7.2, a Party may disclose the other Party's Confidential Information (including this Agreement and the terms herein) in the following instances to the extent reasonably required:

(a) in order to comply with applicable Law (including any securities Law or regulation or the rules of a securities exchange) or with a legal or administrative proceeding;

(b) in connection with prosecuting or defending litigation, and filing, prosecuting and enforcing Patents in connection with Receiving Party's rights and obligations pursuant to this Agreement or a License Agreement;

(c) to attorneys, accountants, auditors, acquirers, licensees, partners, permitted assignees, financial advisors, investors and lenders, including potential acquirers, licensees, partners, assignees, financial advisors, investors and lenders;

provided that (1) where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant to subsections (a) and (b) sufficiently prior to making such disclosure so as to allow Disclosing Party reasonably adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to subsection (c), each of those persons or entities are required to comply with the restrictions on use and disclosure in Section 7.2 (other than financial advisors, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

7.5 **Return of Confidential Information**. Upon expiry or earlier termination of the Agreement, upon written request of a Party (such request, if made, to be made within […***…] months of such expiry or termination) the other Party will destroy or return (as shall be specified in such request) to the requesting Party all copies of the Confidential Information of the requesting Party; provided that the Party may retain: (i) one copy of such Confidential Information for record-keeping purposes, for the sole purpose of ensuring compliance with this Agreement; (ii) any copies of such Confidential Information as is required to be retained under applicable Law; (iii) any copies of such Confidential Information as is necessary or useful for such Party to exercise a right or fulfill an obligation under a License Agreement, if any, or as set forth in this Agreement; and (iv) any copies of any computer records and files containing Confidential Information that have been created by such Party's routine archiving/backup procedures. Upon request of the requesting Party, the Receiving Party shall confirm in writing to the requesting Party the destruction or return of all copies of the Confidential Information of the requesting Party.

7.6 **Publications.** Notwithstanding anything in this Agreement to the contrary, Arcturus shall be permitted to publish the results of a Program only with the prior written consent of CureVac. Arcturus shall submit any proposed publication of the results of a Program to CureVac. Following receipt of the proposed publication by CureVac, CureVac will use Diligent Efforts to provide written approval or disapproval, at CureVac's discretion, within […***…] days. Expedited reviews for abstracts or poster presentations, or for other publications that may relate to potential patent applications, may be arranged if mutually agreeable to the Parties. CureVac is permitted to publish the results of a Program provided, however, that it will not disclose Arcturus Confidential Information in any publication by CureVac of the results of a Program or any Licensed Product development by CureVac without Arcturus' prior written consent, which will not be unreasonably withheld, conditioned or delayed in the event such Arcturus Confidential Information is reasonably required to support the results of a Program so published.

7.7 **Terms of this Agreement; Press Release**. The Parties agree that the existence and terms of the Parties' relationship and this Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Section 7.4. Except as mutually agreed or otherwise required by Law or securities exchange regulation, each Party agrees not to issue any press release or public statement disclosing information relating to the existence of this Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party.

ARTICLE 8

Warranties; Limitations of Liability; Indemnification

8.1 **Representations and Warranties.** Each Party represents and warrants to the other as of the Effective Date that (a) it is a corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated, (b) it has the legal right and power to enter into this Agreement, to extend the rights and licenses granted or to be granted to the other in this Agreement, and to fully perform its obligations hereunder, (c) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder (d) this Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms, and (e) the execution, delivery and performance by a Party of this Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which such Party is a party or by which it is bound.

8.2 **Additional Representations and Covenants of Arcturus.** Arcturus hereby represents and warrants to CureVac as of the Effective Date as follows:

(a) ***Impairment***. Neither Arcturus nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or

otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights including Know-How, that (i) conflicts with or impairs the scope of any rights or licenses granted to CureVac hereunder or (ii) to the knowledge of Arcturus, would otherwise conflict with or limit rights that would be granted to CureVac under any License Agreement.

(b) ***Patents***. **Exhibit 1.3** sets forth a complete and accurate list of all Patents included in the Arcturus Background Technology, indicating any licensor and/or co-owner(s), if applicable. Arcturus is entitled to grant to CureVac the licenses to the Patents and the Know-How within the Arcturus Background Technology for the purposes of this Agreement, including to enter into a License Agreement, subject to the rights of Arcturus and its Affiliates to grant to a Third Party a non-exclusive, co-exclusive or an exclusive license or option with respect to a Target. To Arcturus' knowledge, the Patents listed on **Exhibit 1.3** have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Patents included in the Arcturus Background Technology listed on **Exhibit 1.3** is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and to Arcturus' knowledge as of the Effective Date, no Arcturus Background Technology is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. As of the Effective Date, neither Arcturus nor any of its Affiliates has received any notice alleging that the Patents in the Arcturus Background Technology listed on **Exhibit 1.3** are invalid or unenforceable, or challenging Arcturus' ownership of or right to use any such rights.

(c) ***Arcturus LMD Technology.*** The Arcturus LMD Technology licensed to CureVac under this Agreement comprises all Arcturus LMD Technology Controlled by Arcturus (i) which is necessary or useful for purposes of this Agreement and (ii) to the knowledge of Arcturus, which would be necessary or useful for purposes of a License Agreement.

(d) ***Encumbrances.*** It has the right to grant the license and rights herein to CureVac and it has not granted any liens, security interest, encumbrance, license, right or interest in, to or under the Arcturus Background Technology to any Third Party that is inconsistent with the license granted to CureVac under Section 3.1.

(e) ***Litigation.*** There is no action, suit, proceeding or investigation pending or, to the knowledge of Arcturus, currently threatened against or affecting Arcturus that questions the validity of this Agreement or the right of Arcturus to enter into this Agreement or consummate the transactions contemplated hereby or that relates to the Arcturus LMD Technology.

(f) ***Infringement***. Neither Arcturus nor any of its Affiliates has received any written notice of any claim that, nor does Arcturus or its Affiliates have any knowledge of any claim, any Patent, Know-How or other intellectual property owned or controlled by a Third Party would be infringed or misappropriated by the practice of any Arcturus LMD Technology (i) in connection with the performance of this Agreement and (ii) to the knowledge of Arcturus, with respect to any product under a License Agreement.

(g) ***Third Party Infringement.*** To Arcturus' knowledge, no Third Party is infringing or has infringed any Patent within the Arcturus LMD Technology or is misappropriating or has misappropriated any Know-how within the Arcturus LMD Technology.

8.3 Mutual Covenants.

(a) **No Debarment**. In the course of the performance by the Parties, neither Party nor its Affiliates shall use any employee or consultant who has been debarred by any regulatory authority or, to such Party's or its Affiliates' knowledge, is the subject of debarment proceedings by a regulatory authority. Each Party shall notify the other Party promptly upon becoming aware that any of its or its Affiliates' employees or consultants has been debarred or is the subject of debarment proceedings by any regulatory authority.

(b) **Compliance**. Each Party and its Affiliates shall comply in all material respects with all applicable Laws (including all anti-bribery laws) in the performance of its obligations under this Agreement.

8.4 No Other Warranties. EXCEPT AS EXPRESSLY STATED IN THIS ARTICLE 8, (A) NO REPRESENTATION, CONDITION OR WARRANTY WHATSOEVER IS MADE OR GIVEN BY OR ON BEHALF OF ARCTURUS OR CUREVAC; AND (B) ALL OTHER CONDITIONS AND WARRANTIES WHETHER ARISING BY OPERATION OF LAW OR OTHERWISE ARE HEREBY EXPRESSLY EXCLUDED, INCLUDING ANY CONDITIONS AND WARRANTIES OF MERCHANTABILITY, POTENTIAL FOR SUCCESS OF A PROGRAM, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT.

8.5 No Consequential Damages. Notwithstanding anything in this Agreement or otherwise, neither Party will be liable to the other or any Third Party with respect to any subject matter of this Agreement for any indirect or consequential damages, provided that this Section 8.5 will not apply to breaches of Article 6 or 7 or the Parties' indemnification rights or obligations under Section 8.7, or in the event of willful misconduct.

8.6 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this Agreement through Affiliates, permitted subcontractors or other permitted Third Parties, provided, however, that each Party will remain fully responsible and liable for the performance by its Affiliates and/or permitted subcontractors and Third Parties and will cause its Affiliates, permitted subcontractors or other permitted Third Parties to comply with the provisions of this Agreement in connection therewith.

8.7 Indemnification.

(a) ***Indemnification by Arcturus***. Arcturus will indemnify CureVac, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, "CureVac Indemnitees"), and defend and hold each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, "Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, "Third Party Claims") against the CureVac Indemnitees to the extent arising from or occurring as a result of:

(i) the breach of any representation or warranty by Arcturus under this Agreement; or (ii) any gross negligence or willful misconduct on the part of any Arcturus Indemnitee; or (iii) any alleged infringement or misappropriation of Patents or other intellectual property rights by CureVac in the conduct of the Work Plan based solely on CureVac's use of Arcturus LMD Technology as permitted hereunder (excluding, for clarity, infringement of Patents, Know-How or Materials covering CureVac Technology used by CureVac in the performance of the Work Plan), except in each of cases (i)-(iii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of a CureVac Indemnitee or CureVac's breach of this Agreement.

(b) ***Indemnification by CureVac***. CureVac will indemnify Arcturus, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Arcturus Indemnitees"), and defend and hold each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against Arcturus Indemnitees to the extent arising from or occurring as a result of: (i) the breach by CureVac of any representation or warranty under this Agreement; or (ii) any gross negligence or willful misconduct on the part of any CureVac Indemnitee; or (iii) any alleged infringement or misappropriation of Patents or other intellectual property rights by Arcturus in the conduct of the Work Plan based solely on Arcturus' use of CureVac Technology as permitted hereunder (excluding, for clarity, infringement of Arcturus LMD Technology used by Arcturus in the performance of the Work Plan), except in each of cases (i)-(iii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of an Arcturus Indemnitee or Arcturus' breach of this Agreement.

(c) ***Notice of Claim.*** All indemnification claims provided for in subsections (a) and (b) above will be made solely by such Party to this Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an "Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under subsections (a) or (b) above but in no event will the indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice

must contain a description of the claim and the nature and amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) ***Defense, Settlement, Cooperation and Expenses.***

(i) Control of Defense. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within […***…] days after the indemnifying Party's receipt of an Indemnification Claim Notice. The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to

indemnify the Indemnified Party in respect of the Third Party Claim, nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to such legal counsel and a possible conflict of interest of such counsel retained by the indemnifying Party). In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will as soon as practicable deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including reasonable attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) Right to Participate in Defense. Without limiting subsection (i) above, any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to engage counsel of its choice for such purpose; provided, however, that such engagement will be at the Indemnified Party's own cost and expense unless (A) the indemnifying Party has failed to promptly assume the defense and engage counsel in accordance with subsection (i) above (in which case the Indemnified Party will control the defense) or (B) the interests of the Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, in which case the indemnifying Party will assume one hundred percent (100%) of any reasonable costs and expenses of counsel for the Indemnified Party.

(iii) Settlement. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject

to injunctive or other relief or otherwise adversely affecting the business, Patents or Technology of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, the indemnifying Party will have the sole right to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with subsection (i) above, the indemnifying Party will have authority to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (which consent will not be unreasonably withheld, conditioned or delayed). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party.

(iv) Cooperation. Regardless of whether the indemnifying Party chooses to defend any Third Party Claim, the Indemnified Party will, and will use Diligent Efforts to cause each other indemnified party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith at the indemnifying Party's expense. Such cooperation will include access during normal business hours afforded to the indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making indemnified parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) Costs and Expenses. Except as provided above in this Section 8.7, the costs and expenses, including reasonable attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a Calendar Quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

8.8 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program to protect against potential liabilities and risk

arising out of activities to be performed under this Agreement and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the respective industry of such Party for the activities to be conducted by such Party under this Agreement. The coverage limits set forth in any such programs or policies will not create any limitation on a Party's liability to the other under this Agreement.

ARTICLE 9

Term and Termination

9.1 Term.

(a) This Agreement will commence as of the Effective Date and, unless sooner terminated or extended in accordance with the terms hereof or by mutual written consent, will continue for a period of eight (8) years (the "Initial Term", as may be extended pursuant to Section 9.1(b), the "Term").

(b) Not later than sixty (60) days prior to the expiration of the Initial Term, CureVac shall have the option to extend the Term on an annual basis for up to three (3) years, by providing written notice to Arcturus, subject to payment by CureVac to Arcturus of a non-refundable annual extension fee of […***…], payable within […***…] Business Days after exercise of such option.

(c) The Parties agree that this Agreement and the Co-Development Agreement relate to different projects and, therefore, the validity, term and termination of this Agreement shall be independent from the validity, term and termination of the Co-Development Agreement.

9.2 Termination by CureVac.

(a) ***Breach, Change of Control.*** CureVac will have the right to terminate this Agreement in full or on a Program-by-Program basis upon delivery of written notice to Arcturus in the event of

(i) any material breach by Arcturus

(A) of any terms and conditions of this Agreement, provided that such breach has not been cured within sixty (60) days after written notice thereof is given by CureVac to Arcturus specifying in reasonable detail the nature of the alleged breach; or

(B) in particular the failure of the Escrow Agent to send the Target response notice within the period provided for in Section 4.2(c)(i), provided that such failure has not been cured neither within a first cure period of five (5) Business Days after written notice thereof is given by CureVac to Arcturus nor within a second cure period of five (5) Business Days after written notice of the lapse of the first cure period is given by CureVac to Arcturus, or

(ii) a Change of Control of Arcturus.

In the event of a termination of this Agreement or a Program under this subsection, (i) the JDC will be disbanded or, if applicable, cease to be responsible for the terminated Programs, (ii) Arcturus will receive no further Arcturus FTE funding (if applicable, for the terminated Programs), and (iii) Arcturus will conduct a technology transfer of Arcturus Technology existing at the time of such transfer and provide necessary licenses to CureVac or its Third Party designee each as reasonably necessary for CureVac or such Third Party designee to complete the conduct of a Program, and (iv) the Option Exercise Fee and the payments under the License Agreement(s) (if

applicable, in relation to the terminated Programs) will be reduced by […***…]%. For avoidance of doubt, termination of the Agreement or a Program will not terminate CureVac's reservation of Reserved Targets or the Options subject to the payments associated therewith. For clarity, except in cases of willful misconduct, the remedy set forth in this Section 9.2(a) shall be the sole and exclusive remedy of CureVac under this Agreement (i.e., without limitation of any remedies that may be separately available under any License Agreement) in the event that CureVac elects to terminate a Program but otherwise continue the Agreement in effect.

In the event of a Change of Control of Arcturus, CureVac shall decide, no later than the later of: (i) ten (10) Business Days' written notice following the receipt of a written notification that the closing date of such Change of Control has occurred or (ii) […***…] months written notice following the receipt of a written notification that the signing date of such Change of Control has occurred, to (a) terminate this Agreement, (b) to continue this Agreement and elect (as set forth in such written notice) to have the JDC disbanded and Arcturus to undertake a technology transfer and provide necessary licenses to CureVac or its Third Party designee each as reasonably necessary for CureVac or such Third Party designee to complete the conduct of any then ongoing Programs in accordance with the Work Plan; or (c) continue the Agreement and receive reasonable assurance in writing from the acquirer that the CureVac Confidential Information is not shared with any other entities within the acquirer's group that are not required to manage, perform and exercise Arcturus' rights and obligations under this Agreement.

(b) ***Discretionary Termination*****.** CureVac will have the right to terminate this Agreement in full at any time without cause by giving sixty (60) days' prior written notice to Arcturus. Upon termination by CureVac pursuant to this subsection, CureVac will pay to Arcturus any amounts payable to Arcturus for any Work performed pursuant to the Work Plan up through the date of such termination, subject to Arcturus' transfer of all deliverables under the Work Plan to CureVac.

9.3 **Termination by Arcturus.** Arcturus will have the right to terminate this Agreement in full upon delivery of written notice to CureVac in the event of (i) any material breach by CureVac of any terms and conditions of this Agreement, provided that such breach has not been cured within sixty (60) days after written notice thereof is given by Arcturus to CureVac specifying in reasonable detail the nature of the alleged breach. CureVac hereby agrees that Arcturus is entitled to receive payment of any amounts payable to Arcturus pursuant to this Agreement, including amounts for any Work performed pursuant to the Work Plan, up through the date of such termination. For clarity, a breach by CureVac under this Agreement shall not constitute a breach under a License Agreement unless such breach is also separately a breach pursuant to such License Agreement.

9.4 **Termination Upon Bankruptcy.** All rights and licenses granted under or pursuant to this Agreement by Arcturus or CureVac or their Affiliates are, and will otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of right to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that the Parties and their respective Affiliates and permitted Third Party sublicensees, as licensees of such rights under this Agreement, will retain and may fully exercise all of their rights and elections under the U.S. Bankruptcy Code and any foreign counterparts thereto. Without limiting the Parties' rights under Section 365(n) of the U.S Bankruptcy Code, if a case under U.S. Bankruptcy Code is commenced by or against a Party, the other Party shall be entitled to a copy of any and all such intellectual property and all embodiments of such intellectual property, and the same, if not in the possession of such other Party, shall be promptly delivered to it (i) before this Agreement is rejected by or on behalf of the bankrupt Party, within thirty (30) days after the other Party's written request, unless the bankrupt Party, or its trustee or receiver, elects within thirty (30) days to continue to perform all of its obligations under this Agreement, or (ii) after any rejection of this Agreement by or on behalf of the bankrupt Party, if not previously delivered as provided under clause (i) above. All rights of the Parties under this Section 9.4 and under Section 365(n) of the U.S. Bankruptcy Code are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party may have under this Agreement, under the U.S. Bankruptcy Code, and any other applicable Laws. The non-bankrupt Party shall have the right to perform the obligations of the bankrupt Party hereunder with respect to such intellectual property, but neither such provision nor such performance by the non-bankrupt Party shall release the bankrupt Party from any such obligation or liability for failing to perform it.

9.5 **Effects of Termination.** Upon termination by:

(a) CureVac under Sections 9.2 or 9.4, (i) Arcturus will terminate all Work in progress in an orderly manner as soon as practicable and transfer all deliverables under the Work Plan to CureVac in its Control in the state of such deliverable as of the effective date of termination; (ii) each of the Parties will return or destroy any Materials of the other Party in its Control, based upon written instructions from the other Party within […***…] days of the effective date of termination, unless such Material is necessary or useful for the exercise of a Party's rights or obligations under a License Agreement in which event the Party retaining the Material will notify the other Party of retention pursuant to the requirements of and subject to such License Agreement; and (iii) all rights and licenses pursuant to this Agreement except with respect to any then existing Programs (for which licenses to CureVac or its Third Party designee shall be granted to complete the Program and enter into a License Agreement under the terms of Section 9.2(a)(ii)) shall terminate and be of no further force and effect, it being understood that termination hereunder shall not affect any then existing License Agreement;

(b) Arcturus under Section 9.3, (i) CureVac will promptly pay Arcturus any monies due and owing Arcturus, as of the date of termination, for Work and Services actually performed and all expenses actually incurred as specified in the Work Plan as well as any amounts incurred for orderly wind down any then existing Third Party commitments entered into as of the date of notice of termination to perform the Work Plan; (ii) each of the Parties will return or destroy any Materials of the other Party in its Control, based upon written instructions from the other Party within […***…] days of the effective date of termination, unless such Material is necessary or useful for the exercise of a Party's rights or obligations under a License Agreement in which event the

Party retaining the Material will notify the other Party of retention pursuant to the requirements of and subject to such License Agreement; and (iii) all rights and licenses pursuant to this Agreement shall terminate and be of no further force and effect, it being understood that termination hereunder shall not affect any then existing License Agreement.

9.6 Survival. In addition to the termination consequences set forth in Section 9.5, the following provisions will survive termination or expiration of this Agreement, as well as any other provision which by its terms or by the context thereof, is intended to survive such termination: Sections 1, 3.1(f) (to the extent a License Agreement is executed prior to the effective date of termination), 3.3(a), 6.2, 6.3, 7, 8.5, 8.7, 9.2, 9.5 , 9.6 and 10. Termination or expiration of this Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at Law or in equity with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this Agreement.

ARTICLE 10

Miscellaneous

10.1 Dispute Resolution.

(a) ***Dispute Escalation*****.** In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves or the Program directors. In the event that such dispute is not resolved on an informal basis within […***…] days, either Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive with the appropriate authority to determine the matter for such Party), who will attempt in good faith to resolve such dispute by negotiation and consultation for a […***…] day period following receipt of such written notice

(b) ***Dispute Resolution*****.**

(i) In the event the Chief Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Parties agree to try to solve such dispute amicably by mediation. The Parties shall conduct a mediation procedure according to the Mediation Rules of the World Intellectual Property Organization (WIPO) in effect on the date of the commencement of the mediation proceedings. The location of the mediation proceedings will be New York City, New York, USA. The number of mediators will be […***…]. The language of the mediation proceedings will be English. If the dispute has not been settled pursuant to the said rules within […***…] days following the filing of a request for mediation or within such other period as the Parties may agree in writing, either Party may submit the dispute to final and binding arbitration.

(ii) Any dispute relating to the validity performance, construction or interpretation of this Agreement, which cannot be resolved amicably between the Parties after following the procedure set forth in this Section 10.1, shall be submitted to arbitration in accordance with the Arbitration Rules of WIPO in effect on the date of the commencement of the arbitration proceedings. The location of the arbitration proceedings will be New York City, New York, USA. The number of arbitrators will be […***…]. The language of the arbitration proceeding will be English. The decision of the arbitrators shall be final and binding upon the Parties (absent manifest error on the part of the arbitrator(s)) and enforceable in any court of competent jurisdiction.

10.2 **Relationship of Parties.** Nothing in this Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied Third Party beneficiaries hereunder.

10.3 **Compliance with Law.** Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law.

10.4 **Governing Law.** This Agreement will be governed by and construed in accordance with the Laws of State of New York, USA, without respect to its conflict of Laws rules.

10.5 **Counterparts; Facsimiles.** This Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this Agreement by either Party will constitute a legal, valid and binding execution and delivery of this Agreement by such Party

10.6 **Headings.** All headings in this Agreement are for convenience only and will not affect the meaning of any provision hereof.

(a) ***Waiver of Rule of Construction***. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement will be construed against the drafting party will not apply.

(b) ***Interpretation.*** Whenever any provision of this Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this Agreement as an entirety and not solely to the particular portion of this Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Exhibits in this Agreement are to Sections and Exhibits of this Agreement. References to any Sections include Sections and subsections that are part of the related Section.

10.7 **Further Assurances.** Each Party shall take all customary and reasonable actions and do all things reasonably necessary or proper, including under applicable Law, to make effective and further the intents and purposes of the transactions contemplated by this

Agreement, including executing any further instruments reasonably requested by the other Party.

10.8 **Binding Effect.** This Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

10.9 **Assignment.** This Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this Agreement, except as expressly permitted hereunder, without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that either Party may assign this Agreement without such consent to an Affiliate or to its successor in connection with sale of all or substantially all of its assets or business or that portion of its business pertaining to the subject matter of this Agreement (whether by merger, consolidation or otherwise).

10.10 **Notices.** All notices, requests, demands and other communications required or permitted to be given pursuant to this Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, or registered or certified mail, return receipt requested, postage prepaid or facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier) to the addresses set forth below (or to such address as a Party may subsequently provide by written notice in accordance with this Section 10.10).

If to CureVac:

CureVac AG
Paul-Ehrlich-Str. 15
72076 Tübingen
Germany
Attention: CEO and General Counsel
Fax: +49 7071 9883 - 1101

If to Arcturus:

Arcturus Therapeutics, Inc.
10628 Science Center Drive
Suite 200
San Diego, California 92121
USA
Attn: CEO
Fax: (858) 300-5028

with a copy to (which copy shall not constitute notice):

Cooley LLP
3175 Hanover St.
Palo Alto, CA 94303
Attn: Glen Y. Sato
Fax: (650) 849-7400

10.11 **Amendment and Waiver.** This Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

10.12 **Severability.** In the event that any provision of this Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify the Agreement to preserve (to the extent possible) their original intent.

10.13 **Entire Agreement.** This Agreement together with any License Agreements (including all appendices and exhibits hereto and thereto) entered into during the Term and the Material Transfer Agreements and the Confidentiality Agreement are the sole agreements with respect to the subject matter and supersede all other agreements and understandings between the Parties with respect to same, provided, however, that the terms and conditions under this Agreement apply with respect to the activities which have been performed by the Parties under the Material Transfer Agreement but which are also set forth under the Work Plan, and to such extent this Agreement replaces the Material Transfer Agreements. In case of conflict between this Agreement and the Confidentiality Agreement, this Agreement shall prevail.

10.14 **Force Majeure.** Neither Arcturus nor CureVac will be liable for failure of or delay in performing obligations set forth in this Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Arcturus or CureVac; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

[*Signature page to follow*]

IN WITNESS WHEREOF, the Parties have caused this Development and Option Agreement to be executed by their respective duly authorized officers as of the Effective Date.

CureVac AG

By: /s/ Franz-Werner Haas
(Signature)

Name: Franz-Werner Haas
Title: CCO

By: /s/ Dan Menichella
(Signature)

Name: Dan Menichella
Title: CBO

Arcturus Therapeutics Inc.

By: /s/ Joseph E. Payne
(Signature)

Name: Joseph E. Payne
Title: President & CEO

Exhibit 1.3

Patents and Know-How in the Arcturus Background Technology

[…***…]

*****Confidential Treatment Requested**

Exhibit 1.5

ARCTURUS LMD TECHNOLOGY

[…***…]

*****Confidential Treatment Requested**

Exhibit 1.34

Exclusive License Agreement

see separate document

Exhibit 1.61

Non-Exclusive License Agreement

[*The payments under the Non-Exclusive License Agreement will be reduced by 50% for such non-exclusive license and the other terms under the Exclusive License Agreement will be adjusted to reflect the non-exclusivity of the license*]

Exhibit 3.1 (a)

Work Plan

[…***…]

*****Confidential Treatment Requested**

Exhibit 4.2

Target Reservation Request Form

[…***…]

*****Confidential Treatment Requested**

AMENDMENT TO DEVELOPMENT AND OPTION AGREEMENT

THIS AMENDMENT TO DEVELOPMENT AND OPTION AGREEMENT (this "Amendment"), dated as of May 3, 2018, is made by and between CureVac AG, a German stock corporation with offices at Paul-Ehrlich-Strasse 15, 72076 Tubingen, Germany ("CureVac"), and Arcturus Therapeutics Inc., a Delaware corporation with offices at 10628 Science Center Drive #200, San Diego, CA 92121, USA ("Arcturus"). Each of CureVac and Arcturus may be referred to herein as a "Party" or together as the "Parties".

WHEREAS, the Parties are parties to that certain Development and Option Agreement, dated as of January 1, 2018 (the "Development and Option Agreement");

WHEREAS, pursuant to Section 3.2 of the Development and Option Agreement, CureVac is responsible for funding up to […***…] scientists per year at Arcturus to perform the Work as defined and in accordance with the Work Plan for a period of up to […***…] months at the FTE costs;

WHEREAS, CureVac is now prepared to invest and commit to the full number of […***…] FTEs for the full period of […***…] months, provided Arcturus can provide security as to CureVac's access to the Technology generated in performance of the Work pursuant to the Development and Option Agreement; and

WHEREAS, CureVac and Arcturus desire to amend the Development and Option Agreement as provided in this Amendment in accordance with Section 10.11 of the Development and Option Agreement.

NOW, THEREFORE, in consideration of the foregoing and the promises and mutual agreements contained in this Amendment, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound, the Parties agree as follows:

SECTION 1. Irrevocable Offer.

(a) The heading of Article 5 of the Development and Option Agreement is hereby amended and restated in its entirety as follows: "Irrevocable Offer to Licenses" and the Table of Contents is updated accordingly. The heading of Section 5.1 of the Development and Option Agreement is amended and restated in its entirety as follows: "Irrevocable Offer."

(b) Section 5.1(a) of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

" (a) Arcturus hereby makes a final, binding irrevocable offer (the "Irrevocable Offer") to CureVac to enter into, on the terms of, and subject to the conditions set forth in, the Exclusive License Agreement or, if the Reserved Target is only available on a non-exclusive basis, the Non-Exclusive License Agreement, on a Reserved Target-by-Target basis, a maximum of […***…] licenses under the Arcturus LMD Technology with respect to the development, manufacture and commercialization of Licensed Products containing mRNA Constructs intended to express such Reserved Target in the form of the License Agreement. Upon the execution of this Amendment, the Irrevocable Offer shall remain valid and legally binding on Arcturus and in effect, and the

Irrevocable Offer from Arcturus shall be irrevocable and open for acceptance from CureVac for the period commencing on the Effective Date and ending on the expiration of the Term (the "Offer Period")."

(c) Section 5.1(b) of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

" (b) If, prior to the expiration of the Offer Period, CureVac delivers written notice to Arcturus of its intention to enter into a license for a Reserved Target, which such notice shall set forth the particular Reserved Target which is intended to be expressed by the Licensed Products (each such notice, an "Acceptance Notice"), then upon delivery thereof, for the Reserved Target set forth in such Acceptance Notice, the licenses and all other rights under the applicable License Agreement shall immediately be in effect without the requirement of either Party to execute any further documentation and there shall exist a legal, valid and binding obligation of Arcturus, enforceable against Arcturus in accordance with the terms of the Exclusive License Agreement or, if the Reserved Target set forth in such Acceptance Notice is only available on a non-exclusive basis, the Non-Exclusive License Agreement. A separate Acceptance Notice and Acceptance Fee will be required for each License Agreement with respect to which CureVac accepts the Irrevocable Offer pursuant to this Section 5.1, and CureVac will pay to Arcturus the Acceptance Fee for each such License Agreement as set forth in Section 5.3. In the event that CureVac terminations a license(s) during the Term, the Target(s) subject to the license(s) will be removed from the Reserved Target List and the number of License Agreements for which the Irrevocable Offer exists shall be reduced by one (1) (i.e. the delivery of an Acceptance Notice reduces the total number of License Agreements for which CureVac may accept the Irrevocable Offer by one regardless of whether CureVac elects to continue such License Agreement in effect)."

(d) Section 5.1(c) of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

" (c) In the event that CureVac terminates a License Agreement during the Term, the Targets subject to such license(s) will no longer be available as a Target pursuant to this Agreement."

(e) Section 5.2 of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

"5.2 CureVac's Acceptance of Irrevocable Offer. As soon as practicable following CureVac's delivery of each Acceptance Notice to Arcturus, CureVac and Arcturus will prepare the appendices to the corresponding License Agreement. The License Agreement shall nevertheless enter into force (including payment obligations of CureVac in accordance with the terms of the License Agreement) upon delivery of the Acceptance Notice by CureVac."

(f) Section 5.3 of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

"5.3 Acceptance Fee. If CureVac delivers an Acceptance Notice for a Rare Disease Target pursuant to Section 5.1, CureVac shall pay an Acceptance Fee of […***…] and if CureVac delivers an Acceptance Notice for a Non-Rare Disease Target pursuant to Section 5.1, CureVac shall pay an Acceptance Fee of […***…], hereinafter both the "Acceptance Fee". On the […***…] it delivers an

*****Confidential Treatment Requested**

Acceptance Notice, CureVac shall pay the applicable Acceptance Fee by wire transfer in immediately available funds to the bank account of Arcturus set forth on Schedule 3 (or such other bank account notified in writing to CureVac prior to such date)."

(g) Section 5.4 of the Development and Option Agreement is hereby amended and restated in its entirety as follows:

"5.4 Co-Development Agreement. For clarification, the selection of any program under the Co-Development Agreement shall not constitute the delivery of an Acceptance Notice in accordance with this Section 5, and, accordingly, no Acceptance Fee will be payable and any paid Acceptance Fee shall be credited against any other payments by CureVac applied first to any outstanding payment obligations to Arcturus, and to the extent any remaining amounts remain creditable, then to the next due future payment obligations."

(g) Definitions. Each of the following Sections of the Development and Option Agreement are hereby amended and restated in their entirety as "Intentionally Omitted." : Section 1.35, Section 1.62, Section 1.64, Section 1.65, Section 1.66 and Section 1.67 The following Sections are inserted immediately following Section 1.94 of the Development and Option Agreement:

"**1.95** "Irrevocable Offer" has the meaning set forth in Section 5.1(a).

1.96 "Acceptance Notice" has the meaning set forth in Section 5.1(b).

1.97 "Acceptance Fee" has the meaning set forth in Section 5.3."

(h) Additional Modifications.

(i) In Section 3.1(f) of the Development and Option Agreement, the occurrence of "exercise of an Option and entry into a License Agreement" in the first sentence is hereby replaced with "delivery of an Acceptance Notice and the entering into force of a License Agreement".

(ii) In Section 3.3(c) of the Development and Option Agreement, the occurrence of "whether to exercise an Option" in the third sentence is hereby replaced with "whether to delivery an Acceptance Notice".

(iii) In Section 4.2(c)(iii) of the Development and Option Agreement, the occurrence of "option" in the second sentence is hereby replaced with "right".

(iv) In Section 4.2(d)(ii) of the Development and Option Agreement, the occurrence of "shall be reduced by each exercise of an Option" in the first sentence is hereby replaced with "shall be reduced by each delivery of an Acceptance Notice" and the occurrence of "applying from and after the date of exercise of an Option." in the first sentence is hereby replaced with "applying from and after the date of an Acceptance Notice.".

(v) In Section 6.4(c)(ii) of the Development and Option Agreement, the occurrence of "an Option Notice" in the first sentence is hereby replaced with "an Acceptance Notice".

(vi) In Section 6.4(c)(iii) of the Development and Option Agreement, the occurrence of "to the Options" in the first sentence is hereby replaced with "pursuant to the Irrevocable Offer".

(vii) In Section 9.2(a)(iv) of the Development and Option Agreement, the occurrence of "the Option Exercise Fee" is hereby replaced with "the Acceptance Fee".

(viii) In Section 9.2(a) of the Development and Option Agreement, in the sentence immediately following subsection (iv), the occurrence of "or the Options" is hereby replaced with "or the Irrevocable Offers".

SECTION 2. License Agreements.

(a) "Non-Exclusive License Agreement" means the terms of the Non-Exclusive License Agreement agreed by the Parties, incorporated by reference into the Development and Option Agreement and set forth on Schedule 1-A to this Amendment.

(b) "Exclusive License Agreement" means the terms of the License Agreement agreed by the Parties, incorporated by reference into the Development and Option Agreement and set forth on Schedule 1-B to this Amendment.

SECTION 3. Grant of Security Interest.

(a) As collateral security for the prompt and complete payment and performance when due (whether at stated maturity, by acceleration or otherwise) of all of its obligations under the Development and Option Agreement, and whether direct or indirect (including those acquired by assumption), absolute or contingent, due or to become due, now existing or hereafter arising and including interest and fees that accrue after the commencement by or against Arcturus of any proceeding under any bankruptcy or insolvency Law naming Arcturus as the debtor in such proceeding, regardless of whether such interest and fees are allowed claims in such proceeding, Arcturus hereby mortgages, pledges, assigns and hypothecates to CureVac, and grants to CureVac a Lien on and continuing security interest in, all the right, title and interest of Arcturus, in, to, and under the following property, wherever located, whether now owned or in the future acquired by Arcturus and whether now existing or in the future coming into existence owned by Arcturus (collectively, the "Collateral"):

(i) the Patents and Know-How set forth on Exhibit 1.3 of the Development and Option Agreement;

(ii) the LUNAR™ platform;

(iii) all other Arcturus Background Technology;

(iv) all other Arcturus Program Technology; and

(v) to the extent not otherwise included, all books, records, writings, data bases, information and other property relating to, used or useful in connection with, or evidencing, embodying, incorporating or referring to any of the foregoing, all claims and insurance proceeds arising out of the loss, nonconformity or any interference with the use of, or any defect or infringement of rights in, or damage to, any of the foregoing, and all proceeds, products, offspring, rents, issues, profits and returns of and from, and all distributions on and

rights arising out of, any of the foregoing;

provided that the Collateral shall not exceed the property to which CureVac has or may have rights to pursuant to the terms of the Development and Option Agreement.

For purposes of this Amendment, "Lien" means a pledge, lien, charge or security interest of any kind or nature.

(b) Notwithstanding anything herein to the contrary, in no event shall the Collateral include or the security interest granted under Section 3(a) attach to (i) any Collateral if and to the extent that a security interest therein is prohibited by or in violation of any Law applicable to Arcturus or (ii) any "intent-to-use" application for registration of a trademark or service mark filed pursuant to Section 1(b) of the Lanham Act, 15 U.S.C. § 1051, prior to the filing of a "Statement of Use" pursuant to Section 1(d) of the Lanham Act or an "Amendment to Allege Use" pursuant to Section 1(c) of the Lanham Act with respect thereto, solely to the extent, if any, that, and solely during the period, if any, in which, the grant of a security interest therein would impair the validity or enforceability of any registration that issues from such intent-to-use application under applicable Law and (ii) any Collateral if and to the extent that a grant of a security interest therein would violate or invalidate any lease, license or other agreement applicable thereto to which Arcturus is party as of the date of this Amendment or create a right of termination in favor of any other party thereto (after giving effect to the applicable anti-assignment provisions of the UCC or other applicable Law).

(c) Arcturus makes to CureVac each of the representations and warranties set forth on Part I of Schedule 2.

(d) Arcturus agrees that it will comply with each of the covenants set forth on Part II of Schedule 2.

(e) For the avoidance of doubt, Arcturus shall be permitted, subject to the security interest granted under Section 3(a), to license the Collateral and in connection therewith, CureVac shall acknowledge and respect such licenses in writing the rights of such licensees as reasonably requested by any licensee of the Collateral.

(f) CureVac may exercise from time to time any rights and remedies available to it under the UCC and under any other applicable Law.

SECTION 4. Additional Expenses. In consideration for the rights granted pursuant to Section 1 and Section 3 of this Amendment, CureVac agrees to perform the Work under the Work Plan as part of which CureVac will fund […***…] scientists per year at Arcturus for a period of […***…] months at the FTE Costs.

SECTION 5. Ratification of Agreement. Except as expressly provided in this Amendment, all of the terms, covenants, and other provisions of the Development and Option Agreement are hereby ratified and confirmed and shall continue to be in full force and effect in accordance with their respective terms. From and after the date hereof, all references to the Development and Option Agreement shall refer to the Development and Option Agreement as amended by this Amendment. Capitalized terms used but not defined in this Amendment shall have the meanings assigned to them in the Development and Option Agreement.

SECTION 6. Governing Law. This Amendment shall be governed by and construed in

accordance with the Laws of the State of New York, USA, without respect to its conflict of Laws rules. In the event of a dispute arising out of or relating to this Amendment, the provisions of Section 10.1 of the Development and Option Agreement shall govern the resolution of such dispute.

SECTION 7. Counterparts. This Amendment may be executed and in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this Amendment by either Party will constitute a legal, valid and binding execution and delivery of this Amendment by such Party.

[signature page follows]

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their respective duly authorized officers as of the date hereof.

CUREVAC AG

By: /s/ Dr. Florian von der Mülbe
Name: Dr. Florian von der Mülbe
Title: Chief Operating Officer

By: /s/ Dr. Mariola Fotin-Mleczek
Name: Dr. Mariola Fotin-Mleczek
Title: Chief Scientific Officer

ARCTURUS THERAPEUTICS INC.

By: /s/ Mark Herbert
Name: Mark Herbert
Title: Interim President

Schedule 1-A

Non-Exclusive License Agreement

See attached

Schedule 1-B

Exclusive License Agreement

Schedule 2

[…***…]

[…***…]

"Copyright Office" means the United States Copyright Office.

"IP Filing Office" means, as applicable, the Copyright Office, the PTO or any similar office or agency in any other IP Jurisdiction.

"IP Jurisdiction" means any jurisdiction creating or recognizing rights in intellectual property, including the United States, any state thereof, any foreign country or any subdivision thereof.

"PTO" means the United States Patent and Trademark Office.

Schedule 3

[…***…]

*****Confidential Treatment Requested**

Schedule 1-A

NON-EXCLUSIVE LICENSE AGREEMENT

by and between

CUREVAC AG

and

ARCTURUS THERAPEUTICS INC.

dated

May 3, 2018

Table of Contents

List of Appendices

Appendix 1.3	Description of the Arcturus LMD Technology
Appendix 1.4	Patents and Know-How within the Arcturus Technology as of the License Agreement Effective Date
Appendix 1.28	Joint Interest Patents
Appendix 1.51	Pre-Existing Prosecution, Enforcement and Defense Restrictions
Appendix 1.60	Description of the Target

License Agreement

This License Agreement ("License Agreement"), effective as of delivery of an Acceptance Notice in accordance with Section 5.1(b) of the Development and Option Agreement (as defined below) (the "License Agreement Effective Date"), is made by and between Arcturus Therapeutics Inc., a Delaware corporation ("Arcturus"), and CureVac AG, a German stock corporation with offices at Paul-Ehrlich-Strasse 15, 72076 Tuebingen, Germany ("CureVac"). Each of Arcturus and CureVac may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Arcturus has expertise and intellectual property relating to the development of LMD Technologies (as defined below) that embody or incorporate delivery systems (and components thereof) for molecular therapeutics based on or incorporating lipid-enabled and unlocked nucleomonomer platform for delivery of nucleic acids as specified in **Appendix 1.3**, the Arcturus LMD Technology; and

WHEREAS, CureVac has expertise and intellectual property relating to mRNA Constructs (as defined below); and

WHEREAS, Arcturus and CureVac are parties to that certain Development and Option Agreement (dated January 1, 2018, and amended as of May 3, 2018) (the "Development and Option Agreement") pursuant to which CureVac has options to take licenses under the Arcturus LMD Technology (as defined below) with respect to CureVac's mRNA Constructs; and

WHEREAS, pursuant to the terms of the Development and Option Agreement, CureVac has exercised an option to obtain a license pursuant to this Agreement with respect to the Target (as defined below) and the Parties are now entering into a licensing arrangement whereby CureVac will have a license under the Arcturus LMD Technology to develop and commercialize Licensed Products (as defined below) with respect to such Target.

WHEREAS, the Parties intend to also co-develop an ornithine transcarbamylase ("OTC") deficiency product and possibly other products under a separate co-development and co-commercialization agreement ("Co-Development Agreement").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions.

The following terms and their correlatives will have the following meanings:

1.1 "Affiliate" of a person or entity means any other entity which (directly or indirectly) is controlled by, controls or is under common control with such person or entity. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to an entity will mean (i) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast at least fifty percent (50%) of the votes in the election of directors or (ii) in the case of a non-corporate entity, direct or indirect ownership of at least fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity,

provided that if local Law restricts foreign ownership, control will be established by direct or indirect ownership of the maximum ownership percentage that may, under such local Law, be owned by foreign interests. […***…].

1.2 "Arcturus Indemnitees" has the meaning set forth in Section 9.6(a).

1.3 "Arcturus LMD Technology" means any and all LMD Technology for delivering RNA therapeutics that is Controlled by Arcturus or any of its Affiliates as of the Effective Date or during the Term, including the LUNAR™ platform, a description of which technology, as in existence as of the License Agreement Effective Date, is set forth on **Appendix 1.3**.

1.4 "Arcturus Technology" means any Patents and Know-How that are Controlled by Arcturus or any of its Affiliates as of the License Agreement Effective Date or during the Term and that are necessary or useful for the research, development, manufacturing and commercialization of Licensed Products. The Patents and Know-How comprised in the Arcturus Technology as of the License Agreement Effective Date are listed in **Appendix 1.4** hereto. Arcturus Technology shall include the Arcturus LMD Technology. Notwithstanding the foregoing, Arcturus Technology shall exclude

(a) any Patents and Know-How acquired by Arcturus after License Agreement Effective Date if Arcturus is required to make any payment to a Third Party in connection with the grant, maintenance or exercise of a sublicense to CureVac, unless CureVac agrees in writing to reimburse Arcturus for all such payments; *provided, however*, that such payments shall reduce CureVac's royalty obligations in accordance with Section 4.3(b),

(b) any Patents and Know-How of a Third Party (including its Affiliates) that becomes Arcturus' Affiliate after the License Agreement Effective Date as a results of a Change of Control, but only if and to the extent that it is not LMD Technology, and

(c) any Patents that CureVac elects to exclude pursuant to Section 2.3.

1.5 "Arcturus Technology Patent(s)" means any and all Patents comprised in the Arcturus Technology during the Term, unless otherwise set forth herein. For clarity, Arcturus Technology Patents include Arcturus' interest in the Joint Interest Patents.

1.6 "Business Day" means a day other than a Saturday, Sunday, or bank or other public holiday in San Diego, California, USA or Tübingen, Germany or Boston, Massachusetts, USA.

1.7 "cGMP" means current Good Manufacturing Practices as specified in the U.S. C.F.R., ICH Guideline Q7A, or equivalent Laws of an applicable Regulatory Authority at the time of manufacture.

1.8 "Calendar Quarter" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

1.9 "Change of Control" with respect to Arcturus, shall be deemed to have occurred if during the Term (i) any person or entity is or becomes the "beneficial owner", directly or indirectly, of shares of capital stock or other interests (including partnership interests) of Arcturus then outstanding and normally entitled (without regard to the occurrence of any contingency) to vote in the election of the directors, managers or similar supervisory positions of Arcturus representing fifty percent (50%) or more of the total voting power of all outstanding classes of voting stock of Arcturus or has the power, directly or indirectly, to elect a majority of the members of Arcturus' board of directors, or similar governing body; or (ii) Arcturus enters into a merger, consolidation or similar transaction with another person or entity; or (iii) Arcturus sells or transfers to any Third Party, in one (1) or more related transactions, properties or assets representing all or substantially all of Arcturus' consolidated total assets to which this License Agreement relates, *provided however*, that:

(a) subsections (i) to (iii) shall only apply if the person or entity or Third Party acquiring control is (i) a pharmaceutical company which has experience in developing and commercializing pharmaceutical products (*i.e.*, is a strategic, not financial investor or partner) or (ii) a competitor, i.e., a company whose business consists principally of mRNA development, manufacturing and/or commercialization, and

(b) a bona fide financing transaction with Third Parties that does not otherwise meet the requirements of subsection (a) shall not constitute a Change of Control.

1.10 "Combination Product" means a Licensed Product that includes at least one additional active pharmaceutical ingredient other than LMDs, mRNA Constructs, and other RNAs (i.e., Guide RNA(s)) or DNA Sequence(s). Drug delivery vehicles, adjuvants, and excipients shall not be deemed to be "active ingredients", except in the case where such delivery vehicle, adjuvant, or excipient is recognized as an active ingredient in accordance with 21 C.F.R. 210.3(b)(7) or equivalent Laws in other jurisdictions, *provided however*, should LMDs comprised in a Licensed Product be characterized as "active ingredients" at any time during the Term, such LMDs will not be considered an "active ingredient" for the purposes of this definition.

1.11 "Confidential Information" of a Party means all proprietary Know-How, unpublished patent applications and other non-public information and data of a financial, commercial, business, operational, scientific or technical nature of such Party that is disclosed by or on behalf of such Party or any of its Affiliates or otherwise made available to the other Party or any of its Affiliates, whether made available orally, in writing or in electronic form in connection with this License Agreement, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in connection with this License Agreement. In addition, any non-public information related to this License Agreement or the Licensed Products hereunder and disclosed by a Party to the other Party (or their respective Affiliates) under the Development and Option Agreement will be deemed such Party's Confidential Information hereunder. Technology will be considered the Confidential Information of the Party (or Parties) owning such Technology, and jointly-owned Technology will be considered Confidential Information of both Parties.

1.12 "Control" or "Controlled" means with respect to Technology, a Party owns or has a license to use and practice the respective Patent or Know-How without violating the terms of any agreement with any Third Party.

1.13 "CTA" means a clinical trial application.

1.14 "CureVac Indemnitees" has the meaning set forth in Section 9.6(b).

1.15 "Development and Option Agreement" has the meaning set forth in the Preamble.

1.16 "Diligent Efforts" means, with respect to the efforts to be expended by each Party with respect to the activities of a Party pursuant to this Agreement, active and sustained efforts to conduct the applicable activity, or to attempt to achieve the applicable requirement or goal, in a prompt and expeditious manner, as is reasonably practicable under the circumstances (including the level of FTE funding and budget for out-of-pocket and Third Party contractors set forth therein) and the terms of this Agreement.

1.17 "Disclosing Party" has the meaning set forth in Section 8.1

1.18 "Field of Use" means the treatment and diagnosis of all diseases and conditions.

1.19 "First Commercial Sale" means the first sale for use or consumption of any Licensed Product in a country after all required Regulatory Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.20 "FTE" means a full-time person, or more than one person working the equivalent of a full-time person, where "full-time" is determined by the standard practices in the biopharmaceutical industry in the geographic area in which such personnel are working, consisting of a total of 1880 hours per year of work on the applicable activities. Any person who devotes less than 1880 hours per year on the applicable activities shall be treated as an FTE on a pro-rated basis, based upon the actual number of hours worked by such person on such activities, divided by 1880. Any person who devotes more than 1880 hours per year on the applicable activities shall be treated as one (1) FTE, i.e., in no event shall one person be counted as more than one FTE. FTE activities shall include the performance of the applicable activities and scientific management oversight, as reasonably required, but, for clarity, exclude (i) the work of general corporate or administrative personnel, overhead (including facilities costs), insurances and similar costs.

1.21 "FTE Costs" means an initial rate of […***…] Dollars ($[…***…]) per FTE per year, which shall apply through December 31, 2019. Thereafter, the FTE Rate shall be changed bi-annually at the end of each second calendar year to reflect any percentage increase or decrease (as the case may be) in the Consumer Price Index in the U.S. (index for all items) ("**CPI**") (based on the change in the CPI from the most recent index available as of the Effective Date to the most recent index available as of the date of the calculation of such revised FTE Cost rate).

1.22 "IND" means an investigational new drug application, or equivalent application or submission for approval to conduct human clinical trials.

1.23 "Indemnification Claim Notice" has the meaning set forth in Section 9.6(c).

1.24 "Indemnified Party" has the meaning set forth in Section 9.6(c).

1.25 "Indication" means an individual disease or clinical condition with respect to which at least one adequate and well controlled study is required to support inclusion of such

disease or condition in the indication statement of an FDA approved package insert for a Licensed Product.

1.26 "Initiation" means in connection with a clinical trial in any of its phases 1 through 3 the first dosing of the fifth patient or fifth healthy subject.

1.27 "Inventions" has the meaning set forth in Section 5.1.

1.28 "Joint Interest Patents" means the Patents generated under the Development and Option Agreement and jointly owned by the Parties. Such Joint Interest Patents are listed in **Appendix 1.28** hereto, as amended from time to time.

1.29 "Know-How" means all commercial, technical, scientific and other know-how and information, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols), in all cases, provided it is confidential and proprietary, and regardless of whether patentable, in written, electronic or any other form now known or hereafter developed.

1.30 "Late Stage Development" means Development after the Initiation of a Phase 3 Study.

1.31 "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments, or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.32 "License Agreement" has the meaning set forth in the Preamble.

1.33 "License Agreement Effective Date" has the meaning set forth in the Preamble.

1.34 "Licensed Product" means […***…] product comprised of (i) LMD systems, which are covered by Arcturus LMD Technology; and containing (ii) one or more mRNA Constructs as the active pharmaceutical ingredient(s) intended to express the Target. In case of two or more mRNA Constructs these constructs may be contained in the same or separate LMDs. Licensed Product includes mRNA-LMD products which are administered jointly or separately, and mRNA-LMD products which are administered simultaneously or sequentially as a combination medicinal product or treatment. For Gene Editing purposes a Licensed Product may contain other RNA(s) (i.e., Guide RNA(s)) and/or DNA Sequence(s) which can be delivered together or separately (combined in one LMD or delivered in separate LMDs), in addition to the one or more mRNA Constructs intended to express the DNA Editing Protein.

1.35 "LMD Technology" means Technology Controlled by Arcturus that claims, embodies or incorporates delivery systems (and components thereof) based on or incorporating lipid-mediated delivery (LMD) systems.

1.36 "Losses" has the meaning set forth in Section 9.6(a).

1.37 "Materials" means any tangible chemical or biological material, including any compounds, LMD, DNA, RNA (including mRNA), clones, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How, Controlled by Arcturus.

1.38 "mRNA Construct" means any mRNA construct for the expression of a protein, including the sequence of such construct (which potentially comprises one (1) or more of a cap, 5' UTR, the associated open reading frame, 3'UTR and a poly A tail), the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such construct, such mRNA Construct being covered by mRNA Technology.

1.39 "mRNA Technology" means Technology Controlled by CureVac that claims, embodies or incorporates expression systems (and components thereof), based on or incorporating mRNA.

1.40 "Milestones" means the milestones payable pursuant to Section 4.1.

1.41 "Milestone Event" has the meaning set forth in Section 4.1.

1.42 "Milestone Payment" has the meaning set forth in Section 4.1.

1.43 "Net Sales" means, with respect to any Licensed Product, the gross amount received by CureVac and its Affiliates and Sublicensees for *bona fide* sales of such Licensed Product to a Third Party (other than Affiliates and Sublicensees but including distributors for resale), less deductions, in each case to the extent reasonable, customary, actually allowed and taken in connection with the sale of such Licensed Product and not otherwise recovered or reimbursed:

(a) discounts (including cash, quantity and patient program discounts), retroactive price reductions, commissions, charge-back payments and rebates granted to managed health care organizations or to federal, state and local governments, their agencies, and purchasers and reimbursers or to trade customers;

(b) credits or allowances actually granted upon claims, damaged goods, rejections or returns of, such Licensed Product and not in excess of the selling price of such Product, including such Licensed Product returned in connection with recalls or withdrawals;

(c) freight out, postage, shipping and insurance charges for delivery of such Licensed Product;

(d) taxes or duties levied on, absorbed or otherwise imposed on the sale of such Licensed Product, including value-added taxes, or other governmental charges otherwise imposed upon the billed amount, as adjusted for rebates and refunds; and

(e) wholesaler and distributor administration fees

(f) other customary deductions taken in the ordinary course of business in accordance with IFRS (International Financial Reporting Standards) principles.

If a single item falls into more than one of the above categories above, such items will not be deducted more than once.

Net Sales shall not include any payments among CureVac, its Affiliates and Sublicensees. Net Sales shall be determined in accordance with generally accepted accounting principles, consistently applied across all products. Net Sales for any Combination Product shall be calculated on a country-by-country basis by multiplying actual Net Sales of such Combination Product by the fraction A/(A+B), where A is the weighted average price paid for the Licensed Product contained in such Combination Product sold separately in finished form in such country, and B is the weighted average invoice price paid for the other active ingredients contained in such Combination Product sold separately in finished form in such country, if such Licensed Product and such other active ingredients are each sold separately in such country.

If such other active ingredients are not sold separately in such country, then Net Sales for such Combination Product shall be calculated on a country-by-country basis by multiplying actual Net Sales of such Combination Product by the fraction A/C, where C is the weighted average invoice price paid for such Combination Product in such country. If such Licensed Product is not sold separately in finished form in such country, Net Sales for such Licensed Product will be determined by CureVac's good faith estimate of the relative contribution of such Licensed Product and each such other active ingredients in such Combination Product, and shall take into account in good faith any applicable allocations and calculations that may have been made for the same period in other countries.

1.44 "Non-Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of equal to or more than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Non-Rare Disease Target.

1.45 "Patent(s)" means (a) an issued patent, a patent application, and a future patent issued from any such patent application, (b) a future patent issued from a patent application filed in any country worldwide which claims priority from a patent or patent application of (a), and (c) any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, utility models, supplementary protection certificates and renewals based on any patent or patent application under (a) or (b), but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder)

1.46 "Patent Costs" means the reasonable, documented, out-of-pocket costs and expenses paid to outside legal counsel, and filing and maintenance expenses, actually and reasonably incurred by a Party in prosecuting and maintaining Patents with respect to Licensed Products and enforcing and defending them.

1.47 "Phase 1 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(a) or corresponding foreign regulations.

1.48 "Phase 2 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(b) or corresponding foreign regulations.

1.49 "Phase 3 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(c) or corresponding foreign regulations.

1.50 "Pre-Existing Licensing Restrictions" means, with respect to the Target, that Arcturus or its Affiliates have granted to a Third Party with respect to the Target a non-exclusive, co-exclusive or an exclusive license or option pursuant to a *bona fide* written agreement that is in effect at the time of the submission of the Acceptance Notice by CureVac pursuant to Section 5.1(b) of the (amended) Development and Option Agreement.

1.51 "Pre-Existing Prosecution, Enforcement and Defense Restrictions" means, with respect to the Target, those certain prosecution, enforcement and defense rights granted by Arcturus or its Affiliates to a Third Party(ies) with respect to the Patents pursuant to the *bona fide* written agreement(s) set forth on **Exhibit 1.51** hereto as such *bona fide* written agreement(s) were in effect as of the Effective Date of the Development and Option Agreement. For clarity, the exercise of such foregoing rights by a Third Party with respect to Patents that are not specific to the Target or Licensed Products shall be deemed a Pre-Existing Prosecution, Enforcement and Defense Restriction.

1.52 "Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of less than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Rare Disease Target.

1.53 "Receiving Party" has the meaning set forth in Section 8.1.

1.54 "Regulatory Approval" means, with respect to a country or extra-national territory, any and all approvals (including BLAs and MAAs), licenses, registrations or authorizations of any Regulatory Authority necessary in order to commercially distribute, sell or market a product in such country or some or all of such extra-national territory, including solely to the extent required as a condition to commercial sale to end users, any pricing or reimbursement approvals.

1.55 "Regulatory Authority" means any national (e.g., the FDA), supra-national (e.g., the EMA), regional, state or local regulatory agency, department, bureau, commission, council or other governmental authority, in any jurisdiction in the world, involved in the granting of Regulatory Approval.

1.56 "Royalty Reduction" has the meaning set forth in Section 4.3(b).

1.57 "Royalty Term" has the meaning set forth in Section 4.3(d).

1.58 "Sublicensee" means any Third Party that is granted a sublicense as permitted by Section 2.2, either directly by CureVac or its Affiliates or indirectly by any other Sublicensee hereunder.

1.59 "Sublicense Income" means the fees and other payments, including upfront payments as well as development, regulatory milestone payments received by CureVac or its Affiliates from a Sublicensee, excluding: (a) royalty payments and net sales milestones; (b) reimbursement of costs and expenses, including for patent prosecution and enforcement and

(c) equity or premium on equity and (d) loans or loans forgiven either (i) as a result of financial distress of the borrower or (ii) that are not specific to the Licensed Product.

1.60 "Target" means the Target identified in **Appendix 1.60** hereto. The Target includes

(a) up to N (N= […***…]) proteins, including all possible combinations resulting from removing one of the N proteins (N minus […***…] proteins), together with all variants of such proteins, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof; *provided*, *however*, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring protein; and

(b) […***…] antigens of a given pathogen, including […***…] antigen and any combination of such antigens, together with all variants of such antigens, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof, *provided*, *however*, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring antigen; and

(c) a DNA Target, *provided*, *however*, that the first DNA Target for each DNA Editing Protein would not count as a Target. Each subsequent DNA Target for this DNA Editing Protein would count as a Target. For clarity, a DNA Editing Protein would be defined as a Target under (a) above and count as a single Target.

If a given protein, *e.g.*, an antibody or enzyme, comprises separated amino acid chains which might be delivered by separated mRNA Constructs, such proteins would be defined as one Target.

1.61 "Technology" means collectively Patents and Know-How.

1.62 "Term" has the meaning set forth in Section 10.1.

1.63 "Territory" means worldwide.

1.64 "Third Party" means any person or entity other than CureVac, Arcturus and their respective Affiliates.

1.65 "Third Party Claims" has the meaning set forth in Section 9.6(a).

1.66 "Valid Claim" means a claim of

(a) an issued and unexpired patent (as may be extended through supplementary protection certificate or patent term extension) or

(b) a pending patent application, *provided*, *however*, that once the priority date or earliest filing date to which the pending patent application refers is more than seven years old, such claim shall not constitute a Valid Claim for purposes of this License Agreement anymore, unless and until a patent issues with such claim

included in the Arcturus Technology Patents, which claim has not been revoked, held invalid or unenforceable by a patent office, court or other governmental agency of competent jurisdiction in a final and non-appealable decision (or decision from which no appeal was taken within the allowable time period) and has not been disclaimed, denied, abandoned or admitted to be invalid or unenforceable through reissue, re-examination or disclaimer or otherwise.

2. License Grants; Technology Transfer.

2.1 Licenses by Arcturus. Subject to the terms and conditions of this License Agreement, Arcturus hereby grants to CureVac a non-exclusive license, with the right to sublicense in multiple tiers under the Arcturus Technology Patents and the Arcturus Know-How, in each case solely to develop, have developed, make, have made, use and have used, sell, offer for sale, have sold and import and have imported Licensed Products in the Field of Use in the Territory. Arcturus covenants that, except as required by the Pre-Existing Licensing Restriction, Arcturus will not grant to any Third Party any additional licenses under the Arcturus Technology to develop, have developed, make, have made, use and have used, sell, offer for sale, have sold and import and have imported Licensed Products (or any LMD Product directed to the Target) in the Field of Use in the Territory.

2.2 Sublicensing Rights.

(a) *CureVac Sublicenses*. The licenses granted in Section 2.1 may be sublicensed (with the right to sublicense through multiple tiers), in full or in part, by CureVac, its Affiliates or Sublicensees to CureVac's Affiliates and Third Parties provided, that for any sublicense:

(i) Each sublicense will be in writing (*provided, however*, that not each sublicense to Affiliates must be in writing) and on terms consistent with and subject to the terms of this License Agreement, including but not limited to the limitations on patent prosecution, enforcement and defense rights of such Sublicensee as set forth in Sections 6.1(d) and 7.2(a);

(ii) CureVac will be responsible for any and all obligations of such Sublicensee (including Affiliates and Sublicensees) as if such Sublicensee were CureVac hereunder;

(iii) CureVac provide to Arcturus a copy of such sublicense agreement within thirty (30) days of execution (which copy may be redacted for terms that are not otherwise required to confirm conformance with the terms of this License Agreement); and

(iv) Any sublicense granted by CureVac (and any further sublicenses) to any rights licensed to it hereunder shall terminate immediately upon the termination of this License Agreement, provided that for sublicense to a Third Party, such sublicensed rights shall not terminate if, as of the effective date of such termination pursuant to Sections 10.2, 10.3(a) or 10.4, such Sublicensee is not in material default of its obligations under its sublicense agreement, and within […***…] days of such termination and the disclosure of this License Agreement to

the Sublicensee, the Sublicensee agrees in writing to be bound directly to Arcturus under a license agreement substantially similar to this License Agreement with respect to the rights sublicensed hereunder, substituting such Sublicensee for CureVac.

(b) *Subcontractors.* For clarity purposes, CureVac is entitled to engage contract research organizations and contract manufacturing organizations for the development and manufacture of Licensed Products on behalf of CureVac. To the extent such contract organizations require a license to perform such subcontracted activities under applicable Laws, CureVac is entitled to grant a limited license solely to perform the work for which the subcontractor is engaged, without an obligation to meet the conditions of Section 2.2 (a) (iii).

(c) *Technology Transfer.* Following the License Agreement Effective Date, Arcturus will use Diligent Efforts to transfer the formulation process for the Licensed Products that are intended to express the Target to CureVac or a reputable and competent GMP manufacturer selected by CureVac and reasonably acceptable to Arcturus. Upon written request by CureVac, Arcturus will conduct a technology transfer to CureVac and/or its designee(s). Arcturus will make its personnel available without charge for a total of […***…] hours during normal working hours for such transfer, and for additional hours in excess of […***…] up to a total of […***…] hours to be invoiced monthly at the then current FTE Cost. Such designee(s) may be an Affiliate, sublicensee or Third Party manufacturers selected by CureVac and reasonably acceptable to Arcturus, and which Third Party manufacturers may also be a backup manufacturer or a second manufacturer of Licensed Products as required for the applicable transferee of the then-current process. CureVac shall reimburse Arcturus for the reasonable cost (including internal FTE Cost) incurred to conduct such technology transfer as specified above.

2.3 Updates to Appendix 1.4; Exclusion of Certain Patents. Arcturus shall notify CureVac at least once every […***…] months of Patents that are added to the Arcturus Technology following the License Agreement Effective Date or any Patents that have been abandoned or discontinued in accordance with the terms of this License Agreement**. Appendix 1.4** shall be deemed automatically updated to include any such added Patents, provided that with written notice to Arcturus, CureVac may elect upon […***…] days' irrevocable written notice to Arcturus to exclude any particular Arcturus Technology Patents. Following any such written notice by CureVac, upon the expiration of the notice period the identified Arcturus Technology Patents that CureVac specifies for exclusion from this License Agreement will no longer be licensed to CureVac hereunder, and CureVac shall not have any rights (including rights pursuant to this Agreement) under such Arcturus Technology Patents nor obligations hereunder with respect to such Arcturus Technology Patents. For clarity, in the event that the Licensed Product is subsequently determined to be covered or otherwise infringe a Valid Claim of any excluded patent hereunder, then such infringement shall be deemed to be a material breach of this License Agreement by CureVac.

2.4 Documents and Declarations. At CureVac's reasonable request and cost and expense, Arcturus shall execute all documents, deliver declarations regarding the licenses granted hereunder, and Arcturus shall reasonably cooperate with CureVac to the extent such documents, declarations and/or cooperation are required to give effect to this License Agreement and/or for the recording or registration of the licenses granted hereunder at the

various patent offices in the Territory for the benefit of CureVac, its Affiliates or their Sublicensees.

2.5 Diligence; Reporting. CureVac shall use Diligent Efforts to develop, manufacture and commercialize Licensed Products in the Field of Use in the Territory, and shall keep Arcturus reasonably informed as to the progress and results of its and its Affiliates' and Sublicensees' development, manufacture and commercialization of the Licensed Product. Without limiting the foregoing, CureVac shall provide Arcturus with a written report of the development, manufacture and commercialization of the Licensed Product within […***…] days after the end of each calendar year, and shall promptly respond to Arcturus reasonable questions or requests for additional information relating to such activities.

2.6 Compliance. CureVac shall at all times comply with all applicable Laws (including anti-bribery laws) in the development, manufacture and commercialization of the Licensed Product and the performance of its other obligations under this License Agreement, and shall not use any employee or consultant who has been debarred by any Regulatory Authority or, to CureVac's knowledge, is the subject of debarment proceedings by a regulatory authority.

2.7 Updates. Arcturus shall inform CureVac within […***…] Business Days of intellectual property matters affecting the Arcturus Technology Patents and the Arcturus Know-How of which it becomes aware that would reasonably be considered to negatively impact the rights of CureVac pursuant to this Agreement.

2.8 Material. CureVac shall have the right to retain Material provided by Arcturus under the Development and Option Agreement, to the extent such Material is necessary or useful for the exercise of a CureVac's rights or obligations under this License Agreement. Following the License Agreement Effective Date, only the provisions of this License Agreement, but not of the Development and Option Agreement, shall apply in relation to such Material.

3. License Limitations.

3.1 Reserved Rights. No licenses or other rights are granted by Arcturus hereunder to use any trademark, trade name, trade dress or service mark owned or otherwise Controlled by Arcturus or any of its Affiliates. All licenses and other rights are or shall be granted only as expressly provided in this License Agreement, and no other licenses or other rights is or shall be created or granted by either Party hereunder by implication, estoppel or otherwise. CureVac shall not, and shall not permit any of its Affiliates or Sublicensees to, practice or use any Arcturus Technology outside of the scope of the license granted to it under Section 2.1 or in contravention of Section 3.1. Arcturus retains the exclusive right to practice, license and otherwise exploit the Arcturus Technology outside the scope of the licenses granted to CureVac under Section 2.1 and in an event to practice any rights that are not exclusive pursuant to Section 2.1.

3.2 Other Licenses. Arcturus acknowledges the rights granted to CureVac pursuant to this Agreement and shall not grant licenses under Arcturus Technology to Third Parties that are in conflict with this License Agreement it being understood that a license to enable or implement any Pre-

Existing Licensing Restriction with respect to the Target shall not be deemed a conflict hereunder. In addition, Arcturus shall use Diligent Efforts to undertake that any licenses obtained from Third Parties will be sublicensable to CureVac, to the extent required or useful for the Licensed Product, provided that CureVac shall be responsible for an allocable portion of the payment and obligations that may be required in order to obtain rights with respect to the Licensed Product pursuant to such Third Party agreement.

4. Payments and Royalties.

4.1 Milestone Payments. CureVac will make milestone payments (each, a "Milestone Payment") to Arcturus upon the first occurrence of each of the milestone events (each, a "Milestone Event") by Licensed Product as set forth below in this Section 4.1. CureVac will notify Arcturus of the achievement of each Milestone Event (whether achieved by CureVac, its Affiliates or Sublicensees) within (i) […***…] Business Days of such achievement, if the Milestone Event is achieved by CureVac or its Affiliates, or (ii) […***…] Business Days of the receipt by CureVac of a notification about the achievement, if the Milestone Event is achieved by a Sublicensee.

Each Milestone Payment will be non-refundable, non-creditable and payable to Arcturus by CureVac within […***…] days of delivery of an invoice from Arcturus following notification from CureVac pursuant to the preceding paragraph, provided that if no such notification is timely provided by CureVac, the Milestone Payment shall be deemed payable […***…] days after (A) the achievement of such Milestone Event, if the Milestone Event is achieved by CureVac or its Affiliates, or (B) after the receipt by CureVac of the notification from CureVac pursuant to Section 4.1(ii). For clarity, the term “non-refundable” is not intended to limit either Party’s rights to pursue damages arising from a breach of this Agreement.

If one or more of the Milestone Events set forth below are not achieved or not required for any reason, the payment for such skipped Milestone Event will be due at the same time as the payment for the next achieved Milestone Event. For clarity: […***…].

For clarity, to the extent that a Licensed Product is initiated against a Rare Disease Target and later expanded to a non-Rare Disease Target, then any and all Milestone Payments not previously made shall be due and payable upon the achievement of the next non-Rare Disease Milestone (e.g., […***…]).

Milestone Event	*Milestone Payment*
Rare Disease Targets	
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
Non-rare Disease Targets	
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

4.2 Sublicensing Revenues. If within twenty-four (24) months after the License Agreement Effective Date CureVac grants a sublicense to a Third Party under this License Agreement for the development and commercialization of Licensed Products, then CureVac will pay to Arcturus […***…] of all Sublicense Income actually received by CureVac, to the extent the Sublicense Income exceeds the Option Exercise Fee paid by CureVac under the Development and Option Agreement to exercise the Option for this License Agreement and the Milestone Payments paid by CureVac under this License Agreement. The payments will be made within […***…] days after receipt by CureVac from the Third Party. For purposes of clarity, if CureVac grants a sublicense to Third Parties later than […***…] months after the License Agreement Effective Date, CureVac will not owe any Sublicensing Income to Arcturus.

4.3 Royalties.

(a) *Royalty*. Subject to the remainder of this Section 4.3, on a country-by-country basis and a Licensed Product-by-Licensed Product basis, CureVac will pay to Arcturus (i) a royalty of […***…] of Net Sales of the Licensed Product (ii)

as well as of any net sales milestones (without offset for any reductions pursuant to Section 4.3(b)) for such Licensed Product received from the Sublicensee.

(b) *Third Party Payments and Royalty Reductions*. If CureVac or its Affiliate or Sublicensee, in its reasonable judgment, considers it necessary or useful to obtain a license from any Third Party under any LMD Technology that Covers a Licensed Product in order to develop, manufacture or commercialize such Licensed Product, the amount of CureVac's royalty obligations under Sections 4.3(a) will be reduced by […***…] of the amount of the upfront, milestone and royalty payments made to such Third Party on account of the development, manufacture or commercialization of such Licensed Product ("Royalty Reductions"), *provided, however*, that any Royalty Reduction shall not result in less than the minimum royalty due to Arcturus under Section (c) below.

(c) *Minimum Royalty.* In no event will the Royalty payable by CureVac to Arcturus for any Licensed Product be less than (i) […***…] if the reduction in subsection (e) does not apply; or (ii) […***…] if the reduction in subsection (e) also applies.

(d) *Term*. The royalty term ("Royalty Term") shall expire on a country-by-country and Licensed Product-by-Licensed Product basis, on the last to occur of (i) expiration of the last to expire Valid Claim in the Arcturus Technology that, but for the license described herein from Arcturus to CureVac for the applicable Licensed Product, is infringed by the making, using or sale of such Licensed Product, (ii) expiration of any period of data exclusivity, market exclusivity or supplemental protection certificates covering the Licensed Product in such country; and (iii) […***…] years after First Commercial Sale of Licensed Product in such country. For the avoidance of doubt, upon exhaustion of the obligation to pay Royalties to Arcturus as set forth above the continued use of Arcturus Know-How comprised in the Arcturus Technology for the development, manufacture and/or sale of th**e** Licensed Product shall not, in and of itself, obligate CureVac to pay further royalties to Arcturus. Thereafter, CureVac's license under Section 2.1 will become irrevocable, perpetual, fully paid-up and royalty-free on a country-by-country and Licensed Product-by-Licensed Product basis.

(e) *Know-How Royalty.* On a country-by-country, and a Licensed -Product-by-Licensed Product basis, in the event that during the Royalty Term a Licensed Product is not covered by a Valid Claim, the royalty otherwise payable for such Licensed Product, after the Royalty Reductions above, will be reduced by […***…].

4.4 Payment Terms.

(a) *Manner of Payment*. All payments to be made by CureVac hereunder will be made in U.S. dollars by wire transfer to such bank account as Arcturus may designate.

(b) *Records and Audits*. CureVac shall keep, and shall cause each of its Affiliates and Sublicensees, as applicable, to keep adequate books and records of accounting for the purpose of calculating all royalties and other amounts payable to Arcturus hereunder. For the […***…] years next following the end of the calendar

year to which each shall pertain, such books and records of accounting (including those of CureVac's Affiliates and Sublicensees) shall be kept at each of their principal places of business and shall be open for inspection at reasonable times and upon reasonable notice by an independent certified accountant selected by Arcturus, and which is reasonably acceptable to CureVac, for the sole purpose of inspecting the Net Sales calculations and supporting details to the extent reasonably necessary and resulting royalties and other amounts due to Arcturus under this License Agreement. In no event shall such inspections be conducted hereunder more frequently than once every […***…] months. Such accountant must have executed and delivered to CureVac and its Affiliates, a confidentiality agreement as reasonably requested by CureVac, which shall include provisions limiting such accountant's disclosure to Arcturus to only the results and basis for such results of such inspection. The results of such inspection, if any, shall be binding on both Parties. Any underpayments plus interest from the original due date shall be paid by CureVac within […***…] days of notification of the results of such inspection. Any overpayments shall be fully creditable against amounts payable in subsequent payment periods. Arcturus shall pay for such inspections, except that in the event there is any upward adjustment in aggregate royalties and other amounts payable for any calendar year shown by such inspection of more than […***…] of the amount paid, CureVac shall reimburse Arcturus for any reasonable out-of-pocket costs of such accountant.

(c) *Reports and Royalty Payments*. For as long as royalties are due under Section 4.3, CureVac shall furnish to Arcturus written reports.

(i) Reports shall be provided within […***…] days of (1) the end of the Calendar Quarter if Net Sales are generated by CureVac and its Affiliates, and (2) the receipt of corresponding information (which may be estimated) from Sublicensees but in any event within […***…] days of the end of the Calendar Quarter with respect to Net Sales generated by such Sublicensees.

(ii) Royalty payments for each Calendar Quarter shall be due within […***…] Business Days of delivery of an invoice from Arcturus following submission of a royalty report from CureVac, but only subject to the prior receipt by CureVac of the corresponding royalty payment from the Sublicensee, if applicable; however such royalty payments due to Arcturus shall not be reduced by deductions which exceed those covered by the Net Sales definition according to Section 1.43.

(iii) The report shall include, at a minimum, the following information for the applicable Calendar Quarter for each Licensed Product if Net Sales are generated by CureVac and its Affiliates: (i) the gross sales by country reasonably required for the calculation of royalty payments due according to this Agreement, (ii) the calculation in reasonable detail of the Net Sales from such gross sales amounts, including the deductions pursuant to the definition of Net Sales and the amounts of any credits or reductions permitted by Section 4.2; and (iii) the computations for any Arcturus currency conversions pursuant to subsection (d) below.

(iv) CureVac will require each Sublicensee to share with Arcturus the information listed in the foregoing clauses as it relates to Net

Sales made by such Sublicensee, and to the extent practicable, will include such Sublicensee information in such report; provided that the level of detail with respect to the items subject to report pursuant to Section 4.4(c)(iii) shall be limited to the information that CureVac actually receives from any such Sublicensee. All such reports shall be considered the Confidential Information of CureVac, subject to Section 4.4(b).

(d) *Currency Exchange*. With respect to Net Sales invoiced in U.S. dollars, the Net Sales and the amounts due to Arcturus hereunder will be expressed in U.S. dollars. With respect to Net Sales invoiced in a currency other than U.S. dollars, payments will be calculated based on the average of the closing exchange rates reported by the Wall Street Journal (*http://quotes.wsj.com/fx/EURUSD*), or such other source as the Parties may agree in writing, of the applicable reporting period for the payment due.

(e) *Taxes*. CureVac may withhold from payments due to Arcturus amounts for payment of any withholding tax that is required by Law to be paid to any taxing authority with respect to such payments. CureVac will provide Arcturus all relevant documents and correspondence, and will also provide to Arcturus any other cooperation or assistance on a reasonable basis as may be necessary to enable Arcturus to claim exemption from such withholding taxes and to receive a refund of such withholding tax or claim a foreign tax credit. CureVac will give proper evidence from time to time as to the payment of any such tax. The Parties will cooperate with each other in seeking deductions under any double taxation or other similar treaty or agreement from time to time in force. CureVac shall use Diligent Efforts to minimize withholding taxes. In the event that any tax deduction or withholding obligation arises or increases as a direct result of any reincorporation, redomiciliation, change in source of payments under this Agreement or other similar corporate structuring actions undertaken by CureVac from and after the License Agreement Effective Date, then CureVac shall increase the payment (in respect of which such deduction or withholding of tax is required to be made) to ensure that Arcturus receives an amount equal to the amount that it would have received had no such action occurred. Apart from any such permitted withholding and those deductions expressly included in the definition of Net Sales, the amounts payable by CureVac to Arcturus hereunder will not be reduced on account of any taxes, charges, duties or other levies. Each Party shall be solely responsible for the payment of all taxes imposed on its share of income arising directly or indirectly from the activities of the Parties under this License Agreement.

(f) *Blocked Payments*. In the event that, by reason of applicable law in any country, it becomes impossible or illegal for CureVac or its Affiliates or Sublicensees to transfer, or have transferred on its behalf, payments owed to Arcturus hereunder, CureVac will promptly notify Arcturus of the conditions preventing such transfer and such payments will be deposited in local currency in the relevant country to the credit of Arcturus in a recognized banking institution proposed by Arcturus and reasonably acceptable to CureVac or, if none is proposed by Arcturus within a period of […***…] days, in a recognized banking institution selected by CureVac or its Affiliate or Sublicensee, as the case may be, and identified in a written notice given to Arcturus.

(g) *Interest Due*. If any payment due to Arcturus under this License Agreement is overdue (and is not subject to a good faith dispute), then CureVac will

pay interest thereon (before and after any judgment) at an annual rate of the lesser of […***…] above the prime rate as reported in The Wall Street Journal, Eastern Edition, and the maximum rate permitted by applicable Law, such interest to run from the date upon which payment of such sum became due until payment thereof in full together with such interest.

(h) *Mutual Convenience of the Parties*. The royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying royalties and other amounts to Arcturus.

5. Ownership and Inventorship of IP.

5.1 Solely-Owned IP. As between the Parties and subject to Section 5.3, each Party will own and retain all right, title and interest in and to any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice under or in connection with this License Agreement (the "Inventions") solely by or on behalf of such Party. Subject to the licenses hereunder and the other terms and conditions of this License Agreement or any other agreement between the Parties, each Party will be solely responsible for the prosecution and maintenance, and the enforcement and defense, of its solely-owned Patents.

5.2 Inventorship. Inventorship of all Inventions shall be determined in accordance with applicable laws. Each Party will ensure that each employee, consultant and subcontractor conducting any activities under this License Agreement on behalf of such Party will be subject to written agreements to assign to such Party all of its right, title and interest in and to the Inventions so that such Party can comply with its obligations with respect to the ownership allocation of the Inventions as set forth below. In addition, each Party shall be solely responsible for payments that may be required to any of such Party's employees or consultants and subcontractors in connection with or with respect to such agreements, including moral rights payments.

5.3 Ownership. Notwithstanding inventorship in the first instance pursuant to Section 5.2, ownership of all Inventions, as between the Parties, will be assigned by the Parties as follows: (a) Arcturus will solely own all Inventions that are improvements solely to the LMD Technology ("LMD Inventions"), and (b) CureVac will solely own all Inventions that are improvements solely to the mRNA Technology ("mRNA Inventions"). Specifically, CureVac hereby assigns to Arcturus all of its right, title and interest in and to any and all LMD Inventions, and agrees to take such actions reasonably requested by Arcturus to evidence such assignment. Arcturus hereby assigns to CureVac all of its right, title and interest in and to any and all mRNA Inventions, and agrees to take such actions reasonably requested by CureVac to evidence such assignment. For clarity, the assignment provisions with respect to mRNA Inventions are restricted solely to improvements to the mRNA Technology.

6. Patent Prosecution and Maintenance.

6.1 Generally.

(a) As between the Parties and subject to Section 6.2 below, Arcturus (or its Third Party licensor, if any) will have the sole right, at its sole costs, to prosecute and maintain Arcturus Technology Patents, other than the Joint Interest Patents.

(b) In relation to any Arcturus Technology Patents that specifically claim the Licensed Product, prior to filing, Arcturus will provide CureVac with copies of all specific claims relevant to the Licensed Product in such applications for all such Arcturus Technology Patents, and all other material submissions and correspondence relating to such claims with any patent authorities regarding such Arcturus Technology Patents, in sufficient time (not to be less than […***…] days) to allow for review and comment by CureVac. In addition, Arcturus will provide CureVac and its counsel with an opportunity to consult with Arcturus and its counsel regarding prosecution and maintenance of any such Arcturus Technology Patents, and Arcturus will not unreasonably refuse to address all reasonable comments timely made by or on behalf of CureVac.

(c) As between the Parties, CureVac will have the first right to prosecute and maintain any and all Joint Interest Patents and the Parties will share equally all costs incurred by CureVac in connection with such efforts. Prior to filing, CureVac will provide Arcturus with copies of all applications for such Joint Interest Patents, and all other material submissions and correspondence with any patent authorities regarding such Joint Interest Patents, in sufficient time (not to be less than […***…] days) to allow for review and comment by Arcturus. In addition, CureVac will provide Arcturus and its counsel with an opportunity to consult with CureVac and its counsel regarding prosecution and maintenance of any such Joint Interest Patents, and CureVac will consider in good faith all reasonable comments timely made by or on behalf of Arcturus.

(d) In the event that CureVac or its Affiliates grants a sublicense pursuant to Section 2.2, as between CureVac and any such Sublicensee,

(i) to the extent any such Arcturus Technology Patent or Joint Interest Patent does not specifically claim the Licensed Product, CureVac shall retain its rights to prosecute any such sublicensed Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 6.1(b) and 6.1(c); provided, however, that such Sublicense may provide for instruction by the Sublicensee of CureVac's exercise of its rights to prosecute any sublicensed Arcturus Technology Patent or Joint Interest Patent;

(ii) to the extent any such Arcturus Technology Patent or Joint Interest Patent specifically claims the Licensed Product (i.e., with respect to the claims limited to the Licensed Product, but not the broader claims that cover other products or potential products in such Arcturus Technology Patents or Joint Interest Patents), CureVac shall have the right to sublicense its rights to prosecute any such sublicensed Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 6.1(b) and 6.1(c) to the Sublicensee.

6.2 Election Not to Prosecute or Maintain or Pay Patent Costs.

(a) If Arcturus elects not to pay its share of the Patent Costs associated with prosecution or maintenance of any Joint Interest Patents, then it shall assign its co-ownership share in such Patents to CureVac and the respective Patent shall no longer be considered a Joint Interest Patent.

(b) *By CureVac*. If CureVac elects not (i) to file, prosecute or maintain any Joint Interest Patents for which it is responsible under Section 6.1 in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, or (ii) to pay its share of the Patent Costs associated with prosecution or maintenance of any Joint Interest Patents then in each such case CureVac will so notify Arcturus, promptly in writing and in good time to enable Arcturus to meet any deadlines by which an action must be taken to preserve such Joint Interest Patent in such country at Arcturus' expense, if Arcturus so requests. Upon receipt of each such notice by CureVac, Arcturus will have the right, but not the obligation, to notify CureVac in writing on a timely basis that CureVac should transfer the prosecution or maintenance of such Joint Interest Patent to Arcturus and at Arcturus' sole expense. Arcturus is entitled to discontinue the payment of Patent Costs for any Joint Interest Patents at any time, provided that it will so notify CureVac in writing in time for such discontinuance. In the event that Arcturus assumes the prosecution and maintenance of any such Joint Interest Patent, then CureVac would make available to Arcturus all documentation and correspondence with respect to such Joint Interest Patent, such Joint Interest Patent shall no longer be licensed under this Agreement with respect to the Licensed Product.

6.3 Cooperation. Each Party will reasonably cooperate with the other Party in those activities involving the Arcturus Technology Patents and Joint Interest Patents set forth in Sections 6.1 and 6.2. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants and agents of CureVac and Arcturus and their respective Affiliates and Sublicensees to execute all documents, as reasonable and appropriate so as to enable such activities in respect of any such Arcturus Technology Patents in any country.

7. Patent Enforcement and Defense.

7.1 Notice. To the extent not in breach of an obligation of confidentiality, each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected infringement of any Arcturus Technology Patents by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any Arcturus Technology Patents, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto.

7.2 Enforcement and Defense.

(a) *Enforcement*.

(i) As between the Parties,

(1) Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up enforcement rights), at its cost, will have the first right, but not the obligation, to seek to abate any infringement of the Arcturus Technology Patents (other than those in subsection (2)) by a Third Party, or to file suit against any such Third Party for such infringement, and

(2) CureVac (or its sublicensee, if any) shall have the first right, but not the obligation, to take action or bring suit and bear all expenses against such Third Party infringer with respect to: (A) Joint Interest Patents; and/or (B) any other Arcturus

Technology Patents that, on the date of first notice of such infringement, specifically claim the Licensed Product but are not necessary or useful for the research, development, manufacturing and commercialization of any product comprising Arcturus Technology that is exclusively licensed or optioned to a Third Party or is in Late Stage Development or being commercialized by Arcturus or its Affiliates.

(b) If the Party first responsible for such enforcement elects not to take action or to bring suit to prosecute such infringement or to continue such action or suit, it shall notify the other Party of such election within […***…] days after become aware of or receipt of the notice of the infringement or after the election to stop any such action or suit. If after the expiration of the […***…] days period (or, if earlier, the date upon which the responsible Party provides written notice that it does not plan to bring such action) the responsible Party has neither obtained a discontinuance of infringement nor filed suit against any such Third Party infringer of such Patent, then

(i) in the case of an election by Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up enforcement rights) not to prosecute an infringement of an Arcturus Technology Patent specifically claiming the Licensed Product, CureVac shall have the right, but not the obligation, to take action or bring suit against such Third Party infringer of such Patents, provided that the infringement is with respect to a product related to the Target(s) under this License Agreement, and further provided that CureVac shall bear all the expenses of such suit and

(ii) in the case of a CureVac election not to prosecute an infringement of a Joint Interest Patents or Arcturus Technology Patent with respect to which CureVac has rights to take first action, (i) Arcturus shall have the right, but not the obligation, to take action or bring suit against such Third Party infringer of such Patents, provided that Arcturus shall bear all the expenses of such suit,and CureVac shall join Arcturus in such suit to the extent legally required, unless (ii) CureVac decides to assign its interest in such Joint Interest Patent – on a country-by-country basis - to Arcturus and such Joint Interest Patent shall become an Arcturus Technology Patent and no longer subject to license pursuant to this License Agreement.

(c) *Defense*.

(i) As between the Parties,

(1) Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up defense rights) will have the first right, but not the obligation, at its sole costs, to defend against a declaratory judgment action or other action challenging any Arcturus Technology Patents, other than: (i) Joint Interest Patents; and (ii) any other Arcturus Technology Patents that, on the date of first notice of such action, specifically claim the Licensed Product but are not necessary or useful for the research, development, manufacturing and commercialization of any product comprising Arcturus Technology that is exclusively licensed or optioned to a Third Party or is in Late Stage Development or being commercialized by Arcturus or its Affiliates, and

(2) CureVac shall have the first right, but not the obligation, at its sole costs, to defend against a declaratory judgment action or other action challenging Joint Interest Patents as well as such other Arcturus Technology Patents that specifically claim the Licensed Product.

(ii) If the Party first responsible for such defense does not take steps to defend within a commercially reasonably time, or elects not to continue any such defense (in which case it will promptly provide notice thereof to the other Party), then (i) in the case of an election by Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up defense rights) not to defend an Arcturus Technology Patent specifically claiming the Licensed Product, CureVac shall have the right, but not the obligation, to defend any Arcturus Technology Patents that cover Licensed Product and no other product licensed or optioned by Arcturus to a Third Party or commercialized by Arcturus, provided that CureVac shall bear all the expenses of such suit and (ii) in the case of a CureVac election not to defend the Joint Interest Patents, Arcturus shall have the right, but not the obligation, to take action or bring suit to defend such Patents, provided that Arcturus shall bear all the expenses of such suit. Notwithstanding the foregoing, in the event that CureVac elects not to prosecute an infringement of a Joint Interest Patent, then CureVac shall, at its discretion, either (i) assign such Joint Interest Patent to Arcturus – on a country-by-country basis -, which shall become an Arcturus Technology Patent and no longer subject to license pursuant to this License Agreement or (ii) join Arcturus in such suit to the extent legally required.

(d) Notwithstanding the foregoing, any response to a Third Party infringer's counterclaim of invalidity or unenforceability of any Arcturus Technology Patents shall be controlled by the Party who controls the relevant enforcement proceeding pursuant to Section 7.2 (a) unless otherwise mutually agreed by the Parties.

(e) In the event that CureVac or its Affiliates grants a sublicense pursuant to Section 2.2, as between CureVac and any such Sublicensee,

(i) to the extent any such Arcturus Technology Patent or Joint Interest Patent does not specifically claim the Licensed Product, CureVac shall retain its rights to enforce and defend Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 7.2(a), 7.2(b), 7.2(c) and 7.2(d); provided, however, that CureVac's exercise of its rights to enforce or defend such Arcturus Technology Patent or Joint Interest Patent may be instructed by a Sublicensee;

(ii) to the extent any such Arcturus Technology Patent or Joint Interest Patent specifically claims the Licensed Product, CureVac shall have the right to sublicense its rights to enforce and defend Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 7.2(a), 7.2(b), 7.2(c) and 7.2(d) to the Sublicensee.

(f) *Withdrawal, Cooperation and Participation*. With respect to any infringement or defensive action identified above in this Section 7.2 which may be controlled by either CureVac or Arcturus:

(i) If the controlling Party ceases to pursue or withdraws from such action, it will promptly notify the other Party (in good time to enable the other Party to meet any deadlines by which any action must be taken to preserve any rights in such infringement or defensive action) and such other Party may substitute itself for the withdrawing Party, shall be granted the right and standing to sue in the other Party's name, and proceed under the terms and conditions of this Section 7.2.

(ii) The non-controlling Party will cooperate with the Party controlling any such action (as may be reasonably requested by the controlling Party), including (A) providing access to relevant documents and other evidence, (B) making its and its Affiliates and licensees and Sublicensees and all of their respective employees, subcontractors, consultants and agents available at reasonable business hours and for reasonable periods of time, but only to the extent relevant to such action, and (C) if necessary, by being joined as a party, subject for this clause (C) to the controlling Party agreeing to indemnify such non-controlling Party for its involvement as a named party in such action and paying those Patent Costs incurred by such Party in connection with such joinder. The Party controlling any such action will keep the other Party updated with respect to any such action, including providing copies of all documents received or filed in connection with any such action.

(iii) Each Party will have the right to participate or otherwise be involved in any such action controlled by the other Party, in each case at the participating (i.e., non-controlling) Party's sole cost and expense. If a Party elects to so participate or be involved, the controlling Party will provide the participating Party and its counsel with an opportunity to consult with the controlling Party and its counsel regarding the prosecution of such action (including reviewing the contents of any correspondence, legal papers or other documents related thereto), and the controlling Party will take into account reasonable requests of the participating Party regarding such enforcement or defense.

(g) *Settlement*. Neither Party will settle or consent to an adverse judgment in any action described in this Section 7.2 and controlled by such Party, including any judgment which affects the scope, validity or enforcement of any Arcturus Technology Patents involved therewith, without the prior written consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned).

(h) *Damages*. Unless otherwise agreed by the Parties, all monies recovered upon the final judgment or settlement of any action which may be controlled by either CureVac or Arcturus and described in Section 7.2(a) or 7.2(c) in each case will be used first to reimburse the controlling Party, and thereafter the non-controlling Party, for each of their out-of-pocket costs and expenses relating to the action, with the balance of any such recovery to be divided as follows:

(i) To the extent the action involves a Third Party's research, development, manufacture or commercialization of any product other than the Licensed Product (or a LMD product directed to the same

Target as the Licensed Product), Arcturus shall retain all such recovery; and

(ii) To the extent the action involves a Third Party's research, development, manufacture or commercialization of the Licensed Product (or a LMD product directed to the same Target as the Licensed Product), CureVac will retain such recovery, less the amount of royalties payable to Arcturus by treating such recovery as "Net Sales" hereunder.

(i) Patent Marking. CureVac shall mark all Licensed Product if and to the extent required by the applicable patent marking laws, and shall require all of its Affiliates and sublicensees to do the same.

8. Confidentiality.

8.1 Confidential Information. Each Party ("Disclosing Party") may disclose to the other Party ("Receiving Party"), and Receiving Party may acquire during the course and conduct of activities under this License Agreement, certain proprietary or confidential information of Disclosing Party in connection with this License Agreement.

8.2 Restrictions. During the Term and for […***…] years thereafter, Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, but in no event less than reasonable care. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this License Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent to Receiving Party's Affiliates, and each of their employees, subcontractors, consultants and agents who have a need to know such Confidential Information in order to perform their obligations and exercise their rights under this License Agreement and who are under written obligation to comply with the restrictions on use and disclosure that are no less restrictive than those set forth in this Section 8.2. Receiving Party assumes responsibility for such entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

8.3 Exceptions. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to a specific portion of the Disclosing Party's Confidential Information to the extent that Receiving Party can demonstrate that such portion: (i) was known to Receiving Party or any of its Affiliates prior to the time of disclosure by the Disclosing Party without obligation of confidentiality; (ii) is or becomes public knowledge through no action or omission of Receiving Party or any of its Affiliates; (iii) is obtained on a non-confidential basis by Receiving Party or any of its Affiliates from a Third Party who to Receiving Party's knowledge is lawfully in possession thereof (or if possession is obviously unlawful) and under no obligation of confidentiality to Disclosing Party; or (iv) has been independently developed by or on behalf of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information as documented by the internal records of the Receiving Party.

8.4 Permitted Disclosures. Notwithstanding the obligations set forth in Section 8.2, Receiving Party may disclose Disclosing Party's Confidential Information (including this

License Agreement and the terms herein) to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

(a) in order to comply with applicable Law (including any securities Law or regulation or the rules of a securities exchange) or with a legal or administrative proceeding;

(b) in connection with prosecuting or defending litigation, and filing, prosecuting and enforcing Arcturus Technology Patents in connection with Receiving Party's rights and obligations pursuant to this License Agreement;

(c) to attorneys, accountants, auditors, acquirers, licensees, partners or permitted assignees; financial advisors, investors and lenders, including potential acquirers, licensees, partners, assignees, financial advisors, investors and lenders; and

(d) in the case of CureVac, to (i) subcontractors; or (ii) potential licensees or collaboration partners, but only such information that is reasonably necessary or useful for the subcontractor to perform the subcontracted work or for the potential licensee or partner to evaluate the applicable Licensed Product, and LMD or Licensed Product manufacturing processes;

provided that (1) where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant to subsections (a) and (b) sufficiently prior to making such disclosure so as to allow Disclosing Party reasonably adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to subsections (c), each of those persons or entities are required to comply with the restrictions on use and disclosure in Section 8.2 (other than financial advisors, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

8.5 Return of Confidential Information. Upon expiry or earlier termination of this License Agreement, upon written request of a Party (such request, if made, to be made within three (3) months of such expiry or termination) the other Party will destroy or return (as shall be specified in such request) to the requesting Party all copies of the Confidential Information of the requesting Party; provided that the Party may retain: (i) one copy of such Confidential Information for record-keeping purposes, for the sole purpose of ensuring compliance with this License Agreement; (ii) any copies of such Confidential Information as is required to be retained under applicable Law; (iii) any copies of such Confidential Information as is necessary or useful for such Party to exercise a right or fulfill an obligation under another License Agreement, if any, or as set forth in this License Agreement; and (iv) any copies of any computer records and files containing Confidential Information that have been created by such Party's routine archiving/backup procedures. Upon request of the requesting Party, the Receiving Party shall confirm in writing to the requesting Party the destruction or return of all copies of the Confidential Information of the requesting Party.

8.6 Publications. Notwithstanding anything in this License Agreement to the contrary, CureVac is permitted to publish the results of its development under this License Agreement, *provided, however*, that it will not disclose Arcturus Confidential Information in any publication by CureVac of the results of any Licensed Product development by CureVac

without Arcturus' prior written consent, which will not be unreasonably withheld, conditioned or delayed.

8.7 Terms of this License Agreement; Press Release. The Parties agree that the existence and terms of the Parties' relationship and this License Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Section 8.4. Except as mutually agreed or otherwise required by Law or securities exchange regulation, each Party agrees not to issue any press release or public statement disclosing information relating to the existence of this License Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party.

9. Warranties; Limitations of Liability; Indemnification.

9.1 Representations and Warranties. Each Party represents and warrants to the other as of the License Agreement Effective Date that:

(a) it is a corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated,

(b) it has the legal right and power to enter into this License Agreement, to extend the rights and licenses granted or to be granted to the other in this License Agreement, and to fully perform its obligations hereunder,

(c) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this License Agreement and the performance of its obligations hereunder,

(d) this License Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms and

(e) except with respect to any Pre-Existing Prosecution, Enforcement and Defense Restrictions, the execution, delivery and performance by such Party of this License Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which such Party is a party or by which it is bound, including, in the case of Arcturus, each of the agreements which Arcturus has identified to CureVac prior to the License Agreement Effective Date, in each case as would reasonably be expected to have a material adverse effect on the rights of the other Party hereunder.

9.2 Additional Representations of Arcturus. Arcturus hereby represents and warrants to CureVac as of the License Agreement Effective Date as follows:

(a) *Impairment*. Except with respect to any Pre-Existing Prosecution, Enforcement and Defense Restrictions, neither Arcturus nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights including Know-How, that would in any way conflict with or impair the scope of any rights or licenses granted to CureVac with respect to the Licensed Product hereunder.

(b) *Patents*. **Appendix 1.4** sets forth a complete and accurate list of all Arcturus Technology Patents. Arcturus Controls the Arcturus Technology, and is entitled to grant the licenses specified herein. To Arcturus' knowledge, the Arcturus Technology Patents have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Arcturus Technology Patents is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and to Arcturus' knowledge as of the License Agreement Effective Date, no Arcturus Technology is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. As of the License Agreement Effective Date, neither Arcturus nor any of its Affiliates has received any notice alleging that the Arcturus Technology Patents are invalid or unenforceable, or challenging Arcturus' ownership of or right to use any such rights.

(c) *Entire LMD Technology.* The Arcturus LMD Technology licensed to CureVac under this License Agreement comprises all LMD Technology Controlled by Arcturus which is necessary or useful to develop, manufacture and commercialize the Licensed Products for purposes of this License Agreement.

(d) *Encumbrances.* As of the License Agreement Effective Date, Arcturus has the right to grant the license herein to CureVac and neither Arcturus nor any of its Affiliates has granted any liens or security interests on the Arcturus Technology to any Third Party that is inconsistent with the license granted to CureVac under Section 2.1.

(e) *Litigation.* There is no action, suit, proceeding or investigation pending or, to the knowledge of Arcturus, currently threatened against or affecting Arcturus that questions the validity of this License Agreement or the right of Arcturus to enter into this License Agreement or consummate the transactions contemplated hereby or that relates to the Arcturus Technology.

(f) *Infringement*. Neither Arcturus nor any of its Affiliates has received any written notice of any claim, nor does Arcturus or its Affiliates have any knowledge of any claim, that any Patent, Know-How or other intellectual property owned or controlled by a Third Party would be infringed or misappropriated by the practice of any Arcturus LMD Technology in connection with the production, use, research, development, manufacture or commercialization of any Licensed Product.

(g) *Third Party Infringement*. To Arcturus' knowledge, no Third Party is infringing or has infringed any Patent within the Arcturus LMD Technology or is misappropriating or has misappropriated any Know-how within the Arcturus LMD Technology, in each case relating to the Target.

9.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that any Licensed Product will be successful, in whole or in part. Except as otherwise expressly provided in this License Agreement, the Parties make no representations and extend no warranty of any kind under this License Agreement, neither express nor implied.

9.4 No Consequential Damages. Notwithstanding anything in this License Agreement or otherwise, neither Party will be liable to the other or any Third Party with respect to any subject matter of this License Agreement for any indirect or consequential

damages, provided that this Section 9.4 will not apply to breaches of Article 8 or the Parties' indemnification rights or obligations under Section 9.6, or in the event of willful misconduct.

9.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this License Agreement through Affiliates, subcontractors or - in the event of CureVac - Sublicensees, *provided, however*, that each Party will remain fully responsible and liable for the performance by its Affiliates, subcontractors and Sublicensees, and will cause its Affiliates, subcontractors and Sublicensees to comply with the provisions of this License Agreement in connection therewith.

9.6 Indemnification.

(a) *Indemnification by CureVac*. CureVac will indemnify Arcturus, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, "Arcturus Indemnitees"), and defend and hold each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, "Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, "Third Party Claims") against the Arcturus Indemnitees to the extent arising from or occurring as a result of: (i) the breach by CureVac of any representation or warranty of this License Agreement; (ii) any gross negligence or willful misconduct on the part of any CureVac Indemnitee; or (iii) the development, manufacture or commercialization by or on behalf of CureVac or any of its Affiliates or Sublicensees of Licensed Product other than if related to an LMD component thereof specifically provided by Arcturus, except in each case (i)-(iii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of an Arcturus Indemnitee or Arcturus' breach of this License Agreement.

(b) *Indemnification by Arcturus*. Arcturus will indemnify CureVac, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "CureVac Indemnitees"), and defend and hold each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against CureVac Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Arcturus of any representation or warranty of this License Agreement; or (ii) any gross negligence or willful misconduct on the part of any Arcturus Indemnitee, except in each case (i) and (ii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of a CureVac Indemnitee or CureVac's breach of this License Agreement.

(c) *Notice of Claim*. All indemnification claims provided for in Sections 9.6(a) and 9.6(b) will be made solely by such Party to this License Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an "Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 9.6(a) and 9.6(b), but in no event will the indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party

copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) *Defense, Settlement, Cooperation and Expenses*.

(i) *Control of Defense*. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within thirty (30) days after the indemnifying Party's receipt of an Indemnification Claim Notice. The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to indemnify the Indemnified Party in respect of the Third Party Claim, nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to such counsel and a possible conflict of interest of such counsel retained by the indemnifying Party). In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will as soon as possible deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including reasonable attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 9.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to engage counsel of its choice for such purpose; provided, however, that such engagement will be at the Indemnified Party's own cost and expense unless (i) the indemnifying Party has failed to promptly assume the defense and engage counsel in accordance with Section 9.6(d)(i) (in which case the Indemnified Party will control the defense) or (ii) the interests of the Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, in which case the indemnifying Party will assume one hundred percent (100%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject to injunctive or other relief or

otherwise adversely affecting the business of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, the indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 9.6(d)(i), the indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will use Diligent Efforts to cause each other indemnified party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith, at the indemnifying Party's expense. Such cooperation will include access during normal business hours afforded to the indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making indemnified parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 9.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a Calendar Quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

9.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program (including product liability insurance) to protect

against potential liabilities and risk arising out of activities to be performed under this License Agreement, and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the respective industry of such Party for the activities to be conducted by such Party under this License Agreement. Subject to the preceding sentence, such liability insurance or self-insurance program will insure against all types of liability, including personal injury, physical injury or property damage arising out of the manufacture, sale, use, distribution or marketing of Licensed Product. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this License Agreement.

10. Term and Termination.

10.1 Term.

(a) This License Agreement will commence as of the License Agreement Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue on a Licensed Product-by-Licensed Product and a country-by-country basis, until there are no more payments owed to Arcturus in such country (the longest such period of time hereunder, the "Term"). Upon there being no more such payments hereunder in such country, the license contained in Section 2.1 will become irrevocable, perpetual and fully paid up and will remain in effect with respect to such Licensed Product in such country.

(b) If the Target to which this License Agreement relates is chosen by the Parties for co-development under the Co-Development Agreement, this License Agreement will automatically terminate upon the written agreement of the Parties to include such programs under the Co-Development Agreement, in accordance with Section 4.2(a) of the Co-Development Agreement.

(c) The Parties agree that this Agreement and the Co-Development Agreement relate to different projects and, therefore, the validity, term and termination of this Agreement shall be independent from the validity, term and termination of the Co-Development Agreement.

10.2 Termination by Arcturus.

(a) *Breach*. Arcturus will have the right to terminate this License Agreement in full upon delivery of written notice to CureVac in the event of any material breach by CureVac of any terms and conditions of this License Agreement, provided that such breach has not been cured […***…] after written notice thereof is given by Arcturus to CureVac specifying the nature of the alleged breach.

(b) *Disputed Breach*. If CureVac disputes in good faith the existence or materiality of a breach specified in a notice provided in accordance with Section 10.2(a), and CureVac provides Arcturus notice of such dispute within such […***…]period, then Arcturus shall not have the right to terminate this License Agreement under Section 10.2(a) unless and until it is finally determined, in accordance with Section 11.1, that CureVac has materially breached this License Agreement and that CureVac fails to cure such breach within […***…] following such decision. It is understood and agreed that during the pendency of such

dispute, all of the terms and conditions of this License Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder. During the pendency of any such dispute, CureVac shall pay to Arcturus all Milestone Payments and royalty payments set forth herein.

(c) *Patent Challenge*. Except to the extent the following is unenforceable under the Laws of a particular jurisdiction, Arcturus may terminate this License Agreement on a Patent-by-Patent basis upon delivery of […***…] prior written notice to CureVac

(i) if CureVac or its Affiliates, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any Arcturus Technology Patents anywhere in the world and does not withdraw or settle such challenge within the […***…] cure period; or

(ii) if a sublicensee of CureVac, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any Arcturus Technology Patents anywhere in the world and CureVac does not terminate the corresponding sublicense agreement or such challenge is not withdrawn or settled (by such sublicensee or CureVac) within the […***…] cure period.

10.3 Termination by CureVac; Certain Remedy for Breach.

(a) *Breach*. CureVac will have the right to terminate this License Agreement in full upon delivery of written notice to Arcturus in the event of any material breach by Arcturus of any terms and conditions of this License Agreement, provided that such breach has not been cured within […***…] after written notice thereof is given by CureVac to Arcturus specifying the nature of the alleged breach.

(b) *Discretionary Termination*. CureVac will have the right to terminate this License Agreement in full at its discretion for any reason by delivering written notice to Arcturus, such termination to be effective […***…] following the date of such notice.

(c) *Maintenance of License*. In the event of a material breach by Arcturus of Sections 2.2(c) or 3.2, if such breach has not been cured within […***…] after written notice thereof, CureVac may notify Arcturus in writing that the License Agreement shall remain in full force and effect, provided that any remaining payments to Arcturus pursuant to Sections 4.1, 4.2 and 4.3 following such notification shall be reduced by […***…].

10.4 Rights Upon Bankruptcy. All rights and licenses granted under or pursuant to this License Agreement by Arcturus or its Affiliates are, and will otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of right to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that CureVac and its Affiliates and Sublicensees, as licensees of such rights under this License Agreement, will retain and may fully exercise all of their rights and elections under the U.S.

Bankruptcy Code and any foreign counterparts thereto. Without limiting the Parties' rights under Section 365(n) of the U.S. Bankruptcy Code, if a case under U.S. Bankruptcy Code is commenced by or against a Party, the other Party shall be entitled to a copy of any and all such intellectual property and all embodiments of such intellectual property, and the same, if not in the possession of such other Party, shall be promptly delivered to it (i) before this License Agreement is rejected by or on behalf of the bankrupt Party, within thirty (30) days after the other Party's written request, unless the bankrupt Party, or its trustee or receiver, elects within thirty (30) days to continue to perform all of its obligations under this License Agreement, or (ii) after any rejection of this License Agreement by or on behalf of the bankrupt Party, if not previously delivered as provided under clause (i) above. All rights of the Parties under this Section 10.4 and under Section 365(n) of the U.S. Bankruptcy Code are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party may have under this License Agreement, under the U.S. Bankruptcy Code, and any other applicable Laws. The non-bankrupt Party shall have the right to perform the obligations of the bankrupt Party hereunder with respect to such intellectual property, but neither such provision nor such performance by the non-bankrupt Party shall release the bankrupt Party from any such obligation or liability for failing to perform it.

10.5 Effects of Termination.

(a) Upon termination (but not expiration pursuant to Section 10.1) of this License Agreement for any reason:

(i) *Cessation of Rights*. Except as expressly provided herein, including Sections 8.5, 10.5(a) and as necessary for CureVac to sell off existing inventory as permitted under Section 10.5(iii) below, all rights and licenses granted by Arcturus to CureVac under this License Agreement will terminate. CureVac shall wind down the development (including any clinical trials), manufacture and commercialization of the Licensed Product in compliance with all applicable Laws and at its own cost and expense.

(ii) *Sell Off*. Notwithstanding the termination of CureVac's licenses and other rights under this License Agreement, CureVac shall retain the right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products, in each case that is intended for distribution, sale or disposition in the Territory, for a period of not more than six (6) months following the date of the effective termination, as though this License Agreement had not been terminated, and such distribution, sale or other disposition shall not constitute infringement of the Patents or other intellectual property or proprietary rights of Arcturus or its Affiliates. CureVac's right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products pursuant to this Section 10.5(a)(ii) shall be subject to CureVac's continuing obligation to pay royalties with respect to the Net Sales.

(b) Upon termination pursuant to Section 10.1(b), Arcturus shall refund to CureVac the Option Exercise Fee (as defined in the Development and Option Agreement), the Milestone Payments already paid by CureVac and all other payments made by CureVac in relation to this License Agreement.

10.6 Survival. In addition to the termination consequences set forth in Section 10.5, the following provisions will survive termination or expiration of this License Agreement:

Sections 1, 4 (to the extent of any outstanding payments accrued as of the effective date of termination), 5, 8, 9.4, 9.6, 10.5, 10.6 and 11. Termination or expiration of this License Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this License Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this License Agreement.

11. General Provisions.

11.1 Dispute Resolution.

(a) *Disputes*. Disputes arising under or in connection with this License Agreement will be resolved pursuant to this Section 11.1; *provided, however*, that in the event a dispute cannot be resolved without an adjudication of the rights or obligations of a Third Party (other than any CureVac Indemnitees or Arcturus Indemnitees identified in Section 9.6), the dispute procedures set forth Sections 11.1(c) and 11.1(c) will be inapplicable as to such dispute.

(b) *Dispute Escalation*. In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves. In the event that such dispute is not resolved on an informal basis within thirty (30) days, either Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive with the appropriate authority to determine the matter for such party), who will attempt in good faith to resolve such dispute by negotiation and consultation for a thirty (30) day period following receipt of such written notice

(c) *Dispute Resolution.* In the event the Chief Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Parties agree to try to solve such dispute amicably by mediation. The Parties shall conduct a mediation procedure according to the Mediation Rules of the World Intellectual Property Organization (WIPO) in effect on the date of the commencement of the mediation proceedings. The location of the mediation proceedings will be New York City, New York, U.S.. The number of mediators will be one (1). The language of the mediation proceedings will be English. If the dispute has not been settled pursuant to the said rules within sixty (60) days following the filing of a request for mediation or within such other period as the Parties may agree in writing, either Party may submit the dispute to final and binding arbitration. Any dispute relating to the validity performance, construction or interpretation of this License Agreement, which cannot be resolved amicably between the Parties after following the procedure set forth in this Section 11.1, shall be submitted to arbitration in accordance with the Arbitration Rules of WIPO in effect on the date of the commencement of the arbitration proceedings. The location of the arbitration proceedings will be New York City, New York, U.S.. The number of arbitrators will be three (3). The language of the arbitration proceeding will be English. The decision of the arbitrators shall be final and binding upon the Parties (absent manifest error on the part of the arbitrator(s)) and enforceable in any court of competent jurisdiction.

11.2 Relationship of Parties. Nothing in this License Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied third party beneficiaries hereunder (except for CureVac Indemnitees and Arcturus Indemnitees for purposes of Section 9.6). For clarity, CureVac does not grant to Arcturus any rights or licenses under this License Agreement to any CureVac technology or intellectual property rights.

11.3 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law.

11.4 Governing Law. This License Agreement will be governed by and construed in accordance with the Laws of the State of New York, U.S., without respect to its conflict of Laws rules.

11.5 Counterparts; Facsimiles. This License Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this License Agreement by either Party will constitute a legal, valid and binding execution and delivery of this License Agreement by such Party.

11.6 Headings. All headings in this License Agreement are for convenience only and will not affect the meaning of any provision hereof.

11.7 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this License Agreement. Accordingly, the rule of construction that any ambiguity in this License Agreement will be construed against the drafting party will not apply.

11.8 Interpretation. Whenever any provision of this License Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this License Agreement as an entirety and not solely to the particular portion of this License Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Appendices in this License Agreement are to Sections and Appendices of this License Agreement. References to any Sections include Sections and subsections that are part of the related Section.

11.9 Binding Effect. This License Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

11.10 Assignment. This License Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this License Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that either Party may assign this License Agreement without such consent to an Affiliate or to its successor in connection with sale of all or

substantially all of its assets or business or that portion of its business pertaining to the subject matter of this License Agreement (whether by merger, consolidation or otherwise).

11.11 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this License Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, or registered or certified mail, return receipt requested, postage prepaid or facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier) to the following addresses (or to such address as a Party may subsequently provide by written notice in accordance with this Section 11.11):

If to CureVac: CureVac AG
Paul-Ehrlich-Str. 15
72076 Tübingen
Germany
Attention: CEO and General Counsel
Fax: +49 7071 9883 - 1101

If to Arcturus: Arcturus Therapeutics Inc.
10628 Science Center Drive
Suite 200
San Diego, California 92121
USA
Attn: Chief Executive Officer
Copy to: General Counsel
Fax: (858) 300-5028

with a copy to (which copy shall not constitute notice):
Cooley LLP
3175 Hanover St.
Palo Alto, CA 94303
Attn: Glen Y. Sato
Fax: (650) 849-7400

11.12 Amendment and Waiver. This License Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

11.13 Severability. In the event that any provision of this License Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify the License Agreement to preserve (to the extent possible) their original intent.

11.14 Entire Agreement. This License Agreement together with the Development and Option Agreement and any other license agreements entered into during the Term pursuant to the Development and Option Agreement are the sole agreement with respect to the subject matter hereof and supersedes all other agreements and understandings between the Parties with respect to same.

11.15 Force Majeure. Neither Arcturus nor CureVac will be liable for failure of or delay in performing obligations set forth in this License Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Arcturus or CureVac; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

Appendix 1.3

Description of the Arcturus LMD Technology

[*To be completed in accordance with Section 5.2 of the Development and Option Agreement.*]

Appendix 1.4

Patents and Know-How within the Arcturus Technology
as of the License Agreement Effective Date
[*To be updated in accordance with Section 5.2 of the Development and Option Agreement.*]]

(A) Patents

ARCTURUS LMD TECHNOLOGY
[…***…]

*****Confidential Treatment Requested**

[…***…]

(B) Know-How

[…***…]

Appendix 1.28

Joint Interest Patents

[*To be completed in accordance with Section 5.2 of the Development and Option Agreement and updated during the Term*]

Appendix 1.51

Pre-Existing Restrictions

- […***…]

*****Confidential Treatment Requested**

Appendix 1.60

Description of the Target

The description for a Target described in sub-clause (a) of the definition of Target shall include the following information:

a. […***…];

b. […***…]; and

c. […***…]; and

d. […***…]

The description for a Target described in sub-clause (b) of the definition of Target shall include the following information:

a. […***…]

The description for a Target described in sub-clause (c) of the definition of Target shall include the following information:

a. […***…]; and

b. […***…]

Schedule 1-B

EXCLUSIVE LICENSE AGREEMENT

by and between

CUREVAC AG

and

ARCTURUS THERAPEUTICS INC.

dated

May 3, 2018

Table of Contents

List of Appendices

Appendix 1.3	Description of the Arcturus LMD Technology
Appendix 1.4	Patents and Know-How within the Arcturus Technology as of the License Agreement Effective Date
Appendix 1.28	Joint Interest Patents
Appendix 1.50	Pre-Existing Restrictions
Appendix 1.59	Description of the Target

License Agreement

This License Agreement ("License Agreement"), effective as of delivery of an Acceptance Notice in accordance with Section 5.1(b) of the Development and Option Agreement (as defined below) (the "License Agreement Effective Date"), is made by and between Arcturus Therapeutics Inc., a Delaware corporation ("Arcturus"), and CureVac AG, a German stock corporation with offices at Paul-Ehrlich-Strasse 15, 72076 Tuebingen, Germany ("CureVac"). Each of Arcturus and CureVac may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Arcturus has expertise and intellectual property relating to the development of LMD Technologies (as defined below) that embody or incorporate delivery systems (and components thereof) for molecular therapeutics based on or incorporating lipid-enabled and unlocked nucleomonomer platform for delivery of nucleic acids as specified in **Appendix 1.3**, the Arcturus LMD Technology; and

WHEREAS, CureVac has expertise and intellectual property relating to mRNA Constructs (as defined below); and

WHEREAS, Arcturus and CureVac are parties to that certain Development and Option Agreement (dated January 1, 2018, and amended as of May 3, 2018) (the "Development and Option Agreement") pursuant to which CureVac has options to take licenses under the Arcturus LMD Technology (as defined below) with respect to CureVac's mRNA Constructs; and

WHEREAS, pursuant to the terms of the Development and Option Agreement, CureVac has exercised an option to obtain a license pursuant to this Agreement with respect to the Target (as defined below) and the Parties are now entering into a licensing arrangement whereby CureVac will have a license under the Arcturus LMD Technology to develop and commercialize Licensed Products (as defined below) with respect to such Target.

WHEREAS, the Parties intend to also co-develop an ornithine transcarbamylase ("OTC") deficiency product and possibly other products under a separate co-development and co-commercialization agreement ("Co-Development Agreement").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions.

The following terms and their correlatives will have the following meanings:

1.1 "Affiliate" of a person or entity means any other entity which (directly or indirectly) is controlled by, controls or is under common control with such person or entity. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to an entity will mean (i) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast at least fifty percent (50%) of the votes in the election of directors or (ii) in the case of a non-corporate entity, direct or indirect ownership of at least fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity

provided that if local Law restricts foreign ownership, control will be established by direct or indirect ownership of the maximum ownership percentage that may, under such local Law, be owned by foreign interests. […***…].

1.2 "Arcturus Indemnitees" has the meaning set forth in Section 9.6(a).

1.3 "Arcturus LMD Technology" means any and all LMD Technology for delivering RNA therapeutics that is Controlled by Arcturus or any of its Affiliates as of the Effective Date or during the Term, including the LUNAR™ platform, a description of which technology, as in existence as of the License Agreement Effective Date, is set forth on **Appendix 1.3**.

1.4 "Arcturus Technology" means any Patents and Know-How that are Controlled by Arcturus or any of its Affiliates as of the License Agreement Effective Date or during the Term and that are necessary or useful for the research, development, manufacturing and commercialization of Licensed Products. The Patents and Know-How comprised in the Arcturus Technology as of the License Agreement Effective Date are listed in **Appendix 1.4**. Arcturus Technology shall include the Arcturus LMD Technology. Notwithstanding the foregoing, Arcturus Technology shall exclude

(a) any Patents and Know-How acquired by Arcturus after License Agreement Effective Date if Arcturus is required to make any payment to a Third Party in connection with the grant, maintenance or exercise of a sublicense to CureVac, unless CureVac agrees in writing to reimburse Arcturus for all such payments; *provided*, *however*, that such payments shall reduce CureVac's royalty obligations in accordance with Section 4.3(b),

(b) any Patents and Know-How of a Third Party (including its Affiliates) that becomes Arcturus' Affiliate after the License Agreement Effective Date as a results of a Change of Control, but only if and to the extent that it is not LMD Technology, and

(c) any Patents that CureVac elects to exclude pursuant to Section 2.3.

1.5 "Arcturus Technology Patent(s)" means any and all Patents comprised in the Arcturus Technology during the Term, unless otherwise set forth herein. For clarity, Arcturus Technology Patents include Arcturus' interest in the Joint Interest Patents.

1.6 "Business Day" means a day other than a Saturday, Sunday, or bank or other public holiday in San Diego, California, USA or Tübingen, Germany or Boston, Massachusetts, USA.

1.7 "cGMP" means current Good Manufacturing Practices as specified in the U.S. C.F.R., ICH Guideline Q7A, or equivalent Laws of an applicable Regulatory Authority at the time of manufacture.

1.8 "Calendar Quarter" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

1.9 "Change of Control" with respect to Arcturus, shall be deemed to have occurred if during the Term (i) any person or entity is or becomes the "beneficial owner", directly or indirectly, of shares of capital stock or other interests (including partnership interests) of Arcturus then outstanding and normally entitled (without regard to the occurrence of any contingency) to vote in the election of the directors, managers or similar supervisory positions of Arcturus representing fifty percent (50%) or more of the total voting power of all outstanding classes of voting stock of Arcturus or has the power, directly or indirectly, to elect a majority of the members of Arcturus' board of directors, or similar governing body; or (ii) Arcturus enters into a merger, consolidation or similar transaction with another person or entity; or (iii) Arcturus sells or transfers to any Third Party, in one (1) or more related transactions, properties or assets representing all or substantially all of Arcturus' consolidated total assets to which this License Agreement relates, *provided however*, that:

(a) subsections (i) to (iii) shall only apply if the person or entity or Third Party acquiring control is (i) a pharmaceutical company which has experience in developing and commercializing pharmaceutical products (*i.e.*, is a strategic, not financial investor or partner) or (ii) a competitor, i.e., a company whose business consists principally of mRNA development, manufacturing and/or commercialization, and

(b) a bona fide financing transaction with Third Parties that does not otherwise meet the requirements of subsection (a) shall not constitute a Change of Control.

1.10 "Combination Product" means a Licensed Product that includes at least one additional active pharmaceutical ingredient other than LMDs, mRNA Constructs, and other RNAs (i.e., Guide RNA(s)) or DNA Sequence(s). Drug delivery vehicles, adjuvants, and excipients shall not be deemed to be "active ingredients", except in the case where such delivery vehicle, adjuvant, or excipient is recognized as an active ingredient in accordance with 21 C.F.R. 210.3(b)(7) or equivalent Laws in other jurisdictions, *provided however*, should LMDs comprised in a Licensed Product be characterized as "active ingredients" at any time during the Term, such LMDs will not be considered an "active ingredient" for the purposes of this definition.

1.11 "Confidential Information" of a Party means all proprietary Know-How, unpublished patent applications and other non-public information and data of a financial, commercial, business, operational, scientific or technical nature of such Party that is disclosed by or on behalf of such Party or any of its Affiliates or otherwise made available to the other Party or any of its Affiliates, whether made available orally, in writing or in electronic form in connection with this License Agreement, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in connection with this License Agreement. In addition, any non-public information related to this License Agreement or the Licensed Products hereunder and disclosed by a Party to the other Party (or their respective Affiliates) under the Development and Option Agreement will be deemed such Party's Confidential Information hereunder. Technology will be considered the Confidential Information of the Party (or Parties) owning such Technology, and jointly-owned Technology will be considered Confidential Information of both Parties.

1.12 "Control" or "Controlled" means with respect to Technology, a Party owns or has a license to use and practice the respective Patent or Know-How without violating the terms of any agreement with any Third Party.

1.13 "CTA" means a clinical trial application.

1.14 "CureVac Indemnitees" has the meaning set forth in Section 9.6(b).

1.15 "Development and Option Agreement" has the meaning set forth in the Preamble.

1.16 "Diligent Efforts" means, with respect to the efforts to be expended by each Party with respect to the activities of a Party pursuant to this Agreement, active and sustained efforts to conduct the applicable activity, or to attempt to achieve the applicable requirement or goal, in a prompt and expeditious manner, as is reasonably practicable under the circumstances (including the level of FTE funding and budget for out-of-pocket and Third Party contractors set forth therein) and the terms of this Agreement.

1.17 "Disclosing Party" has the meaning set forth in Section 8.1

1.18 "Field of Use" means the treatment and diagnosis of all diseases and conditions.

1.19 "First Commercial Sale" means the first sale for use or consumption of any Licensed Product in a country after all required Regulatory Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.20 "FTE" means a full-time person, or more than one person working the equivalent of a full-time person, where "full-time" is determined by the standard practices in the biopharmaceutical industry in the geographic area in which such personnel are working, consisting of a total of 1880 hours per year of work on the applicable activities. Any person who devotes less than 1880 hours per year on the applicable activities shall be treated as an FTE on a pro-rated basis, based upon the actual number of hours worked by such person on such activities, divided by 1880. Any person who devotes more than 1880 hours per year on the applicable activities shall be treated as one (1) FTE, i.e., in no event shall one person be counted as more than one FTE. FTE activities shall include the performance of the applicable activities and scientific management oversight, as reasonably required, but, for clarity, exclude (i) the work of general corporate or administrative personnel, overhead (including facilities costs), insurances and similar costs.

1.21 "FTE Costs" means an initial rate of […***…] Dollars ($[…***…]) per FTE per year, which shall apply through December 31, 2019. Thereafter, the FTE Rate shall be changed bi-annually at the end of each second calendar year to reflect any percentage increase or decrease (as the case may be) in the Consumer Price Index in the U.S. (index for all items) ("**CPI**") (based on the change in the CPI from the most recent index available as of the Effective Date to the most recent index available as of the date of the calculation of such revised FTE Cost rate).

1.22 "IND" means an investigational new drug application, or equivalent application or submission for approval to conduct human clinical trials.

1.23 "Indemnification Claim Notice" has the meaning set forth in Section 9.6(c).

1.24 "Indemnified Party" has the meaning set forth in Section 9.6(c).

1.25 "Indication" means an individual disease or clinical condition with respect to which at least one adequate and well controlled study is required to support inclusion of such

disease or condition in the indication statement of an FDA approved package insert for a Licensed Product.

1.26 "Initiation" means in connection with a clinical trial in any of its phases 1 through 3 the first dosing of the fifth patient or fifth healthy subject.

1.27 "Inventions" has the meaning set forth in Section 5.1.

1.28 "Joint Interest Patents" means the Patents generated under the Development and Option Agreement and jointly owned by the Parties. Such Joint Interest Patents are listed in **Appendix 1.28** hereto, as amended from time to time.

1.29 "Know-How" means all commercial, technical, scientific and other know-how and information, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols), in all cases, provided it is confidential and proprietary, and regardless of whether patentable, in written, electronic or any other form now known or hereafter developed.

1.30 "Late Stage Development" means Development after the Initiation of a Phase 3 Study.

1.31 "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments, or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.32 "License Agreement" has the meaning set forth in the Preamble.

1.33 "License Agreement Effective Date" has the meaning set forth in the Preamble.

1.34 "Licensed Product" means […***…] product comprised of (i) LMD systems, which are covered by Arcturus LMD Technology; and containing (ii) one or more mRNA Constructs as the active pharmaceutical ingredient(s) intended to express the Target. In case of two or more mRNA Constructs these constructs may be contained in the same or separate LMDs. Licensed Product includes mRNA-LMD products which are administered jointly or separately, and mRNA-LMD products which are administered simultaneously or sequentially as a combination medicinal product or treatment. For Gene Editing purposes a Licensed Product may contain other RNA(s) (i.e., Guide RNA(s)) and/or DNA Sequence(s) which can be delivered together or separately (combined in one LMD or delivered in separate LMDs), in addition to the one or more mRNA Constructs intended to express the DNA Editing Protein.

1.35 "LMD Technology" means Technology Controlled by Arcturus that claims, embodies or incorporates delivery systems (and components thereof) based on or incorporating lipid-mediated delivery (LMD) systems.

1.36 "Losses" has the meaning set forth in Section 9.6(a).

1.37 "Materials" means any tangible chemical or biological material, including any compounds, LMD, DNA, RNA (including mRNA), clones, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How, Controlled by Arcturus.

1.38 "mRNA Construct" means any mRNA construct for the expression of a protein, including the sequence of such construct (which potentially comprises one (1) or more of a cap, 5' UTR, the associated open reading frame, 3'UTR and a poly A tail), the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such construct, such mRNA Construct being covered by mRNA Technology.

1.39 "mRNA Technology" means Technology Controlled by CureVac that claims, embodies or incorporates expression systems (and components thereof), based on or incorporating mRNA.

1.40 "Milestones" means the milestones payable pursuant to Section 4.1.

1.41 "Milestone Event" has the meaning set forth in Section 4.1.

1.42 "Milestone Payment" has the meaning set forth in Section 4.1.

1.43 "Net Sales" means, with respect to any Licensed Product, the gross amount received by CureVac and its Affiliates and Sublicensees for *bona fide* sales of such Licensed Product to a Third Party (other than Affiliates and Sublicensees but including distributors for resale), less deductions, in each case to the extent reasonable, customary, actually allowed and taken in connection with the sale of such Licensed Product and not otherwise recovered or reimbursed:

(a) discounts (including cash, quantity and patient program discounts), retroactive price reductions, commissions, charge-back payments and rebates granted to managed health care organizations or to federal, state and local governments, their agencies, and purchasers and reimbursers or to trade customers;

(b) credits or allowances actually granted upon claims, damaged goods, rejections or returns of, such Licensed Product and not in excess of the selling price of such Product, including such Licensed Product returned in connection with recalls or withdrawals;

(c) freight out, postage, shipping and insurance charges for delivery of such Licensed Product;

(d) taxes or duties levied on, absorbed or otherwise imposed on the sale of such Licensed Product, including value-added taxes, or other governmental charges otherwise imposed upon the billed amount, as adjusted for rebates and refunds; and

(e) wholesaler and distributor administration fees

(f) other customary deductions taken in the ordinary course of business in accordance with IFRS (International Financial Reporting Standards) principles.

If a single item falls into more than one of the above categories above, such items will not be deducted more than once.

Net Sales shall not include any payments among CureVac, its Affiliates and Sublicensees. Net Sales shall be determined in accordance with generally accepted accounting principles, consistently applied across all products. Net Sales for any Combination Product shall be calculated on a country-by-country basis by multiplying actual Net Sales of such Combination Product by the fraction A/(A+B), where A is the weighted average price paid for the Licensed Product contained in such Combination Product sold separately in finished form in such country, and B is the weighted average invoice price paid for the other active ingredients contained in such Combination Product sold separately in finished form in such country, if such Licensed Product and such other active ingredients are each sold separately in such country.

If such other active ingredients are not sold separately in such country, then Net Sales for such Combination Product shall be calculated on a country-by-country basis by multiplying actual Net Sales of such Combination Product by the fraction A/C, where C is the weighted average invoice price paid for such Combination Product in such country. If such Licensed Product is not sold separately in finished form in such country, Net Sales for such Licensed Product will be determined by CureVac's good faith estimate of the relative contribution of such Licensed Product and each such other active ingredients in such Combination Product, and shall take into account in good faith any applicable allocations and calculations that may have been made for the same period in other countries.

1.44 "Non-Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of equal to or more than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Non-Rare Disease Target.

1.45 "Patent(s)" means (a) an issued patent, a patent application, and a future patent issued from any such patent application, (b) a future patent issued from a patent application filed in any country worldwide which claims priority from a patent or patent application of (a), and (c) any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, utility models, supplementary protection certificates and renewals based on any patent or patent application under (a) or (b), but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder)

1.46 "Patent Costs" means the reasonable, documented, out-of-pocket costs and expenses paid to outside legal counsel, and filing and maintenance expenses, actually and reasonably incurred by a Party in prosecuting and maintaining Patents with respect to Licensed Products and enforcing and defending them.

1.47 "Phase 1 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(a) or corresponding foreign regulations.

1.48 "Phase 2 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(b) or corresponding foreign regulations.

1.49 "Phase 3 Study" means a human clinical trial of a Licensed Product in any country that would satisfy the requirements of 21 CFR 312.21(c) or corresponding foreign regulations.

1.50 "Pre-Existing Restrictions" means, with respect to the Target, those certain prosecution, enforcement and defense rights granted by Arcturus or its Affiliates to a Third Party(ies) with respect to the Patents pursuant to the *bona fide* written agreement(s) set forth on **Exhibit 1.50** hereto as such *bona fide* written agreement(s) were in effect as of the Effective Date of the Development and Option Agreement. For clarity, the exercise of such foregoing rights by a Third Party with respect to Patents that are not specific to the Target or Licensed Products shall be deemed a Pre-Existing Restriction.

1.51 "Rare Disease Target" means a Target that addresses at a first place an indication related to a Licensed Product with an incidence of less than […***…] in […***…] people in the U.S. or EU. The indication for which the first IND or CTA application will be filed will determine whether a Target is a Rare Disease Target.

1.52 "Receiving Party" has the meaning set forth in Section 8.1.

1.53 "Regulatory Approval" means, with respect to a country or extra-national territory, any and all approvals (including BLAs and MAAs), licenses, registrations or authorizations of any Regulatory Authority necessary in order to commercially distribute, sell or market a product in such country or some or all of such extra-national territory, including solely to the extent required as a condition to commercial sale to end users, any pricing or reimbursement approvals.

1.54 "Regulatory Authority" means any national (e.g., the FDA), supra-national (e.g., the EMA), regional, state or local regulatory agency, department, bureau, commission, council or other governmental authority, in any jurisdiction in the world, involved in the granting of Regulatory Approval.

1.55 "Royalty Reduction" has the meaning set forth in Section 4.3(b).

1.56 "Royalty Term" has the meaning set forth in Section 4.3(d).

1.57 "Sublicensee" means any Third Party that is granted a sublicense as permitted by Section 2.2, either directly by CureVac or its Affiliates or indirectly by any other Sublicensee hereunder.

1.58 "Sublicense Income" means the fees and other payments, including upfront payments as well as development, regulatory milestone payments received by CureVac or its Affiliates from a Sublicensee, excluding: (a) royalty payments and net sales milestones; (b) reimbursement of costs and expenses, including for patent prosecution and enforcement and (c) equity or premium on equity and (d) loans or loans forgiven either (i) as a result of financial distress of the borrower or (ii) that are not specific to the Licensed Product.

1.59 "Target" means the Target identified in **Appendix 1.59** hereto. The Target includes

(a) up to N (N= […***…]) proteins, including all possible combinations resulting from removing one of the N proteins (N minus […***…] proteins), together with all variants of such

proteins, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof; *provided*, *however*, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring protein; and

(b) […***…] antigens of a given pathogen, including […***…] antigen and any combination of such antigens, together with all variants of such antigens, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs, orthologs thereof, *provided*, *however*, that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar biological activity to the naturally occurring antigen; and

(c) a DNA Target, *provided*, *however*, that the first DNA Target for each DNA Editing Protein would not count as a Target. Each subsequent DNA Target for this DNA Editing Protein would count as a Target. For clarity, a DNA Editing Protein would be defined as a Target under (a) above and count as a single Target.

If a given protein, *e.g.*, an antibody or enzyme, comprises separated amino acid chains which might be delivered by separated mRNA Constructs, such proteins would be defined as one Target.

1.60 "Technology" means collectively Patents and Know-How.

1.61 "Term" has the meaning set forth in Section 10.1.

1.62 "Territory" means worldwide.

1.63 "Third Party" means any person or entity other than CureVac, Arcturus and their respective Affiliates.

1.64 "Third Party Claims" has the meaning set forth in Section 9.6(a).

1.65 "Valid Claim" means a claim of

(a) an issued and unexpired patent (as may be extended through supplementary protection certificate or patent term extension) or

(b) a pending patent application, *provided*, *however*, that once the priority date or earliest filing date to which the pending patent application refers is more than seven years old, such claim shall not constitute a Valid Claim for purposes of this License Agreement anymore, unless and until a patent issues with such claim

included in the Arcturus Technology Patents, which claim has not been revoked, held invalid or unenforceable by a patent office, court or other governmental agency of competent jurisdiction in a final and non-appealable decision (or decision from which no appeal was taken within the allowable time period) and has not been disclaimed, denied, abandoned or admitted to be invalid or unenforceable through reissue, re-examination or disclaimer or otherwise.

2. License Grants; Technology Transfer.

2.1 Licenses by Arcturus. Subject to the terms and conditions of this License Agreement, Arcturus hereby grants to CureVac an exclusive license, with the right to sublicense in multiple tiers under the Arcturus Technology Patents and the Arcturus Know-How, in each case solely to develop, have developed, make, have made, use and have used, sell, offer for sale, have sold and import and have imported Licensed Products in the Field of Use in the Territory.

2.2 Sublicensing Rights.

(a) *CureVac Sublicenses*. The licenses granted in Section 2.1 may be sublicensed (with the right to sublicense through multiple tiers), in full or in part, by CureVac, its Affiliates or Sublicensees to CureVac's Affiliates and Third Parties provided, that for any sublicense:

(i) Each sublicense will be in writing (*provided*, *however*, that not each sublicense to Affiliates must be in writing) and on terms consistent with and subject to the terms of this License Agreement, including but not limited to the limitations on patent prosecution, enforcement and defense rights of such Sublicensee as set forth in Sections 6.1(d) and 7.2(e);

(ii) CureVac will be responsible for any and all obligations of such Sublicensee (including Affiliates and Sublicensees) as if such Sublicensee were CureVac hereunder;

(iii) CureVac provide to Arcturus a copy of such sublicense agreement within thirty (30) days of execution (which copy may be redacted for terms that are not otherwise required to confirm conformance with the terms of this License Agreement); and

(iv) Any sublicense granted by CureVac (and any further sublicenses) to any rights licensed to it hereunder shall terminate immediately upon the termination of this License Agreement, provided that for sublicense to a Third Party, such sublicensed rights shall not terminate if, as of the effective date of such termination pursuant to Sections 10.2, 10.3(a) or 10.4, such Sublicensee is not in material default of its obligations under its sublicense agreement, and within […***…] days of such termination and the disclosure of this License Agreement to the Sublicensee, the Sublicensee agrees in writing to be bound directly to Arcturus under a license agreement substantially similar to this License Agreement with respect to the rights sublicensed hereunder, substituting such Sublicensee for CureVac.

(b) *Subcontractors*. For clarity purposes, CureVac is entitled to engage contract research organizations and contract manufacturing organizations for the development and manufacture of Licensed Products on behalf of CureVac. To the extent such contract organizations require a license to perform such subcontracted activities under applicable Laws, CureVac is entitled to grant a limited license solely

to perform the work for which the subcontractor is engaged, without an obligation to meet the conditions of Section 2.2 (a)(iii).

(c) *Technology Transfer.* Following the License Agreement Effective Date, Arcturus will use Diligent Efforts to transfer the formulation process for the Licensed Products that are intended to express the Target to CureVac or a reputable and competent GMP manufacturer selected by CureVac and reasonably acceptable to Arcturus. Upon written request by CureVac, Arcturus will conduct a technology transfer to CureVac and/or its designee(s). Arcturus will make its personnel available without charge for a total of […***…] hours during normal working hours for such transfer, and for additional hours in excess of […***…] up to a total of […***…] hours to be invoiced monthly at the then current FTE Cost. Such designee(s) may be an Affiliate, sublicensee or Third Party manufacturers selected by CureVac and reasonably acceptable to Arcturus, and which Third Party manufacturers may also be a backup manufacturer or a second manufacturer of Licensed Products as required for the applicable transferee of the then-current process. CureVac shall reimburse Arcturus for the reasonable cost (including internal FTE Cost) incurred to conduct such technology transfer as specified above.

2.3 Updates to Appendix 1.4; Exclusion of Certain Patents. Arcturus shall notify CureVac at least once every […***…] months of Patents that are added to the Arcturus Technology following the License Agreement Effective Date or any Patents that have been abandoned or discontinued in accordance with the terms of this License Agreement**. Appendix 1.4** shall be deemed automatically updated to include any such added Patents, provided that with written notice to Arcturus, CureVac may elect upon […***…] days' irrevocable written notice to Arcturus to exclude any particular Arcturus Technology Patents. Following any such written notice by CureVac, upon the expiration of the notice period the identified Arcturus Technology Patents that CureVac specifies for exclusion from this License Agreement will no longer be licensed to CureVac hereunder, and CureVac shall not have any rights (including rights pursuant to this Agreement) under such Arcturus Technology Patents nor obligations hereunder with respect to such Arcturus Technology Patents. For clarity, in the event that the Licensed Product is subsequently determined to be covered or otherwise infringe a Valid Claim of any excluded patent hereunder, then such infringement shall be deemed to be a material breach of this License Agreement by CureVac.

2.4 Documents and Declarations. At CureVac's reasonable request and cost and expense, Arcturus shall execute all documents, deliver declarations regarding the licenses granted hereunder, and Arcturus shall reasonably cooperate with CureVac to the extent such documents, declarations and/or cooperation are required to give effect to this License Agreement and/or for the recording or registration of the licenses granted hereunder at the various patent offices in the Territory for the benefit of CureVac, its Affiliates or their Sublicensees.

2.5 Diligence; Reporting. CureVac shall use Diligent Efforts to develop, manufacture and commercialize Licensed Products in the Field of Use in the Territory, and shall keep Arcturus reasonably informed as to the progress and results of its and its Affiliates' and Sublicensees' development, manufacture and commercialization of the Licensed Product. Without limiting the foregoing, CureVac shall provide Arcturus with a written report of the development, manufacture and commercialization of the Licensed Product within […***…] days after the end of each calendar year, and shall promptly respond to Arcturus reasonable questions or requests for additional information relating to such activities.

2.6 Compliance. CureVac shall at all times comply with all applicable Laws (including anti-bribery laws) in the development, manufacture and commercialization of the Licensed Product and the performance of its other obligations under this License Agreement, and shall not use any employee or consultant who has been debarred by any Regulatory Authority or, to CureVac's knowledge, is the subject of debarment proceedings by a regulatory authority.

2.7 Updates. Arcturus shall inform CureVac within […***…] Business Days of intellectual property matters affecting the Arcturus Technology Patents and the Arcturus Know-How of which it becomes aware that would reasonably be considered to negatively impact the rights of CureVac pursuant to this Agreement.

2.8 Material. CureVac shall have the right to retain Material provided by Arcturus under the Development and Option Agreement, to the extent such Material is necessary or useful for the exercise of a CureVac's rights or obligations under this License Agreement. Following the License Agreement Effective Date, only the provisions of this License Agreement, but not of the Development and Option Agreement, shall apply in relation to such Material.

3. License Limitations.

3.1 Reserved Rights. No licenses or other rights are granted by Arcturus hereunder to use any trademark, trade name, trade dress or service mark owned or otherwise Controlled by Arcturus or any of its Affiliates. All licenses and other rights are or shall be granted only as expressly provided in this License Agreement, and no other licenses or other rights is or shall be created or granted by either Party hereunder by implication, estoppel or otherwise. CureVac shall not, and shall not permit any of its Affiliates or Sublicensees to, practice or use any Arcturus Technology outside of the scope of the license granted to it under Section 2.1 or in contravention of Section 3.1. Arcturus retains the exclusive right to practice, license and otherwise exploit the Arcturus Technology outside the scope of the licenses granted to CureVac under Section 2.1 Notwithstanding the exclusive license granted to CureVac under Section 2.1, Arcturus retains the right under the Arcturus Technology to perform, or have performed, Arcturus' obligations under this License Agreement

3.2 Other Licenses. Arcturus acknowledges the rights granted to CureVac pursuant to this Agreement and shall not grant licenses under Arcturus Technology to Third Parties that are in conflict with this License Agreement it being understood that a license to enable or implement any Pre-Existing Restriction with respect to the Target shall not be deemed a conflict hereunder. In addition, Arcturus shall use Diligent Efforts to undertake that any licenses obtained from Third Parties will be sublicensable to CureVac, to the extent required or useful for the Licensed Product, provided that CureVac shall be responsible for an allocable portion of the payment and obligations that may be required in order to obtain rights with respect to the Licensed Product pursuant to such Third Party agreement.

4. Payments and Royalties.

4.1 Milestone Payments. CureVac will make milestone payments (each, a "Milestone Payment") to Arcturus upon the first occurrence of each of the milestone events (each, a "Milestone Event") by Licensed Product as set forth below in this Section 4.1. CureVac will notify Arcturus of the achievement of each Milestone Event (whether achieved by CureVac, its Affiliates or Sublicensees) within (i) […***…] Business Days of such

achievement, if the Milestone Event is achieved by CureVac or its Affiliates, or (ii) […***…] Business Days of the receipt by CureVac of a notification about the achievement, if the Milestone Event is achieved by a Sublicensee.

Each Milestone Payment will be non-refundable, non-creditable and payable to Arcturus by CureVac within […***…] days of delivery of an invoice from Arcturus following notification from CureVac pursuant to the preceding paragraph, provided that if no such notification is timely provided by CureVac, the Milestone Payment shall be deemed payable […***…] days after (A) the achievement of such Milestone Event, if the Milestone Event is achieved by CureVac or its Affiliates, or (B) after the receipt by CureVac of the notification from CureVac pursuant to Section 4.1(ii). For clarity, the term "non-refundable" is not intended to limit either Party's rights to pursue damages arising from a breach of this Agreement.

If one or more of the Milestone Events set forth below are not achieved or not required for any reason, the payment for such skipped Milestone Event will be due at the same time as the payment for the next achieved Milestone Event. For clarity: […***…].

For clarity, to the extent that a Licensed Product is initiated against a Rare Disease Target and later expanded to a non-Rare Disease Target, then any and all Milestone Payments not previously made shall be due and payable upon the achievement of the next non-Rare Disease Milestone (e.g., […***……***…]).

Milestone Event	***Milestone Payment***
Rare Disease Targets	
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

Milestone Event	*Milestone Payment*
[…***……***…]	[…***…]
Non-rare Disease Targets	
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

4.2 Sublicensing Revenues. If within twenty-four (24) months after the License Agreement Effective Date CureVac grants a sublicense to a Third Party under this License Agreement for the development and commercialization of Licensed Products, then CureVac will pay to Arcturus […***…] of all Sublicense Income actually received by CureVac, to the extent the Sublicense Income exceeds the Option Exercise Fee paid by CureVac under the Development and Option Agreement to exercise the Option for this License Agreement and the Milestone Payments paid by CureVac under this License Agreement. The payments will be made within […***…] days after receipt by CureVac from the Third Party. For purposes of clarity, if CureVac grants a sublicense to Third Parties later than […***…] months after the License Agreement Effective Date, CureVac will not owe any Sublicensing Income to Arcturus.

4.3 Royalties.

(a) *Royalty*. Subject to the remainder of this Section 4.3, on a country-by-country basis and a Licensed Product-by-Licensed Product basis, CureVac will pay to Arcturus (i) a royalty of […***…] of Net Sales of the Licensed Product (ii) as well as of any net sales milestones (without offset for any reductions pursuant to Section 4.3(b)) for such Licensed Product received from the Sublicensee.

(b) *Third Party Payments and Royalty Reductions*. If CureVac or its Affiliate or Sublicensee, in its reasonable judgment, considers it necessary or useful to obtain a license from any Third Party under any LMD Technology that Covers a Licensed Product in order to develop, manufacture or commercialize such Licensed Product, the amount of CureVac's royalty obligations under Sections 4.3(a) will be reduced by […***…] of the amount of the upfront, milestone and royalty payments made to such Third Party on account of the development, manufacture or commercialization of such Licensed Product ("Royalty Reductions"), *provided, however*, that any Royalty Reduction shall not result in less than the minimum royalty due to Arcturus under Section (c) below.

(c) *Minimum Royalty.* In no event will the Royalty payable by CureVac to Arcturus for any Licensed Product be less than (i) […***…] if the reduction in subsection (e) does not apply; or (ii) […***…] if the reduction in subsection (e) also applies.

(d) *Term*. The royalty term ("Royalty Term") shall expire on a country-by-country and Licensed Product-by-Licensed Product basis, on the last to occur of (i) expiration of the last to expire Valid Claim in the Arcturus Technology that, but for the license described herein from Arcturus to CureVac for the applicable Licensed Product, is infringed by the making, using or sale of such Licensed Product, (ii) expiration of any period of data exclusivity, market exclusivity or supplemental protection certificates covering the Licensed Product in such country; and (iii) […***…] years after First Commercial Sale of Licensed Product in such country. For the avoidance of doubt, upon exhaustion of the obligation to pay Royalties to Arcturus as set forth above the continued use of Arcturus Know-How comprised in the Arcturus Technology for the development, manufacture and/or sale of th**e** Licensed Product shall not, in and of itself, obligate CureVac to pay further royalties to Arcturus. Thereafter, CureVac's license under Section 2.1 will become irrevocable, perpetual, fully paid-up and royalty-free on a country-by-country and Licensed Product-by-Licensed Product basis.

(e) *Know-How Royalty.* On a country-by-country, and a Licensed -Product-by-Licensed Product basis, in the event that during the Royalty Term a Licensed Product is not covered by a Valid Claim, the royalty otherwise payable for such Licensed Product, after the Royalty Reductions above, will be reduced by […***…].

4.4 Payment Terms.

(a) *Manner of Payment*. All payments to be made by CureVac hereunder will be made in U.S. dollars by wire transfer to such bank account as Arcturus may designate.

(b) *Records and Audits*. CureVac shall keep, and shall cause each of its Affiliates and Sublicensees, as applicable, to keep adequate books and records of accounting for the purpose of calculating all royalties and other amounts payable to Arcturus hereunder. For the […***…] years next following the end of the calendar year to which each shall pertain, such books and records of accounting (including those of CureVac's Affiliates and Sublicensees) shall be kept at each of their principal places of business and shall be open for inspection at reasonable times and upon reasonable notice by an independent certified accountant selected by Arcturus, and which is reasonably acceptable to CureVac, for the sole purpose of inspecting the Net Sales calculations and supporting details to the extent reasonably necessary and resulting royalties and other amounts due to Arcturus under this License Agreement. In no event shall such inspections be conducted hereunder more frequently than once every […***…] months. Such accountant must have executed and delivered to CureVac and its Affiliates, a confidentiality agreement as reasonably requested by CureVac, which shall include provisions limiting such accountant's disclosure to Arcturus to only the results and basis for such results of such inspection. The results of such inspection, if any, shall be binding on both Parties. Any underpayments plus interest from the original due date shall be paid by CureVac within […***…] days

of notification of the results of such inspection. Any overpayments shall be fully creditable against amounts payable in subsequent payment periods. Arcturus shall pay for such inspections, except that in the event there is any upward adjustment in aggregate royalties and other amounts payable for any calendar year shown by such inspection of more than […***…] of the amount paid, CureVac shall reimburse Arcturus for any reasonable out-of-pocket costs of such accountant.

(c) *Reports and Royalty Payments*. For as long as royalties are due under Section 4.3, CureVac shall furnish to Arcturus written reports.

(i) Reports shall be provided within […***…] days of (1) the end of the Calendar Quarter if Net Sales are generated by CureVac and its Affiliates, and (2) the receipt of corresponding information (which may be estimated) from Sublicensees but in any event within […***…] days of the end of the Calendar Quarter with respect to Net Sales generated by such Sublicensees.

(ii) Royalty payments for each Calendar Quarter shall be due within […***…] Business Days of delivery of an invoice from Arcturus following submission of a royalty report from CureVac, but only subject to the prior receipt by CureVac of the corresponding royalty payment from the Sublicensee, if applicable; however such royalty payments due to Arcturus shall not be reduced by deductions which exceed those covered by the Net Sales definition according to Section 1.43.

(iii) The report shall include, at a minimum, the following information for the applicable Calendar Quarter for each Licensed Product if Net Sales are generated by CureVac and its Affiliates: (i) the gross sales by country reasonably required for the calculation of royalty payments due according to this Agreement, (ii) the calculation in reasonable detail of the Net Sales from such gross sales amounts, including the deductions pursuant to the definition of Net Sales and the amounts of any credits or reductions permitted by Section 4.2; and (iii) the computations for any Arcturus currency conversions pursuant to subsection (d) below.

(iv) CureVac will require each Sublicensee to share with Arcturus the information listed in the foregoing clauses as it relates to Net Sales made by such Sublicensee, and to the extent practicable, will include such Sublicensee information in such report; provided that the level of detail with respect to the items subject to report pursuant to Section 4.4(c)(iii) shall be limited to the information that CureVac actually receives from any such Sublicensee. All such reports shall be considered the Confidential Information of CureVac, subject to Section 4.4(b).

(d) *Currency Exchange*. With respect to Net Sales invoiced in U.S. dollars, the Net Sales and the amounts due to Arcturus hereunder will be expressed in U.S. dollars. With respect to Net Sales invoiced in a currency other than U.S. dollars, payments will be calculated based on the average of the closing exchange rates reported by the Wall Street Journal (*http://quotes.wsj.com/fx/EURUSD*), or such other source as the Parties may agree in writing, of the applicable reporting period for the payment due.

(e) *Taxes*. CureVac may withhold from payments due to Arcturus amounts for payment of any withholding tax that is required by Law to be paid to any taxing authority with respect to such payments. CureVac will provide Arcturus all relevant documents and correspondence, and will also provide to Arcturus any other cooperation or assistance on a reasonable basis as may be necessary to enable Arcturus to claim exemption from such withholding taxes and to receive a refund of such withholding tax or claim a foreign tax credit. CureVac will give proper evidence from time to time as to the payment of any such tax. The Parties will cooperate with each other in seeking deductions under any double taxation or other similar treaty or agreement from time to time in force. CureVac shall use Diligent Efforts to minimize withholding taxes. In the event that any tax deduction or withholding obligation arises or increases as a direct result of any reincorporation, redomiciliation, change in source of payments under this Agreement or other similar corporate structuring actions undertaken by CureVac from and after the License Agreement Effective Date, then CureVac shall increase the payment (in respect of which such deduction or withholding of tax is required to be made) to ensure that Arcturus receives an amount equal to the amount that it would have received had no such action occurred. Apart from any such permitted withholding and those deductions expressly included in the definition of Net Sales, the amounts payable by CureVac to Arcturus hereunder will not be reduced on account of any taxes, charges, duties or other levies. Each Party shall be solely responsible for the payment of all taxes imposed on its share of income arising directly or indirectly from the activities of the Parties under this License Agreement.

(f) *Blocked Payments*. In the event that, by reason of applicable law in any country, it becomes impossible or illegal for CureVac or its Affiliates or Sublicensees to transfer, or have transferred on its behalf, payments owed to Arcturus hereunder, CureVac will promptly notify Arcturus of the conditions preventing such transfer and such payments will be deposited in local currency in the relevant country to the credit of Arcturus in a recognized banking institution proposed by Arcturus and reasonably acceptable to CureVac or, if none is proposed by Arcturus within a period of […***…] days, in a recognized banking institution selected by CureVac or its Affiliate or Sublicensee, as the case may be, and identified in a written notice given to Arcturus.

(g) *Interest Due*. If any payment due to Arcturus under this License Agreement is overdue (and is not subject to a good faith dispute), then CureVac will pay interest thereon (before and after any judgment) at an annual rate of the lesser of […***…] above the prime rate as reported in The Wall Street Journal, Eastern Edition, and the maximum rate permitted by applicable Law, such interest to run from the date upon which payment of such sum became due until payment thereof in full together with such interest.

(h) *Mutual Convenience of the Parties*. The royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying royalties and other amounts to Arcturus.

5. Ownership and Inventorship of IP.

5.1 Solely-Owned IP. As between the Parties and subject to Section 5.3, each Party will own and retain all right, title and interest in and to any and all Know-How and Patents

arising therefrom that are discovered, created, conceived, developed or reduced to practice under or in connection with this License Agreement (the "Inventions") solely by or on behalf of such Party. Subject to the licenses hereunder and the other terms and conditions of this License Agreement or any other agreement between the Parties, each Party will be solely responsible for the prosecution and maintenance, and the enforcement and defense, of its solely-owned Patents.

5.2 Inventorship. Inventorship of all Inventions shall be determined in accordance with applicable laws. Each Party will ensure that each employee, consultant and subcontractor conducting any activities under this License Agreement on behalf of such Party will be subject to written agreements to assign to such Party all of its right, title and interest in and to the Inventions so that such Party can comply with its obligations with respect to the ownership allocation of the Inventions as set forth below. In addition, each Party shall be solely responsible for payments that may be required to any of such Party's employees or consultants and subcontractors in connection with or with respect to such agreements, including moral rights payments.

5.3 Ownership. Notwithstanding inventorship in the first instance pursuant to Section 5.2, ownership of all Inventions, as between the Parties, will be assigned by the Parties as follows: (a) Arcturus will solely own all Inventions that are improvements solely to the LMD Technology ("LMD Inventions"), and (b) CureVac will solely own all Inventions that are improvements solely to the mRNA Technology ("mRNA Inventions"). Specifically, CureVac hereby assigns to Arcturus all of its right, title and interest in and to any and all LMD Inventions, and agrees to take such actions reasonably requested by Arcturus to evidence such assignment. Arcturus hereby assigns to CureVac all of its right, title and interest in and to any and all mRNA Inventions, and agrees to take such actions reasonably requested by CureVac to evidence such assignment. For clarity, the assignment provisions with respect to mRNA Inventions are restricted solely to improvements to the mRNA Technology.

6. Patent Prosecution and Maintenance.

6.1 Generally.

(a) As between the Parties and subject to Section 6.2 below, Arcturus (or its Third Party licensor, if any) will have the sole right, at its sole costs, to prosecute and maintain Arcturus Technology Patents, other than the Joint Interest Patents.

(b) In relation to any Arcturus Technology Patents that specifically claim the Licensed Product, prior to filing, Arcturus will provide CureVac with copies of all specific claims relevant to the Licensed Product in such applications for all such Arcturus Technology Patents, and all other material submissions and correspondence relating to such claims with any patent authorities regarding such Arcturus Technology Patents, in sufficient time (not to be less than […***…] to allow for review and comment by CureVac. In addition, Arcturus will provide CureVac and its counsel with an opportunity to consult with Arcturus and its counsel regarding prosecution and maintenance of any such Arcturus Technology Patents, and Arcturus will not unreasonably refuse to address all reasonable comments timely made by or on behalf of CureVac.

(c) As between the Parties, CureVac will have the first right to prosecute and maintain any and all Joint Interest Patents and the Parties will share equally all costs

incurred by CureVac in connection with such efforts. Prior to filing, CureVac will provide Arcturus with copies of all applications for such Joint Interest Patents, and all other material submissions and correspondence with any patent authorities regarding such Joint Interest Patents, in sufficient time (not to be less than […***…] days) to allow for review and comment by Arcturus. In addition, CureVac will provide Arcturus and its counsel with an opportunity to consult with CureVac and its counsel regarding prosecution and maintenance of any such Joint Interest Patents, and CureVac will consider in good faith all reasonable comments timely made by or on behalf of Arcturus.

(d) In the event that CureVac or its Affiliates grants a sublicense pursuant to Section 2.2, as between CureVac and any such Sublicensee,

(i) to the extent any such Arcturus Technology Patent or Joint Interest Patent does not specifically claim the Licensed Product, CureVac shall retain its rights to prosecute any such sublicensed Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 6.1(b) and 6.1(c); provided, however, that such Sublicense may provide for instruction by the Sublicensee of CureVac's exercise of its rights to prosecute any sublicensed Arcturus Technology Patent or Joint Interest Patent;

(ii) to the extent any such Arcturus Technology Patent or Joint Interest Patent specifically claims the Licensed Product (i.e., with respect to the claims limited to the Licensed Product, but not the broader claims that cover other products or potential products in such Arcturus Technology Patents or Joint Interest Patents), CureVac shall have the right to sublicense its rights to prosecute any such sublicensed Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 6.1(b) and 6.1(c) to the Sublicensee.

6.2 Election Not to Prosecute or Maintain or Pay Patent Costs.

(a) If Arcturus elects not to file, prosecute or maintain any Arcturus Technology Patents that specifically claim the Licensed Product for which it is responsible under Section 6.1 in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, then Arcturus will so notify CureVac, promptly in writing with reasonable notice to enable CureVac to meet any deadlines by which an action must be taken to preserve such Arcturus Technology Patent that specifically claim the Licensed Product in such country, if CureVac so requests. Upon receipt of each such notice by Arcturus, CureVac will have the right, but not the obligation, to notify Arcturus in writing on a timely basis that Arcturus should transfer the prosecution or maintenance of such Arcturus Technology Patents that specifically claim the Licensed Product to CureVac and at CureVac's sole expense or continue the prosecution and/or maintenance of such Arcturus Technology Patent that specifically claim the Licensed Product in the respective country, and thereafter, Arcturus would prosecute and maintain such Arcturus Technology Patent that specifically claim the Licensed Product in such country at the sole direction and expense of CureVac, Arcturus would make available to CureVac all documentation and correspondence with respect to such Arcturus Technology Patent. CureVac's license to such Arcturus Technology Patent under Section 2.1 will be irrevocable and royalty-free, and such Arcturus Technology Patent will thereafter no longer be part of the Arcturus Technology for purposes of this License Agreement. CureVac is entitled to discontinue the payment of Patent Costs

for any Arcturus Technology Patents that specifically claim the Licensed Product at any time, provided that it will so notify Arcturus in writing in time for such discontinuance.

(b) If Arcturus elects not to pay its share of the Patent Costs associated with prosecution or maintenance of any Joint Interest Patents, then it shall assign its co-ownership share in such Patents to CureVac and the respective Patent shall no longer be considered a Joint Interest Patent.

(c) *By CureVac*. If CureVac elects not (i) to file, prosecute or maintain any Joint Interest Patents for which it is responsible under Section 6.1 in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, or (ii) to pay its share of the Patent Costs associated with prosecution or maintenance of any Joint Interest Patents then in each such case CureVac will so notify Arcturus, promptly in writing and in good time to enable Arcturus to meet any deadlines by which an action must be taken to preserve such Joint Interest Patent in such country at Arcturus' expense, if Arcturus so requests. Upon receipt of each such notice by CureVac, Arcturus will have the right, but not the obligation, to notify CureVac in writing on a timely basis that CureVac should transfer the prosecution or maintenance of such Joint Interest Patent to Arcturus and at Arcturus' sole expense. Arcturus is entitled to discontinue the payment of Patent Costs for any Joint Interest Patents at any time, provided that it will so notify CureVac in writing in time for such discontinuance. In the event that Arcturus assumes the prosecution and maintenance of any such Joint Interest Patent, then CureVac would make available to Arcturus all documentation and correspondence with respect to such Joint Interest Patent, such Joint Interest Patent shall no longer be licensed under this Agreement with respect to the Licensed Product.

6.3 Cooperation. Each Party will reasonably cooperate with the other Party in those activities involving the Arcturus Technology Patents and Joint Interest Patents set forth in Sections 6.1 and 6.2. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants and agents of CureVac and Arcturus and their respective Affiliates and Sublicensees to execute all documents, as reasonable and appropriate so as to enable such activities in respect of any such Arcturus Technology Patents in any country.

7. Patent Enforcement and Defense.

7.1 Notice. To the extent not in breach of an obligation of confidentiality, each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected infringement of any Arcturus Technology Patents by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any Arcturus Technology Patents, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto.

7.2 Enforcement and Defense.

(a) *Enforcement*.

(i) As between the Parties,

(1) Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up enforcement rights), at its cost, will have the first right, but not the obligation, to seek to abate any infringement of the Arcturus Technology Patents (other than those in subsection (2)) by a Third Party, or to file suit against any such Third Party for such infringement, and

(2) CureVac (or its sublicensee, if any) shall have the first right, but not the obligation, to take action or bring suit and bear all expenses against such Third Party infringer with respect to: (A) Joint Interest Patents; and/or (B) any other Arcturus Technology Patents that, on the date of first notice of such infringement, specifically claim the Licensed Product but are not necessary or useful for the research, development, manufacturing and commercialization of any product comprising Arcturus Technology that is exclusively licensed or optioned to a Third Party or is in Late Stage Development or being commercialized by Arcturus or its Affiliates.

(b) If the Party first responsible for such enforcement elects not to take action or to bring suit to prosecute such infringement or to continue such action or suit, it shall notify the other Party of such election within […***…] days after become aware of or receipt of the notice of the infringement or after the election to stop any such action or suit. If after the expiration of the […***…] days period (or, if earlier, the date upon which the responsible Party provides written notice that it does not plan to bring such action) the responsible Party has neither obtained a discontinuance of infringement nor filed suit against any such Third Party infringer of such Patent, then

(i) in the case of an election by Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up enforcement rights) not to prosecute an infringement of an Arcturus Technology Patent specifically claiming the Licensed Product, CureVac shall have the right, but not the obligation, to take action or bring suit against such Third Party infringer of such Patents, provided that the infringement is with respect to a product related to the Target(s) under this License Agreement, and further provided that CureVac shall bear all the expenses of such suit and

(ii) in the case of a CureVac election not to prosecute an infringement of a Joint Interest Patents or Arcturus Technology Patent with respect to which CureVac has rights to take first action, (i) Arcturus shall have the right, but not the obligation, to take action or bring suit against such Third Party infringer of such Patents, provided that Arcturus shall bear all the expenses of such suit,and CureVac shall join Arcturus in such suit to the extent legally required, unless (ii) CureVac decides to assign its interest in such Joint Interest Patent – on a country-by-country basis - to Arcturus and such Joint Interest Patent shall become an Arcturus Technology Patent and no longer subject to license pursuant to this License Agreement.

(c) *Defense*.

(i) As between the Parties,

(1) Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up defense rights) will have the first right, but not the

obligation, at its sole costs, to defend against a declaratory judgment action or other action challenging any Arcturus Technology Patents, other than: (i) Joint Interest Patents; and (ii) any other Arcturus Technology Patents that, on the date of first notice of such action, specifically claim the Licensed Product but are not necessary or useful for the research, development, manufacturing and commercialization of any product comprising Arcturus Technology that is exclusively licensed or optioned to a Third Party or is in Late Stage Development or being commercialized by Arcturus or its Affiliates, and

(2) CureVac shall have the first right, but not the obligation, at its sole costs, to defend against a declaratory judgment action or other action challenging Joint Interest Patents as well as such other Arcturus Technology Patents that specifically claim the Licensed Product.

(ii) If the Party first responsible for such defense does not take steps to defend within a commercially reasonably time, or elects not to continue any such defense (in which case it will promptly provide notice thereof to the other Party), then (i) in the case of an election by Arcturus and its Third Party licensor or licensee (solely to the extent of any existing back-up defense rights) not to defend an Arcturus Technology Patent specifically claiming the Licensed Product, CureVac shall have the right, but not the obligation, to defend any Arcturus Technology Patents that cover Licensed Product and no other product licensed or optioned by Arcturus to a Third Party or commercialized by Arcturus, provided that CureVac shall bear all the expenses of such suit and (ii) in the case of a CureVac election not to defend the Joint Interest Patents, Arcturus shall have the right, but not the obligation, to take action or bring suit to defend such Patents, provided that Arcturus shall bear all the expenses of such suit. Notwithstanding the foregoing, in the event that CureVac elects not to prosecute an infringement of a Joint Interest Patent, then CureVac shall, at its discretion, either (i) assign such Joint Interest Patent to Arcturus – on a country-by-country basis -, which shall become an Arcturus Technology Patent and no longer subject to license pursuant to this License Agreement or (ii) join Arcturus in such suit to the extent legally required.

(d) Notwithstanding the foregoing, any response to a Third Party infringer's counterclaim of invalidity or unenforceability of any Arcturus Technology Patents shall be controlled by the Party who controls the relevant enforcement proceeding pursuant to Section 7.2 (a) unless otherwise mutually agreed by the Parties.

(e) In the event that CureVac or its Affiliates grants a sublicense pursuant to Section 2.2, as between CureVac and any such Sublicensee,

(i) to the extent any such Arcturus Technology Patent or Joint Interest Patent does not specifically claim the Licensed Product, CureVac shall retain its rights to enforce and defend Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 7.2(a), 7.2(b), 7.2(c) and 7.2(d); provided, however, that CureVac’s exercise of its rights to enforce or defend such Arcturus Technology Patent or Joint Interest Patent may be instructed by a Sublicensee;

(ii) to the extent any such Arcturus Technology Patent or Joint Interest Patent specifically claims the Licensed Product, CureVac shall have the right

to sublicense its rights to enforce and defend Arcturus Technology Patents and Joint Interest Patents as set forth in Sections 7.2(a), 7.2(b), 7.2(c) and 7.2(d) to the Sublicensee.

(f) *Withdrawal, Cooperation and Participation*. With respect to any infringement or defensive action identified above in this Section 7.2 which may be controlled by either CureVac or Arcturus:

(i) If the controlling Party ceases to pursue or withdraws from such action, it will promptly notify the other Party (in good time to enable the other Party to meet any deadlines by which any action must be taken to preserve any rights in such infringement or defensive action) and such other Party may substitute itself for the withdrawing Party, shall be granted the right and standing to sue in the other Party's name, and proceed under the terms and conditions of this Section 7.2.

(ii) The non-controlling Party will cooperate with the Party controlling any such action (as may be reasonably requested by the controlling Party), including (A) providing access to relevant documents and other evidence, (B) making its and its Affiliates and licensees and Sublicensees and all of their respective employees, subcontractors, consultants and agents available at reasonable business hours and for reasonable periods of time, but only to the extent relevant to such action, and (C) if necessary, by being joined as a party, subject for this clause (C) to the controlling Party agreeing to indemnify such non-controlling Party for its involvement as a named party in such action and paying those Patent Costs incurred by such Party in connection with such joinder. The Party controlling any such action will keep the other Party updated with respect to any such action, including providing copies of all documents received or filed in connection with any such action.

(iii) Each Party will have the right to participate or otherwise be involved in any such action controlled by the other Party, in each case at the participating (i.e., non-controlling) Party’s sole cost and expense. If a Party elects to so participate or be involved, the controlling Party will provide the participating Party and its counsel with an opportunity to consult with the controlling Party and its counsel regarding the prosecution of such action (including reviewing the contents of any correspondence, legal papers or other documents related thereto), and the controlling Party will take into account reasonable requests of the participating Party regarding such enforcement or defense.

(g) *Settlement*. Neither Party will settle or consent to an adverse judgment in any action described in this Section 7.2 and controlled by such Party, including any judgment which affects the scope, validity or enforcement of any Arcturus Technology Patents involved therewith, without the prior written consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned).

(h) *Damages*. Unless otherwise agreed by the Parties, all monies recovered upon the final judgment or settlement of any action which may be controlled by either CureVac or Arcturus and described in Section 7.2(a) or 7.2(c) in each case will be

used first to reimburse the controlling Party, and thereafter the non-controlling Party, for each of their out-of-pocket costs and expenses relating to the action, with the balance of any such recovery to be divided as follows:

(i) To the extent the action involves a Third Party's research, development, manufacture or commercialization of any product other than the Licensed Product (or a LMD product directed to the same Target as the Licensed Product), Arcturus shall retain all such recovery; and

(ii) To the extent the action involves a Third Party's research, development, manufacture or commercialization of the Licensed Product (or a LMD product directed to the same Target as the Licensed Product), CureVac will retain such recovery, less the amount of royalties payable to Arcturus by treating such recovery as "Net Sales" hereunder.

(i) Patent Marking. CureVac shall mark all Licensed Product if and to the extent required by the applicable patent marking laws, and shall require all of its Affiliates and sublicensees to do the same.

8. Confidentiality.

8.1 Confidential Information. Each Party ("Disclosing Party") may disclose to the other Party ("Receiving Party"), and Receiving Party may acquire during the course and conduct of activities under this License Agreement, certain proprietary or confidential information of Disclosing Party in connection with this License Agreement.

8.2 Restrictions. During the Term and for […***…] years thereafter, Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, but in no event less than reasonable care. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this License Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent to Receiving Party's Affiliates, and each of their employees, subcontractors, consultants and agents who have a need to know such Confidential Information in order to perform their obligations and exercise their rights under this License Agreement and who are under written obligation to comply with the restrictions on use and disclosure that are no less restrictive than those set forth in this Section 8.2. Receiving Party assumes responsibility for such entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

8.3 Exceptions. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to a specific portion of the Disclosing Party's Confidential Information to the extent that Receiving Party can demonstrate that such portion: (i) was known to Receiving Party or any of its Affiliates prior to the time of disclosure by the Disclosing Party without obligation of confidentiality; (ii) is or becomes public knowledge through no action or omission of Receiving Party or any of its Affiliates; (iii) is obtained on a non-confidential basis by Receiving Party or any of its Affiliates from a Third Party who to Receiving Party's knowledge is lawfully in possession thereof (or if possession is obviously unlawful) and

under no obligation of confidentiality to Disclosing Party; or (iv) has been independently developed by or on behalf of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information as documented by the internal records of the Receiving Party.

8.4 Permitted Disclosures. Notwithstanding the obligations set forth in Section 8.2, Receiving Party may disclose Disclosing Party's Confidential Information (including this License Agreement and the terms herein) to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

(e) in order to comply with applicable Law (including any securities Law or regulation or the rules of a securities exchange) or with a legal or administrative proceeding;

(f) in connection with prosecuting or defending litigation, and filing, prosecuting and enforcing Arcturus Technology Patents in connection with Receiving Party's rights and obligations pursuant to this License Agreement;

(g) to attorneys, accountants, auditors, acquirers, licensees, partners or permitted assignees; financial advisors, investors and lenders, including potential acquirers, licensees, partners, assignees, financial advisors, investors and lenders; and

(h) in the case of CureVac, to (i) subcontractors; or (ii) potential licensees or collaboration partners, but only such information that is reasonably necessary or useful for the subcontractor to perform the subcontracted work or for the potential licensee or partner to evaluate the applicable Licensed Product, and LMD or Licensed Product manufacturing processes;

provided that (1) where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant to subsections (a) and (b) sufficiently prior to making such disclosure so as to allow Disclosing Party reasonably adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to subsections (c), each of those persons or entities are required to comply with the restrictions on use and disclosure in Section 8.2 (other than financial advisors, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

8.5 Return of Confidential Information. Upon expiry or earlier termination of this License Agreement, upon written request of a Party (such request, if made, to be made within three (3) months of such expiry or termination) the other Party will destroy or return (as shall be specified in such request) to the requesting Party all copies of the Confidential Information of the requesting Party; provided that the Party may retain: (i) one copy of such Confidential Information for record-keeping purposes, for the sole purpose of ensuring compliance with this License Agreement; (ii) any copies of such Confidential Information as is required to be retained under applicable Law; (iii) any copies of such Confidential Information as is necessary or useful for such Party to exercise a right or fulfill an obligation under another License Agreement, if any, or as set forth in this License Agreement; and (iv) any copies of any computer records and files containing Confidential Information that have been created by such Party's routine archiving/backup procedures. Upon request of the requesting Party, the

Receiving Party shall confirm in writing to the requesting Party the destruction or return of all copies of the Confidential Information of the requesting Party.

8.6 Publications. Notwithstanding anything in this License Agreement to the contrary, CureVac is permitted to publish the results of its development under this License Agreement, *provided, however*, that it will not disclose Arcturus Confidential Information in any publication by CureVac of the results of any Licensed Product development by CureVac without Arcturus' prior written consent, which will not be unreasonably withheld, conditioned or delayed.

8.7 Terms of this License Agreement; Press Release. The Parties agree that the existence and terms of the Parties' relationship and this License Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Section 8.4. Except as mutually agreed or otherwise required by Law or securities exchange regulation, each Party agrees not to issue any press release or public statement disclosing information relating to the existence of this License Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party.

9. Warranties; Limitations of Liability; Indemnification.

9.1 Representations and Warranties. Each Party represents and warrants to the other as of the License Agreement Effective Date that:

(a) it is a corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated,

(b) it has the legal right and power to enter into this License Agreement, to extend the rights and licenses granted or to be granted to the other in this License Agreement, and to fully perform its obligations hereunder,

(c) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this License Agreement and the performance of its obligations hereunder,

(d) this License Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms and

(e) except with respect to any Pre-existing Restrictions, the execution, delivery and performance by such Party of this License Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which such Party is a party or by which it is bound, including, in the case of Arcturus, each of the agreements which Arcturus has identified to CureVac prior to the License Agreement Effective Date, in each case as would reasonably be expected to have a material adverse effect on the rights of the other Party hereunder.

9.2 Additional Representations of Arcturus. Arcturus hereby represents and warrants to CureVac as of the License Agreement Effective Date as follows:

(a) *Impairment*. Except with respect to any Pre-existing Restrictions, neither Arcturus nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights including Know-How, that would in any way conflict with or impair the scope of any rights or licenses granted to CureVac with respect to the Licensed Product hereunder.

(b) *Patents*. **Appendix 1.4** sets forth a complete and accurate list of all Arcturus Technology Patents. Arcturus Controls the Arcturus Technology, and is entitled to grant the licenses specified herein. To Arcturus' knowledge, the Arcturus Technology Patents have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Arcturus Technology Patents is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and to Arcturus' knowledge as of the License Agreement Effective Date, no Arcturus Technology is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. As of the License Agreement Effective Date, neither Arcturus nor any of its Affiliates has received any notice alleging that the Arcturus Technology Patents are invalid or unenforceable, or challenging Arcturus' ownership of or right to use any such rights.

(c) *Entire LMD Technology.* The Arcturus LMD Technology licensed to CureVac under this License Agreement comprises all LMD Technology Controlled by Arcturus which is necessary or useful to develop, manufacture and commercialize the Licensed Products for purposes of this License Agreement.

(d) *Encumbrances.* As of the License Agreement Effective Date, Arcturus has the right to grant the license herein to CureVac and neither Arcturus nor any of its Affiliates has granted any liens or security interests on the Arcturus Technology to any Third Party that is inconsistent with the license granted to CureVac under Section 2.1.

(e) *Litigation.* There is no action, suit, proceeding or investigation pending or, to the knowledge of Arcturus, currently threatened against or affecting Arcturus that questions the validity of this License Agreement or the right of Arcturus to enter into this License Agreement or consummate the transactions contemplated hereby or that relates to the Arcturus Technology.

(f) *Infringement*. Neither Arcturus nor any of its Affiliates has received any written notice of any claim, nor does Arcturus or its Affiliates have any knowledge of any claim, that any Patent, Know-How or other intellectual property owned or controlled by a Third Party would be infringed or misappropriated by the practice of any Arcturus LMD Technology in connection with the production, use, research, development, manufacture or commercialization of any Licensed Product.

(g) *Third Party Infringement*. To Arcturus' knowledge, no Third Party is infringing or has infringed any Patent within the Arcturus LMD Technology or is misappropriating or has misappropriated any Know-how within the Arcturus LMD Technology, in each case relating to the Target.

9.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that any Licensed Product will be successful, in whole or in part. Except as otherwise expressly provided in this License Agreement, the Parties make no representations and extend no warranty of any kind under this License Agreement, neither express nor implied.

9.4 No Consequential Damages. Notwithstanding anything in this License Agreement or otherwise, neither Party will be liable to the other or any Third Party with respect to any subject matter of this License Agreement for any indirect or consequential damages, provided that this Section 9.4 will not apply to breaches of Article 8 or the Parties' indemnification rights or obligations under Section 9.6, or in the event of willful misconduct.

9.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this License Agreement through Affiliates, subcontractors or - in the event of CureVac - Sublicensees, *provided, however*, that each Party will remain fully responsible and liable for the performance by its Affiliates, subcontractors and Sublicensees, and will cause its Affiliates, subcontractors and Sublicensees to comply with the provisions of this License Agreement in connection therewith.

9.6 Indemnification.

(a) *Indemnification by CureVac*. CureVac will indemnify Arcturus, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, "Arcturus Indemnitees"), and defend and hold each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, "Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, "Third Party Claims") against the Arcturus Indemnitees to the extent arising from or occurring as a result of: (i) the breach by CureVac of any representation or warranty of this License Agreement; (ii) any gross negligence or willful misconduct on the part of any CureVac Indemnitee; or (iii) the development, manufacture or commercialization by or on behalf of CureVac or any of its Affiliates or Sublicensees of Licensed Product other than if related to an LMD component thereof specifically provided by Arcturus, except in each case (i)-(iii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of an Arcturus Indemnitee or Arcturus' breach of this License Agreement.

(b) *Indemnification by Arcturus*. Arcturus will indemnify CureVac, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "CureVac Indemnitees"), and defend and hold each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against CureVac Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Arcturus of any representation or warranty of this License Agreement; or (ii) any gross negligence or willful misconduct on the part of any Arcturus Indemnitee, except in each case (i) and (ii) to the extent arising from or occurring as a result of the gross negligence or willful misconduct on the part of a CureVac Indemnitee or CureVac's breach of this License Agreement.

(c) *Notice of Claim*. All indemnification claims provided for in Sections 9.6(a) and 9.6(b) will be made solely by such Party to this License Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an "Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 9.6(a) and 9.6(b), but in no event will the indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) *Defense, Settlement, Cooperation and Expenses*.

(i) *Control of Defense*. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within thirty (30) days after the indemnifying Party's receipt of an Indemnification Claim Notice. The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to indemnify the Indemnified Party in respect of the Third Party Claim, nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to such counsel and a possible conflict of interest of such counsel retained by the indemnifying Party). In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will as soon as possible deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including reasonable attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 9.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to engage counsel of its choice for such purpose; provided, however, that such engagement will be at the Indemnified Party's own cost and expense unless (i) the indemnifying Party has failed to promptly assume the defense and engage counsel in accordance with Section 9.6(d)(i) (in which case the Indemnified Party will control the defense) or (ii) the interests of the

Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, in which case the indemnifying Party will assume one hundred percent (100%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject to injunctive or other relief or otherwise adversely affecting the business of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, the indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 9.6(d)(i), the indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will use Diligent Efforts to cause each other indemnified party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith, at the indemnifying Party's expense. Such cooperation will include access during normal business hours afforded to the indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making indemnified parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 9.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a Calendar Quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

9.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program (including product liability insurance) to protect against potential liabilities and risk arising out of activities to be performed under this License Agreement, and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the respective industry of such Party for the activities to be conducted by such Party under this License Agreement. Subject to the preceding sentence, such liability insurance or self-insurance program will insure against all types of liability, including personal injury, physical injury or property damage arising out of the manufacture, sale, use, distribution or marketing of Licensed Product. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this License Agreement.

10. Term and Termination.

10.1 Term.

(a) This License Agreement will commence as of the License Agreement Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue on a Licensed Product-by-Licensed Product and a country-by-country basis, until there are no more payments owed to Arcturus in such country (the longest such period of time hereunder, the "Term"). Upon there being no more such payments hereunder in such country, the license contained in Section 2.1 will become irrevocable, perpetual and fully paid up and will remain in effect with respect to such Licensed Product in such country.

(b) If the Target to which this License Agreement relates is chosen by the Parties for co-development under the Co-Development Agreement, this License Agreement will automatically terminate upon the written agreement of the Parties to include such programs under the Co-Development Agreement, in accordance with Section 4.2(a) of the Co-Development Agreement.

(c) The Parties agree that this Agreement and the Co-Development Agreement relate to different projects and, therefore, the validity, term and termination of this Agreement shall be independent from the validity, term and termination of the Co-Development Agreement.

10.2 Termination by Arcturus.

(a) *Breach*. Arcturus will have the right to terminate this License Agreement in full upon delivery of written notice to CureVac in the event of any material breach by CureVac of any terms and conditions of this License Agreement, provided that such breach has not been cured within […***…] after written

notice thereof is given by Arcturus to CureVac specifying the nature of the alleged breach.

(b) *Disputed Breach*. If CureVac disputes in good faith the existence or materiality of a breach specified in a notice provided in accordance with Section 10.2(a), and CureVac provides Arcturus notice of such dispute within such […***…] period, then Arcturus shall not have the right to terminate this License Agreement under Section 10.2(a) unless and until it is finally determined, in accordance with Section 11.1, that CureVac has materially breached this License Agreement and that CureVac fails to cure such breach within […***…] following such decision. It is understood and agreed that during the pendency of such dispute, all of the terms and conditions of this License Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder. During the pendency of any such dispute, CureVac shall pay to Arcturus all Milestone Payments and royalty payments set forth herein.

(c) *Patent Challenge.* Except to the extent the following is unenforceable under the Laws of a particular jurisdiction, Arcturus may terminate this License Agreement on a Patent-by-Patent basis upon delivery of […***…] prior written notice to CureVac

(i) if CureVac or its Affiliates, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any Arcturus Technology Patents anywhere in the world and does not withdraw or settle such challenge within the […***…] cure period; or

(ii) if a sublicensee of CureVac, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any Arcturus Technology Patents anywhere in the world and CureVac does not terminate the corresponding sublicense agreement or such challenge is not withdrawn or settled (by such sublicensee or CureVac) within the […***…] cure period.

10.3 Termination by CureVac; Certain Remedy for Breach.

(a) *Breach*. CureVac will have the right to terminate this License Agreement in full upon delivery of written notice to Arcturus in the event of any material breach by Arcturus of any terms and conditions of this License Agreement, provided that such breach has not been cured within […***…] after written notice thereof is given by CureVac to Arcturus specifying the nature of the alleged breach.

(b) *Discretionary Termination*. CureVac will have the right to terminate this License Agreement in full at its discretion for any reason by delivering written notice to Arcturus, such termination to be effective […***…] following the date of such notice.

(c) *Maintenance of License*. In the event of a material breach by Arcturus of Sections 2.2(c) or 3.2, if such breach has not been cured within […***…] after written notice thereof, CureVac may notify Arcturus in writing that the License

Agreement shall remain in full force and effect, provided that any remaining payments to Arcturus pursuant to Sections 4.1, 4.2 and 4.3 following such notification shall be reduced by […***…].

10.4 Rights Upon Bankruptcy. All rights and licenses granted under or pursuant to this License Agreement by Arcturus or its Affiliates are, and will otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of right to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that CureVac and its Affiliates and Sublicensees, as licensees of such rights under this License Agreement, will retain and may fully exercise all of their rights and elections under the U.S. Bankruptcy Code and any foreign counterparts thereto. Without limiting the Parties' rights under Section 365(n) of the U.S. Bankruptcy Code, if a case under U.S. Bankruptcy Code is commenced by or against a Party, the other Party shall be entitled to a copy of any and all such intellectual property and all embodiments of such intellectual property, and the same, if not in the possession of such other Party, shall be promptly delivered to it (i) before this License Agreement is rejected by or on behalf of the bankrupt Party, within thirty (30) days after the other Party's written request, unless the bankrupt Party, or its trustee or receiver, elects within thirty (30) days to continue to perform all of its obligations under this License Agreement, or (ii) after any rejection of this License Agreement by or on behalf of the bankrupt Party, if not previously delivered as provided under clause (i) above. All rights of the Parties under this Section 10.4 and under Section 365(n) of the U.S. Bankruptcy Code are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party may have under this License Agreement, under the U.S. Bankruptcy Code, and any other applicable Laws. The non-bankrupt Party shall have the right to perform the obligations of the bankrupt Party hereunder with respect to such intellectual property, but neither such provision nor such performance by the non-bankrupt Party shall release the bankrupt Party from any such obligation or liability for failing to perform it.

10.5 Effects of Termination.

(a) Upon termination (but not expiration pursuant to Section 10.1) of this License Agreement for any reason:

(i) *Cessation of Rights*. Except as expressly provided herein, including Sections 8.5, 10.5(a) and as necessary for CureVac to sell off existing inventory as permitted under Section 10.5(iii) below, all rights and licenses granted by Arcturus to CureVac under this License Agreement will terminate. CureVac shall wind down the development (including any clinical trials), manufacture and commercialization of the Licensed Product in compliance with all applicable Laws and at its own cost and expense.

(ii) *Sell Off*. Notwithstanding the termination of CureVac's licenses and other rights under this License Agreement, CureVac shall retain the right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products, in each case that is intended for distribution, sale or disposition in the Territory, for a period of not more than six (6) months following the date of the effective termination, as though this License Agreement had not been terminated, and such distribution, sale or other disposition shall not constitute infringement of the Patents or other intellectual property or proprietary rights of Arcturus or its Affiliates. CureVac's right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products pursuant to this

Section 10.5(a)(ii) shall be subject to CureVac's continuing obligation to pay royalties with respect to the Net Sales.

(b) Upon termination pursuant to Section 10.1(b), Arcturus shall refund to CureVac the Option Exercise Fee (as defined in the Development and Option Agreement), the Milestone Payments already paid by CureVac and all other payments made by CureVac in relation to this License Agreement.

10.6 Survival. In addition to the termination consequences set forth in Section 10.5, the following provisions will survive termination or expiration of this License Agreement: Sections 1, 4 (to the extent of any outstanding payments accrued as of the effective date of termination), 5, 8, 9.4, 9.6, 10.5, 10.6 and 11. Termination or expiration of this License Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this License Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this License Agreement.

11. General Provisions.

11.1 Dispute Resolution.

(a) *Disputes*. Disputes arising under or in connection with this License Agreement will be resolved pursuant to this Section 11.1; *provided, however*, that in the event a dispute cannot be resolved without an adjudication of the rights or obligations of a Third Party (other than any CureVac Indemnitees or Arcturus Indemnitees identified in Section 9.6), the dispute procedures set forth Sections 11.1(c) and 11.1(c) will be inapplicable as to such dispute.

(b) *Dispute Escalation*. In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves. In the event that such dispute is not resolved on an informal basis within thirty (30) days, either Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive with the appropriate authority to determine the matter for such party), who will attempt in good faith to resolve such dispute by negotiation and consultation for a thirty (30) day period following receipt of such written notice

(c) *Dispute Resolution.* In the event the Chief Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Parties agree to try to solve such dispute amicably by mediation. The Parties shall conduct a mediation procedure according to the Mediation Rules of the World Intellectual Property Organization (WIPO) in effect on the date of the commencement of the mediation proceedings. The location of the mediation proceedings will be New York City, New York, U.S.. The number of mediators will be one (1). The language of the mediation proceedings will be English. If the dispute has not been settled pursuant to the said rules within sixty (60) days following the filing of a request for mediation or within such other period as the Parties may agree in writing, either Party may submit the dispute to final and binding arbitration. Any dispute relating to the validity

performance, construction or interpretation of this License Agreement, which cannot be resolved amicably between the Parties after following the procedure set forth in this Section 11.1, shall be submitted to arbitration in accordance with the Arbitration Rules of WIPO in effect on the date of the commencement of the arbitration proceedings. The location of the arbitration proceedings will be New York City, New York, U.S.. The number of arbitrators will be three (3). The language of the arbitration proceeding will be English. The decision of the arbitrators shall be final and binding upon the Parties (absent manifest error on the part of the arbitrator(s)) and enforceable in any court of competent jurisdiction.

11.2 Relationship of Parties. Nothing in this License Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied third party beneficiaries hereunder (except for CureVac Indemnitees and Arcturus Indemnitees for purposes of Section 9.6). For clarity, CureVac does not grant to Arcturus any rights or licenses under this License Agreement to any CureVac technology or intellectual property rights.

11.3 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law.

11.4 Governing Law. This License Agreement will be governed by and construed in accordance with the Laws of the State of New York, U.S., without respect to its conflict of Laws rules.

11.5 Counterparts; Facsimiles. This License Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this License Agreement by either Party will constitute a legal, valid and binding execution and delivery of this License Agreement by such Party.

11.6 Headings. All headings in this License Agreement are for convenience only and will not affect the meaning of any provision hereof.

11.7 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this License Agreement. Accordingly, the rule of construction that any ambiguity in this License Agreement will be construed against the drafting party will not apply.

11.8 Interpretation. Whenever any provision of this License Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this License Agreement as an entirety and not solely to the particular portion of this License Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Appendices in this License Agreement are to Sections and Appendices of this License Agreement. References to any Sections include Sections and subsections that are part of the related Section.

11.9 Binding Effect. This License Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

11.10 Assignment. This License Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this License Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that either Party may assign this License Agreement without such consent to an Affiliate or to its successor in connection with sale of all or substantially all of its assets or business or that portion of its business pertaining to the subject matter of this License Agreement (whether by merger, consolidation or otherwise).

11.11 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this License Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, or registered or certified mail, return receipt requested, postage prepaid or facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier) to the following addresses (or to such address as a Party may subsequently provide by written notice in accordance with this Section 11.11):

If to CureVac: CureVac AG
Paul-Ehrlich-Str. 15
72076 Tübingen
Germany
Attention: CEO and General Counsel
Fax: +49 7071 9883 - 1101

If to Arcturus: Arcturus Therapeutics Inc.
10628 Science Center Drive
Suite 200
San Diego, California 92121
USA
Attn: Chief Executive Officer
Copy to: General Counsel
Fax: (858) 300-5028

with a copy to (which copy shall not constitute notice):
Cooley LLP
3175 Hanover St.
Palo Alto, CA 94303
Attn: Glen Y. Sato
Fax: (650) 849-7400

11.12 Amendment and Waiver. This License Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the

undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

11.13 Severability. In the event that any provision of this License Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify the License Agreement to preserve (to the extent possible) their original intent.

11.14 Entire Agreement. This License Agreement together with the Development and Option Agreement and any other license agreements entered into during the Term pursuant to the Development and Option Agreement are the sole agreement with respect to the subject matter hereof and supersedes all other agreements and understandings between the Parties with respect to same.

11.15 Force Majeure. Neither Arcturus nor CureVac will be liable for failure of or delay in performing obligations set forth in this License Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Arcturus or CureVac; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

Appendix 1.3

Description of the Arcturus LMD Technology

[*To be completed in accordance with Section 5.2 of the Development and Option Agreement.*]

Appendix 1.4

Patents and Know-How within the Arcturus Technology
as of the License Agreement Effective Date
[*To be updated in accordance with Section 5.2 of the Development and Option Agreement.*]

(C) Patents

ARCTURUS LMD TECHNOLOGY
[…*…]**

*****Confidential Treatment Requested**

[…*…]**

(D) Know-How

[…***…]

Appendix 1.28

Joint Interest Patents

[*To be completed in accordance with Section 5.2 of the Development and Option Agreement and updated during the Term*]

Appendix 1.50

Pre-Existing Restrictions

- […***…]

*****Confidential Treatment Requested**

Appendix 1.59

Description of the Target

The description for a Target described in sub-clause (a) of the definition of Target shall include the following information:

a. […***…];

b. […***…]; and

c. […***…]; and

d. […***…]

The description for a Target described in sub-clause (b) of the definition of Target shall include the following information:

b. […***…]

The description for a Target described in sub-clause (c) of the definition of Target shall include the following information:

a. […***…]; and

b. […***…]

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

CO-DEVELOPMENT AND CO-COMMERCIALIZATION AGREEMENT

This CO-DEVELOPMENT AND CO-COMMERCIALIZATION AGREEMENT (this "**Agreement**") is made as of 1 January 2018 (the "**Effective Date**"), by and between **Arcturus Therapeutics, Inc.**, a Delaware corporation with offices at 10628 Science Center Drive, Suite 200, San Diego, California 92121, U.S. ("**Arcturus**"), and **CureVac AG**, a German stock corporation with offices at Paul-Ehrlich-Strasse 15, 72076 Tuebingen, Germany ("**CureVac**"). CureVac and Arcturus are referred to in this Agreement individually as a "**Party**" and collectively as the "**Parties**".

RECITALS

WHEREAS, Arcturus has expertise and intellectual property relating to the targeted delivery of nucleic acid therapeutics, including its proprietary lipid-mediated delivery technology, and is developing an mRNA-based product for treating ornithine transcarbamylase ("**OTC**") deficiency, among other programs;

WHEREAS, CureVac has expertise and intellectual property relating to mRNA therapeutics, in particular mRNA Constructs (as defined below);

WHEREAS, Arcturus and CureVac desire to establish a collaboration for the co-development and, if successful, commercialization of such OTC product, incorporating CureVac's or Arcturus' mRNA technology in combination with Arcturus's lipid-mediated delivery system; and

WHEREAS, Arcturus desires to grant CureVac an option to co-develop one additional mRNA therapeutics program of Arcturus, and CureVac desires to grant Arcturus an option to co-develop up to two of CureVac's mRNA therapeutics programs, which co-development programs, if successful, would be commercialized by the Parties;

WHEREAS, the Parties have entered in parallel into a Development and Option Agreement of even date herewith ("**Development and Option Agreement**") from which Reserved Target List potential Products for Development in the Field may be selected for Development, Manufacture and Commercialization pursuant to this Agreement;

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the receipt and sufficiency of which are hereby acknowledged, CureVac and Arcturus hereby agree as follows:

ARTICLE 1

DEFINITIONS

The terms in this Agreement with initial letters capitalized shall have the meanings set forth below, or the meaning as designated in the indicated places throughout this Agreement.

1.1 "**Affiliate**" means, with respect to a Party, any Person that controls, is controlled by, or is under common control with that Party, as of the Effective Date or thereafter during the Term, but only for so long as such control exists. For the purpose of this definition only, "control" (including, with correlative meaning, the terms "controlled by" and "under the common control") means the actual power, either directly or indirectly through one or more intermediaries, to direct or cause the direction of the management and policies of such Person, whether by the ownership of more than fifty percent (50%) of the voting stocking of such Person, by contract or otherwise. Regarding CureVac, Affiliate shall not include [*…***…].

1.2 "**Alliance Manager**" is defined in Section 2.7.

1.3 "**Approved Third Party Payments**" is defined in Section 3.5.

1.4 "**Arcturus Clinical Development Plan**" is defined in Section 4.5(c).

1.5 "**Arcturus Know-How**" means, subject to Section 14.2, all Know-How that is (a) Controlled by Arcturus or its Affiliates as of the Effective Date or during the Term; and (b) reasonably required for the Development, Manufacture or Commercialization of any Product in the Field. Arcturus Know-How includes Arcturus's interest in Joint Know-How. Arcturus Know-How existing as of the Effective Date is listed in **Exhibit 1.5**.

1.6 "**Arcturus LMD Technology**" means Arcturus's proprietary lipid-mediated delivery technology for delivering RNA therapeutics, including the LUNAR™ platform, a description of which technology, as in existence as of the Effective Date, is set forth on **Exhibit 1.6**.

1.7 "**Arcturus mRNA Construct**" means an mRNA Construct that embodies the Arcturus mRNA Technology.

1.8 "**Arcturus mRNA Technology**" means technology Controlled by Arcturus or its Affiliates related to mRNA Constructs, a description of which technology, as in existence as of the Effective Date, is set forth on **Exhibit 1.8**.

1.9 "**Arcturus Option**" is defined in Section 4.6(a).

1.10 "**Arcturus Patents**" means, subject to Section 14.2, all Patent Rights that are (a) Controlled by Arcturus or its Affiliates as of the Effective Date or during the Term, and (b) reasonably required for the Development, Manufacture or Commercialization of any Product in the Field. Arcturus Patents existing as of the Effective Date are listed in **Exhibit 1.5**. Arcturus Patents include Arcturus's interest in Joint Patents.

1.11 "**Arcturus Product**" means any product being developed in the Arcturus Program that contains an Arcturus mRNA Construct formulated with the Arcturus LMD Technology.

1.12 "**Arcturus Product Marks**" is defined in Section 9.9.

1.13 "**Arcturus Program**" means one of Arcturus's proprietary drug development programs to develop mRNA therapeutics, as determined pursuant to Section 4.2.

1.14 "**Arcturus Technology**" means the Arcturus Patents and Arcturus Know-How.

1.15 **"Business Day"** means a day other than a Saturday, Sunday, or bank or other public holiday in San Diego, California, USA or Tübingen, Germany or Boston, Massachusetts, USA.

1.16 "**Change of Control**" with respect to a Party, shall be deemed to have occurred if during the Term (i) any person or entity is or becomes the "beneficial owner", directly or indirectly, of shares of capital stock or other interests (including partnership interests) of a Party's then outstanding and normally entitled (without regard to the occurrence of any contingency) to vote in the election of the directors, managers or similar supervisory positions of a Party's representing fifty percent (50%) or more of the total voting power of all outstanding classes of voting stock of such Party or has the power, directly or indirectly, to elect a majority of the members of the Party's board of directors, or similar governing body; or (ii) such Party enters into a merger, consolidation or similar transaction with another person or entity; or (iii) such Party sells or transfers to any Third Party, in one (1) or more related transactions, properties or assets representing all or substantially all of such Party's consolidated total assets to which this Agreement relates; *provided*, *however*, that

(a) subsections (i) to (iii) shall only apply if the person or entity or Third Party acquiring control is a pharmaceutical company which has experience in developing and commercializing pharmaceutical products (*i.e.*, is a strategic, not financial investor or partner) or a competitor, i.e., a company whose business consists principally of mRNA development, manufacturing and/or commercialization and

(b) a bone fide financing transaction with Third Parties that does not otherwise meet the requirements of subsection (a) shall not constitute a Change of Control.

1.17 "**Claims**" means all liability, loss, damage, claim, injury, costs or expenses (including reasonable attorneys' fees and expenses of litigation) of any kind arising from Third Party demands, claims, actions and proceedings (whether criminal or civil, in contract, tort or otherwise).

1.18 "**Clinical Development Costs**" means, with respect to a Product, the costs and expenses for Developing such Product under a Clinical Development Plan, which shall include FTE Costs incurred (at the FTE Costs), and the direct Third Party costs, in each case without mark-up or administrative fee, recorded as an expense, by or on behalf of a Party or any of its Affiliates that are specifically identifiable or reasonably and directly allocable to those activities conducted in accordance with the applicable Clinical Development Plan. Except for costs in clause (d) below, Clinical Development Costs shall be limited to (i) those

activities that are specifically identified in the applicable Clinical Development Plan and (ii) those costs contained in the budget therein. Subject to the foregoing, Clinical Development Costs shall include such costs in connection with the following activities, as applicable:

(a) clinical trials (including Required Phase 4 Studies) for a Product, including (i) the preparation for and conduct of clinical trials; (ii) data collection and analysis and report writing; (iii) clinical laboratory work; (iv) regulatory activities in direct connection with such studies, including adverse event recordation and reporting, but not including regulatory activities relating generally to a Product and not directly related to such studies, such as regulatory activities relating to Marketing Authorization Applications, other than as set forth in clause (b); and (v) advisory meetings in connection with a Product.

(b) the preparation of a regulatory dossier to the extent necessary to obtain any Regulatory Approval for a Product and filing fees in connection with the filing of applications for Regulatory Approvals;

(c) (i) Manufacture or purchase of a Product for use in clinical trials or other activities for such Product; (ii) the manufacture, purchase or packaging of comparators or placebo for use in clinical trials for a Product (with the manufacturing costs for comparators or placebo to be determined in the same manner as manufacturing costs are determined for such Product); and (iii) costs and expenses of disposal of drugs and other supplies used in such clinical trials or other activities (in each case ((i) through (iii)) determined based on the definition of Manufacturing Costs), but excluding the costs for scale-up, qualification and validation; and

(d) Recall or withdrawal expenses to be treated as Clinical Development Costs pursuant to Section 5.5(b); and Damages from Third Party Claims to be treated as Clinical Development Costs pursuant to Section 13.4.

1.19 "**Clinical Development Plan**" is defined in Section 4.7.

1.20 "**CMO**" means any Third Party contract manufacturing organization.

1.21 "**Co-Developed Arcturus Product**" means any Arcturus Product for which CureVac exercises the CureVac Option.

1.22 "**Co-Developed CureVac Product**" means any CureVac Product for which Arcturus exercises an Arcturus Option.

1.23 "**Commercialization**" means the commercial activities regarding a Product in the Field in the Territory as provided in Section 7.1. **"Commercialize"** has a correlative meaning.

1.24 "**Commercialization Costs**" means all internal (at the FTE Costs) and Third Party costs and expenses incurred by or on behalf of either Party that are directly allocable to the Commercialization of Products in the Territory, including the manufacture of Products in support of such Commercialization.

1.25 "**Commercialization Plan**" is defined in Section 7.3.

1.26 "**Committee**" means the JSC or any subcommittee established under Section 2.1(l), as applicable.

1.27 "**Competing Product**" means any product that contains or employs a nucleic acid construct that is capable of expressing a functional version of (a) with respect to the OTC Product, ornithine transcarbamylase, (b) with respect to a Product expressing an antibody, all antibodies directed at the same antigen and (c) with respect to all other Products, the protein that is the target of such Product, as further agreed by the Parties at the time the applicable program is included under this Agreement; for example if such protein referenced under (a) or (c) is part of an enzymatic pathway, then products directed to other components of the pathway may also be considered a Competing Product.

1.28 "**Confidential Information**" of a Party means all proprietary Know-How, unpublished patent applications and other non-public information and data of a financial, commercial, business, operational, scientific or technical nature of such Party that is disclosed by or on behalf of such Party or any of its Affiliates or otherwise made available to the other Party or any of its Affiliates, whether made available orally, in writing or in electronic form in connection with this Agreement, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in connection with this Agreement. In addition, any non-public information related to this Agreement or the Products hereunder and disclosed by a Party to the other Party (or their respective Affiliates) under the Confidentiality Agreement will be deemed such Party's Confidential Information hereunder. Any Joint Know-How shall be deemed to be Confidential Information of both CureVac and Arcturus.

1.29 "**Confidentiality Agreement**" means that certain Confidentiality Agreement between the Parties dated as of [*… ***…].

1.30 "**Control**" or "**Controlled**" means, with respect to any Know-How, Patent Rights or other intellectual property rights, a Party has the legal authority or right (whether by ownership, license or otherwise) to grant a license, sublicense, access or right to use (as applicable) under such Know-How, Patent Rights, or other intellectual property rights to the other Party on the terms and conditions set forth herein at the time of such grant, in each case without breaching the terms of any agreement with a Third Party.

1.31 "**CureVac Clinical Development Plan**" is defined in Section 4.6(c).

1.32 "**CureVac Know-How**" means, subject to Section 14.2, all Know-How that is (a) Controlled by CureVac or its Affiliates as of the Effective Date or during the Term; and (b) reasonably required for the Development, Manufacture or Commercialization of any Product in the Field. CureVac Know-How includes CureVac's interest in Joint Know-How. CureVac Know-How existing as of the Effective Date is listed in **Exhibit 1.32**.

1.33 "**CureVac mRNA Construct**" means an mRNA Construct that embodies the CureVac mRNA Technology.

1.34 "**CureVac mRNA Technology**" means technology Controlled by CureVac or its Affiliates related to mRNA Constructs, a description of which technology, as in existence as of the Effective Date, is set forth on **Exhibit 1.32**.

1.35 "**CureVac Option**" is defined in Section 4.5(b).

1.36 "**CureVac Patents**" means, subject to Section 14.2, all Patent Rights that are (a) Controlled by CureVac or its Affiliates as of the Effective Date or during the Term; and (b) reasonably required for the Development, Manufacture or Commercialization of any Product in the Field. CureVac Patents existing as of the Effective Date are listed in **Exhibit 1.32**. CureVac Patents include CureVac's interest in Joint Patents.

1.37 "**CureVac Product**" means any product being developed in the CureVac Program that contains a CureVac mRNA Construct formulated with the Arcturus LMD Technology.

1.38 "**CureVac Product Marks**" is defined in Section 9.9.

1.39 "**CureVac Program**" means one of CureVac's proprietary drug development programs to develop mRNA therapeutics, as determined pursuant to Section 4.2.

1.40 "**CureVac Technology**" means the CureVac Know-How and CureVac Patents.

1.41 "**Develop**" or "**Development**" means all development activities for any Product that are directed to obtaining Regulatory Approval(s) of such Product, including: all non-clinical, preclinical and clinical activities conducted in support of Regulatory Approval (including any Required Phase 4 Studies), testing and studies of such Product (including IND-enabling studies); manufacturing development, process and formulation development; toxicology, pharmacokinetic and pharmacological studies; manufacture and distribution of such Product for use in clinical trials (including placebos and comparators); statistical analyses; assay development; instrument design and development; protocol design and development; quality assurance and control; report writing; and the preparation, filing and prosecution of any MAA for such Product; and all regulatory affairs related to any of the foregoing.

1.42 "**Development and Option Agreement**" is defined in the Recitals above.

1.43 "**Development Plan**" is defined in Section 4.7.

1.44 "**Diligent Efforts**" means: (a) where applied to carrying out specific tasks and obligations of a Party under this Agreement, expending reasonable, diligent, good faith efforts and resources to accomplish such task or obligation as such Party would normally use to accomplish a similar task or obligation under similar circumstances; and (b) where applied to the Development, Manufacture and/or Commercialization of a Product, the use of reasonable, diligent, good faith efforts and resources, in an active and ongoing program, as normally used by a biotechnology company for a priority product discovered or identified internally by such Party, which product is at a similar stage in its development or product life and is of similar market potential and intellectual property protection. "Diligent Efforts" shall require that such Party (on its own and/or acting through any of its Affiliates, sublicensees or subcontractors), at a minimum: (i) promptly assign responsibility for such obligations to qualified personnel, set annual goals and objectives for carrying out such obligations, and monitor and hold personnel accountable for progress with respect to such goals and objectives; (ii) set and seek to achieve specific and meaningful objectives for carrying out such obligations; and (iii) make and implement decisions and allocate resources designed to diligently advance progress with respect to such objectives.

1.45 "**Disclosing Party**" is defined in Section 10.1.

1.46 "**Distribution Costs**" means those Commercialization Costs incurred by a Party or for its account, during the Term and pursuant to this Agreement, that are directly and reasonably allocable to the distribution of a Product in the Territory, including: (a) handling and transportation to fulfill orders with respect to a Product (but excluding such costs to the extent they are treated as a deduction in the definition of Net Sales); (b) customer services, including order entry, billing and adjustments, inquiry and credit and collection with respect to a Product; (c) reasonable and customary fees and other amounts payable to distributors; and (d) costs of storage and distribution of Products.

1.47 "**Divestiture**" means the sale, exclusive license or transfer of rights to a Competing Product to a Third Party without receiving a continuing share of equity, profit, royalty payments, or other economic interest in the success of such Competing Product in the Territory. "**Divest**" has a correlative meaning.

1.48 "**Dollar**" means the U.S. dollar, and "$" shall be interpreted accordingly.

1.49 **"EMA"** means the European Medicines Agency or any successor entity thereto.

1.50 "**Executive Officers**" means the Chief Executive Officer of Arcturus and the Chief Executive Officer of CureVac.

1.51 "**FCPA**" is defined in Section 14.8(a).

1.52 "**FDA**" means the United States Food and Drug Administration or any successor entity thereto.

1.53 "**Field**" means the treatment (except with vaccines) of all diseases and conditions in humans.

1.54 "**Finance Officers**" means one individual designated by each Party by written notice to the other Party to manage the financial reconciliation of Clinical Development Costs, Joint Commercialization Costs and other costs shared by the Parties under this Agreement.

1.55 "**First Commercial Sale**" means, with respect to any Product in any country or jurisdiction, the first sale of such Product to a Third Party for distribution, use or consumption in such country or jurisdiction after Regulatory Approval for commercial sale has been obtained for such Product in such country or jurisdiction.

1.56 "**First Program Addition Period**" is defined in Section 4.2.

1.57 "**Forced Opt-Out**" is defined in Section 14.3.

1.58 "**FTE**" means the equivalent of a full time individual's work for a twelve (12) month period (consisting of a total of [*…***…] hours (in relation to Arcturus) or […***…] hours (in relation to CureVac) per year of dedicated effort). Any person who devotes less than […***…] hours (in relation to Arcturus) or […***…] hours (in relation to CureVac) per year on the applicable activities shall be treated as an FTE on a pro-rata basis, based upon the actual

number of hours worked by such person on such activities, divided by [*…***…] (in relation to Arcturus) or […***…] (in relation to CureVac). Any person who devotes more than […***…] hours (in relation to Arcturus) or […***…] hours (in relation to CureVac) per year on the applicable activities shall be treated as one (1) FTE. FTE activities shall not include the work of general corporate or administrative personnel.

1.59 **"FTE Costs"** means an initial rate of […***…] Dollars ($[…***…]) per FTE per year, which shall apply through […***…]. Thereafter, the FTE Costs shall be changed bi-annually at the end of each second calendar year to reflect any percentage increase or decrease (as the case may be) in the Consumer Price Index in the U.S. or Germany (index for all items) ("**CPI**") (based on the change in the CPI from the most recent index available as of the Effective Date to the most recent index available as of the date of the calculation of such revised FTE Cost rate).

1.60 "**GAAP**" means (a) for Arcturus, U.S. generally accepted accounting principles; and (b) for CureVac, German generally accepted accounting principles.

1.61 "**Governmental Authority**" means any federal, state, national, state, provincial or local government, or political subdivision thereof, or any multinational organization or any authority, agency or commission entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing authority or power, any court or tribunal (or any department, bureau or division thereof, or any governmental arbitrator or arbitral body).

1.62 "**IND**" means any investigational new drug application, clinical trial application, clinical trial exemption or similar or equivalent application or submission for approval to conduct human clinical investigations filed with or submitted to a Regulatory Authority in conformance with the requirements of such Regulatory Authority.

1.63 "**Initiation**" means, with respect to a clinical trial of a Product, the first dosing of the first human subject for such clinical trial.

1.64 "**Invention**" means any process, composition, formulation, article of manufacture, method, discovery or finding, patentable or otherwise, that is generated by or on behalf of a Party or both Parties (including their respective Affiliates, sublicensees and subcontractors), whether or not patentable, in connection with the Development, Manufacture or Commercialization of mRNA Constructs or Products under this Agreement, including all rights, title and interest in and to the intellectual property rights therein.

1.65 **"Joint Commercialization Costs"** means, with respect to a Product in a given time period, the sum of the following:

(a) Commercialization Costs incurred by a Party in performing its obligations under a Commercialization Plan and in accordance with the budget then in effect and that are directly and reasonably allocable to Commercialization of Products in the Territory under such Commercialization Plan, which consist of: (i) Manufacturing Costs; (ii) Sales and Marketing Costs; (iii) costs associated with medical education activities (to the extent not otherwise included in Sales and Marketing Costs); and (iv) Distribution Costs;

(b) Approved Third Party Payments under Section 3.5;

(c) recall and withdrawal expenses to be treated as Joint Commercialization Costs pursuant to Section 5.5(b);

(d) patent enforcement costs to be treated as Joint Commercialization Costs pursuant to Section 9.5(f);

(e) Trademark Costs;

(f) regulatory costs for Commercialization activities; and

(g) Damages from Third Party Claims to be treated as Joint Commercialization Costs pursuant to Section 13.4.

Joint Commercialization Costs shall include such Commercialization Costs that are incurred after the Effective Date and prior to the First Commercial Sale of a Product (i.e., pre-launch costs), including those Commercialization Costs set forth in the Commercialization Plan and related budget. Notwithstanding the foregoing, Joint Commercialization Costs shall exclude income tax liabilities and corporate overhead costs of either Party.

1.66 "**Joint Know-How**" is defined in Section 9.1(d).

1.67 "**Joint Patents**" is defined in Section 9.1(d).

1.68 "**Joint Steering Committee**" or "**JSC**" is defined in Section 2.1.

1.69 "**Know-How**" means any information, including discoveries, improvements, modifications, processes, methods, assays, designs, protocols, formulas, data, know-how and trade secrets (in each case, patentable, copyrightable or otherwise), but excluding any Patent Rights.

1.70 "**Law**" means any federal, state, local, foreign or multinational law, statute, standard, ordinance, code, rule, regulation, resolution or promulgation, or any order by any Governmental Authority, or any license, franchise, permit or similar right granted under any of the foregoing, or any similar provision having the force or effect of law.

1.71 "**MAA**" or "**Marketing Authorization Application**" means an application to the appropriate Regulatory Authority for approval to market a Product (but excluding pricing approval) in the Field in any particular jurisdiction (including, without limitation, a New Drug Application in the U.S.) and all amendments and supplements thereto.

1.72 "**Manufacture**" and "**Manufacturing**" mean activities directed to manufacturing, including (i) preparation, e.g., process development, intermediate and validation, (ii) production, e.g., processing, filling, finishing, packaging, labeling, quality assurance testing, release and the conduct of stability studies and (iii) storing and transporting any Product, including.

1.73 **"Manufacturing Costs"** means costs of manufacturing an mRNA Construct or Product or any component thereof, including the formulation of Product, which is either:

(a) supplied to a Party by a Third Party, in which event Manufacturing Costs means: (i) the amount paid to such Third Party for the manufacturing and supply of

mRNA Construct or Product (excluding any payments to Third Parties for licenses to intellectual property); plus (ii) reasonable direct and identifiable internal costs and Third Party costs incurred or accrued (including any prepayments) by the manufacturing Party in connection with inventory write-offs, variances, manufacturing process improvements, storage, freight, manufacturing scale-up, manufacturing site qualification, materials, quality assurance and quality control (including testing), supply chain management, capital equipment, similar activities composing the manufacturing Party's oversight of the manufacturing process of the Third Party, and any value-added tax or similar tax due for amounts paid to such Third Party, but excluding costs otherwise included within Clinical Development Costs; or

(b) manufactured directly by a Party or its Affiliate, in which case Manufacturing Costs means the "standard cost" per unit (which for purposes of ongoing cost accounting purposes shall be calculated in accordance with the Manufacturing Party's then-current standard cost process in accordance with GAAP that is applied consistently to all pharmaceutical products manufactured by such Party in the applicable facility). The Parties shall reconcile the standard cost charges, and appropriate credits or payments from one Party to the other shall be made to effect such reconciliation not less than annually against the above Manufacturing Cost definition, including variances to standard costs and inventory write-offs. This standard cost shall include

(i) the cost of materials, direct labor, and other direct and identifiable variable costs incurred or accrued by the manufacturing Party in connection with the manufacture of an mRNA Construct or Product, manufacturing process improvements, storage and freight specific to an mRNA Construct or Product, manufacturing scale-up, and

(ii) an allocable portion consistently applied to all products and mRNA Constructs or Product manufactured in the applicable manufacturing facility for: manufacturing process improvements, manufacturing site qualification, materials, quality assurance and quality control (including testing), supply chain management, and costs of equipment, plant operations and plant support services necessary to produce an mRNA Construct or Product, but excluding costs otherwise not specific to the mRNA Construct or Product or otherwise included within Clinical Development Costs. For clarity, the costs of plant operations and support services shall include utilities, maintenance, engineering, safety and other similar activities, including idle plant capacity reserved specifically for the mRNA Construct or Product based on anticipated volumes in the ensuing [*…***…] months and an allocable portion of human resources, finance, plant management. In any event, costs that cannot be identified to a specific activity supporting manufacturing of an mRNA Construct or Product, such as charges for corporate overhead or excess capacity not specifically reserved as described above, shall be excluded from the determination of Manufacturing Costs.

(c) In each case ((a) and (b)), such costs shall be deemed Manufacturing Costs to the extent such costs are directly and reasonably allocable to the Development or Commercialization of a Product in the Territory, and in accordance with GAAP. Manufacturing Costs shall be included in Clinical Development Costs as incurred. Manufacturing Costs shall be included in Joint Commercialization Costs on a "cost of sales" basis as Product is sold, via standard costs and reconciliation for variances to standard cost and inventory write-offs. In the event that a Party performs any of its manufacturing and supply obligations through one or more Affiliates, any inter-company amounts or fees paid for any such services or Product or any intermediate used therein by such Party shall not be

included in calculating Manufacturing Costs and only those costs directly incurred by such Affiliate shall be so included. Manufacturing Costs shall include costs of such activities that are undertaken at any time during the Term of this Agreement (including manufacturing activities relating to the Commercialization of a Product that are undertaken prior to the initial Regulatory Approval of such Product). The JSC shall determine the Manufacturing Costs and allocate them to the Clinical Development Costs and the Commercialization Costs, based on the rules stated in this Section 1.73.

1.74 "**Materials**" means any and all proprietary tangible materials (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical materials), including reagents, research tools and compositions of matter.

1.75 "**mRNA Construct**" means any mRNA construct for the expression of a protein that is either (a) ornithine transcarbamylase or (b) a protein that is the subject of an Arcturus Program or CureVac Program, if the CureVac Option or Arcturus Option, respectively, has been exercised for such program, in each case including the sequence of such construct (which potentially comprises one (1) or more of cap, 5' UTR, the associated open reading frame, 3'UTR and a poly A tail), the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such construct.

1.76 "**Net Sales**" means the gross amount billed or invoiced by or for the benefit of a Party, its Affiliates, and its sublicensees to independent, unrelated Third Parties (other than Affiliates and sublicensees but including distributors for resales) for the bona fide sale or transfer of a Product, less the following deductions, in each case to the extent reasonable, customary, actually allowed and taken in connection with such Product and not otherwise recovered by or reimbursed:

(a) sales, value-added and excise taxes or customs duties paid by the selling party and any other governmental charges imposed upon the sale of such Product and actually paid, as adjusted for rebates and refunds;

(b) discounts (including cash, quantity and patient program discounts), price reductions, commissions, rebates and chargebacks actually granted, allowed or incurred in connection with the sale of the such Product;

(c) allowances or credits to customers actually given and not in excess of the selling price of such Product, on account of claims, damaged goods, rejection, outdating, product withdraw, recalls or return of such Product; and

(d) rebates, reimbursements, fees or similar payments to wholesalers and other distributors, pharmacies and other retailers, buying groups (including group purchasing organizations), health care insurance carriers, pharmacy benefit management companies, health maintenance organizations, Governmental Authorities, or other institutions or health care organizations.

If a single item falls into more than one of the categories set forth in clauses (a)-(d) above, such item may not be deducted more than once.

Sales between a Party and its Affiliates and sublicensees shall be disregarded for purposes of calculating Net Sales except if such purchaser is an end user, but the subsequent sale from such entity to an unrelated Third Party shall be included in the Net Sales definition.

With respect to any sale of any Product in a given country for any substantive consideration other than monetary consideration on arm's length terms (which has the effect of reducing the invoiced amount below what it would have been in the absence of such non-monetary consideration), for purposes of calculating the Net Sales, such Product shall be deemed to be sold exclusively for cash at the average Net Sales price charged to Third Parties for cash sales of such Product in such country during the applicable reporting period (or if there were only *de minimis* cash sales in such country, at the fair market value as determined in good faith based on pricing in comparable markets). Notwithstanding the foregoing, Net Sales shall not include amounts (whether actually existing or deemed to exist for purposes of calculation) for Products distributed for use in clinical trials.

Net Sales shall be calculated on an accrual basis, in a manner consistent with such Party's accounting policies for external reporting purposes, as consistently applied across all products, in accordance with U.S. GAAP or German GAAP, as applicable. To the extent any accrued amounts used in the calculation of Net Sales are estimates, such estimates shall be trued-up in accordance with such Party's accounting policies for external reporting purposes, as consistently applied, and Net Sales and related payments under this Agreement shall be reconciled as appropriate.

1.77 **"Operating Profit (or Loss)"** means, for a given Product and calendar quarter, (a) Net Sales of such Product by a Party and its Affiliates (but not sublicensees) in the Territory during such period, minus (b) Joint Commercialization Costs incurred during such time period, in each case with respect to such Product, plus (c) any payments received from any sublicensee of a Party with respect to such Product, whether in the form of upfront, milestone, or royalty payments. For clarity, Operating Profit (or Loss) shall be determined prior to application of any income taxes, and if such terms are used individually, "**Operating Profit**" shall mean a positive Operating Profit (or Loss), and "**Operating Loss**" shall mean a negative Operating Profit (or Loss).

1.78 "**Opt-Out**" is defined in Section 4.9(a).

1.79 "**Opt-Out Product**" is defined in Section 4.9(b).

1.80 "**OTC**" is defined in the Preamble.

1.81 "**OTC Clinical Development Plan**" is defined in Section 4.4(c).

1.82 "**OTC Development Candidate**" means an OTC Product that the JSC has approved for advancement into IND-enabling studies.

1.83 "**OTC mRNA Construct**" means any mRNA Construct that encodes the enzyme ornithine transcarbamylase.

1.84 "**OTC Preclinical Development Plan**" means the plan for preclinical Development of OTC Products until IND filing for an OTC Product, as amended from time to time in accordance with the terms of this Agreement, and including a budget for all such activities.

1.85 "**OTC Product**" means any product containing an OTC mRNA Construct formulated with the Arcturus LMD Technology.

1.86 "**Partnering**" is defined in Section 7.6.

1.87 "**Patent Rights**" means all patents and patent applications (which for the purpose of this Agreement shall be deemed to include certificates of invention and applications for certificates of invention), including all divisionals, continuations, substitutions, continuations-in-part, re-examinations, reissues, additions, renewals, revalidations, extensions, registrations, and supplemental protection certificates and the like of any such patents and patent applications, and any and all foreign equivalents of the foregoing.

1.88 "**Person**" means any individual, partnership, limited liability company, firm, corporation, association, trust, unincorporated organization or other entity.

1.89 "**Phase 1 Clinical Trial**" means a controlled human clinical trial of a Product that would satisfy the requirements of 21 CFR 312.21(a) or corresponding foreign regulations, regardless of whether such trial is referred to as a "phase 1 clinical trial" in the applicable Development Plan.

1.90 "**Phase 2 Clinical Trial**" means a controlled human clinical trial of a Product that would satisfy the requirements of 21 CFR 312.21(b) or corresponding foreign regulations, regardless of whether such trial is referred to as a "phase 2 clinical trial" in the applicable Development Plan.

1.91 "**Phase 3 Clinical Trial**" means a controlled or uncontrolled human clinical trial of a Product that would satisfy the requirements of 21 CFR 312.21(c) or corresponding foreign regulations, regardless of whether such trial is referred to as a "phase 3 clinical trial" in the applicable Development Plan.

1.92 "**Phase 4 Study**" means a study or data collection effort with respect to any Product that is commenced after the receipt of Regulatory Approval in the country where such trial is conducted.

1.93 "**Product**" means any: (a) OTC Product; (b) Co-Developed Arcturus Product; or (c) Co-Developed CureVac Product.

1.94 "**Product Infringement**" is defined in Section 9.5(a).

1.95 "**Program Addition Period**" is defined in Section 4.2.

1.96 "**Receiving Party**" is defined in Section 10.1.

1.97 "**Regulatory Approval**" means all approvals necessary for the commercial sale of a Product in the Field in a given country or regulatory jurisdiction, including any pricing and reimbursement approvals (but solely to the extent necessary for commercial sale of the Product).

1.98 "**Regulatory Authority"** means any applicable Governmental Authority responsible for granting Regulatory Approvals for the Products, including the FDA, the EMA and any corresponding national or regional regulatory authorities.

1.99 "**Regulatory Exclusivity**" means any exclusive marketing rights or data exclusivity rights conferred by any Regulatory Authority with respect to a pharmaceutical product other than patents, including, without limitation, orphan drug exclusivity, new chemical entity exclusivity, biosimilar exclusivity, data exclusivity or pediatric exclusivity.

1.100 "**Regulatory Materials**" means any regulatory application, submission, notification, communication, correspondence, registration and other filings made to, received from or otherwise conducted with a Regulatory Authority in order to Develop, Manufacture, or Commercialize a Product in the Field in a particular country or jurisdiction. "Regulatory Materials" includes any IND, MAA and Regulatory Approval.

1.101 **"Required Phase 4 Study"** means a Phase 4 Study that is conducted pursuant to a request or requirement of a Regulatory Authority.

1.102 "**Royalty Rate**" is defined in Section 4.9(b)(iv).

1.103 "**Sales and Marketing Costs**" means the costs that are directly and reasonably allocable to the sales and marketing of a Product in the Territory and that are compliant with applicable Laws and applicable guidelines concerning the advertising, sales and marketing of prescription drug products (e.g., PhRMA Code), including: (a) activities directed to the advertising and marketing of a Product; (b) professional education in the Territory, including launch meetings; (c) costs of advertising, public relations and medical education agencies with respect to a Product; (d) speaker programs with respect to a Product, including the training of such speakers; (e) developing and providing training packages, promotional literature, samples, promotional materials and other selling materials with respect to a Product; (f) developing and performing market research with respect to a Product and developing branding, communications and life cycle management plans; (g) conducting symposia and opinion leader development activities with respect to a Product; (h) developing reimbursement programs with respect to a Product; and (i) sales force costs.

1.104 "**Second Program Addition Period**" is defined in Section 4.2.

1.105 "**Term**" is defined in Section 11.1.

1.106 "**Territory**" means all countries and territories of the world.

1.107 "**Third Party**" means any Person other than a Party or an Affiliate of a Party.

1.108 "**Trademark Costs**" mean those costs incurred for outside counsel and other Third Parties, and filing and maintenance expenses, in each case incurred in connection with the establishment and maintenance of rights under trademarks applicable to a Product, including costs of trademark filing and registration fees, actions to enforce or maintain a trademark and other trademark proceedings.

1.109 "**United States**" or "**U.S.**" means the United States of America, including its territories and possessions.

1.110 "**Valid Claim**" means a claim of

(a) an issued and unexpired patent (as may be extended through supplementary protection certificate or patent term extension) or

(b) a pending patent application, *provided, however*, that once the priority date or earliest filing date to which the pending patent application refers is more than [*…***…] years old, such claim shall not constitute a Valid Claim for purposes of this Agreement anymore, unless and until a patent issues with such claim

included in the Arcturus Patents or CureVac Patents, which claim has not been revoked, held invalid or unenforceable by a patent office, court or other governmental agency of competent jurisdiction in a final and non-appealable decision (or decision from which no appeal was taken within the allowable time period) and has not been disclaimed, denied, abandoned or admitted to be invalid or unenforceable through reissue, re-examination or disclaimer or otherwise.

1.111 Interpretation. In this Agreement, unless otherwise specified:

(a) The words “include”, “includes” and “including” shall be deemed to be followed by the phrase “without limitation”.

(b) words denoting the singular shall include the plural and vice versa and words denoting any gender shall include all genders;

(c) words such as “herein”, “hereof”, and “hereunder” refer to this Agreement as a whole and not merely to the particular provision in which such words appear; and

(d) the Exhibits and other attachments form part of the operative provision of this Agreement and references to “this Agreement” shall include references to the Exhibits and attachments.

ARTICLE 2

GOVERNANCE

2.1 Joint Steering Committee. The Parties hereby establish a joint steering committee (the “**Joint Steering Committee**” or the “**JSC**”) consisting of an equal number, initially […***…] senior executives of each Party. The JSC shall manage the overall collaboration of the Parties under this Agreement, and shall in particular:

(a) coordinate the activities of the Parties under this Agreement, including facilitating communications between the Parties with respect to the Development, Manufacture and Commercialization of mRNA Constructs and Products;

(b) provide a forum for discussion of the Development, Manufacture and Commercialization of mRNA Constructs and Products;

(c) discuss potential programs for inclusion as an Arcturus Program or CureVac Programs, in accordance with the procedure in Section 4.2;

(d) coordinate the activities of the Parties under each Development Plan and oversee the implementation of each Development Plan;

(e) review the Parties' nomination of OTC Product as OTC Development Candidate and determine whether to approve such nomination;

(f) determine the final OTC mRNA Construct sequence as OTC Development Candidate;

(g) review and approve each Development Plan, and prepare and approve annual or interim amendments to the Development Plans;

(h) review and approve the protocol and statistical analysis plan established by the sponsor for each human clinical trial conducted under a Clinical Development Plan;

(i) review the progress of the clinical trials on a regular basis including interim data;

(j) monitor and coordinate all regulatory actions, communications and submissions for Products under the Development Plans;

(k) coordinate the activities of the Parties under the Commercialization Plans and oversee the implementation of the Commercialization Plans;

(l) establish and implement a publication plan for Products;

(m) establish joint subcommittees, as appropriate, to carry out its functions, and direct and oversee the operation of such joint subcommittees, including resolving any disputed matter of such joint subcommittees; and

(n) perform such other duties as are expressly assigned to the JSC in this Agreement, and perform such other functions as appropriate to further the purposes of this Agreement as may be allocated to it by the Parties' written agreement.

2.2 Limitation of Committee Authority. Each Committee shall only have the powers expressly assigned to in this Article 2 and elsewhere in this Agreement and shall not have the authority to: (a) modify or amend the terms and conditions of this Agreement; (b) waive either Party's compliance with the terms and conditions of this Agreement; or (c) determine any such issue in a manner that would conflict with the express terms and conditions of this Agreement.

2.3 Committee Membership and Meetings.

(a) Committee Members. The initial members of each Party on the JSC as of the Effective Date are designated in writing within [*…***…] days of the Effective Date and upon designation included in **Exhibit 2.3**. Each Party may replace its representatives on any Committee by written notice to the other Party. Each Committee representative shall have appropriate knowledge and expertise and sufficient seniority (including budgetary authority, as applicable) within the applicable Party to make recommendations and decisions arising within the scope of the applicable Committee's responsibilities. Each Party shall appoint one (1) of its representatives on each Committee to act as a co-chairperson of such Committee. The co-chairpersons shall jointly prepare and circulate agendas […***…] Business Days prior to such meeting and reasonably detailed

minutes for each Committee meeting within [*…***…] days after such meeting, but shall otherwise not have any additional function or authority as compared to the other members of the applicable Committee.

(b) **Meetings**. Each Committee shall hold meetings at such times as it elects to do so, but in no event shall such meetings be held less frequently than once every […***…] months for each Committee. Meetings of any Committee will be held teleconference, videoconference or in person and, unless the Parties otherwise agree, at least one JSC meeting in each calendar year will be in person held on an alternative basis in Tubingen, Germany and in San Diego, CA. Each Party shall be responsible for all of its own expenses of participating in any Committee. No action taken at any meeting of a Committee shall be effective unless a representative of each Party is participating.

(c) **Non-Member Attendance**. With the consent of the other Party (which will not be unreasonably withheld, delayed or conditioned and which will not be required for the attendance of the Alliance Manager), each Party may from time to time invite a reasonable number of participants, in addition to its representatives, to attend the Committee meetings in a non-voting capacity; provided that if either Party intends to have any Third Party (including any consultant) attend such a meeting, such Party shall provide prior written notice to the other Party and shall ensure that such Third Party is bound by confidentiality and non-use obligations consistent with the terms of this Agreement.

2.4 **Continuity of Representation.** Notwithstanding the Parties' respective right to replace its Alliance Manager and members of Committees by written notification to the other Party, each Party shall strive to maintain continuity in the representation of such Alliance Manager and Committee members.

2.5 **Decision-Making.** All decisions of each Committee shall be made by unanimous vote, with each Party's representatives collectively having one (1) vote. If after reasonable discussion and good faith consideration of each Party's view on a particular matter before a Committee, the representatives of the Parties cannot reach an agreement as to such matter within […***…] Business Days after such matter was brought to such Committee for resolution or after such matter has been referred to such Committee, such disagreement shall, upon the written request of either Party, be referred to the JSC (in the case of disagreement of a joint subcommittee) or to the Executive Officers (in the case of disagreement of the JSC) for resolution. The Executive Officers shall meet in person within […***…] days after such referral to attempt in good faith to resolve such disagreement. If the Executive Officers cannot resolve such matter within […***…] days after such matter has been referred to them, then:

(a) Arcturus shall have the right to decide on matters pertaining to

(i) the Manufacture of Products using mRNA Constructs, but not the Manufacture of mRNA Constructs, supplied by CureVac (including the formulation but excluding fill and finish);

(ii) subject to Sections 2.5(b)(i) and 2.5(d), the clinical Development of OTC Products and Co-Developed Arcturus Products, the regulatory strategy for OTC Products and Co-Developed Arcturus Products, the fill and finish of OTC Products

and Co-Developed Arcturus Products and the Commercialization of OTC Products and Co-Developed Arcturus Products,

(b) CureVac shall have the right to decide on matters pertaining to

(i) the Manufacture of mRNA Constructs for the Products;

(ii) subject to Sections 2.5(a)(i) and 2.5(d), the clinical Development of Co-Developed CureVac Products, the regulatory strategy for Co-Developed CureVac Products, the fill and finish of Co-Developed CureVac Products and the Commercialization of Co-Developed CureVac Products,

(c) with respect to all other matters, neither Party shall have the right to make the final decision, and the status quo will remain unless the Parties agree otherwise,

(d) *provided, however*, that neither Party shall have

(i) the right to require the other Party to conduct any activities or make any investments without such other Party's written consent, in particular, to determine certain amounts of supply of mRNA Constructs other than in accordance with the Development Plan or Commercialization Plan, as applicable, or Products or to establish a second source, other than as may be expressly agreed in a supply agreement,

(ii) a casting vote regarding the approval of a Development Plan or Commercialization Plan or any amendment thereto leading to a cost-increase of more than [*…***…]% from the agreed budgeted amount.

2.6 Discontinuation of Participation on a Committee. The activities to be performed by each Committee shall solely relate to governance under this Agreement, and are not intended to be or involve the delivery of services. Each Committee shall continue to exist until the first to occur of: (a) the Parties mutually agreeing to disband the committee; or (b) a Party providing written notice to the other Party of its intention to disband and no longer participate in such Committee. Once the Parties mutually agree or a Party has provided written notice to disband such Committee to the other Party, such Committee shall have no further obligations under this Agreement and, thereafter, the Alliance Managers shall be the contact persons for the exchange of information under this Agreement and decisions of such Committee shall be decisions as between the Parties, subject to the other terms and conditions of this Agreement.

2.7 Alliance Managers. Each Party hereby appoints the person listed on **Exhibit 2.3** to act as its alliance manager under this Agreement as of the Effective Date (the "**Alliance Manager**"). Each Party's Alliance Manager shall: (a) serve as the primary contact point between the Parties for the purpose of providing the other Party with information on the progress of such Party's activities under this Agreement; (b) be primarily responsible for facilitating the flow of information and otherwise promoting communication, coordination and collaboration between the Parties; (c) attempt to facilitate the prompt resolution of any disputes; (d) attend all JSC meetings, and have the right to attend all other Committee and subcommittee meetings, all as non-voting members. An Alliance Manager may also bring any matter to the attention of any Committee if such Alliance Manager reasonably believes that such matter warrants such attention. Each Party may replace its Alliance Manager at any time upon written notice to the other Party.

2.8 Commercialization and Collaboration Decisions. The Parties shall mutually agree on any decisions for Commercialization by a licensee or strategic partner; provided that following the completion of Phase 1 Clinical Trials for each Product, the Parties shall determine which of the Parties shall be the lead in potential Commercialization efforts (subject to Section 7.5 and 7.6), including identifying and reviewing with the other Party on not less than a [*…***…] basis, the Commercialization plans and efforts and the discussions with potential future licensees or strategic partners with respect to such Product. This Section 2.8 shall not apply with respect to any Opt-Out Product.

ARTICLE 3

LICENSES

3.1 License to CureVac. Subject to the terms and conditions of this Agreement, Arcturus hereby grants to CureVac the following licenses under the Arcturus Technology (sublicensable solely as provided in Section 3.3):

(a) a non-exclusive, royalty-free license to Develop mRNA Constructs and Products in the Field in accordance with the Development Plans, and

(b) a sole (i. e., Arcturus will not grant respective licenses to any Third Party, however, Arcturus reserves for itself and its Affiliates the right to use the licensed rights), profit sharing (in case of Commercialization in accordance with Article 7) or royalty-bearing (in case of an Opt-Out or Forced Opt-Out in accordance with Sections 4.9 or 14.3, respectively) license to Commercialize Co-Developed CureVac Products in the Field in the Territory; and

(c) a non-exclusive, royalty-free license to Manufacture and have Manufactured the mRNA Constructs that are included in Products worldwide, provided that CureVac shall have the right to use such mRNA Constructs solely for supply to Arcturus to Manufacture Products for use by CureVac in connection with the exercising of its rights under Sections 3.1(a) and/or 3.1(b) or for use by Arcturus in connection with the exercising of its rights under Sections 3.2(a) and/or 3.2(b).

For the avoidance of doubt, the licenses granted by Arcturus to CureVac under this Agreement do not include any rights for CureVac to develop, make, have made, sell, offer for sale or otherwise commercialize any proprietary product of Arcturus that is not a Product.

3.2 License to Arcturus. Subject to the terms and conditions of this Agreement, CureVac hereby grants to Arcturus the following licenses under the CureVac Technology (sublicensable solely as provided in Section 3.3):

(a) a non-exclusive, royalty-free license to Develop mRNA Constructs and Products in the Field in accordance with the Development Plans,

(b) a sole (i. e., CureVac will not grant respective licenses to any Third Party, however, CureVac reserves for itself and its Affiliates the right to use the licensed rights), profit sharing (in case of Commercialization in accordance with Section 7) or royalty-bearing (in case of an Opt-Out or Forced Opt-Out in accordance with Sections 4.9 or 14.3,

respectively) license to Commercialize OTC Products and Co-Developed Arcturus Products in the Field in the Territory; and

(c) a non-exclusive, royalty-free license to Manufacture and have Manufactured Products worldwide from mRNA Constructs supplied by CureVac (i.e. no license granted for the Manufacture of mRNA Constructs), provided that Arcturus shall have the right to use such Products solely in connection with the exercising of its rights under Sections 3.2(a) and/or 3.2(b) or for supply to CureVac for use by CureVac in connection with the exercising of its rights under Sections 3.1(a) and/or 3.1(b).

For the avoidance of doubt, the licenses granted by CureVac to Arcturus under this Agreement do not include any rights for Arcturus to develop, make, have made, sell, offer for sale or otherwise commercialize any proprietary product of CureVac that is not a Product.

3.3 Sublicense Rights. Subject to the terms and conditions of this Agreement:

(a) Subject to Section 3.4(c) below, each Party may exercise its rights and perform its obligations under this Agreement by itself or through the engagement of any of its Affiliates without the other Party's prior written consent; *provided*, *however*, that

(i) such Party shall provide written notice to the other Party informing the other Party of such engagement within [*…***…] days after such engagement, and

(ii) the Affiliate, in performing the obligations, shall use the standard of care applicable to the Party making the delegation.

(b) Each Party may sublicense (through multiple tiers) the rights granted to it under Section 3.1 (in the case of CureVac) or Section 3.2 (in the case of Arcturus) to one (1) or more Third Parties with the other Party's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed. Each Party will provide to the other Party a copy of any such sublicense agreement within […***…] days of execution thereof, which sublicense agreement may be redacted as necessary to protect commercially sensitive information and shall be treated as Confidential Information of the Party providing the sublicense agreement.

(c) Each Party shall remain directly responsible for all of its obligations under this Agreement that have been delegated, subcontracted or sublicensed to any of its Affiliates, sublicensees or subcontractors and shall ensure that such Affiliates, sublicensees and subcontractors comply with the terms and conditions of this Agreement. Without limiting the foregoing, in the event that a Party engages a subcontractor to perform any activities assigned to it under this Agreement, such Party shall ensure that such subcontractor is bound by written obligations of confidentiality and non-use consistent with this Agreement and has agreed to assign to the Party engaging such subcontractor (and/or grant a fully-paid, exclusive, royalty-free, worldwide license to such Party, with the right to sublicense through multiple tiers, under) all Inventions made by such subcontractor in the course of performing such subcontracted work that relate to any Products or their use, manufacture or sale.

3.4 No Implied Licenses; Negative Covenant. Except as set forth herein, neither Party shall acquire any license or other intellectual property interest, by implication or otherwise, under or to any trademarks, Patent Rights, Know-How, or other intellectual

property owned or Controlled by the other Party. For clarity, the license granted to each Party under any particular Patent Rights or Know-How Controlled by the other Party shall confer exclusivity to the Party obtaining such license only to the extent the Party granting such license Controls the exclusive rights to such Patent Rights or Know-How. Neither Party shall, nor shall permit any of its Affiliates or sublicensees to, practice any Patent Rights or Know-How licensed to it by the other Party outside the scope of the license granted to it under this Agreement.

3.5 Third Party Licenses. The Parties acknowledge that during the Term, it may be beneficial to obtain a license under intellectual property controlled by a Third Party. The Parties agree that (a)

(a) with respect to any such Third Party intellectual property that is necessary (i.e., in the absence of a license thereto a claim of infringement or misappropriation is likely) to make, have made, use, sell, offer for sale, import and export mRNA Constructs or Products in the Territory, the Parties shall discuss whether to obtain such license, with the Party having the final say and responsibility for negotiating such license that has the lead regarding Commercialization of the respective Product, after good faith consideration of the other Party's input, and

(b) with respect to Third Party intellectual property that is useful (but not necessary, e.g., it covers a technology or feature desired to be incorporated into the Product or used in its manufacture) to make, have made, use, sell, offer for sale, import and export mRNA Constructs or Products in the Territory, the Parties shall determine whether to obtain a license to such Third Party intellectual property, *provided*, *however*, that the decision to obtain a license must be made unanimously and that, notwithstanding Section 2.5, neither Party has the final say in this decision, and if a determination is made to obtain such license, the Party that has the lead regarding Commercialization of the respective Product shall have responsibility for negotiating such license, after good faith consideration of the other Party's input.

The Party entering into any such Third Party license after the Effective Date pursuant to this Section 3.5 shall be responsible for making all payments with respect to such licenses (**"Approved Third Party Payments"**), subject to inclusion of any and all such payments with respect to a Product in Joint Commercialization Costs.

3.6 Exclusivity.

(a) Exclusivity Obligation. During the Term with respect to each Product, Arcturus shall not, and shall ensure that its Affiliates do not, and CureVac shall not, and shall ensure that its Affiliates do not, directly or indirectly, alone or with or through any Third Party, clinically develop or commercialize any Competing Product to such Product in the Territory.

(b) Acquired Rights of Arcturus. In the event that Arcturus or its Affiliate, either through its own efforts or by acquisition of such rights (whether through merger, acquisition or similar transaction), obtains the rights to a Competing Product that would cause Arcturus to breach Section 3.6(a), then Arcturus shall:

(i) if such Product is a Co-Developed CureVac Product, upon written notice to CureVac within [*…***…] days after such rights are first obtained, either

(1) terminate this Agreement with respect to such Co-Developed CureVac Products pursuant to Section 11.2(a), in which case such notice will serve as notice of termination under Section 11.2(a) with respect to such Products; or

(2) Divest such Competing Product, in which case Arcturus or its Affiliate shall, or shall cause the applicable entity to, complete the Divestiture of such Competing Product within […***…] months from the date Arcturus or its Affiliate obtained any rights in such Competing Product, in which case the conduct of activities with respect to such Competing Product by Arcturus or its Affiliate during such […***…] month period shall not be deemed a breach of Arcturus's exclusivity obligations under Section 3.6, provided that such activities with respect to such Competing Product during such […***…] month period are conducted independently of the activities conducted under this Agreement and no Arcturus Technology or CureVac Technology is used in the conduct of such activities; or

(ii) if such Product is an OTC Product or Co-Developed Arcturus Product, Divest such Competing Product in accordance with Section 3.6(b)(i)(2).

(c) **Acquired Rights of CureVac.** In the event that CureVac or its Affiliate, either through its own efforts or by acquisition of such rights (whether through merger, acquisition or similar transaction), obtains the rights to a Competing Product that would cause CureVac to breach Section 3.6, then CureVac shall:

(i) if such Product is an OTC Product or Co-Developed Arcturus Product, upon written notice to Arcturus within […***…] days after such rights are first obtained, either

(1) terminate this Agreement with respect to such Products pursuant to Section 11.2(a), in which case such notice will serve as notice of termination under Section 11.2(a) with respect to such Products; or

(2) Divest such Competing Product, in which case CureVac or its Affiliate shall, or shall cause the applicable entity to, complete the Divestiture of such Competing Product within […***…] months from the date CureVac or its Affiliate obtained any rights in such Competing Product, in which case the conduct of activities with respect to such Competing Product by CureVac or its Affiliate during such […***…] month period shall not be deemed a breach of CureVac's exclusivity obligations under Section 3.6(a), provided that such activities with respect to such Competing Product during such […***…] month period are conducted independently of the activities conducted under this Agreement and no Arcturus Technology or CureVac Technology is used in the conduct of such activities; or

(ii) if such Product is a Co-Developed CureVac Product, Divest such Competing Product in accordance with Section 3.6(c)(i)(2).

3.7 **Diligent Efforts**. During the Term with respect to each Product and potential program subject to co-development hereunder, each Party shall act in good faith and use Diligent Efforts to undertake and complete its obligations with respect to such program and Product hereunder.

*****Confidential Treatment Requested**

ARTICLE 4

DEVELOPMENT

4.1 General. Subject to the terms and conditions of this Agreement, the Parties will collaborate on the Development of Products in the Field for up to four (4) different co-development programs, under the direction of the JSC and pursuant to Development Plans, as described in more detail in this Article 4. As of the Effective Date, the Parties have agreed to Develop an OTC Product. In addition, Arcturus will have an option to co-Develop with CureVac up to two (2) different CureVac Programs, and CureVac will have an option to co-Develop with Arcturus one (1) Arcturus Program. For clarification, the Parties contemplate that Targets for programs and potential Products in the Field will be selected, in case of CureVac, from the Reserved Target List under the Development and Option Agreement; provided that the selection of any program under this Agreement shall not constitute the selection of a Target as defined and in accordance with Section 4.2 of the Development and Option Agreement (i.e., shall be subject to substitution rather than reduction of Targets then currently available to CureVac upon such selection hereunder). Accordingly, once one of the Reserved Targets as defined in the Development and Option Agreement is selected for co-Development under this Agreement, such Reserved Target shall be removed from the Reserved Target List following the effectiveness of a license hereunder, with the effect that CureVac shall be entitled to nominate a new Target in accordance with Section 4.2 of the Development and Option Agreement.

4.2 Additional Programs for Potential Co-Development.

(a) During the first [*…***…] month period after the Effective Date (the "**First Program Addition Period**"), each Party will propose to the other Party in writing an available drug development program to develop mRNA therapeutics, in case of CureVac from the Reserved Target List under the Development and Option Agreement, which is reasonably acceptable to the other Party. In relation to the proposed program, each Party will reasonably inform the other Party about the respective development activities, answer questions and provide reasonable access to the results and data of such program, such results and data to include (i) the requirements for a data package consisting of up to […***…] pivotal animal studies and (ii) other requirements as set forth on **Exhibit 4.2**. The Parties will (i) determine by written agreement whether to include such programs under this Agreement, and (ii) at such time will agree on the applicable exclusivity for such program according to Section 3.6 and the lead party pursuant to Section 2.8, subject to Section 4.3, if included under this Agreement.

(b) During […***…] months after the Effective Date (the "**Second Program Addition Period**", together with the "**First Program Addition Period**" the "**Program Addition Period**"), CureVac will propose to Arcturus in writing a second drug development program to develop mRNA therapeutics from the Reserved Target List under the Development and Option Agreement, which is reasonably acceptable to Arcturus. The procedure under Section 4.2(a) shall apply accordingly.

4.3 Overall Allocation of Responsibilities.

(a) OTC Product. The Parties have agreed to conduct preclinical development of OTC Product pursuant to the OTC Preclinical Development Plan, which allocates responsibility for preclinical development activities for OTC Product between the Parties. Thereafter, Arcturus will be responsible for IND filing for an OTC Product and will be the sponsor of clinical trials of such OTC Product.

(b) Co-Developed Arcturus Product. Arcturus will be responsible for all preclinical development of Co-Developed Arcturus Product. Following CureVac's exercise of its CureVac Option, Arcturus will be responsible for IND filing for a Co-Developed Arcturus Product and will be the sponsor of clinical trials of such Co-Developed Arcturus Product.

(c) Co-Developed CureVac Products. CureVac will be responsible for all preclinical development of Co-Developed CureVac Products, except that Arcturus will be responsible for the activities related to formulating CureVac mRNA Constructs with Arcturus LMD Technology. Following Arcturus's exercise of its Arcturus Option with respect to a CureVac Program, CureVac will be responsible for IND filing for a Co-Developed CureVac Product from such program and will be the sponsor of clinical trials of such Co-Developed CureVac Product.

4.4 OTC Products.

(a) OTC Preclinical Development Plan. As of the Effective Date, the Parties have agreed on an initial OTC Preclinical Development Plan, attached to this Agreement as **Exhibit 4.4**. Either Party may propose amendments to the OTC Preclinical Development Plan from time to time, and such amendments shall become effective upon the approval of the JSC. The OTC Preclinical Development Plan shall set forth: (a) the activities to be conducted by each Party for the preclinical Development of OTC Products, including IND enabling studies; (b) the estimated timelines for such activities; (c) the estimated internal and external costs to be incurred by or on account of each Party in connection with such activities; and (d) the criteria for selecting OTC Development Candidates.

(b) Designation of OTC Development Candidates.

(i) Selection of Technology. The Parties agree that the OTC Products will include OTC mRNA Constructs based on Arcturus mRNA Technology or CureVac mRNA Technology. In addition, during the [*…***…] period following the Effective Date, the JSC shall select the sequence for the OTC mRNA Construct.

(ii) OTC Development Candidate Selection. From time to time during the conduct of the OTC Preclinical Development Plan (such timeline to be further specified in the OTC Preclinical Development Plan), either Party may nominate a particular OTC Product to the JSC for consideration as an OTC Development Candidate. Such nomination shall be made prior to the Initiation of IND-enabling studies for such OTC Product, unless the Parties otherwise agree. Promptly after such nomination, each Party shall present to the JSC the data and results it has obtained with respect to such OTC Product, and the JSC shall determine, within […***…] Business Days after receiving such data and results, whether such OTC Product will be approved as an OTC Development Candidate under this Agreement. If the JSC determines not to approve such OTC Product as an OTC Development Candidate, then the JSC shall inform the Parties in writing of such decision,

and may request that further activities be conducted with respect to such OTC Product prior to reconsideration for nomination as an OTC Development Candidate, subject to Section 2.5. If the JSC approves a particular OTC Product as a Development Candidate, then the Parties shall proceed to conduct IND-enabling studies in accordance with the OTC Preclinical Development Plan.

(c) **Clinical Development**. At the time a particular OTC Product is designated as an OTC Development Candidate by the JSC, the JSC shall prepare and submit to the Parties for approval a comprehensive clinical Development plan and budget for such OTC Development Candidate (the "**OTC Clinical Development Plan**"). The OTC Clinical Development Plan shall include a development and regulatory strategy for the OTC Product, including the Parties' respective roles in the Development of such OTC Product and the countries in which Development will occur, and in particular will set forth: (i) the timeline and details of all additional preclinical and clinical Development activities to be conducted by the Parties that are designed to generate data sufficient to file an MAA for the applicable OTC Product in the U.S., EU and Japan; (ii) the protocol synopsis for each clinical trial included in such OTC Clinical Development Plan; (iii) a Manufacturing plan for the Manufacture of the OTC Product in support of the OTC Clinical Development Plan; and (iv) the Clinical Development Costs expected to be incurred by or on behalf of the Parties to carry out such clinical Development. Arcturus shall have the primary responsibility to conduct the Development activities under the OTC Clinical Development Plan.

4.5 Arcturus Products.

(a) **Preclinical Development.** Arcturus will be solely responsible, in its sole discretion, for all preclinical Development of Arcturus Products.

(b) **Option to CureVac to Co-Develop Arcturus Products**. Arcturus hereby grants to CureVac an option during the Program Addition Period to one (1) Arcturus Program to co-Develop and share Operating Profit (or Loss) for Arcturus Products in accordance with the terms of this Agreement (the "**CureVac Option**").

(i) Arcturus shall propose a Program in accordance with Section 4.2.

(ii) Upon request from CureVac, such request to be made within [*…***…] days following such proposal, Arcturus shall promptly provide to CureVac a data package containing (i) all data and results from its preclinical development of Arcturus Products and (ii) an itemized statement setting forth all costs and expenses incurred by Arcturus to conduct the Arcturus Program to date, including Third Party expense and FTE Costs (at the FTE Costs) (the "**Arcturus Preclinical Program Costs**"). During an […***…]-day period following delivery of such data package, which period may be extended by mutual agreement not to be unreasonably withheld by either Party, Arcturus shall promptly respond to CureVac's reasonable requests for more information and other inquiries with respect to the Arcturus Program.

(iii) CureVac may exercise the CureVac Option, within […***…] days following the end of the […***…]-day period (extended if applicable) specified in subsection (ii), by (1) written notice to Arcturus together with (2) payment of fifty percent (50%) of the Arcturus Preclinical Program Costs, and thereafter the Parties shall share all

further co-Development costs equally. For clarity, to the extent that an option is not exercised following delivery of the information set forth in this Section 4.5(b), then the option to CureVac shall terminate.

(c) Clinical Development. Promptly after CureVac's exercise of the CureVac Option, the JSC shall prepare and submit to the Parties for approval a comprehensive clinical Development plan and budget for the applicable Co-Developed Arcturus Product (the "**Arcturus Clinical Development Plan**"). The Arcturus Clinical Development Plan shall include a development and regulatory strategy for the Co-Developed Arcturus Product, including the Parties' respective roles in the Development of such Product and the countries in which Development will occur, and in particular will set forth the timeline and details of: (i) all additional preclinical and clinical Development activities to be conducted by the Parties that are designed to generate data sufficient to file an MAA for the applicable Co-Developed Arcturus Product in the U.S., EU and Japan; (ii) the protocol synopsis for each clinical trial included in such Arcturus Clinical Development Plan; (iii) a Manufacturing plan for the Manufacture of the Co-Developed Arcturus Product for such clinical trials; and (iv) the Clinical Development Costs expected to be incurred by or on behalf of the Parties to carry out such clinical Development. Arcturus shall have the primary responsibility to conduct the Development activities under the Arcturus Clinical Development Plan.

4.6 CureVac Products

(a) Preclinical Development. CureVac will be solely responsible, in its sole discretion, for all preclinical Development of CureVac Products.

(b) Option to Arcturus to Co-Develop CureVac Products. CureVac hereby grants to Arcturus an option during the Program Addition Period for two (2) CureVac Programs to co-Develop and share Operating Profit (or Loss) for CureVac Products in accordance with the terms of this Agreement (the "**Arcturus Option**").

(i) CureVac shall propose a Program in accordance with Section 4.2.

(ii) Upon request from Arcturus, such request to be made within [*…***…] days following such proposal, CureVac shall promptly provide to Arcturus a data package containing (i) all data and results from its preclinical development of CureVac Products and (ii) an itemized statement setting forth all costs and expenses incurred by CureVac to conduct the applicable CureVac Program to date, including Third Party expense and FTE Costs incurred by CureVac and Arcturus under the Development and Option and, if applicable, the License Agreement (the "**CureVac Preclinical Program Costs**" for the applicable CureVac Program). During an […***…]-day period following delivery of such data package, which period may be extended by mutual agreement not to be unreasonably withheld by either Party, CureVac shall promptly respond to Arcturus's reasonable requests for more information and other inquiries with respect to the applicable CureVac Program.

(iii) The Option Exercise Fee and the Milestone Payments already paid by CureVac under the Development and Option Agreement and the License Agreement shall not be included in the CureVac Preclinical Program Costs. However, CureVac shall

have the right to set off such payments against any payments due to Arcturus under this Agreement, the Development and Option Agreement or any License Agreement.

(iv) Arcturus may exercise the Arcturus Option for a CureVac Program, within [*…***…] days following the end of the […***…]-day period (extended if applicable) specified in subsection (ii), by (1) written notice to CureVac together with (2) payment of fifty percent (50%) of the CureVac Preclinical Program Costs for such CureVac Program, and thereafter the Parties shall share all further co-Development costs equally. For clarity, to the extent that an option is not exercised following delivery of the information set forth in this Section 4.6(b), then such one (1) Arcturus Option shall terminate.

(c) **Clinical Development**. Promptly after Arcturus's exercise of an Arcturus Option, the JSC shall prepare and submit to the Parties for approval a comprehensive clinical Development plan and budget for the applicable Co-Developed CureVac Product (the "**CureVac Clinical Development Plan**" for such Product). Each CureVac Clinical Development Plan shall include a development and regulatory strategy for the applicable Co-Developed CureVac Product, including the Parties' respective roles in the Development of such Product and the countries in which Development will occur, and in particular will set forth the timeline and details of: (i) all additional preclinical and clinical Development activities to be conducted by the Parties that are designed to generate data sufficient to file an MAA for the applicable Co-Developed CureVac Product in the U.S., EU and Japan; (ii) the protocol synopsis for each clinical trial included in such CureVac Clinical Development Plan; (iii) a Manufacturing plan for the Manufacture of such Co-Developed CureVac Product for such clinical trials; and (iv) the Clinical Development Costs expected to be incurred by or on behalf of the Parties to carry out such clinical Development. CureVac shall have the primary responsibility to conduct the Development activities under each CureVac Clinical Development Plan.

4.7 Development Plans; Amendment.

(a) The OTC Preclinical Development Plan, OTC Clinical Development Plan, Arcturus Clinical Development Plan and CureVac Clinical Development Plans shall each be referred to as a "**Development Plan**" for the applicable Product, and each Development Plan for clinical Development will be referred to as a "**Clinical Development Plan**".

(b) From time to time during the Term, the JSC shall prepare and approve amendments, as appropriate, to the then-current Development Plans. Once approved by the JSC, a revised Development Plan shall replace the corresponding prior Development Plan. If the terms of any Development Plan contradict, or create inconsistencies or ambiguities with, the terms of this Agreement, then the terms of this Agreement shall govern.

4.8 Development Costs.

(a) **Preclinical Development**. The Parties shall share equally all internal costs (at the FTE Costs) and Third Party costs incurred to conduct (i) preclinical Development under the OTC Preclinical Development Plan and (ii) preclinical Development of Co-Developed Arcturus Products and Co-Developed CureVac Products, *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties; *provided, further*, that the foregoing does

not include any Manufacturing Costs, which are addressed in Section 6.3 and which shall be balanced in accordance with Section 4.8(b). In addition, Arcturus will be solely responsible for all costs incurred for regulatory activities for the Co-Developed Arcturus Products prior to the Initiation of clinical trials, and CureVac will be solely responsible for all costs incurred for regulatory activities for the Co-Developed CureVac Products prior to the Initiation of clinical trials.

(b) **True-Up Prior to Clinical Development**. The Parties agree that as soon as practicable but in any event prior to Initiating a clinical trial for each Product, each Party should have invested approximately the same amount in internal costs (including costs related to the Program incurred under the Development and Option Agreement and, if applicable, the respective License Agreement) and Third Party costs to conduct its activities with respect to such OTC Product, Co-Developed Arcturus Product and Co-Developed CureVac Product, including Manufacturing Costs. Within [*…***…] days after the JSC approves the applicable Clinical Development Plan, the Parties shall determine a mechanism for balancing such investments, and each Party shall comply with the determined mechanism and the costs should be shared and balanced equally prior to the Initiation of such clinical trial.

(c) **Clinical Development**.

(i) The Parties shall share equally all Clinical Development Costs, subject to the remainder of this Section 4.8(c) , *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties; *provided, further*, that for any calendar year, neither Party will be permitted to recover Clinical Development Costs in excess of the amount allocated to such Party's Development activities for such year under the budget in the applicable Clinical Development Plan without the advance or retroactive, unanimous approval of the JSC.

(ii) At each of the development stages for each Product, the Parties will update the Clinical Development Plan for such Product to include a detailed budget for the next phase of clinical Development and submit such updated plan and budget to the JSC for approval.

(d) **Payments of Costs**. The Parties shall reconcile and pay costs described in this Section 4.8 in accordance with Section 8.2.

4.9 **Opt-Out**

(a) Within […***…] days after approval of the applicable budget in accordance with Section 4.8(c)(ii), Arcturus shall have the right to opt out of future sharing of Clinical Development Costs with respect to Co-Developed CureVac Products, and CureVac shall have the right to opt out of future sharing of Clinical Development Costs with respect to OTC Products and Co-Developed Arcturus Products, in each case upon written notice to the other Party (an "**Opt-Out**").

(b) Consequences of an Opt-Out.

(i) The Party that Opts-Out for a Product (the "**Opt-Out Product**") will not be obligated to pay any Clinical Development Costs for such Product incurred after delivery of such notice.

(ii) From and after such Opt-Out, such Party shall no longer have license rights pursuant to Article 3, but shall remain subject to the limitations and obligations set forth in Section 3.6.

(iii) Section 11.3(a)(iv) shall apply accordingly, provided that the Party that Opts-Out is considered the Terminating Party.

(iv) From and after such Opt-Out, such Party shall no longer be eligible to receive its share of Operating Profit or obligated to pay its share of Operating Loss for the applicable Product, and instead such Party shall receive royalties on Net Sales in the Territory of the Product for which it has opted out (the "**Royalty Rate**" for the applicable Product):

(A) The Royalty Rate for the OTC product shall be as follows, provided that these rates shall be reviewed and if appropriate, adjusted in good faith by the Parties upon the earlier of (1) [*…***…] days following the Opt-Out notice and (2) the Initiation of a Phase 3 Clinical Trial

Time of Opt-Out or Forced Opt-Out	Applicable Royalty Rate
[…***…]	[…***…]%
[…***…]	[…***…]%
[…***…]	[…***…]%
[…***…]	[…***…]%
[…***…]	[…***…]%

(B) The Royalty Rate for other Products shall be agreed to in good faith by the Parties upon the earlier of (1) […***…] days following the Opt-Out notice and (2) […***…].

4.10 Diligence. Each Party shall use Diligent Efforts to conduct the Development activities (including related regulatory activities) assigned to it under the Development Plans, and shall conduct such activities in good scientific manner and in compliance with applicable Laws. Arcturus shall use Diligent Efforts to Develop and seek Regulatory Approval of an OTC Product and a Co-Developed Arcturus Product in the Field in the Territory, and CureVac shall use Diligent Efforts to Develop and seek Regulatory Approval of a Co-Developed CureVac Product from each CureVac Program in the Field in the Territory.

4.11 Development Records. Each Party shall maintain complete, current and accurate records of all Development activities conducted by it hereunder, and all data and other Information resulting from such activities. Such records shall fully and properly reflect all work done and results achieved in the performance of the Development activities in good scientific manner appropriate for regulatory and patent purposes. Each Party shall document all non-clinical studies and clinical trials in formal written study reports according to applicable Laws and national and international guidelines (*e.g.*, ICH, GCP, GLP, and GMP). Each Party shall have the right to review and copy such records maintained by the other Party at reasonable times and to obtain access to the original to the extent necessary for regulatory and patent purposes or for other legal proceedings.

4.12 Data Exchange and Development Reports. In addition to adverse event and safety data reporting obligations pursuant to Section 5.4, each Party shall promptly provide the other Party with copies of all data and results generated by or on behalf of such Party in the course of performing the Development activities hereunder. Each Party shall provide the JSC with regular reports detailing its Development activities for the Products, and the results of such activities at each regularly scheduled JSC meeting. The Parties shall discuss the status, progress and results of each Party's Development activities at such JSC meetings. In addition, each Party agrees to provide serious adverse events and suspected unexpected serious adverse reactions reports (redacted with respect to any specific trials or collaborator or licensee confidential information) then in such Party's Control with respect to the CureVac mRNA Technology and Arcturus LMD Technology then being evaluated by a Party for a program under Development hereunder, respectively.

4.13 Exchange of Materials.

(a) If a Party provides any Materials to the other Party under this Agreement in connection with the Development of the Products, the Party receiving such Materials shall use such Materials solely to Develop the Products in accordance with this Agreement. Without limiting the foregoing, except as necessary to Develop the Products in accordance with this Agreement, neither Party shall attempt to reverse engineer, design around, deconstruct or in any way determine the structure or composition of the other Party's Materials, shall not generate analogs of or derivatives based on such Materials, shall not sell, transfer, disclose or otherwise provide access to such Materials to any Third Party without the written consent of the other Party, except that each Party may allow access to the other Party's Materials to its employees, agents, and sub-contractors who require such access for the Development of the Products under and in accordance with this Agreement; provided that such employees, agents and sub-contractors are apprised of the proprietary nature of the Materials and are bound by written agreement to retain and use the Materials in a manner that is consistent with the terms of this Agreement.

(b) Upon the completion of the relevant Development work or the providing Party's request, any remaining Materials will be returned to the providing Party, or otherwise disposed of as mutually agreed by the Parties.

ARTICLE 5

REGULATORY

5.1 Regulatory Responsibilities. The Development Plans shall set forth the regulatory strategy for seeking Regulatory Approval for the Products in the Field by the FDA, EMA and Regulatory Authorities in Japan. All regulatory activities shall be conducted using Diligent Efforts and in accordance with the regulatory strategy set forth in the Development Plans.

5.2 Cooperation and Allocation of Responsibilities.

(a) OTC Products and Arcturus Product. Arcturus shall be the regulatory sponsor and shall be solely responsible for all regulatory activities for the OTC Products and the Co-Developed Arcturus Products. Arcturus shall be responsible for preparing and filing, and shall be the owner of, all MAAs for such Products in the Field in the Territory, and shall be responsible for all regulatory activities necessary to obtain and maintain Regulatory Approval of such Products in the Field in the Territory.

(b) CureVac Products. CureVac shall be the regulatory sponsor and shall be solely responsible for all regulatory activities for the Co-Developed CureVac Products. CureVac shall be responsible for preparing and filing, and shall be the owner of, all MAAs for such Products in the Field in the Territory, and shall be responsible for all regulatory activities necessary to obtain and maintain Regulatory Approval of such Products in the Field in the Territory.

(c) Cooperation. For each Product, each Party shall cooperate reasonably with the other Party with respect to all regulatory activities. Without limiting the foregoing, each Party:

(i) shall consult with the other Party through the JSC regarding regulatory matters pertaining to all Regulatory Materials of the Products, including plans, strategies, filings, reports, updates and supplements in connection therewith;

(ii) shall provide the other Party with drafts of any Regulatory Materials for the Products to be submitted by such Party to any Regulatory Authority a reasonable time (but in no event less than [*…***…] days, unless impractical) prior to submission for review and comment, and shall consider in good faith any comments received from the other Party;

(iii) shall provide the other Party with copies of any Regulatory Materials submitted to and any correspondence received from any Regulatory Authority pertaining to the Products promptly after its submission or receipt by such Party; and

(iv) shall provide the other Party written minutes or other records of any oral discussions with any Regulatory Authority pertaining to the Products promptly after any such discussion.

If any Regulatory Material to be provided under this Section 5.2 was originally created in a language other than the English language, the providing Party shall provide an English translation along with the original document to the receiving Party at the providing Party's cost.

5.3 Meetings with Regulatory Authorities.

(a) Arcturus shall lead and present at each meeting and teleconference with Regulatory Authorities for OTC Products and Co-Developed Arcturus Products. CureVac shall not initiate contact, or respond to any inquiry from, any Regulatory Authority with respect to such Products without first notifying Arcturus in writing and obtaining Arcturus's written consent for such contact or response. Arcturus shall provide CureVac with at least [*…***…] days (unless impractical) advance notification of any in-person meeting or teleconference with the Regulatory Authorities that relates to the Development of such Products. CureVac shall have the right, but not the obligation, to have its representatives attend (but, unless otherwise requested by Arcturus, not participate in) such meetings.

(b) CureVac shall lead and present at each meeting and/or teleconference with Regulatory Authorities for Co-Developed CureVac Products. Arcturus shall not initiate contact, or respond to any inquiry from, any Regulatory Authority with respect to such Products without first notifying CureVac in writing and obtaining CureVac's written consent for such contact or response. CureVac shall provide Arcturus with at least […***…] days (unless impractical) advance notification of any in-person meeting or teleconference with the Regulatory Authorities that relates to the Development of such Products. Arcturus shall have the right, but not the obligation, to have its representatives attend (but, unless otherwise requested by CureVac, not actively participate in) such meetings.

5.4 Pharmacovigilance. Within […***…] year after the Effective Date, the Parties shall enter into a pharmacovigilance agreement regarding the Products setting forth the procedures and actions that the Parties shall employ with respect to safety data sharing and adverse event reporting for the Products (the "**Pharmacovigilance Agreement**"). The Pharmacovigilance Agreement shall include mutually acceptable guidelines and procedures for the receipt, investigation, recordation, communication, and exchange (as between the Parties) of adverse event reports and any other information concerning the safety of the Products. The Pharmacovigilance Agreement shall also cover adverse events related to the use of the Arcturus LMD Technology. Such guidelines and procedures shall be in accordance with, and enable the Parties to fulfill, local and national regulatory reporting obligations under applicable laws and regulations. Each Party hereby agrees to comply with its respective obligations under such Pharmacovigilance Agreement and to cause its Affiliates and sublicensees to comply with such obligations.

5.5 Product Withdrawals and Recalls.

(a) If any Regulatory Authority (a) threatens, initiates or advises any action regarding clinical holds of trials or any validated safety signals or to remove any Product from the market in the Territory or (b) requires or advises a Party or its Affiliates to distribute a "Dear Doctor" letter or its equivalent regarding use of any Product in the Territory, then such Party shall notify the other Party of such event within […***…] Business Days (or sooner if required by applicable Laws) after such Party becomes aware of the action, threat, advice or requirement (as applicable). The JSC will discuss and attempt to agree upon whether to recall or withdraw a Product in the Territory; provided, however, that if the Parties fail to agree within an appropriate time period, Arcturus shall decide whether to recall or withdraw any OTC Product or Co-Developed Arcturus Product in the Territory, and CureVac shall decide whether to recall or withdraw any Co-Developed CureVac Product in the Territory.

(b) Any recall or withdrawal expenses with respect to Products shall be treated as Clinical Development Costs or Joint Commercialization Costs, as applicable, except to the extent that the recall or withdrawal is attributable to the gross negligence or willful misconduct of a Party in which event (i) such Party shall bear such costs for which it is responsible and (ii) such costs shall not be included in Clinical Development Costs or Joint Commercialization Costs.

ARTICLE 6

MANUFACTURING AND SUPPLY

6.1 General. The Manufacture of the mRNA Constructs and Products, including all process and formulation development in connection therewith, including CMC activities, shall be overseen and coordinated by the JSC, and conducted pursuant to the sections of the Development Plans and the Commercialization Plans pertaining to such Manufacturing activities. At each regularly scheduled JSC meeting, as applicable, each Party shall provide reports summarizing its Manufacturing activities and the results of such activities. Each Party shall use Diligent Efforts to conduct all Manufacturing activities allocated to such Party under this Agreement, the Development Plans and the Commercialization Plans.

6.2 Allocation of Supply Obligations.

(a) Preclinical and Clinical Supply.

(i) mRNA Constructs.

(1) Subject to subsection (ii), CureVac shall Manufacture and supply all mRNA Constructs in the Products (whether using the CureVac mRNA Technology or (in case of the OTC Product) the Arcturus mRNA Technology) for use in Development activities under the Development Plans and for Commercial use. The Parties shall negotiate in good faith and enter into preclinical and clinical supply agreements for mRNA Constructs within [*…***…] days after the Effective Date to enable the Manufacturing and supply for Development of Products.

(2) If and to the extent the Parties agree to use the Arcturus mRNA Technology (in case of the OTC Product), CureVac's obligation to Manufacture and supply mRNA Constructs shall be subject to the successful establishment of the production process. The Parties will further specify the necessary activities, including sufficient periods of testing, in the respective Development Plan.

(ii) Products. Arcturus shall Manufacture and supply all Products, using mRNA Constructs supplied by CureVac, for use in Development activities under the Development Plans and for Commercial use. Such activities include producing lipid-mediated delivery systems and formulating such lipid-mediated delivery systems with mRNA Constructs provided by CureVac. The Parties shall negotiate in good faith and enter into preclinical and clinical supply agreements for the Products within […***…] days after the Effective Date to enable the Development and Commercialization of Products. Each such supply agreement shall contain provisions expressly providing for technology transfer, qualification and license rights to a second source of Manufacture of Products designated by the Party Commercializing such Product (or OTC Product), subject to reasonable approval not to be unreasonably withheld, conditioned or delayed.

(iii) **Fill and Finish.** The Parties will discuss and decide upon the use of a sub-contractor for fill and finish in the JSC in accordance with section 2.5.

(b) **Commercial Supply**. At a time to be determined by the JSC but in any event not later than […***…] following the completion of […***…] for a Product, the Parties shall negotiate in good faith and enter into commercial supply agreements governing the Manufacture and supply of mRNA Constructs by CureVac and the Manufacture and supply of Products by Arcturus, in each case for commercial use. Each such commercial supply agreement shall contain provisions expressly providing for technology transfer, qualification and license rights to a second source of Manufacture of Constructs or Products, respectively, designated by the Party Commercializing such Product (or OTC Product), subject to reasonable approval not to be unreasonably withheld, conditioned or delayed.

(c) For clarification, regarding the Manufacture and supply for Development and Commercialization, CureVac shall have the casting vote in relation to the mRNA Constructs in accordance with Section 2.5(b)(i) and Arcturus shall have the casting vote in relation to the Manufacture and supply of Products using mRNA Constructs supplied by CureVac in accordance with Section 2.5(a)(i), in particular in relation to the selection of a second source.

6.3 **Allocation of Manufacturing Costs**.

(a) **Preclinical Manufacture.**

(i) **OTC Products**.

(1) **Pre-Candidate Selection**. For all […***…] activities conducted under the OTC Preclinical Development Plan prior to selection of a Development Candidate, […***…] shall be […***…] responsible for […***…] costs (at the […***…]) and […***…] costs […***…] incurs to […***…], and […***…] shall be initially responsible for […***…] costs (at the […***…]) and […***…] costs […***…] incurs to […***…] using […***…], provided that such […***…] shall be […***…].

(2) **Post-Candidate Selection**. For […***…] activities conducted under the OTC Preclinical Development Plan from and after selection of an OTC Development Candidate, […***…] shall be […***…] responsible for […***…] costs incurred by […***…] to […***…] and […***…], and […***…] shall […***…] (at the […***…]) incurred by […***…] for such activities, *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties.

(3) **Process Development**. Notwithstanding the foregoing, […***…] shall be […***…] responsible for […***…] costs (at the […***…]) and […***…] costs incurred by […***…] for process development necessary for establishing GMP production of mRNA Constructs.

(4) **Payment of Costs**. To the extent that a Party is responsible for costs under this Section 6.3(a)(i), the Parties shall reconcile and pay costs in

(1) accordance with the procedures of Section 8.1(a) and true up the costs as provided in Section 4.8. The costs under this Section 6.3(a)(i) shall be considered Manufacturing Costs.

(ii) **Co-Development Programs**. All internal costs (at the FTE Costs) and all Third Party costs incurred by a Party to Manufacture Products under its respective program (i.e., the CureVac Programs or the Arcturus Program) prior to IND filing will be borne by such Party and included in the Arcturus Preclinical Program Costs or CureVac Preclinical Program Costs, as applicable, and subject to fifty percent (50%) reimbursement by the other Party pursuant to Sections 4.5(b) and 4.6(b) , *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties.

(b) **Clinical Development Plans.** The Manufacturing Costs incurred by or on behalf of either Party under the Clinical Development Plans shall be deemed Clinical Development Costs and shared equally between the Parties, subject to a Party's Opt-Out, *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties.

(c) **Commercial Supply**. The Manufacturing Costs incurred by or on behalf of either Party for Commercialization in the Territory shall be included in Joint Commercialization Costs and shared between the Parties accordingly, *provided, however*, in each case, that the costs have been included in the respective Development Plan or have otherwise been approved by both Parties.

(d) **Contract Manufacturer**. Each Party shall have the right to Manufacture the mRNA Constructs and Products under this Agreement through a CMO, provided that its agreement with such CMO shall

(i) permit such Party to transfer the manufacturing process used by such CMO to the other Party, in case and to the extent such technology transfer is required under this Agreement; and

(ii) require such CMO to transfer to such Party engaging such CMO all records pertaining to such Manufacturing activities, so that such Party may satisfy its obligations under Section 6.5.

6.4 **Transfer of Manufacturing Know-How**.

(a) **Technology Transfer.** Following the successful establishment of the production process as described in Section 6.2(a)(i)(2), upon selection of the OTC Product or a Co-Developed Arcturus Product using Arcturus mRNA Technology, the Parties shall establish the procedures for Arcturus to effect the transfer to CureVac of the Arcturus Know-How that is then being used by Arcturus or its CMO in the Manufacture of mRNA Constructs using the Arcturus mRNA Technology. Arcturus shall conduct such technology transfer as soon as practicable in accordance with such procedures, at CureVac's expense.

(b) **Assistance.** In connection with the transfer of Know-How under this Section 6.4, Arcturus shall provide reasonable technical assistance at CureVac's request and expense.

6.5 Manufacturing Records. Each Party shall promptly provide the other Party, upon its reasonable request for the purpose of this Agreement, copies of the Manufacturing records (including specifications, protocols, batch records, master batch records and other CMC information) maintained by the first Party, its Affiliates or Third Party contractors pertaining to mRNA Constructs and Products for such other Party's use in connection with the Manufacture of the mRNA Constructs or Products under this Agreement, to the extent reasonably necessary to perform obligations or exercise rights under this Agreement. Each Party hereby grants the other Party the right to reference (and have referenced by its CMO) the Drug Master Files, if any, maintained by the first Party, its Affiliates or Third Party contractors pertaining to mRNA Constructs and Products for such other Party's use in connection with the Manufacture of the mRNA Constructs and Products under this Agreement. For as long as a Party Manufactures any mRNA Construct or Product under this Agreement for use in Development or Commercialization by the other Party, the other Party shall have the right to inspect the facility where such mRNA Construct or Product is being Manufactured, upon reasonable request by such other Party and at a time mutually agreed upon by the Parties, provided that neither Party shall have the right to conduct such inspection at any given facility more frequently than [*…***…] per calendar year. As between the Parties, all proprietary information pertaining to the facility and personnel obtained by the inspecting Party through such inspection shall be deemed Confidential Information of the inspected Party.

6.6 Manufactured Products. Each Party represents and warrants that all mRNA Constructs and Products Manufactured and supplied by such Party for clinical use under this Agreement shall at the time of delivery: (a) meet the applicable specifications; (b) be Manufactured in accordance with current Good Manufacturing Practices; and (c) be Manufactured in accordance with all applicable Laws.

ARTICLE 7

COMMERCIALIZATION

7.1 General. Subject to Section 7.5, Arcturus shall have the primary responsibility for all aspects of the Commercialization of OTC Products and Co-Developed Arcturus Products in the Field in the Territory, and CureVac shall have the primary responsibility for all aspects of the Commercialization of Co-Developed CureVac Products in the Field in the Territory, such activities to include in each case: (a) developing and executing a commercial launch and pre-launch plan of a Product, (b) negotiating with applicable Governmental Authorities regarding the pricing and reimbursement status of the applicable Products; (c) strategic marketing and promotion, sale force detailing, advertising, medical education and liaison; (d) offer for sale, booking sales, importation, product distribution and performance of related services; (e) handling all aspects of order processing, invoicing and collection, inventory and receivables and other sales activities; (f) providing customer support, including handling medical queries, and performing other related functions; (g) conforming its practices and procedures to applicable Laws relating to the marketing, detailing and promotion of the applicable Products and (h) any Phase 4 Studies that are not Required Phase 4 Studies.

7.2 Commercial Diligence. Arcturus shall use Diligent Efforts to Commercialize one (1) OTC Product and, if CureVac exercises the CureVac Option, one (1) Co-Developed Arcturus Product in each country in which it receives Regulatory Approval. If Arcturus

exercises the Arcturus Option for one or both CureVac Programs, CureVac shall use Diligent Efforts to Commercialize one Co-Developed CureVac Product from each such CureVac Program in each country in which it receives Regulatory Approval.

7.3 Commercialization Plan. No later than [*…***…] after the Initiation of the first Phase 3 Clinical Trial of (a) each Co-Developed CureVac Product, but excluding Opt-Out Products, CureVac shall prepare and provide to Arcturus for review and discussion a written plan for the Commercialization of such Product in the Territory and (b) the OTC Product and the Co-Developed Arcturus Product, but excluding Opt-Out Products, Arcturus shall prepare and provide to CureVac for review and discussion a written plan for the Commercialization of such Product in the Territory (with respect to each Product, a "**Commercialization Plan**"). Each Commercialization Plan shall include a reasonably detailed description of (i) the level of activities and support for, anticipated timeline and corresponding budget for the applicable Party's Commercialization activities and (ii) the supply by the other Party with respect to such Product, including mRNA Constructs. Each Party shall periodically (at least on an annual basis) prepare updates and amendments to its Commercialization Plans to reflect changes in its plans, including in response to changes in the marketplaces, relative success of the Products and other relevant factors influencing such plans and activities. Each Party shall submit all updates and amendments to each Commercialization Plan to the other Party for review and discussion before adopting such updates and amendments.

7.4 Reports. Each Party shall update the JSC at each regularly scheduled JSC meeting regarding its Commercialization activities with respect to the applicable Products in the Territory. Each such update shall be in a form to be agreed by the JSC and shall summarize such Party's (either by itself or through its Affiliates and its sublicensees) Commercialization activities with respect to the applicable Products in the Territory. Each update will be at a level of detail reasonably requested by the other Party and sufficient to enable such other Party to determine such Party's compliance with its diligence obligations pursuant to Section 7.2.

7.5 Co-Commercialization. Promptly following the completion of Phase 2 Clinical Trials, the Parties shall discuss in good faith the potential for Co-Commercialization of a Co-Developed Product and shall negotiate […***…] to enter into a term sheet specifying the terms pursuant to which the Parties may Co-Commercialize any such Co-Developed Product (such terms may include a territorial split). In the event that the Parties are unable to agree, then the Party leading the Co-Development shall have the right to Commercialize (but not license to or co-commercialize with a Third Party except in accordance with Section 7.6) such Co-Developed Product for the applicable share of Operating Profit (or Loss).

7.6 Partnering. With respect to any Co-Developed Products, the Parties shall mutually agree upon a strategy for potential licensing and the lead Party to identify, negotiate and enter into a sublicense to a Third Party ("**Partnering**"). In the event that the Parties are unable to agree, then the Party leading the Co-Development shall be the lead Party. In the conduct of any such licensing activities by a Party, the other Party shall be kept informed in reasonable detail of the list of identified potential licensees, the status of inquiries and discussions and the progress of any negotiations. In addition, the non-lead Party shall be provided a copy of any term sheet or draft agreement for comment, which input shall be reasonably considered by the lead Party. For clarity, Commercial Partnering activities shall

be considered "Commercialization" as defined in Section 1.23, *provided, however*, that costs associated with Partnering activities shall be shared equally as Development Costs prior to the execution of a Partnering agreement and as Commercialization Costs after the execution of a Partnering agreement.

ARTICLE 8

FINANCIAL PROVISIONS

8.1 Preclinical Costs for OTC Products.

(a) Reporting. Within [*…***…] days after the end of each month during which either Party incurs any costs in accordance with the OTC Preclinical Development Plan that are subject to cost sharing under Sections 4.8(a) and 6.3(a)(i), each Party shall submit to the Finance Officers a report summarizing in reasonable detail all such internal costs (at the FTE Costs) and Third Party costs incurred by such Party to conduct the applicable activities in accordance with the OTC Preclinical Development Plan; provided that if there are any such costs incurred in such month that a Party is unable to timely include in such financial report, such amount shall be included and reconciled in the financial report in a future month. Each such report shall specify in reasonable detail all such costs, and if requested by the other Party, any invoices or other supporting documentation for any payments to a Third Party that individually exceed […***…] Dollars ($[…***…]) or with respect to which documentation is otherwise reasonably requested shall be promptly provided.

(b) Payment. Within […***…] Business Days after receipt of the reports under Section 8.1(a), the Finance Officers shall conduct a reconciliation and determine if any reconciliation payment is due from one Party to another for such calendar month and, if so, the amount of such reconciliation payment. If any such payment is owed, the applicable Party shall make such payment to the other Party within […***…] days after the Finance Officer's reconciliation; provided, however, that in the event of any disagreement with respect to the calculation of such payment, any undisputed portion thereof shall be paid in accordance with the foregoing timetable and the remaining, disputed portion shall be paid within […***…] Business Days after the date on which the Parties, using good faith efforts, resolve the dispute. In addition, within […***…] days after the end of each calendar quarter during which a Party is conducting activities under the OTC Preclinical Development Plan, each Party shall submit to the Finance Officers a statement of all costs such Party incurred that are subject to cost sharing under Sections 4.8(a) and 6.3(a)(i), and to the extent that such statements differ from the previously provided monthly statements, the Finance Officers will determine any true-up payment due from one Party to the other, which payments will be due within […***…] days after the Finance Officers' determination.

(c) True-Up. The Parties will provide all information and make payments necessary to comply with any mechanism determined by the JSC pursuant to Section 4.8(b).

8.2 Clinical Development Costs.

(a) Reconciliation of Clinical Development Costs. Within […***…] days after the end of each calendar quarter during which either Party incurs any Clinical Development Costs for any Product which have been included in the respective Development

Plan or have otherwise been approved by both Parties, unless an Opt-Out has become effective for such Product prior to such calendar quarter, each Party shall submit to the Finance Officers a report setting forth the Clinical Development Costs it incurred in such calendar quarter for each Product; provided that if there are any Clinical Development Costs incurred in such calendar quarter that a Party is unable to timely include in such financial report, such amount shall be included and reconciled in the financial report in a future calendar quarter. Each such report shall specify in reasonable detail all such costs, and if requested by the other Party, any invoices or other supporting documentation for any payments to a Third Party that individually exceed [*…***…] Dollars ($[…***…]) or with respect to which documentation is otherwise reasonably requested shall be promptly provided.

(b) Payment of Quarterly Aggregate Payment. Within […***…] Business Days after receipt of the reports under Section 8.2(a), the Finance Officers shall conduct a reconciliation of the actual costs incurred by the Parties for each Product and determine if any reconciliation payment is due from one Party to another for such Product for such calendar quarter and, if so, the amount of such reconciliation payment (the "**Quarterly Reconciliation Payment**" for a Product) such that each Party bears fifty percent (50%) of the Clinical Developments Costs for each Product and calendar quarter. The Finance Officers shall determine, based on the Quarterly Reconciliation Payments for all Products for such calendar quarter, the overall payment due from one Party to another (the "**Quarterly Aggregate Payment**"). If a Quarterly Aggregate Payment is owed, the applicable Party shall make such payment to the other Party within […***…] days after the Finance Officer's reconciliation; provided, however, that in the event of any disagreement with respect to the calculation of any Quarterly Reconciliation Payment, any undisputed portion of such Quarterly Aggregate Payment shall be paid in accordance with the foregoing timetable and the remaining, disputed portion shall be paid within […***…] Business Days after the date on which the Parties, using good faith efforts, resolve the dispute.

8.3 Joint Commercialization Cost Sharing Prior to First Commercial Sale.

(a) Payment of Joint Commercialization Costs. Prior to First Commercial Sale of each Product, the Parties shall share all Joint Commercialization Costs incurred for such Product prior to an Opt-Out with respect to such Product, with each Party responsible for fifty percent (50%) of such costs, *provided, however*, that the costs have been included in the respective Commercialization Plan or have otherwise been approved by both Parties. Following the reconciliation of Joint Commercialization Costs incurred for such Product during a calendar quarter prior to an Opt-Out for such Product pursuant to Section 8.3(b), the Party owing a reconciliation payment shall make such payment in accordance with Section 8.3(b).

(b) Reconciliation of Joint Commercialization Costs. Within […***…] days after the end of each calendar quarter prior to First Commercial Sale anywhere in the Territory and during which either Party incurs prior to an Opt-Out any Joint Commercialization Costs with respect to a Product, both Parties shall submit to the Finance Officers a report setting forth the Joint Commercialization Costs it incurred in such calendar quarter; provided that if there are any Joint Commercialization Costs incurred in such calendar quarter that a Party is unable to timely include in such financial report, such amount shall be included and reconciled in the financial report in the next possible calendar quarter. Each such report shall specify in reasonable detail all such costs, and if requested by the other

Party, any invoices or other supporting documentation for any payments to a Third Party that individually exceed [*…***…] Dollars ($[…***…]) or with respect to which documentation is otherwise reasonably requested shall be promptly provided. Within […***…] Business Days after receipt of such reports, the Finance Officers shall confer and agree in writing on whether a reconciliation payment is due from one Party to the other Party, and if so, the amount of such reconciliation payment, so that the Parties share equally the Joint Commercialization Costs for such Product. The Party required to pay such reconciliation payment shall make such payment to the other Party within […***…] Business Days after the end of such […***…] Business Day conferral period; provided, however, that in the event of any disagreement with respect to the calculation of such reconciliation payment, any undisputed portion of such reconciliation payment shall be paid in accordance with the foregoing timetable and the remaining, disputed portion shall be paid within […***…] Business Days after the date on which the Parties, using good faith efforts, resolve the dispute.

8.4 Operating Profit and Loss Sharing After First Commercial Sale.

(a) Share of Operating Profits and Operating Losses. Following the first calendar quarter in which occurs the First Commercial Sale of each Product anywhere in the Territory, and for so long as such Product is being sold in the Territory, and provided that an Opt-Out has not occurred with respect to such Product, the Parties shall share equally all Operating Profits and all Operating Losses (as applicable) for such Product in the Territory. The remainder of this Section 8.4 will apply only for Products for which an Opt-Out has not occurred.

(b) Calculation and Payment.

(i) Within […***…] days after the end of each calendar quarter beginning with the calendar quarter in which the First Commercial Sale of each Product occurs in the Territory, the applicable Party (i.e., Arcturus, with respect to OTC Products and Co-Developed Arcturus Products, and CureVac, with respect to Co-Developed CureVac Products) shall report to the Finance Officers the Net Sales of the applicable Product in the Territory, and each Party shall report to the Finance Officers the Joint Commercialization Costs incurred by it in such calendar quarter for such Product in the Territory; provided that if there are any Joint Commercialization Costs incurred in such calendar quarter that a Party is unable to timely include in such financial report, such amount shall be included and reconciled in the financial report for a future calendar quarter. Each such report shall specify in reasonable detail all deductions to the extent allowed in the calculation of such Net Sales and all expenses included in Joint Commercialization Costs, and if requested by the other Party, any invoices or other supporting documentation for any payments to a Third Party that individually exceed […***…] Dollars ($[…***…]) or with respect to which documentation is otherwise reasonably requested shall be promptly provided.

(ii) Within […***…] Business Days after receipt of such reports, the Finance Officers shall confer and agree upon in writing a consolidated financial statement for each Product setting forth: (A) the Operating Profit or Operating Loss for such calendar quarter and (B) each Party's fifty percent (50%) share of Operating Profit or Operating Loss. The Finance Officers will also determine, based on the amounts in the preceding clause (B) for all Products, the amount due from one Party to the other Party such that each Party bears fifty percent (50%) of Operating Loss and receives fifty percent (50%) of Operating Profit for

each Product. Within [*…***…] Business Days after such […***…] Business Day conferral period, Arcturus or CureVac, as applicable, shall make such payment to the other Party; provided, however, that in the event of any disagreement with respect to the calculation of such payment, any undisputed portion of such payment shall be paid in accordance with the foregoing timetable and the remaining, disputed portion shall be paid within […***…] Business Days after the date on which the Parties, using good faith efforts, resolve the dispute.

8.5 Royalty Payments for Products Following an Opt-Out.

(a) Royalties. Subject to the other terms of this Section 8.5, the Party that is responsible for selling an Opt-Out Product shall make quarterly, non-refundable, non-creditable royalty payments to the other Party equal to the applicable Royalty Rate of Net Sales of such Opt-Out Product in the Territory.

(b) Royalty Term. A Party's royalty payment obligations under this Section 8.5 with respect to a particular Opt-Out Product and country shall commence upon the First Commercial Sale of such Opt-Out Product in such country (by such Party or its respective Affiliates or sublicensees) and shall continue, on a Product-by-Product and country-by-country basis, until the latest of (i) the expiration of the last to expire Valid Claim in such country claiming the composition of, or the method of making or using, such Opt-Out Product; (ii) the expiration of any Regulatory Exclusivity granted with respect to such Opt-Out Product in such country; and (iii) […***…] years after the First Commercial Sale of such Opt-Out Product in such country (the "**Royalty Term**" for such Product and country).

(c) Royalty Reduction upon Loss of Exclusivity. In any country in which there is no Valid Claim claiming the composition of, or the method of making or using, a particular Opt-Out Product, and no Regulatory Exclusivity granted with respect to such Opt-Out Product, during the Royalty Term for such Opt-Out Product and country, the applicable Party shall owe royalties under this Section 8.5 on Net Sales of such Opt-Out Product in such country at a rate that is […***…] ([…***…]%) of the applicable Royalty Rate.

(d) Royalty Reports and Payment. Within […***…] days after each calendar quarter, commencing with the calendar quarter during which the First Commercial Sale of any Opt-Out Product is made anywhere in the Territory, the Party responsible for making royalty payments shall provide the other Party with a report that contains the following information for the applicable calendar quarter, on an Opt-Out Product-by-Opt-Out Product and country-by-country basis: (i) the amount of gross sales of the Opt-Out Products, (ii) a calculation of the royalty payment due on such sales, and (iii) the exchange rate for such country. Concurrent with the delivery of the applicable quarterly report, the Party providing such report shall pay in Dollars all royalties due to the other Party with respect to Net Sales of Opt-Out Products by such Party and its Affiliates and sublicensees for such calendar quarter.

8.6 Currency; Exchange Rate. All payments to be made by a Party to the other Party under this Agreement shall be made in Dollars or Euros, as appropriate, by bank wire transfer in immediately available funds to a bank account designated by written notice from the Party that receives the payment. The rate of exchange to be used in computing the amount of currency equivalent in Dollars or Euros shall be made at the average of the closing exchange rates reported by the Wall Street Journal (*http://quotes.wsj.com/fx/EURUSD*), or

such other source as the Parties may agree in writing, of the applicable reporting period for the payment due.

8.7 Late Payments. If a Party does not receive payment of any sum due to it on or before the due date therefor, simple interest shall thereafter accrue on the sum due to such Party from the due date until the date of payment at a per-annum rate of U.S. prime plus [*…***…] percentage points or the maximum rate allowable by applicable Law, whichever is less.

8.8 Taxes.

(a) Taxes on Income. Each Party shall be solely responsible for the payment of all taxes imposed on its share of income arising directly or indirectly from the activities of the Parties under this Agreement.

(b) Tax Cooperation. The Parties agree to cooperate with one another and use reasonable efforts to avoid or reduce tax withholding or similar obligations in respect of royalties, milestone payments, and other payments made by a Party to the other Party under this Agreement. To the extent a Party is required by applicable Laws to deduct and withhold taxes on any payment to the other Party, such Party shall (i) promptly notify the other Party of such requirement; (ii) pay the amounts of such taxes to the proper Governmental Authority in a timely manner, (iii) promptly provide the other party with an official receipt or other document evidencing such payment of tax. Each Party shall provide the other Party any tax forms that may be reasonably necessary in order for such other Party to not withhold tax or to withhold tax at a reduced rate under an applicable bilateral income tax treaty, to the extent legally able to do so. Each Party shall use reasonable efforts to provide any such tax forms to the other Party in advance of the due date. Each Party shall provide the other with reasonable assistance to enable the recovery, as permitted by Law, of withholding taxes or similar obligations resulting from payments made under this Agreement.

(c) Payor Withholding Tax Action. If a Party (the "**Payor**") is required to make a payment to the other Party subject to a deduction or withholding of tax, then (A) if such deduction or withholding of tax obligation arises as a result of any action by Payor, including an assignment of this Agreement, or any failure on the part of Payor to comply with applicable Law, that has the effect of modifying the tax treatment or increasing the tax of the other Party (a "**Payor Withholding Tax Action**"), then Payor shall increase the payment (in respect of which such deduction or withholding of tax is required to be made) by the amount necessary (the "**Additional Tax**") to ensure that the other Party receives an amount equal to the amount that it would have received had no such Payor Withholding Tax Action occurred, and (B) Payor shall deduct and withhold the Additional Tax from the payment made by Payor to the other Party. Payor shall timely remit the Additional Tax, along with any other tax deducted and withheld from the payment made by Payor, to the proper Governmental Authority for the account of the other Party in accordance with applicable Law.

8.9 Records and Audit Rights. Each Party shall maintain complete and accurate records in sufficient detail to permit the other Party to confirm the accuracy of the amount of Clinical Development Costs, Operating Profit (and Loss), royalties and other amounts payable under this Agreement. Upon reasonable prior notice, such records shall be open during regular business hours for a period of […***…] years from the creation of individual records for examination by an independent certified public accountant selected by the

auditing Party and reasonably acceptable to the audited Party for the sole purpose of verifying for the auditing Party the accuracy of the financial reports furnished by the audited Party pursuant to this Agreement or of any payments made, or required to be made, by or to the audited Party pursuant to this Agreement. Such audits not occur more often than [*…***…] each calendar year. Such auditor shall not disclose the audited Party's Confidential Information to the auditing Party, except to the extent such disclosure is necessary to verify the accuracy of the financial reports furnished by the audited Party or the amount of payments to or by the audited Party under this Agreement. Any amounts shown to be owed but unpaid shall be paid within […***…] days after the accountant's report, plus interest (as set forth in Section 8.7) from the original due date (unless challenged in good faith by the audited Party in which case any dispute with respect thereto shall be resolved in accordance with Section 14.6). The auditing Party shall bear the full cost of such audit unless such audit reveals an overpayment to, or an underpayment by, the audited Party that resulted from a discrepancy in the financial report provided by the audited Party for the audited period, which underpayment or overpayment was more than […***…] percent ([…***…]%) of the amount set forth in such report, in which case the audited Party shall reimburse the auditing Party for the costs for such audit. If any such overpayment exceeds such five percent amount, then the auditing Party will refund such amount to the auditing Party within […***…] days after the accountant's report (unless challenged in good faith by the audited Party in which case any dispute with respect thereto shall be resolved in accordance with Section 14.7).

ARTICLE 9

INTELLECTUAL PROPERTY RIGHTS

9.1 Ownership of Inventions.

(a) Inventorship of all Inventions shall be determined in accordance with appliable patent laws. Notwithstanding the previous sentence, ownership of all Inventions, as between the Parties, will be determined and assigned in accordance with Section 9.1(b) Section 9.1(c), respectively.

(b) (i) Arcturus shall solely own any and all Inventions that are improvements, modifications, derivatives or enhancements to the Arcturus LMP Technology or the Arcturus mRNA Technology (but not also an improvement to the CureVac mRNA Technology) (the "**Arcturus Improvement Technology**"), (ii) CureVac shall solely own any and all Inventions that are improvements, modifications, derivatives or enhancements to the CureVac mRNA Technology (but not also an improvement to the Arcturus LMP Technology or the Arcturus mRNA Technology) (the "**CureVac Improvement Technology**"), and (iii) Arcturus and CureVac shall jointly own any and all Inventions that are improvements, modifications, derivatives or enhancements to both (A) the CureVac mRNA technology and (B) the Arcturus LMP Technology and/or the Arcturus mRNA Technology (the "**Joint Improvement Technology**").

(c) CureVac hereby assigns to Arcturus all of its right, title and interest in and to any and all Arcturus Improvement Technology, and agrees to take such actions reasonably requested by Arcturus to evidence such assignment. Arcturus hereby assigns to CureVac all of its right, title and interest in and to any and all CureVac Improvement

Technology, and agrees to take such actions reasonably requested by Arcturus to evidence such assignment. To the extent any Joint Improvement Technology is made solely by one Party, such Party hereby assigns to the other Party, without any additional costs, an undivided one-half interest in and to such Joint Improvement Technology, and agrees to take such actions reasonably requested by the other Party to evidence such assignment; this assignment obligation shall apply accordingly if otherwise an assignment of a partial interest is necessary for each Party to have an undivided one-half interest in and to such Joint Improvement Technology.

(d) All jointly owned Inventions shall be referred to as "**Joint IP**", and each Party shall own an undivided one-half interest in the Joint IP. Know-How included in Joint IP shall be referred to as "**Joint Know-How**" and Patent Rights included in Joint IP shall be referred to as "**Joint Patents**".

(e) **Personnel Obligations.** Prior to beginning work under this Agreement, each employee, agent or independent contractor of a Party or its respective Affiliates shall be bound by non-disclosure and invention assignment obligations that are consistent with the obligations of such Party in this Article 9, including: (i) promptly reporting any invention, discovery, process or other intellectual property right; (ii) assigning to such Party, as appropriate, all of his or her right, title and interest in and to any invention, discovery, process or other intellectual property right; (iii) cooperating in the preparation, filing, prosecution, maintenance and enforcement of any patent and patent application; (iv) performing all acts and signing, executing, acknowledging and delivering any and all documents required for effecting the obligations and purposes of this Agreement; and (v) abiding by the obligations of confidentiality and non-use set forth in Article 10. It is understood and agreed that such non-disclosure and invention assignment agreement need not reference or be specific to this Agreement. Each Party shall be solely responsible for payments that may be required to any of such Party's employees, agents or independent contractors in connection with or with respect to such agreements, including moral rights (or droit moral) payments with respect to any Inventions hereunder.

(f) **Background Technology.** Each Party shall continue to own all right, title and interest in and to its background technology and any technology or intellectual property that is not an Invention (i.e., Arcturus Technology and CureVac Technology, as applicable, excluding Inventions).

9.2 **Disclosure of Inventions.** Each Party shall promptly disclose to the other Party all Inventions and shall also respond promptly to reasonable requests from the other Party for additional information relating to such Inventions.

9.3 **Exploitation and Licenses of Joint IP.** Each Party (i) shall have the right to license, and exploit such Joint IP (including Joint Know-How and Joint Patents) anywhere in the world, without a duty of accounting or an obligation to seek consent from the other Party for the exploitation or license of the Joint IP (subject to the licenses granted to the other Party under this Agreement and subject to any other intellectual property held by such other Party), and (ii) hereby grants to the other Party a cost-free, perpetual, non-exclusive, transferable license, with the right to grant sublicenses in multiple tiers, under its interest in the Joint IP to enable the other Party to use the Joint IP as specified in (i).

9.4 **Patent Prosecution.**

(a) Arcturus Patents.

(i) Arcturus shall be responsible for filing, prosecuting and maintaining the Arcturus Patents (excluding the Joint Patents), at its own cost and expense, and shall keep CureVac reasonably informed of the status of such Arcturus Patents. With respect to any Arcturus Patents (excluding Joint Patents) that specifically claim (i) a Co-Developed CureVac Product but not any other product or (ii) Joint Improvement Technology (the "**Arcturus Product Patents**"), Arcturus shall consult with CureVac and shall promptly provide CureVac with material correspondence received from any patent authorities in connection therewith. In addition, Arcturus shall promptly provide CureVac with drafts of all proposed material filings and correspondence to any patent authorities with respect to such Arcturus Product Patents for CureVac's review and comment prior to the submission of such proposed filings and correspondence. Arcturus shall confer with CureVac and take into consideration CureVac's comments prior to submitting such filings and correspondence, provided that CureVac shall provide such comments within [*…***…] days of receiving the draft filings and correspondence from Arcturus. If CureVac does not provide comments within such period of time, then CureVac shall be deemed to have no comment to such proposed filings or correspondence. In case of disagreement between the Parties with respect to the filing, prosecution and maintenance of such Arcturus Product Patents, the final decision shall be made by Arcturus. For the purpose of this Article 9, "prosecution" shall include any post-grant proceeding including supplemental examination, post grant review proceeding, inter parties review proceeding, patent interference proceeding, opposition proceeding and reexamination.

(ii) Arcturus shall notify CureVac of any decision to cease prosecution or maintenance of any Arcturus Product Patents. Arcturus shall provide such notice at least […***…] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such Arcturus Product Patent. In such event, Arcturus shall permit CureVac, at its discretion and expense, to continue prosecution or maintenance of such Arcturus Product Patent. CureVac's prosecution or maintenance of such Arcturus Product Patent shall not change the Parties' respective rights and obligations under this Agreement with respect to such Arcturus Product Patent other than those expressly set forth in this Section 9.4(a)(ii).

(b) CureVac Patents.

(i) CureVac shall be responsible for filing, prosecuting and maintaining the CureVac Patents (excluding the Joint Patents), at its own cost and expense, and shall keep Arcturus reasonably informed of the status of such CureVac Patents. With respect to any CureVac Patents (excluding Joint Patents) that specifically claim (i) an OTC Product or Co-Developed Arcturus Product but not any other product or (ii) Joint Improvement Technology (the "**CureVac Product Patents**"), CureVac shall consult with Arcturus and shall promptly provide Arcturus with material correspondence received from any patent authorities in connection therewith. In addition, CureVac shall promptly provide Arcturus with drafts of all proposed material filings and correspondence to any patent authorities with respect to such CureVac Product Patents for Arcturus's review and comment prior to the submission of such proposed filings and correspondence. CureVac shall confer with Arcturus and take into consideration Arcturus's comments prior to submitting such filings and correspondence, provided that Arcturus shall provide such comments within […***…] days of receiving the draft filings and correspondence from CureVac. If

Arcturus does not provide comments within such period of time, then Arcturus shall be deemed to have no comment to such proposed filings or correspondence. In case of disagreement between the Parties with respect to the filing, prosecution and maintenance of such CureVac Product Patents, the final decision shall be made by CureVac.

(ii) CureVac shall notify Arcturus of any decision to cease prosecution or maintenance of any CureVac Product Patents. CureVac shall provide such notice at least [*…***…] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such CureVac Product Patent. In such event, CureVac shall permit Arcturus, at its discretion and expense, to continue prosecution or maintenance of such CureVac Product Patent. Arcturus's prosecution or maintenance of such CureVac Product Patent shall not change the Parties' respective rights and obligations under this Agreement with respect to such CureVac Product Patent other than those expressly set forth in this Section 9.4(b)(ii).

(c) Joint Patents.

(i) The Parties shall determine which Party shall be responsible for filing, prosecuting and maintaining the Joint Patents worldwide and the Parties shall share equally the cost for the prosecution and maintenance of Joint Patents, provided that unless agreed otherwise the Parties intend that the Party designated as the lead for Commercialization of an OTC or Co-Developed Product shall be responsible for prosecuting and maintaining applicable Joint Patents. The prosecuting Party shall consult with the other Party and keep the other Party reasonably informed of the status of the Joint Patents and shall promptly provide the other Party with material correspondence received from any patent authorities in connection therewith. In addition, the prosecuting Party shall promptly provide the other Party with drafts of all proposed material filings and correspondence to any patent authorities with respect to Joint Patents for review and comment prior to the submission of such proposed filings and correspondence. The prosecuting Party shall confer with the other Party and take into consideration such other Party's comments prior to submitting such filings and correspondence, provided that the other Party shall provide such comments within […***…] days of receiving the draft filings and correspondence from the prosecuting Party. If the other Party does not provide comments within such period of time, then it shall be deemed to have no comment to such proposed filings or correspondence. In case of disagreement between the Parties with respect to the filing, prosecution and maintenance of such Joint Patents, the final decision shall be made the prosecuting Party.

(ii) The prosecuting Party shall notify the other Party of any decision to cease prosecution or maintenance of any Joint Patents. The prosecuting Party shall provide such notice at least […***…] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such Joint Patent. In such event, the prosecuting Party shall permit the other Party, at its discretion and expense, to continue prosecution or maintenance of such Joint Patent.

(d) Collaboration. Each Party shall provide the other Party all reasonable assistance and cooperation in the patent prosecution efforts under this Section 9.4, including providing any necessary powers of attorney and executing any other required documents or instruments for such prosecution. When a Party assumes the responsibilities for the prosecution and maintenance of a Patent under Section 9.4(a)(ii), 9.4(b)(ii) or 9.4(c)(ii) above, the other Party shall promptly transfer to such Party the patent prosecution files for

such Patent and provide reasonable assistance in the transfer of the prosecution responsibilities. The Party assuming such prosecution and maintenance responsibilities shall have the right to engage its own counsel to do so.

9.5 Patent Enforcement.

(a) If either Party becomes aware of (i) any existing or threatened infringement of any Arcturus Patent or CureVac Patents (including Joint Patents) in the Field in the Territory, which infringing activity involves the using, making, importing, exporting, offering for sale or selling Products or products that are competitive with Products, or the submission to a Party or a Regulatory Authority of an application for a product that references a Product, or (ii) a declaratory judgment action asserting the invalidity, unenforceability or non-infringement of any Arcturus Patent or CureVac Patent (including a Joint Patents) in the Territory in connection with any infringement described in clause (i) (each of (i) and (ii), a "**Product Infringement**"), it shall promptly notify the other Party in writing to that effect, and the Parties will consult with each other regarding any actions to be taken with respect to such Product Infringement.

(b) CureVac shall have the first right to bring and control any legal action to enforce CureVac Patents (and Joint Patents prosecuted by CureVac) in connection with any Product Infringement ("**CureVac Product Infringement**") as it reasonably determines appropriate, and Arcturus shall have the right to be represented in any such action by counsel of its choice. Prior to CureVac's commencing any such action, and periodically during the course of such action, the Parties shall meet to discuss CureVac's proposed strategy for such action and the progress thereof, and CureVac shall reasonably consider any comments thereto made by Arcturus. If CureVac decides not to bring such legal action, it shall so inform Arcturus promptly and Arcturus shall have the right to bring and control any legal action to enforce CureVac Patent in connection with such CureVac Product Infringement as it reasonably determines appropriate after consultation with CureVac.

(c) Arcturus shall have the first right to bring and control any legal action to enforce Arcturus Patents (and Joint Patents prosecuted by Arcturus) in connection with any Product Infringement ("**Arcturus Product Infringement**") as it reasonably determines appropriate, and CureVac shall have the right to be represented in any such action by counsel of its choice. Prior to Arcturus's commencing any such action, and periodically during the course of such action, the Parties shall meet to discuss Arcturus's proposed strategy for such action and the progress thereof, and Arcturus shall reasonably consider any comments thereto made by CureVac. If Arcturus decides not to bring such legal action, it shall so inform CureVac promptly and CureVac shall have the right to bring and control any legal action to enforce Arcturus Patent in connection with such Arcturus Product Infringement as it reasonably determines appropriate after consultation with Arcturus.

(d) Arcturus shall have the exclusive right to enforce the Arcturus Patents (other than Joint Patents) for any infringement that is not a Product Infringement at its own expense as it reasonably determines appropriate. CureVac shall have the exclusive right to enforce the CureVac Patents (other than Joint Patents) for any infringement that is not a Product Infringement at its own expense as it reasonably determines appropriate. Each Party shall have the right to enforce the Joint Patents for any infringement that is not a Product Infringement at its own expense as it reasonably determines appropriate.

(e) At the request of the Party bringing the action against any Product Infringement, the other Party shall provide reasonable assistance in connection therewith, including by executing reasonably appropriate documents, cooperating in discovery and joining as a party to the action if required. In connection with any such proceeding, the Party bringing the action shall not enter into any settlement admitting the invalidity of, or otherwise impairing any Patent Rights of the other Party.

(f) All costs and expenses incurred in connection with an enforcement action relating to a claim of Product Infringement shall be treated as Joint Commercialization Costs for the applicable Product, except that with respect to Opt-Out Products, the Party bringing the action will bear its costs and expenses, and those of the other Party if incurred at such Party's request. Any recoveries from such actions shall (i) in the case of Opt-Out Products, be used first to reimburse the Parties' costs and expenses in connection with such actions, and the remainder will be deemed Net Sales and retained by the selling Party, subject to a royalty payment to the other Party in accordance with Section 8.5, and (ii) in the case of other Products, be deemed Net Sales and shared between the Parties as part of the Operating Profit (or Loss) for the applicable Product.

9.6 Orange Book. Each Party shall cooperate with the other Party to: (i) file appropriate information with the FDA listing any of the Arcturus Patents and CureVac Patents (including Joint Patents) in the Orange Book; and (ii) with respect to other countries in the Territory, file appropriate information with the applicable Regulatory Authority listing any such Patent Rights in the listing source in such country.

9.7 Patent Extensions

(a) The Parties shall cooperate in obtaining patent term restoration (under but not limited to the U.S. Drug Price Competition and Patent Term Restoration Act and its foreign equivalent), supplemental protection certificates or their equivalents, and patent term extensions with respect to the Arcturus Patents and CureVac Patents (including Joint Patents) in any country and/or region where applicable.

(b) CureVac shall determine which Arcturus Patents and CureVac Patents it shall apply to extend in any country and/or region for any Co-Developed CureVac Product; provided that CureVac shall not have the right to extend any Arcturus Patent that claims (generically or specifically) any product then being developed or commercialized other than a Co-Developed CureVac Product without the prior written consent of Arcturus, which shall not be unreasonably withheld, conditioned or delayed. Arcturus shall determine which Arcturus Patents and CureVac Patents it shall apply to extend in any country and/or region for any OTC Product or Co-Developed Arcturus Product; provided that Arcturus shall not have the right to extend any CureVac Patent that claims (generically or specifically) any product then being developed or commercialized other than an OTC Product or Co-Developed Arcturus Product without the prior written consent of CureVac, which shall not be unreasonably withheld, conditioned or delayed.

9.8 Patents Licensed From Third Parties. Each Party's rights under this Article 9 with respect to the prosecution and enforcement of any Arcturus Patent or CureVac Patent shall be subject to the rights retained by and/or any obligations to any upstream licensor to prosecute and enforce such Patent Right, if such Arcturus Patent is subject to an upstream license agreement.

9.9 Trademarks. CureVac shall have the right to brand the Co-Developed CureVac Products in Territory using CureVac trademarks and any other trademarks and trade names it determines appropriate for such Products (the "**CureVac Product Marks**"), which may vary by country or within a country. CureVac shall own all rights in the CureVac Product Marks and shall register and maintain the CureVac Product Marks in the countries and regions in the Territory that it determines reasonably necessary. Arcturus shall have the right to brand the OTC Products and Co-Developed Arcturus Products using Arcturus trademarks and any other trademarks and trade names it determines appropriate for such Products (the "**Arcturus Product Marks**"). Arcturus shall own all rights in the Arcturus Product Marks and shall register and maintain the Arcturus Product Marks in the countries and regions in the Territory that it determines reasonably necessary. Each Party shall not, and shall ensure that its Affiliates and sublicensees will not, make any use of the trademarks or house marks of the other Party or its Affiliates or licensees (including their corporate names) or any trademark confusingly similar thereto.

ARTICLE 10

CONFIDENTIALITY; PUBLICATION

10.1 Duty of Confidence. Subject to the other provisions of this Article 10, all Confidential Information of a Party (the "**Disclosing Party**") shall be maintained in confidence and otherwise safeguarded by the other Party (the "**Receiving Party**") and its Affiliates, using Diligent Efforts, but in any event no less than in the same manner and the same protections with which the Receiving Party maintains its own confidential information.

10.2 Exceptions. The foregoing obligations as to particular Confidential Information of a Disclosing Party shall not apply to the extent that the Receiving Party can demonstrate that such Confidential Information:

(a) is known by the Receiving Party at the time of its receipt without an obligation of confidentiality, and not through a prior disclosure by the Disclosing Party, as documented by the Receiving Party's business records;

(b) is in the public domain before its receipt from the Disclosing Party, or thereafter enters the public domain through no fault or omission of the Receiving Party or any of its Affiliates;

(c) is subsequently disclosed to the Receiving Party by a Third Party who may lawfully do so and is not under an obligation of confidentiality to the Disclosing Party; or

(d) is developed by the Receiving Party independently and without the aid, application or use of or reference to any Confidential Information received from the Disclosing Party, as documented by the Receiving Party's business records.

Any combination of features or disclosures shall not be deemed to fall within the foregoing exclusions merely because individual features are published or available to the general public or in the rightful possession of the Receiving Party unless the combination itself and principle

of operation are published or available to the general public or in the rightful possession of the Receiving Party.

10.3 Authorized Disclosures. The Receiving Party may only use any such Confidential Information for the purposes of performing its obligations or exercising its rights under this Agreement. Notwithstanding the obligations set forth in Sections 10.1 and 10.5, a Party may disclose the other Party's Confidential Information (including this Agreement and the terms herein)

(a) if and to the extent such disclosure is reasonably necessary (i) for the filing or prosecuting Patent Rights as contemplated by this Agreement; (ii) in connection with regulatory filings for the Products; (iii) for the prosecuting or defending litigation as contemplated by this Agreement; (iv) in connection with the exercise of its rights or the performance of its obligations hereunder, including in relation to Joint Know-How the Development and Commercialization in accordance with this Agreement, provided that the recipient is bound by confidentiality obligations corresponding to the obligations under this Agreement; (v) to obtain advice in relation to this Agreement and the activities hereunder; (vi) for the purpose of evaluating or carrying out an actual or potential investment, acquisition or collaboration to such Party's attorneys, independent accountants or financial advisors, actual or potential investors and lenders, acquirers, licensees, assignees and other financial or commercial partners ("**Recipients**"), provided that in each such case such Recipients are bound by confidentiality and non-use obligations substantially consistent with those contained in this Agreement; or

(b) if and to the extent such disclosure is required by judicial or administrative process, provided that in such event such Party shall promptly inform the other Party of such required disclosure and provide the other Party an opportunity to challenge or limit the disclosure obligations. Confidential Information that is disclosed by judicial or administrative process shall remain otherwise subject to the confidentiality and non-use provisions of this Article 10, and the Party disclosing Confidential Information pursuant to law or court order shall take all steps reasonably necessary, including seeking confidential treatment or a protective order to ensure the continued confidential treatment of such Confidential Information.

10.4 Publications. The JSC (itself or through a subcommittee) shall establish a publication strategy and plan for the Products. Such strategy as it pertains to any particular clinical trial will be established prior to the Initiation of such trial, and updated from time to time as the publication subcommittee may agree. Such publication subcommittee shall have the right to review and approve any publication relating to the Products, including scientific, health economic or pharmacoeconomic publications, considering CureVac's and Arcturus's interest in publishing the results of the Development work in order to obtain recognition within the scientific or other applicable community and to advance the state of knowledge in the field, the need to protect Confidential Information and the Parties' mutual interest in obtaining valid patent protection, and protecting reasonable business interests and trade secret information. Consequently, except for disclosures permitted pursuant to Sections 10.2 and 10.3, each Party and its respective Affiliates, employee(s) and consultant(s) shall deliver to such publication subcommittee for review and comment a copy of any proposed publication or presentation that pertains to any Product, pursuant to a procedure to be established by such publication subcommittee (but excluding general corporate publications and presentations). Such publication subcommittee shall have the right to require modifications of the

publication or presentation: (a) to protect each Parties' respective Confidential Information; (b) for trade secret reasons or business reasons; and/or (c) to delay such submission for an additional [*…***…] days as may be reasonably necessary to seek patent protection for the information disclosed in such proposed submission.

10.5 Publicity; Use of Names.

(a) The Parties intend to issue a mutually agreed joint press release announcing this Agreement promptly after the mutual execution of the Agreement. Subject to Section 10.3 above, no other disclosure of the existence or the terms of this Agreement may be made by either Party or its Affiliates except as provided in this Section 10.5, and no Party shall use the name, trademark, trade name or logo of the other Party, its Affiliates or their respective employees in any publicity, promotion, news release or disclosure relating to this Agreement or its subject matter, except as provided in this Section 10.5 or with the prior express written permission of the other Party, except as may be required by applicable Law.

(b) A Party may disclose this Agreement in securities filings with the U.S. Securities and Exchange Commission (the "**SEC**") or equivalent foreign agency to the extent required by applicable Law. In such event, the Party seeking such disclosure shall prepare a proposed redacted version of this Agreement to request confidential treatment for this Agreement, and the other Party agrees to promptly (and in any event, no less than […***…] days after receipt of such proposed redactions) give its input in a reasonable manner in order to allow the Party seeking disclosure to file its request within the time lines proscribed by applicable Law. The Party seeking such disclosure shall reasonably consider any comments thereto provided by the other Party within such […***…] day period.

(c) Each Party acknowledges that the other Party may be legally required to make public disclosures (including in filings with the Governmental Authorities) of certain terms of or material developments or material information generated under this Agreement and agrees that each Party may make such disclosures as required by law, provided that the Party seeking such disclosure first provides the other Party a copy of the proposed disclosure, and shall reasonably consider any comments thereto provided by the other Party within […***…] days after the receipt of such proposed disclosure, to the extent practicable.

(d) Other than the press release set forth in Exhibit 10.5, the Parties agree that the portions of any other news release or other public announcement relating to this Agreement or the performance hereunder that would disclose information other than that already in the public domain, shall first be reviewed and approved by both Parties (with such approval not to be unreasonably withheld, conditioned or delayed). For each such disclosure, a Party shall provide the other Party with a draft of such disclosure at least […***…] Business Days prior to its intended release for review and comment, and shall consider such other Party's comments in good faith. If a Party does not receive comments from the other Party within […***…] Business Days, such Party shall have the right to make such disclosure without further delay.

(e) The Parties agree that after a disclosure pursuant to Section 10.5(c), or after a press release (including the initial press release) or other public announcement pursuant to Section 10.5(d) has been reviewed and approved by the other Party, the disclosing Party may make subsequent public disclosures reiterating such information without having to obtain the other Party's prior consent and approval.

*****Confidential Treatment Requested**

(f) Each Party agrees that the other Party shall have the right to use such first Party's name and logo in presentations, the company's website, collateral materials and corporate overviews to describe the collaboration relationship, as well as in taglines of press releases issued pursuant to this Section 10.5.

ARTICLE 11

TERM AND TERMINATION

11.1 Term. The term of this Agreement shall commence upon the Effective Date and, unless earlier terminated pursuant to this Article 11, shall continue in full force and effect, on a country-by-country and Product-by-Product basis, until such time when the applicable Party (including its Affiliates and sublicensees) (i.e., CureVac with respect to Co-Developed CureVac Products and Arcturus with respect to OTC Products and Co-Developed CureVac Products) has permanently stopped selling such Product in such country, or with respect to Opt-Out Products, the expiration of the Royalty Term for such Product and country (the "**Term**").

11.2 Termination.

(a) Termination by a Party for Convenience. CureVac may terminate this Agreement with respect to all OTC Products and/or all Co-Developed Arcturus Products, on one hundred eighty (180) days written notice to Arcturus. Arcturus may terminate this Agreement with respect to all Co-Developed CureVac Products from one or both CureVac Programs, on one hundred eighty (180) days written notice to CureVac.

(b) Termination for Material Breach.

(i) If either Party believes that the other is in breach of its material obligations hereunder, then the non-breaching Party may deliver notice of such breach to the other Party. For all breaches other than a failure to make a payment as set forth in this Agreement, the allegedly breaching Party shall have [*…***…] from such notice to dispute or cure such breach; *provided* that if such breach is not reasonably capable of cure within such time period, the breaching Party may submit a cure plan reasonably acceptable to the non-breaching Party prior to the end of such time period, in which case the cure period shall be extended for up to an additional […***…], so long as the breaching Party is using Diligent Efforts to implement such cure plan during such cure period. For any breach arising from a failure to make a payment set forth in this Agreement, the allegedly breaching Party shall have […***…] from the receipt of the notice to dispute or cure such breach. If the Party receiving notice of breach fails to cure, or fails to dispute, that breach within the applicable period set forth above, then the Party originally delivering the notice of breach may terminate this Agreement effective on written notice of termination to the other Party.

(ii) If the allegedly breaching Party in good faith disputes such material breach or disputes the failure to cure or remedy such material breach and provides written notice of that dispute to the other Party within the applicable period set forth above, the matter shall be addressed under the dispute resolution provisions in Section 14.7, and the notifying Party may not terminate this Agreement until it has been determined under Section 14.7 that the allegedly breaching Party is in material breach of this Agreement, and: (i) the

*****Confidential Treatment Requested**

*****Confidential Treatment Requested**

breach cannot be cured; or (ii) if the breach can be cured, such breaching Party further fails to cure such breach within [*…***…] after the conclusion of that dispute resolution procedure, and in each case such termination shall then be effective upon written notification from the notifying Party to the breaching Party.

(iii) Notwithstanding the foregoing, if the breach relates only to one or more, but not all types of Product (i.e., OTC Products, Co-Developed Arcturus Products or Co-Developed CureVac Products from each CureVac Program), then the non-breaching Party's termination right will be with respect to the affected Products only, and not this Agreement in its entirety.

(c) Termination for Patent Challenge. Arcturus may terminate, at its discretion, this Agreement in its entirety or in relation to the affected Products, if CureVac or its Affiliates or sublicensees, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any Arcturus Patents. CureVac may terminate, at its discretion, this Agreement in its entirety or in relation to the affected Products, if Arcturus or its Affiliates or sublicensees, individually or in association with any other person or entity, commences a legal action challenging the validity, enforceability or scope of any CureVac Patents.

11.3 Effects of Termination. Upon the termination (but not expiration) of this Agreement for any reason, the following provisions shall apply, provided that, if the Agreement is terminated with respect to particular Products only, the following provisions shall only apply to such Products and the mRNA Constructs therein (collectively, "**Terminated Products**"):

(a) Termination by a Party for Convenience. If this Agreement is terminated by either Party under Section 11.2(a) (the "**Terminating Party**"), then the following will apply:

(i) All licenses and other rights granted to the Terminating Party for Terminated Products will terminate.

(ii) All licenses and other rights granted to the other Party (the "**Non-Terminating Party**") with respect to the Terminated Products shall survive and become fully paid and royalty free. In addition, if CureVac is the Terminating Party, CureVac hereby grants Arcturus an exclusive, sublicensable, irrevocable, perpetual, fully paid up, royalty free license under the CureVac Technology to develop and commercialize Terminated Products in the Field in the Territory, and if Arcturus is the Terminating Party, Arcturus hereby grants CureVac an exclusive, sublicensable, irrevocable, perpetual, fully paid up, royalty free license under the Arcturus Technology to develop and commercialize Terminated Products in the Field in the Territory.

(iii) The Terminating Party shall promptly return to the Non-Terminating Party all Confidential Information of the Non-Terminating Party.

(iv) With respect to mRNA Constructs or Products being Manufactured by the Terminating Party or its Affiliate, such Party shall, at the Non-Terminating Party's discretion:

(1) continue to Manufacture and supply such mRNA Constructs or Products for a period of the earlier of (x) such time as technology transfer and qualification of a CMO designated by the Non-Terminating Party and reasonably acceptable to the Terminating Party is completed and (y) [*…***…] years after such termination, *provided, however*, that in such case the Terminating Party may charge a markup of […***…] percent on the Manufacturing Costs in relation to mRNA Constructs or Products which are not included in the binding forecasts (as defined in the respective supply agreement) on the date the termination notice is received by the Non-Terminating Party;

(2) assign or transfer to the Non-Terminating Party any Manufacturing agreement between the Terminating Party and a CMO with respect to such mRNA Construct or Product; and/or

(3) transfer to the Non-Terminating Party (or its designee) all Know-How and materials to enable it to assume the Manufacture and supply of such mRNA Construct or Product for. The Terminating Party will make its personnel available during normal working hours without charge for a total of […***…] hours for such transfer, and for additional hours in excess of […***…] up to a total of […***…] hours to be invoiced monthly at the then current FTE Cost. Such designee(s) may be an Affiliate, sublicensee or Third Party manufacturers selected by the Non-Terminating Party and reasonably acceptable to the Terminating Party, and which Third Party manufacturers may, in case of commercial supply, also be a backup manufacturer or a second source manufacturer of mRNA Constructs or Products as required for the applicable transferee of the then-current process.

For clarity, the Non-Terminating Party shall retain the right of reference to any drug master file or other corresponding regulatory filing until such time as the transfer of Manufacture is completed hereunder.

(v) In addition to the foregoing, the Terminating Party shall use reasonable efforts with respect to those activities for which it is responsible to ensure orderly transition and uninterrupted Development, Manufacturing and Commercialization of Terminated Products by the Non-Terminating Party.

(b) **Termination by a Party for Material Breach or Patent Challenge**. If this Agreement is terminated by either Party (the "**Non-Breaching Party**") under Section 11.2(b) or 11.2(c), then Section 11.3(a) will apply, *provided*, *however*, that

(i) the breaching or challenging Party will be deemed the Terminating Party and the non-breaching or non-challenging Party will be deemed the Non-Terminating Party,

(ii) the non-breaching or non-challenging Party shall not be required to use Diligent Efforts regarding the Development and Commercialization and shall no longer be bound by the Development Plan or Commercialization Plan, if any, and

(iii) the non-breaching or non-challenging Party shall have the right, at its discretion, to select between the options (1)-(3) specified in Section 11.3(a)(iv).

(iv) For clarity, if this Agreement is terminated in its entirety, then the consequences set forth above will apply to each Terminated Product as provided above.

(c) **Termination Press Releases**. In the event of termination of this Agreement for any reason and subject to the provisions of Section 10.5, the Parties shall cooperate in good faith to coordinate public disclosure of such termination and the reasons therefor, and shall not, except to the extent required by applicable Law, disclose such information without the prior approval of the other Party. The principles to be observed in such disclosures shall be accuracy, compliance with applicable Law and regulatory guidance documents, and reasonable sensitivity to potential negative reactions to such news.

11.4 **Survival.** Expiration or termination of this Agreement shall not relieve the Parties of any obligation accruing prior to such expiration or termination. Without limiting the foregoing, the provisions of the following Articles and Sections shall survive the expiration or termination of this Agreement: 1 (to the extent applicable), 4.9 (if applicable), 5.5, 6 (in case of ongoing Manufacture and supply obligations), 6.5, 8.1, 8.2(b), 8.4 (for these to the extent required to finally reconcile the equalization of costs or profit share), 8.5 – 8.9 (if applicable), 9.1, 9.3, 9.4(c), 10, 11.3-11.5, 13 and 14.

11.5 **Termination Not Sole Remedy.** Termination is not the sole remedy under this Agreement and, whether or not termination is effected and notwithstanding anything contained in this Agreement to the contrary, all other remedies shall remain available except as agreed to otherwise herein.

ARTICLE 12

REPRESENTATIONS AND WARRANTIES

12.1 **Representations and Warranties of Each Party.** Each Party represents and warrants to the other Party as of the Effective Date that:

(a) it has the full right, power and authority to enter into this Agreement, to perform its obligations hereunder; and

(b) this Agreement has been duly executed by it and is legally binding upon it, enforceable in accordance with its terms, and does not conflict with any agreement, instrument or understanding, oral or written, to which it is a party or by which it may be bound, nor violate any material law or regulation of any court, governmental body or administrative or other agency having jurisdiction over it.

12.2 **Representations and Warranties by Arcturus.** Arcturus represents and warrants to CureVac as of the Effective Date that:

(a) it has not previously assigned, transferred, conveyed or otherwise encumbered its right, title and interest in Arcturus Technology in a manner that is inconsistent with the license granted to CureVac under Section 3.1;

(b) to Arcturus's knowledge, all Arcturus Patents existing as of the Effective Date are listed in **Exhibit 1.5**;

(c) it has the right to grant the license and rights herein to CureVac and it has not granted any license, right or interest in, to or under the Arcturus Technology to any Third Party that is inconsistent with the license granted to CureVac under Section 3.1;

(d) it has not received any written notice from any Third Party asserting or alleging that the development of Arcturus Technology prior to the Effective Date infringed or misappropriated the intellectual property rights of such Third Party;

(e) to Arcturus's knowledge, the development of Arcturus Technology prior to the Effective Date did not infringe any valid intellectual property rights owned or possessed by any Third Party and did not breach any obligation of confidentiality or non-use owed by Arcturus to a Third Party; and

(f) there are no judgments or settlements against or owed by Arcturus, and to Arcturus's knowledge, there are no pending or threatened claims or litigation, in each case relating to Arcturus Technology.

12.3 Representations and Warranties by CureVac. CureVac represents and warrants to Arcturus as of the Effective Date, subject to the disclosures in **Exhibit 12.3**, that:

(a) it has not previously assigned, transferred, conveyed or otherwise encumbered its right, title and interest in CureVac Technology in a manner that is inconsistent with the license granted to Arcturus under Section 3.2;

(b) to CureVac's knowledge, all CureVac Patents existing as of the Effective Date are listed in Exhibit 1.32;

(c) it has the right to grant the license and rights herein to Arcturus and it has not granted any license, right or interest in, to or under the CureVac Technology to any Third Party that is inconsistent with the license granted to CureVac under Section 3.2;

(d) it has not received any written notice from any Third Party asserting or alleging that the development of CureVac Technology prior to the Effective Date infringed or misappropriated the intellectual property rights of such Third Party;

(e) to CureVac's knowledge, the development of CureVac Technology prior to the Effective Date did not infringe any valid intellectual property rights owned or possessed by any Third Party and did not breach any obligation of confidentiality or non-use owed by CureVac to a Third Party; and

(f) there are no judgments or settlements against or owed by CureVac, and to CureVac's knowledge, there are no pending or threatened claims or litigation, in each case relating to CureVac Technology.

12.4 Mutual Covenants.

(a) **No Debarment**. In the course of the Development, Manufacture and Commercialization of the Products, neither Party nor its Affiliates shall use any employee or consultant who has been debarred by any Regulatory Authority or, to such Party's or its Affiliates' knowledge, is the subject of debarment proceedings by a Regulatory Authority. Each Party shall notify the other Party promptly upon becoming aware that any of its or its Affiliates' employees or consultants has been debarred or is the subject of debarment proceedings by any Regulatory Authority.

(b) Compliance. Each Party and its Affiliates shall comply in all material respects with all applicable Laws (including all anti-bribery laws) in the Development, Manufacture and Commercialization of the Products and performance of its obligations under this Agreement.

12.5 No Other Warranties. Except as expressly stated in this Article 12, (a) no representation, condition or warranty whatsoever is made or given by or on behalf of Arcturus or CureVac; and (b) all other conditions and warranties whether arising by operation of law or otherwise are hereby expressly excluded, including any conditions and warranties of merchantability, fitness for a particular purpose or non-infringement.

ARTICLE 13

INDEMNIFICATION; INSURANCE

13.1 Indemnification by Arcturus. Arcturus shall indemnify, defend and hold CureVac, its Affiliates and their respective officers, directors, agents, employees, licensees, sublicensees or contractors ("**CureVac Indemnitees**") harmless from and against any Claims arising under or related to this Agreement against them to the extent arising or resulting from: (a) the gross negligence, recklessness or willful misconduct of any of the Arcturus Indemnitees; (b) the breach of any of the warranties or representations made by Arcturus to CureVac under this Agreement; (c) the Development, Manufacture or Commercialization of Opt-Out Products that are OTC Products or Co-Developed Arcturus Products by or on behalf of Arcturus or any of its Affiliates, licensees, sublicensees or contractors;

except, in each case (a)-(c), to the extent such Claims result from the breach by CureVac of any covenant, representation, warranty or other agreement made by CureVac in this Agreement or the gross negligence, recklessness or willful misconduct of any CureVac Indemnitee.

13.2 Indemnification by CureVac. CureVac shall indemnify, defend and hold Arcturus, its Affiliates, and their respective officers, directors, agents, employees, licensees, sublicensees or contractors ("**Arcturus Indemnitees**") harmless from and against any Claims arising under or related to this Agreement against them to the extent arising or resulting from (a) the, gross negligence, recklessness or willful misconduct of any of the CureVac Indemnitees; (b) the breach of any of the warranties or representations made by CureVac to Arcturus under this Agreement; (c) the Development, Manufacture or Commercialization of Opt-Out Products that are Co-Developed CureVac Products by or on behalf of CureVac or any of its Affiliates, licensees, sublicensees or contractors;

except, in each case (a)-(c), to the extent such Claims result from the breach by Arcturus of any covenant, representation, warranty or other agreement made by Arcturus in this Agreement or the gross negligence, recklessness or willful misconduct of any Arcturus Indemnitee.

13.3 Indemnification Procedure. If either Party is seeking indemnification under Sections 13.1 or 13.2 (the **"Indemnified Party"**), it shall inform the other Party (the **"Indemnifying Party"**) of the Claim giving rise to the obligation to indemnify pursuant to such Section as soon as reasonably practicable after receiving notice of the Claim. The Indemnifying Party shall have the right to assume the defense of any such Claim for which it

is obligated to indemnify the Indemnified Party. The Indemnified Party shall cooperate with the Indemnifying Party and the Indemnifying Party's insurer as the Indemnifying Party may reasonably request, and at the Indemnifying Party's cost and expense. The Indemnified Party shall have the right to participate, at its own expense and with counsel of its choice, in the defense of any Claim that has been assumed by the Indemnifying Party. Neither Party shall have the obligation to indemnify the other Party in connection with any settlement made without the Indemnifying Party's written consent, which consent shall not be unreasonably withheld, conditioned or delayed. If the Parties cannot agree as to the application of Section 13.1 or 13.2 as to any Claim, pending resolution of the dispute pursuant to Section 14.7, the Parties may conduct separate defenses of such Claims, with each Party retaining the right to claim indemnification from the other Party in accordance with Section 13.1 or 13.2 upon resolution of the underlying Claim.

13.4 Third Party Claims Related To Products. Subject to Sections 5.5, 13.1 or 13.2, damages or other amounts payable to a Third Party claimant, as well as any reasonable attorneys' fees and costs of litigation incurred by either Party (collectively, **"Damages"**) from Third Party claims relating to the Development, Manufacture or Commercialization of any Product that is not an Opt-Out Product, including Damages from claims of infringement of Third Party patent rights and product liability claims of death or personal injury, shall be included within Clinical Development Costs or Joint Commercialization Costs (as the case may be) incurred by the affected Party and shared by the Parties accordingly.

13.5 Mitigation of Loss. Each Indemnified Party shall take and shall procure that its Affiliates take all such reasonable steps and action as are reasonably necessary or as the Indemnifying Party may reasonably require in order to mitigate any Claims (or potential losses or damages) under this Article 13. Nothing in this Agreement shall or shall be deemed to relieve any Party of any common law or other duty to mitigate any losses incurred by it.

13.6 Limitation of Liability. Neither Party shall be liable to the other for any special, consequential, incidental, punitive or indirect damages arising from or relating to any breach of this Agreement, regardless of any notice of the possibility of such damages. Notwithstanding the foregoing, nothing in this Section 13.6 is intended to or shall limit or restrict the indemnification rights or obligations of any Party under Sections 13.1 or 13.2, or damages available for a Party's breach of its obligations relating to Confidentiality or intellectual property hereunder.

13.7 Insurance. Each Party shall procure and maintain insurance, including product liability insurance, with respect to its activities hereunder and which is consistent with normal business practices of prudent companies similarly situated at all times during which any Product is being clinically tested in human subjects or commercially distributed or sold. Each Party shall provide the other Party with evidence of such insurance upon request and shall provide the other Party with written notice at least [*…***…] days prior to the cancellation, non-renewal or material changes in such insurance. It is understood that such insurance shall not be construed to create a limit of either Party's liability with respect to its indemnification obligations under this Article 13.

*****Confidential Treatment Requested**

ARTICLE 14

GENERAL PROVISIONS

14.1 Force Majeure. Neither Party shall be held liable to the other Party nor be deemed to have defaulted under or breached this Agreement for failure or delay in performing any obligation under this Agreement to the extent such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party, potentially including embargoes, war, acts of war (whether war be declared or not), acts of terrorism, insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, fire, floods, earthquakes or other acts of God, or acts, generally applicable action or inaction by any governmental authority (but excluding any government action or inaction that is specific to such Party, its Affiliates or sublicensees, such as revocation or non-renewal of such Party's license to conduct business), or omissions or delays in acting by the other Party, or unavailability of materials related to the Manufacture of the Products. The affected Party shall notify the other Party in writing of such force majeure circumstances as soon as reasonably practical, and shall promptly undertake and continue diligently all reasonable efforts necessary to cure such force majeure circumstances or to perform its obligations in spite of the ongoing circumstances.

14.2 Assignment. This Agreement may not be assigned or otherwise transferred, nor may any right or obligation hereunder be assigned or transferred, by either Party without the prior written consent of the other Party. Notwithstanding the foregoing, either Party may, without consent of the other Party, assign this Agreement and its rights and obligations hereunder in whole or in part to an Affiliate of such Party, or in whole to its successor in interest in connection with the sale of all or substantially all of its stock or its assets to which this Agreement relates, or in connection with a merger, acquisition or similar transaction. The intellectual property of any such successor in interest (an "**Acquiror**") held or developed by such Acquiror (whether prior to or after such acquisition) shall be excluded from the Arcturus Technology and the CureVac Technology, and such Acquiror (and Affiliates of such Acquiror that are not controlled by (as defined in the definition of Affiliate) the acquired Party itself) shall be excluded from "Affiliate" solely for purposes of the applicable components of the foregoing intellectual property definitions, in all such cases if and only if: (a) the acquired Party remains a wholly-owned subsidiary of the Acquiror; (b) all intellectual property of the acquired Party and all research and development assets and operations of the acquired Party, in each case relating to mRNA Constructs and Products, remain with the acquired Party and are not transferred to the Acquiror or another Affiliate of the Acquiror; (c) the scientific and Development activities of the acquired Party and the Acquiror (if any) are maintained separate and distinct, and (d) there is no exchange of Know-How relating to mRNA Constructs or Products between the acquired Party and the Acquiror. Any attempted assignment not in accordance with this Section 14.2 shall be null and void and of no legal effect. Any permitted assignee shall assume all assigned obligations of its assignor under this Agreement. The terms and conditions of this Agreement shall be binding upon, and shall inure to the benefit of, the Parties and their respective successors and permitted assigns.

14.3 Change of Control

(a) In case of a Change of Control of a Party, within [*…***…] days after the other Party has been informed about such Change of Control in writing, the other Party shall have the right to require the Party to opt out of future sharing of Clinical Development Costs with respect to any or all of such other Party's Products (i.e., Co-Developed CureVac Products if the Change of Control Party is Arcturus, and OTC Products and Co-Developed Arcturus Product if the Change of Control party is CureVac) (a "**Forced Opt-Out**").

(b) In case of a Forced Opt-Out, the effects of the Opt-Out for the Party that Opts-Out specified in Section 4.9(b) shall apply accordingly to the Party required to Opt-Out under this Section 14.3.

14.4 **Severability.** If any one or more of the provisions contained in this Agreement is held invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby, unless the absence of the invalidated provision(s) adversely affects the substantive rights of the Parties. The Parties shall in such an instance use their best efforts to replace the invalid, illegal or unenforceable provision(s) with valid, legal and enforceable provision(s) which, insofar as practical, implement the purposes of this Agreement.

14.5 **Notices.** All notices which are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, return receipt requested, addressed as follows:

If to Arcturus:

Arcturus Therapeutics, Inc.
10628 Science Center Drive
Suite 200
San Diego, California 92121
USA
Attn: CEO
Fax: (858) 300-5028

with a copy to (which copy shall not constitute notice):

Cooley LLP
3175 Hanover St.
Palo Alto, CA 94303
Attn: Glen Y. Sato
Fax: (650) 849-7400

If to CureVac:

CureVac AG
Paul-Ehrlich-Str. 15
72076 Tübingen
Germany
Attention: CEO and General Counsel
Fax: +49 7071 9883 - 1101

or to such other address(es) as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such notice shall be deemed to have been given: (a) when delivered if personally delivered or sent by facsimile on a Business Day (or if delivered or sent on a non-Business Day, then on the next Business Days); (b) on the Business Day after dispatch if sent by internationally-recognized overnight courier; or (c) on the [*…***…] Business Day following the date of mailing, if sent by mail.

14.6 Governing Law. This Agreement shall be governed by and construed and any dispute under this Agreement shall be resolved in accordance with the laws of the State of New York, USA, without reference to any rules of conflict of laws.

14.7 Dispute Resolution.

(a) ***Dispute Escalation*****.** In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves or the co-chairpersons of the JSC. In the event that such dispute is not resolved on an informal basis within […***…] days, any Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive with the appropriate authority to determine the mater for such Party), who will attempt in good faith to resolve such dispute by negotiation and consultation for a […***…] day period following receipt of such written notice.

(b) ***Dispute Resolution*****.**

(i) In the event the Chief Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Parties agree to try to solve such dispute amicably by mediation. The Parties shall conduct a mediation procedure according to the Mediation Rules of the World Intellectual Property Organization (WIPO) in effect on the date of the commencement of the mediation proceedings. The location of the mediation proceedings will be New York City, New York, USA. The number of mediators will be one (1). The language of the mediation proceedings will be English.

(ii) If the dispute has not been settled pursuant to the said rules within […***…] days following the filing of a request for mediation or within such other period as the Parties may agree in writing, either Party may submit the dispute to final and binding arbitration. Any dispute relating to the validity performance, construction or interpretation of this Agreement, which cannot be resolved amicably between the Parties after following the procedure set forth in this Section 14.7, shall be submitted to arbitration in accordance with the Arbitration Rules of WIPO in effect on the date of the commencement of the arbitration proceedings. The location of the arbitration proceedings will be New York

City, New York, USA. The number of arbitrators will be [*…***…]. The language of the arbitration proceeding will be English. The decision of the arbitrators shall be final and binding upon the Parties (absent manifest error on the part of the arbitrator(s)) and enforceable in any court of competent jurisdiction.

14.8 Foreign Corrupt Practices Act Compliance.

(a) **Compliance with FCPA**. The U.S. government imposes and enforces prohibitions on the payment or transfer of anything of value to governments, government officials, political parties, political party officials (or relatives or associates of such officials), whether directly or indirectly, to obtain or retain business. This U.S. law is referred to as the Foreign Corrupt Practices Act ("**FCPA**"), and it can have application to conduct of a U.S. corporation's foreign subsidiaries, employees, agents and distributors. A summary of the law and related information can be found at http://www.justice.gov/criminal/fraud/fcpa. By signing this Agreement, each Party warrants that:

(i) It is familiar with the provisions and restrictions contained in the OECD Anti-Bribery Convention and FCPA and it has adopted and maintained an FCPA policy.

(ii) It shall comply with the FCPA in marketing, selling and/or servicing the Products under this Agreement.

(iii) It shall not, in the course of its duties under the Agreement, offer, promise, give, demand, seek or accept, directly or indirectly, any gift or payment, consideration or benefit in kind that would or could be construed as an illegal or corrupt practice.

(iv) It is not a government official (as the term is defined in the FCPA) or affiliated with any government official.

(v) It shall immediately notify the other Party of any attempt by a government official to directly or indirectly solicit, ask for, or attempt to extort anything of value from such Party, and shall refuse any such solicitation, request or extortionate demand.

(b) **No Action**. In no event shall a Party be obligated under the Agreement to take any action or omit to take any action that such Party believes, in good faith, would cause it to be in violation of any applicable laws and regulations, including the anti-bribery laws referenced in this Section 14.8.

(c) **Due Diligence**. Each Party shall have the right to visit the offices of the other Party from time to time during the term of the Agreement on an "as needed" basis and conduct due diligence in relation to such other Party's business related to performance of its obligations under this Section 14.8 and may do so in the way it deems necessary, appropriate or desirable so as to ensure that such other Party complies with this Section 14.8 and any other applicable laws and regulations in its business operations. Each Party shall make every effort to cooperate fully with the other Party in any such due diligence.

(d) **Audit**. In the event that a Party has reason to believe that a breach of any obligation of the other Party under this Section 14.8 has occurred or may occur, such Party shall have the right to select an independent Third Party to conduct an audit of the other

Party and review relevant books and records of the other Party, to satisfy itself that no breach has occurred. Unless otherwise required under applicable laws and regulations or by order of a competent court or regulatory authority, the auditing Party shall ensure that the selected independent Third Party will keep confidential all audited matters and the results of the audit. Each Party does reserve the right to disclose to the U.S. or foreign government, its agencies and/or any other government or non-government party, information relating to a possible violation by the other Party of any applicable law, including a violation of the FCPA or any other applicable anti-bribery law.

(e) Material Breach. Each Party acknowledges that any material violation of this Section 14.8 by such Party or any of its Affiliates, sublicensees or subcontractors shall be deemed a material breach of this Agreement by such Party and shall give rise to the right for the other Party to terminate this Agreement immediately by written notice to such Party.

14.9 Entire Agreement; Amendments. This Agreement, together with the Exhibits hereto and the Confidentiality Agreement, contains the entire understanding of the Parties with respect to the collaboration and the licenses granted hereunder. In case of conflict between this Agreement and the Confidentiality Agreement, this Agreement shall prevail. Any other express or implied agreements and understandings, negotiations, writings and commitments, either oral or written, in respect to the collaboration and the licenses granted hereunder are superseded by the terms of this Agreement. The Exhibits to this Agreement are incorporated herein by reference and shall be deemed a part of this Agreement. This Agreement may be amended, or any term hereof modified, only by a written instrument duly executed by authorized representatives of both Parties hereto.

14.10 Headings. The captions to the several Articles, Sections and subsections hereof are not a part of this Agreement, but are merely for convenience to assist in locating and reading the several Articles and Sections hereof.

14.11 Rights in Bankruptcy. All rights and licenses granted under or pursuant to this Agreement by CureVac and Arcturus are, and shall otherwise be deemed to be, for purposes of Section 365(n) of Title 11, United States Code, as amended (the **"U.S. Bankruptcy Code"**), licenses of rights to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that each Party, as licensee of certain rights under this Agreement, shall retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code. The Parties further agree that, in the event of the commencement of a bankruptcy proceeding by or against a Party (such Party, the **"Bankrupt Party"**) under the U.S. Bankruptcy Code or analogous provisions of applicable Law outside the U.S., (a) the other Party shall be entitled to a complete duplicate of (or complete access to, as appropriate) any intellectual property licensed to such other Party and all embodiments of such intellectual property, which, if not already in such other Party's possession, shall be promptly delivered to it (x) upon any such commencement of a bankruptcy proceeding upon such other Party's written request therefor, unless the Bankrupt Party elects to continue to perform all of its obligations under this Agreement or (y) if not delivered under clause (x), following the rejection of this Agreement by the Bankrupt Party upon written request therefor by the other Party and (b) the Bankrupt Party shall not interfere with the other Party's rights to intellectual property and all embodiments of intellectual property, and shall assist and not interfere with the other Party in obtaining intellectual property and all embodiments of intellectual property from another entity. The "embodiments" of intellectual property

includes all tangible, intangible, electronic or other embodiments of rights and licenses hereunder, including all products embodying intellectual property, mRNA Constructs, Products, filings with Regulatory Authorities and related rights and CureVac Know-How in the case that CureVac is the Bankrupt Party and Arcturus Know-How in the case that Arcturus is the Bankrupt Party.

14.12 Independent Contractors. It is expressly agreed that Arcturus and CureVac shall be independent contractors and that the relationship between the two Parties shall not constitute a partnership, joint venture or agency. Neither Arcturus nor CureVac shall have the authority to make any statements, representations or commitments of any kind, or to take any action, which shall be binding on the other Party, without the prior written consent of the other Party.

14.13 Waiver. The waiver by either Party hereto of any right hereunder, or of any failure of the other Party to perform, or of any breach by the other Party, shall not be deemed a waiver of any other right hereunder or of any other breach by or failure of such other Party whether of a similar nature or otherwise.

14.14 Cumulative Remedies. No remedy referred to in this Agreement is intended to be exclusive, but each shall be cumulative and in addition to any other remedy referred to in this Agreement or otherwise available under law.

14.15 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement shall be construed against the drafting Party shall not apply.

14.16 Business Day Requirements. In the event that any notice or other action or omission is required to be taken by a Party under this Agreement on a day that is not a Business Day then such notice or other action or omission shall be deemed to be required to be taken on the next occurring Business Day.

14.17 Translations. This Agreement is in the English language only, which language shall be controlling in all respects, and all versions hereof in any other language shall be for accommodation only and shall not be binding upon the Parties. All communications and notices to be made or given pursuant to this Agreement, and any dispute proceeding related to or arising hereunder, shall be in the English language. If there is a discrepancy between any translation of this Agreement and this Agreement, this Agreement shall prevail.

14.18 Further Actions. Each Party agrees to execute, acknowledge and deliver such further instruments, and to do all such other acts, as necessary or appropriate in order to carry out the purposes and intent of this Agreement.

14.19 Counterparts. This Agreement may be executed in two or more counterparts by original signature, facsimile or PDF files, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

<REMAINDER OF PAGE INTENTIONALLY LEFT BLANK>

IN WITNESS WHEREOF, the Parties intending to be bound have caused this Co-Development and Co-Commercialization and Collaboration Agreement to be executed by their duly authorized representatives as of the Effective Date.

Arcturus Therapeutics, Inc.

By: /s/ Joseph E. Payne
Name: Joseph E. Payne
Title: President & CEO

CureVac AG

By: /s/ Dan Menichella
Name: Dan Menichella
Title: CBO

By: /s/ Franz W. Haas
Name: Franz W. Haas
Title: CCO

Signature Page to the Co-Development and Co-Commercialization Agreement

LIST OF EXHIBITS

EXHIBIT 1.5

ARCTURUS PATENTS AND KNOW HOW

[*…*…]**

***Confidential Treatment Requested

[*…*…]**

*****Confidential Treatment Requested**

[…***…]

*****Confidential Treatment Requested**

EXHIBIT 1.6

ARCTURUS LMD TECHNOLOGY

…***…]

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

EXHIBIT 1.8

ARCTURUS mRNA TECHNOLOGY

*…***…]

***Confidential Treatment Requested

[*…*…]**

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

EXHIBIT 1.32

Existing CureVac Know-How and CureVac Patents

[*…*…]**

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

[***…***…]

***Confidential Treatment Requested

[*…*…]**

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

[***…***…**]

*****Confidential Treatment Requested**

*…***…]

*****Confidential Treatment Requested**

[*…*…]**

*****Confidential Treatment Requested**

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…*…]**

*****Confidential Treatment Requested**

Exhibit 4.4

OTC Preclinical Development Plan
[*…***…]**

*****Confidential Treatment Requested**

Exhibit 10.5

Joint Press Release

[*to be agreed post signature*]

Exhibit 12.3

Disclosure Letter

Disclosures Regarding Representations and Warranties of CureVac

[*…***…]

***Confidential Treatment Requested

[*…***…]

*****Confidential Treatment Requested**

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…***…]

*****Confidential Treatment Requested**

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…***…]

***Confidential Treatment Requested

[*…***…

*****Confidential Treatment Requested**

[…***…*]

***Confidential Treatment Requested

*…***…]

*****Confidential Treatment Requested**

EXHIBIT 2.3

[*…***…]

***Confidential Treatment Requested

EXHIBIT 4.2

Minimum Data Package Requirements

[*…***…]

***Confidential Treatment Requested

Exhibit 4.14

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

EXECUTION COPY

LICENSE AGREEMENT

By and Between

PROTIVA BIOTHERAPEUTICS INC.

AND

MARINA BIOTECH, INC.

TABLE OF CONTENTS

LICENSE AGREEMENT

This LICENSE AGREEMENT ("**Agreement**"') is made as of this 28th day of November, 2012 ("**Effective Date**"), by and between **PROTIVA BIOTHERAPEUTICS INC.**, a British Columbia corporation ("**PROTIVA**"), and **MARINA BIOTECH, INC.**, a Delaware corporation ("**MARINA**"). PROTIVA and MARINA are each referred to individually as a "**Party**" and together as the "**Parties.**"

RECITALS

WHEREAS, MARINA has developed a proprietary platform for creating novel oligonucleotide therapeutics and owns or Controls (as defined below) certain intellectual property relating thereto; and

WHEREAS, PROTIVA wishes to obtain, and MARINA wishes to grant, a license to such intellectual property on the terms and conditions set forth herein;

NOW THEREFORE, in consideration of the mutual covenants and agreements herein contained, the Parties agree as follows.

Article 1 DEFINITIONS AND INTERPRETATION

1.1 Definitions.

Unless the context otherwise requires, the terms in this Agreement with initial letters capitalized, shall have the meanings set forth below, or the meaning as designated in the indicated places throughout this Agreement.

(a) "**Affiliate**" means, with respect to a Person, any other Person that controls, is controlled by, or is under common control with that Person. For the purpose of this definition, "**control**" shall mean direct or indirect ownership of fifty percent (50%) or more of the shares of stock entitled to vote for the election of directors, in the case of a corporation, or fifty percent (50%) or more of the equity interest in the case of any other type of legal entity, status as a general partner in any partnership, or any other arrangement whereby the entity or person controls or has the right to control the board of directors or equivalent governing body of a corporation or other entity, or the ability to cause the direction of the management or policies of a corporation or other entity. In the case of entities organized under the laws of certain countries, the maximum percentage ownership permitted by law for a foreign investor may be less than fifty percent (50%), and in such case such lower percentage shall be substituted in the preceding sentence, *provided*, that such foreign investor has the power to direct the management and policies of such entity.

(b) "**Agreement**" shall have the meaning set forth in the preamble.

(c) "**Applicable Law**" means all applicable laws, rules, ordinances, and regulations, including any rules, regulations, guidelines or other requirements of relevant government agencies, that may be in effect from time to time in the applicable country or jurisdiction, applicable to the specific activities being undertaken pursuant to this Agreement.

(d) "**Business Day**" means any day that is not a Saturday, a Sunday, or other day which is a statutory holiday in the Province of British Columbia, Canada or a Federal holiday in the State of Washington, U.S.A.

(e) "**Calendar Quarter**" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

(f) "**Calendar Year**" means each successive period of twelve (12) months commencing on January 1 and ending on December 31.

(g) "**Claims**" means all Third Party demands, claims, actions, proceedings and liabilities (whether criminal or civil, in contract, tort or otherwise) for losses, damages, reasonable legal costs and other reasonable expenses of any nature whatsoever.

(h) "**Combination Product**" means a single Product or a co-packaged Product in dosage form that includes one or more UNAs and one or more Other APIs. All reference to Product in this Agreement shall be deemed to include Combination Products, to the extent applicable.

(i) "**Commercialize**" or "**Commercialization**" means those activities comprising or relating to the manufacturing, promotion, marketing, advertising, distribution and sale of PROTIVA Products, including Phase IV trials or equivalent clinical trials conducted following Regulatory Approval as needed or useful to promote and market the Licensed Product and/or maintain such Regulatory Approval.

(j) "**Commercially Reasonable Efforts**" means, with respect to particular tasks or activities hereunder in developing or Commercializing a PROTIVA Product, a level of efforts applied to such tasks or activities reasonably consistent with the efforts commonly used by similarly-situated companies in the pharmaceutical industry (taking into account, among other things, the size, available resources, available funding, product lines and other relevant characteristics of such companies) to conduct such activities on products at a similar (as compared to the PROTIVA Product at the applicable time) stage in its product life and of similar market potential, profit potential and strategic value resulting from its own research efforts, based on information and conditions then-prevailing, including, without limitation, efficacy of the product, the competitiveness of alternative products in the marketplace, the patent and other proprietary position of the product, the likelihood of regulatory approval given the regulatory structure involved and the likelihood of adequate reimbursement. Commercially Reasonable Efforts shall be determined on a country by country or market-by-market basis (as most applicable) for a particular PROTIVA Product, and it is anticipated that the level of effort will change over time reflecting changes in the status of the PROTIVA Product and the country (or markets) involved.

(k) "**Confidential Information**" means all Know-How and other confidential and/or proprietary information and data of a financial, commercial, scientific or technical nature owned or Controlled by a disclosing Party or entrusted to a disclosing Party by a Third Party with the right to disclose, and which the disclosing Party or any of its Affiliates has supplied or otherwise made available to the other Party or its Affiliates, whether made available orally, in writing or in electronic form, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in relation to this

Agreement. For purposes hereof, this Agreement and the terms hereof shall be deemed to be the Confidential Information of both Parties, subject to the rights of disclosure set forth in Article 8 and Subsections 12.2(b) and 12.2(c).

(l) "**Control**" or "**Controlled**" means, with respect to any Know How, Patents, other Intellectual Property Rights, or any confidential, proprietary or trade secret information, the legal authority or right (whether by ownership, license or otherwise) of a Party to grant a license or a sublicense of or under such Know How, Patents, or Intellectual Property Rights to another Person, or to otherwise disclose such proprietary or trade secret information to another Person, without breaching the terms of any agreement with a Third Party, or misappropriating the proprietary or trade secret information of a Third Party.

(m) "**Effective Date**" shall have the meaning set forth in the first paragraph of this Agreement.

(n) "**Feasibility Studies**" shall have the meaning set forth in Section 4.1(b).

(o) "**Field**" shall mean all uses and purposes for the development of human therapeutics.

(p) "**First Commercial Sale**" means, with respect to a particular country, the first commercial sale of a PROTIVA Product in a country by PROTIVA or its Affiliates to a Third Party or by a Sublicensee or its Affiliates to an unaffiliated Person, after all needed Regulatory Approvals for the Licensed Product have been granted in such country.

(q) "**Generic Product**" means, with respect to a PROTIVA Product, a generic product in a formulation similar to and substitutable for such PROTIVA Product.

(r) "**Indemnification Claim Notice**" shall have the meaning set forth in Subsection 11.3(b).

(s) "**Indemnified Party**" shall have the meaning set forth in Subsection 11.3(b).

(t) "**Indemnifying Party**" shall have the meaning set forth in Subsection 11.3(b).

(u) "**Intellectual Property Rights**" means all intellectual property rights subject to protection by intellectual property laws in any country of the world, arising under statutory or common law, contract, or otherwise, and whether or not perfected, including without limitation:

(i) all rights under Patents;

(ii) all rights associated with works of authorship including without limitation, copyrights, moral rights, copyright applications, copyright registrations, synchronization rights, mask work rights, mask work applications, mask work registrations;

(iii) all rights relating to the protection of trade secrets, know-how (including KnowHow) and confidential information (including Confidential Information); and

(iv) all rights analogous to those set forth in this subsection above and any and all other proprietary rights relating to intangible property

(v) "**Invention**" means all discoveries, inventions, developments, improvements, Know How, writings or rights conceived, discovered, invented, developed, created, made or reduced to practice.

(w) "**Joint IP**" shall have the meaning set forth in Subsection 6.l(b).

(x) "**Know-How**" means all technical information, know-how and data, including inventions (whether patentable or not), discoveries, trade secrets, specifications, instructions, processes, formulae, materials, expertise and other technology applicable to compounds, biologics, formulations, compositions, products or to their manufacture, development, registration, use or commercialization or methods of assaying or testing them or processes for their manufacture, formulations containing them, compositions incorporating or comprising them and including all biological, chemical, pharmacological, biochemical, toxicological, pharmaceutical, physical and analytical, safety, quality control, manufacturing, preclinical and clinical data, instructions, processes, formulae, expertise and information, regulatory filings and copies thereof, relevant to the development, manufacture, use or commercialization of and/or which may be useful in studying, testing, development, production or formulation of products, or intermediates for the synthesis thereof.

(y) "**License Fee**" shall have the meaning set for that Section 4.l(c).

(z) "**MAA**" (marketing authorizing application) means an application for the authorization to market a Product in any country or group of countries outside the United States, as defined in the applicable laws and regulations and filed with the Regulatory Authority of a given country or group of countries.

(aa) "**Major Market**" means *[...***...]. For clarity, obtaining Regulatory Approval of PROTIVA Product from [...***...], which approval applies [...***...] (as then constituted), shall be deemed to be obtaining a Regulatory Approval in a Major Market for purposes of the applicable provisions of this Agreement.

(bb) "**MARINA Indemnitees**" shall have the meaning set forth in Section 11.2.

(cc) "**MARINA Inventions**" shall have the meaning set forth in Subsection 6.1(a).

(dd) "**MARINA Know-How**" means the Know-How owned or Controlled by MARINA or its Affiliates on and after the Effective Date relating to the UNA® Platform Technology. The MARINA Know-How shall also include the UNA® Data.

(ee) "**MARINA Patents**" means the Patents identified in Exhibit A and any other Patents owned or Controlled by MARINA or its Affiliates on or after the Effective Date that have claims covering any aspect of the UNA Platform Technology, including Patents arising from MARINA Inventions.

(ff) "**MARINA Technology**" means MARINA Patents and MARINA Know-How and MARINA Inventions.

(gg) "**Milestone Event**" shall have the meaning set forth in Section 4.2.

(hh) "**NDA**" means a New Drug Application, as defined in 21 C.F.R. 314, and any other appropriate application or registration submitted to the appropriate Regulatory Authority in a particular country in the Territory to seek Regulatory Approval for sale of Licensed Product in such country.

* ***** Confidential Treatment Requested**

(ii) "**Net Sales**" means the gross invoice price of Product sold by PROTIVA or its Affiliates to the first Third Party (or by a Sublicensee or its Affiliates to a non-affiliated Person in any arm's length transaction) after deducting if not previously deducted, from the amount invoiced or received:

(i) trade and quantity discounts other than early pay cash discounts;

(ii) returns, rebates, chargebacks and other allowances;

(iii) retroactive price reductions that are actually allowed or granted;

(iv) sales commissions paid to Third Party distributors and/or selling agents (which shall not be deemed to include contract sales organizations); and

(v) bad debt, sales or excise taxes, early payment cash discounts, transportation and insurance, custom duties, and other governmental charges.

For clarity, Net Sales shall not include funds:

(vi) derived from the transfer or sale of Product between any of PROTIVA and its Affiliates (or between any Sublicensee and its Affiliates);

(vii) derived from the transfer or sale of Product by PROTIVA or its Affiliates to a Third Party (or by a Sublicensee or its Affiliates to a non-affiliated Person) for the development or analytical, preclinical or clinical testing of a Product;

(viii) derived from the transfer or sale of reasonable quantities of Product by PROTIVA or its Affiliates to a Third Party (or by a Sublicensee or its Affiliates to a nonaffiliated Person) for samples, donations or compassionate use; and

(ix) constituting Sublicensing Revenue.

Any Product sold in other than in an arm's length transaction or for other property (e.g., barter) shall be deemed invoiced at its fair market value. The calculation of Net Sales of any Combination Product shall, subject to the exclusions set forth above and be calculated using one of the following methods:

(x) by multiplying the annual Net Sales of the Combination Product during the applicable royalty accounting period by a fraction, the numerator of which is the aggregate gross selling price of the Product contained in the Combination Product if sold separately, and the denominator of which is the sum of the gross selling price of both the Product and the Other API(s) contained in the Combination Product if sold separately; or

(xi) if no such separate sales are made of any of the Product or the Other APIs during the applicable accounting period, or if any of the Product or the Other APIs have not been sold separately for at least one (1) year, PROTIVA shall calculate Net Sales of such Combination Product by the fraction C/C+D, where C is a reasonable estimate of the fair market value of the Product portion of such Combination Product, D is a reasonable estimate of the fair market value of the Other API(s) in such Combination Product, and the estimates of C and D are determined by mutual agreement of the Parties negotiating in good faith.

(jj) "**Other API**" means an active, proprietary pharmaceutical ingredient that is not an UNA and that, if administered independently, would have a clinical effect.

(kk) "**Party**" shall have the meaning set forth in the preamble.

(ll) "**Patents**" means all patents and patent applications, author certificates, inventor certificates, utility certificates, improvement patents and models and certificates of addition and all foreign counterparts of them and including all divisionals, continuations, substitutions, confirmations, continuations-in-part, re-registrations, re-examinations, reissues, additions, renewals, extensions, registrations, and supplemental protection certificates and the like of any of the foregoing.

(mm) "**Person**" means any individual, partnership, limited liability company, firm, corporation, association, trust, unincorporated organization or other entity.

(nn) "**Product**" means any product or process covered by a claim in a MARINA Patent or otherwise utilizing or incorporating MARINA Know-How.

(oo) "**PROTIVA Indemnitees**" shall have the meaning set forth in Section 11.1.

(pp) "**PROTIVA** Product" shall have the meaning set forth in Section 2.2.

(qq) "**Regulatory Approval**" means all approvals (including supplements, amendments, pre and post-approvals and price approvals), licenses, registrations or authorizations necessary for the manufacture, distribution, use or sale of a Licensed Product in the applicable country or regulatory jurisdiction.

(rr) "**Regulatory Authority**" means any governmental agency or authority responsible for granting Regulatory Approvals for Products, including the United States Food and Drug Administration, the European Medicines Agency, or any successor entities thereto and any corresponding national or regional regulatory authorities.

(ss) "**Regulatory Filings**" means any submission to a Regulatory Authority of any appropriate regulatory application, and shall include, without limitation, any submission to a regulatory advisory board, MAA, and any supplement or amendment thereto. For the avoidance of doubt, Regulatory Filings shall include any Investigational New Drug (IND), New Drug Application (NDA) or the corresponding application in any other country or group of countries.

(tt) "**Royalties Report**" shall have the meaning set forth in Section 4.6.

(uu) "**Royalty Term**" means, as to a particular PROTIVA Product sold in a country, the period from the date of First Commercial Sale of such PROTIVA Product in such country until the later of:

(i) the date of expiration of the last to expire issued Patent included in the MARINA Patents having a Valid Claim that claims the PROTIVA Product in such country; or

(ii) *[...***...] after such First Commercial Sale of the Licensed Product in a Major Market.

(vv) "**Sublicensee**" means a Person to whom PROTIVA or its Affiliate has granted a sublicense agreement under PROTIVA's rights pursuant to Section 2.2.

(ww) "**Sublicense Fees**" shall have the meaning set forth in Section 4.5.

* ***** Confidential Treatment Requested**

(xx) "**Sublicensing Revenue**" means all consideration received by PROTIVA (or its Affiliates) from a Sublicensee in consideration of the grant of a sublicense under the MARINA Patents to such Sublicensee (which may include upfront fees, milestone payments and other similar fees), but excluding:

(i) royalties payable to PROTIVA (or its Affiliates) based on Net Sales by a Sublicensee or its Affiliates;

(ii) any amounts paid as reimbursement of research or development costs and expenses incurred by PROTIVA or its Affiliates (including past and ongoing costs and expenses) relating to PROTIVA Products;

(iii) direct reimbursement of Patent prosecution or enforcement costs;

(iv) payments of a share of amounts recovered in enforcing Patent or other Intellectual Property Rights (except to the extent such share is calculated or treated as royalties under the terms of such sublicense);

(v) transfer price payments for sale of compounds or products (such exclusion not to exceed *[...***...] of actual fully-burdened cost of goods);

(vi) bona fide loans on commercial terms; and

(vii) any payments made to purchase equity in PROTIVA or a PROTIVA Affiliate at fair market value.

(yy) **Term**" means the term of this Agreement as set forth in Section 9.1.

(zz) "**Territory**" means all countries of the world.

(aaa) "**Third Party**" means any Person other than a Party or an Affiliate of a Party.

(bbb) "**Third Party Claim**" means any claim, action, allegation, suit or legal proceeding brought by a Third Party against another entity or person.

(ccc) "**UNA**" means an unlocked nucleobase analog.

(ddd) "**UNA Data**" means all data and information owned or Controlled by MARINA relating to the structure, activity and/or other characteristics of the UNA Platform Technology.

(eee) "**UNA Platform Technology**" means the technology for the development, production and use of UNAs and compounds containing one or more UNAs, including, without limitation, Know-How relating to the manufacture, formulation, ingredients, preparation, presentation, means of delivery, dosage or packaging of such UNAs, all as in existence as of the Effective Date.

(fff) "**United States**" or "**US**" means the United States of America, its territories and possessions.

(ggg) "**Upfront Payment**" shall have the meaning set forth in Subsection 4.l(a).

(hhh) "**USD**" or "**US$**" means the lawful currency of the United States.

(iii) "**Valid Claim**" means an unexpired claim of an issued Patent within the MARINA Patents that has not been ruled to be unpatentable, invalid or unenforceable by a court or other

* ***** Confidential Treatment Requested**

authority in the country of the Patent with competent jurisdiction, from which decision no appeal is taken or can be taken.

1.2 Interpretation.

In this agreement unless otherwise specified:

(a) "includes" and "including" shall mean respectively includes and including without limitation;

(b) a Party includes its permitted assignees and/or their respective permitted successors in title to substantially the whole of its undertaking;

(c) a statute or statutory instrument or any of their provisions is to be construed as a reference to that statute or statutory instrument or such provision as the same may have been or may from time to time hereafter be amended or re-enacted;

(d) words denoting the singular shall include the plural and vice versa and words denoting any gender shall include all genders;

(e) the Exhibits and other attachments form part of the operative provision of this Agreement and references to this Agreement shall, unless the context otherwise requires, include references to the Exhibits and attachments;

(f) the headings in this Agreement are for information only and shall not be considered in the interpretation of this Agreement;

(g) general words shall not be given a restrictive interpretation by reason of their being preceded or followed by words indicating a particular class of acts, matters or things; and

(h) the Parties agree that the terms and conditions of this Agreement are the result of negotiations between the Parties and that this Agreement shall not be construed in favor of or against any Party by reason of the extent to which any Party participated in the preparation of this Agreement.

Article 2 LICENSES

2.1 License Grant.

Subject to the terms and conditions of this Agreement, MARINA hereby grants to PROTIVA and its Affiliates a non-exclusive, irrevocable (subject to Subsection 9.2(c)), perpetual, worldwide license, with the right to grant sublicenses as permitted in Section 2.2, under the MARINA Technology to research, develop, make, have made, use, import, offer for sale, sell, have sold, commercialize and otherwise exploit any Product in the Field in the Territory.

2.2 Sublicense Rights.

PROTIVA may sublicense to a Third Party the rights granted to it by MARINA under Section 2.1 at any time at its sole discretion, but only in connection with:

(a) the continuing research, development and or commercialization of a PROTIVA Product or the manufacturing of a PROTIVA Product by such Third Party or its Affiliates, either itself or as part of a collaboration with PROTIVA or any of its Affiliates, or

(b) the sublicense of a technology platform consisting of the use of PROTIVA's proprietary lipid nano-particle technology in combination with MARINA Technology.

A "**PROTIVA Product**" means any Product with respect to which PROTIVA or any of its Affiliates has conducted research, manufacturing, development activities that are related to such Product. For the avoidance of doubt, this Section 2.2 shall not include any right by PROTIVA to grant a "naked" sublicense of MARINA Technology alone.

Article 3 DISCLOSURE AND TRANSFER OF MARINA KNOW-HOW AND COOPERATION

3.1 Disclosure and Transfer of MARINA Know-How.

As soon as reasonably possible after the Effective Date (and in any event within ten (10) days after the Effective Date), MARINA, without additional consideration, shall use good faith, diligent efforts to disclose to PROTIVA or its designated Affiliate all MARINA Know-How in existence as of the Effective Date and shall provide such copies of any existing tangible embodiment thereof in written or electronic form as may be reasonably requested by PROTIVA, including delivery of an electronic copy of the UNA Data in a commonly usable format (to the extent in existence on the date hereof). Such disclosures shall include all MARINA Know-How and any other data, information and documents known to and Controlled by MARINA as of the Effective Date which may be necessary or useful to PROTIVA to practice the licenses granted hereunder efficiently.

3.2 Cooperation.

Upon request by PROTIVA within a reasonable period after disclosure by MARINA of the MARINA Know-How and other data, information and documents pursuant to Section 3.1, MARINA will provide reasonable assistance to PROTIVA or its designated Affiliate in connection with understanding and using the MARINA Know-How for purposes consistent with licenses and rights granted to PROTIVA hereunder; *provided*, that PROTIVA shall promptly pay or reimburse MARINA for any travel or other out-of-pocket expenses incurred by MARINA in connection with providing such assistance requested by PROTIVA.

Article 4 FINANCIAL PROVISIONS

4.1 Upfront Payment.

(a) In partial consideration of the rights granted by MARINA to PROTIVA under this Agreement, PROTIVA shall pay to MARINA within *[...***...] of the Effective Date a non-refundable, non-creditable upfront payment in the amount of [...***...] (the "**Upfront Payment**").

(b) [...***...]

(c) *[...***...]

4.2 Milestone Payments.

(a) In partial consideration of the license rights granted by MARINA under this Agreement, PROTIVA shall pay to MARINA a milestone payment upon first achievement by PROTIVA or an Affiliate (but not by any Sublicensee, as further set forth below in this Section 4.2) of the applicable milestone event set forth in the table below (each such event, a "**Milestone Event**") such payments to be in the listed amounts for the applicable Milestone Event:

Milestone Event	Milestone Payment
For each PROTIVA Product directed to a specific gene target:	
(1) [...***...]	[...***...]
(2) [...***...]	[...***...]
(3) [...***...]	[...***...]

(b) For clarity each of the above milestone payments shall be paid only once for a particular PROTIVA Product directed to a specific gene target, regardless if any such Milestone Event is achieved more than once for that particular PROTIVA Product directed to a specific gene target.

(c) For additional clarity where PROTIVA has entered into a sublicense agreement with a Sublicensee who has been granted rights to commercialize a PROTIVA Product directed to a specific gene target, PROTIVA shall not be liable to pay any milestone payments on account of the achievement by the Sublicensee (alone, or in collaboration with PROTIVA or any of its Affiliates) of any of the foregoing Milestone Events• but instead any payments received by PROTIVA on account of the Sublicensee's milestone achievement shall be included in Sublicensing Revenue and PROTIVA shall pay to MARINA the applicable Sublicense Fees pursuant to Section 4.5

(d) PROTIVA shall promptly notify MARINA of the achievement of any Milestone Event for each PROTIVA Product directed to a specific gene target. All milestone payments under Subsection 4.2(a) are non-refundable and non-creditable, and shall be due within *[...***...] of achievement of the applicable Milestone Event.

4.3 Royalties.

In partial consideration of the license rights granted by MARINA under this Agreement, PROTIVA shall pay to MARINA a royalty on Net Sales of PROTIVA Products by PROTIVA or any of its Affiliates during the Royalty Term as follows:

(a) For sales of a PROTIVA Product in any country in the Territory where such sale would infringe, absent the license granted in Section 2.1, a Valid Claim of an issued MARINA Patent, PROTIVA shall pay to MARINA a royalty on Net Sales of such PROTIVA Product calculated using the royalty rate set opposite the amount of Net Sales in the table below:

Net Sales in a Calendar Year	Royalty Rate
[...***...]	[...***...]
[...***...]	[...***...]
[...***...]	[...***...]

(b) For sales of a PROTIVA Product in any country in the Territory where either (i) there are no Valid Claims covering the PROTIVA Product that would be infringed, absent the license granted in Section 2.1, by a sale of such PROTIVA Product, or (ii) sales of Generic Products exist alongside sales of the PROTIVA Product, PROTIVA shall pay to MARINA a reduced royalty on Net Sales of such PROTIVA Product calculated using the royalty rate set opposite the amount of Net Sales in the table below:

Net Sales in a Calendar Year	Royalty Rate
[...***...]	[...***...]
[...***...]	[...***...]
[...***...]	[...***...]

provided, however, that the royalty obligation under this Subsection 4.3(b) in respect of such PROTIVA Product in all countries in the Territory shall cease upon the [...***...] anniversary of the First Commercial Sale of such PROTIVA Product in any Major Market country.

4.4 Anti-Stacking Provisions.

If PROTIVA or its Affiliate owes to one or more Third Parties, under license agreement(s)

granting PROTIVA (or its Affiliate or Sublicensee) Intellectual Property Rights that are needed to make, use sell or otherwise commercialize the MARINA Technology as contained in the PROTIVA Product royalties or similar payments on sales of such PROTIVA Products, then PROTIVA may reduce the royalties owed to MARINA under Section 4.3 by *[...***...] of the royalty or similar payments actually paid to such Third Parties, provided that PROTIVA shall not reduce any particular royalty payment to MARINA by more than [...***...] of the amount otherwise owed under Section 4.3 for the applicable royalty period.

4.5 Sublicense Fees.

In partial consideration of the license rights granted by MARINA under this Agreement, including specifically the right to sublicense such rights under Section 2.2, PROTIVA shall pay to MARINA an amount (the "**Sublicense Fees**") equal to a percentage of Sublicensing Revenue received by PROTIVA (or its Affiliate) from its Sublicensees pursuant to such sublicenses. The percentage of Sublicensing Revenue payable by PROTIVA to MARINA shall be determined by the development stage of the PROTIVA Product that is the subject of the sublicense at the time PROTIVA or its Affiliate and the Sublicensee execute such sublicense, as follows:

Development Stage at Time of Sublicense Execution	**Percentage of Sublicensing Revenue**
[...***...]	[...***...]
[...***...]	[...***...]
[...***...]	[...***...]
[...***...]	[...***...]

4.6 Payment of Royalty and Sublicense Fee Obligations.

The royalty obligation under Section 4.3 shall accrue upon the sales of a PROTIVA Product in each particular country in the Territory, commencing upon First Commercial Sale after Regulatory Approval of the PROTIVA Product in such country and except as otherwise provided under Subsection 4.3(b), such obligation shall end upon the expiration of the Royalty Term applicable to such PROTIVA Product in such country. All such royalty payments are non-refundable and non-creditable and shall be due within [...***...] after the end of each Calendar Quarter and are payable in immediately available funds. The Sublicense Fees owed under Section 4.5 shall be paid with respect to particular Sublicensing Revenue received by PROTIVA, within [...***...] after PROTIVA's receipt of the applicable revenues and are payable in immediately available funds. PROTIVA shall notify MARINA in writing promptly upon the First Commercial Sale of each PROTIVA Product in each country and thereafter PROTIVA shall furnish MARINA with a written report (the "**Royalties Report**") for each completed Calendar Quarter showing, on a country-by-country basis, according to the volume of units of PROTIVA Products sold in each such country (by SKU) during the reporting period (whether PROTIVA Product is sold by PROTIVA or its Affiliates or Sublicensees):

(a) the gross invoiced sales of the PROTIVA Product sold in each country during the reporting period, and the amounts deducted therefrom to determine Net Sales from such gross invoiced sales;

(b) the royalties payable in dollars, if any, which shall have accrued hereunder based upon such Net Sales; and

(c) the withholding taxes, if any, required by Applicable Law to be deducted in respect of such sales (provided that, as to sales by Sublicensees, PROTIVA shall report only the net sales numbers (using the definition for such term in the applicable Sublicense) as reported by the Sublicensee, if such Sublicensee does not report gross invoiced sales numbers).

With respect to sales of PROTIVA Products invoiced in US dollars, the gross invoiced sales, Net Sales and royalties payable shall be expressed in the Royalties Report in US Dollars. With respect to sales of PROTIVA Products invoiced in a currency other than US Dollars, the gross invoiced sales, Net Sales and royalties payable shall be expressed in the Royalties Report in the domestic currency of the party making the sale as well as in the US Dollar equivalent of the royalties payable and the exchange rate used in determining the amount of US dollars. The US dollar equivalent shall be calculated on a calendar-month basis using the average monthly interbank rate listed in *The Wall Street Journal*.

4.7 Currency Restrictions.

If at any time legal restrictions in any country in the world prevent the prompt remittance of any payments with respect to sales in that country, PROTIVA shall have the right and option upon written notice to MARINA to make (or to cause its Sublicensee to make) such payments by depositing the amount thereof in local currency to MARINA's account (or such other designated nominee by MARINA) in a bank or depository in such country.

4.8 Taxes.

In the event that laws, rules or regulations require PROTIVA to withhold taxes with respect to any payment to be made by PROTIVA to MARINA pursuant to this Agreement, PROTIVA will notify MARINA of such withholding requirement prior to making the payment to MARINA. Any and all taxes levied by a proper taxing authority required to be withheld by PROTIVA or its Sublicensees on account of royalties accruing to MARINA under this Agreement may be deducted from such royalty payment provided that (a) such amount is promptly paid for and on behalf of MARINA to the appropriate tax authorities, and (b) PROTIVA furnishes MARINA with official tax receipts or other appropriate evidence of payment issued by the appropriate tax authorities. PROTIVA shall provide such assistance to MARINA, including the provision of such documentation as may be required by a tax authority, as may be reasonably necessary in MARINA's efforts to claim an exemption from or reduction of such taxes.

4.9 Late Payments.

All fees and royalties not received by MARINA when due under this Agreement shall bear interest from the date they were due until the date they are paid at a rate equal to the then current 30-day United States dollar LIBOR rate plus two percent per annum or the maximum rate permitted by law, whichever is less. Notwithstanding anything to the contrary in this Agreement, PROTIVA

shall have no obligation to pay royalties to MARINA pursuant to Section 4.3 until PROTIVA actually receives revenue from Net Sales.

4.10 Audit.

PROTIVA and its Affiliates shall keep complete and accurate records of the underlying revenue and expense data relating to the calculations of Net Sales, Sublicensing Revenue and payments required under this Agreement. MARINA shall have the right, at its own expense and no more than once per Calendar Year, to have an independent, certified public accountant, selected by MARINA and reasonably acceptable to PROTIVA, review all such records upon reasonable notice and during regular business hours and under obligations of strict confidence, for the sole purpose of verifying the basis and accuracy of payments required and made under this Agreement within the prior *[...***...] period. No Calendar Quarter may be audited more than one time. PROTIVA shall receive a copy of each audit report promptly from MARINA. Should the inspection lead to the discovery of a discrepancy to MARINA's detriment, PROTIVA shall pay the amount of the discrepancy in MARINA's favor within [...***...] after being notified thereof. MARINA shall pay the full cost of the inspection unless the discrepancy is greater than [...***...], in which case PROTIVA shall pay to MARINA the actual cost charged by such accountant for such inspection. If such audit shows a discrepancy in PROTIVA's favor, then PROTIVA may credit the amount of such discrepancy against subsequent amounts owed to MARINA, or if no further amounts are owed under this Agreement, then MARINA shall pay PROTIVA the amount of the discrepancy within [...***...] after being notified thereof.

Article 5 PAYMENT TERMS

5.1 Payment Terms.

All payments from PROTIVA to MARINA shall be made by wire transfer to the credit of such bank account as may be designated by MARINA in this Agreement or in writing to PROTIVA. Any payment which falls due on a date which is not a Business Day may be made on the next succeeding Business Day.

5.2 Currency.

All payments under this Agreement shall be paid in US dollars.

Article 6 INTELLECTUAL PROPERTY

6.1 Ownership of Inventions.

Subject to Section 6.2, as between PROTIVA and MARINA:

(a) all Inventions of any kind whatsoever first conceived, reduced to practice, developed or created by MARINA or its Affiliates, alone or with any Third Party, prior to or during the Term relating to UNA or the UNA Platform Technology ("**MARINA Inventions**") shall be owned by MARINA; and

(b) all Inventions of any kind whatsoever first conceived, reduced to practice, developed or created by one or more Persons acting on behalf of MARINA or its Affiliates (or any Third Party acting under its direction) together with one or more Persons acting on behalf of PROTIVA or its Affiliates (or any Third Party acting under its direction) during the Term

relating to UNA or the UNA Platform Technology ("**Joint IP**"), shall be jointly owned by the Parties. Neither Party shall assign its rights to Joint IP without the prior written consent of the other Party.

Inventorship and authorship will be determined under the applicable rules and precedents prevailing in the United States.

6.2 Disclosure of Inventions During the Term.

If, within *[...***...] after the Effective Date and during the Term, MARINA becomes the owner, solely or jointly, of any additional Intellectual Property Rights that constitute MARINA Inventions, whether developed in the performance of this Agreement or (unless prohibited by the terms of any agreement between MARINA and a Third Party) outside the framework of this Agreement, and whether or not patentable, MARINA will notify PROTIVA in writing within [...***...] of becoming aware of any such disclosable MARINA Inventions. MARINA shall, throughout the Term, provide status updates on any additional Intellectual Property Rights that constitute disclosable MARINA Inventions at such times and in such manner as may be mutually agreed by the Parties, provided that during the first two (2) years during the Term, the Parties shall meet no less frequently than on a Calendar Quarterly basis.

6.3 Perfection of Ownership Rights.

Each Party will ensure that its employees and contractors who perform any obligations under this Agreement have entered into written agreements with such Party under which its employees and contractors assign to such Party all ownership rights in any Intellectual Property Rights made or developed by its employees and contractors in the course of work for such Party.

Article 7 PATENT PROSECUTION

7.1 Prosecution and Maintenance.

(a) All Patent applications included in the MARINA Patents and, upon issuance, all resulting issued Patents therefrom, shall be filed, prosecuted and maintained by MARINA, at its sole cost and expense and in its discretion, which shall be exercised in good faith, in accordance with this Article 7.

(b) All Patent applications arising from Joint IP and, upon issuance, all resulting issued Patents therefrom, shall be filed, prosecuted and maintained by PROTIVA, at its sole cost and expense and in its discretion, which shall be exercised in good faith, in accordance with this Article 7.

(c) Without limiting the generality of the foregoing, MARINA and PROTIVA shall in the performance of their respective obligations under Subsections 7.l(a) and 7.l (b), be responsible for:

(i) the continued prosecution of any pending Patent applications;

(ii) the maintenance of all such issued Patents; and

(iii) the filing and prosecution of additional Patent applications (and maintenance of Patents thereon) in any jurisdiction world-wide, on a commercially reasonable basis, including, without limitation, any continuations, continuations-in-part,

divisionals, Patents of addition, reissues, re-examinations, supplemental protection certificates, renewals and extensions or substitutes therefore.

7.2 Updating of Patent Tables.

(a) The table of licensed Patents in Exhibit A ("**Table of Licensed Patents**") will be deemed to be a living document continually updated by notice from MARINA to PROTIVA of Patent filing, prosecution, maintenance and discontinuation of any MARINA Patents.

(b) PROTIVA shall create and maintain a table of Patents arising from Joint IP ("**Table of Jointly Owned Patents**"), which table will be deemed to be a living document continually updated by notice from PROTIVA to MARINA of Patent filing, prosecution, maintenance and discontinuation of any Patents arising from Joint IP.

(c) By way of non-limiting example, a Patent application shall be deemed to have been added to the Table of Licensed Patents or to the Table of Jointly Owned Patents, as applicable, on the date that such Patent application is submitted to the US Patent and Trademarks Office or any foreign equivalent.

7.3 Consultation and Reporting.

(a) On a timely basis, MARINA will consult with PROTIVA on all material actions to be taken with respect to the filing, prosecution and maintenance of the MARINA Patents, including claims and any proposed amendments thereto. PROTIVA will have the right to comment on Marina's proposed actions and to identify any process, uses or Products arising out of the MARINA Technology that may be patentable and MARINA will reasonably consider such comments.

(b) On a timely basis, PROTIVA will consult with MARINA on all material actions to be taken with respect to the filing, prosecution and maintenance of any Patents arising from Joint IP, including claims and any proposed amendments thereto. MARINA will have the right to comment on PROTIVA'S proposed actions and to identify any process, uses or Products arising out of the Joint IP that may be patentable and PROTIVA will reasonably consider such comments.

(c) In the performance of their respective obligations under Section 7.1, MARINA will disclose to PROTIVA in respect of the MARINA Patents, and PROTIVA will disclose to MARINA in respect of the Patents arising from Joint IP, on a timely basis:

(i) the complete text of each Patent application and issued Patent within the MARINA Patents or Patents arising from Joint IP, as applicable; and

(ii) all material communications to and from the patent office, including communications concerning the institution or possible institution of any interference, opposition, re-examination, reissue, revocation, nullification or any official proceeding involving any of the MARINA Patents or Patents arising from Joint IP, as applicable.

(d) If MARINA desires additional claims to be filed, prosecuted and maintained under any Patents arising from Joint IP for MARINA or its sublicensees' uses outside the Field, MARINA will:

(i) notify PROTIVA in writing setting forth the specific claims, jurisdiction and nature of Patent protection required by MARINA; and

(ii) request that PROTIVA file a divisional application with such additional claims and either (A) oversee the prosecution of such divisional application, at its cost and expense, in which case MARINA will keep PROTIVA informed of the progress thereof, or (B) have PROTIVA oversee the prosecution of such divisional application, and reimburse PROTIVA for all costs and expenses (including PROTIVA's external patent counsel costs) incurred by PROTIVA in pursuing such additional claims ("**Patent Prosecution Fees**").All Patent Prosecution Fees shall be due and payable to PROTIVA within *[...***...] of MARINA'S receipt of each invoice from PROTIVA, with interest on late payment calculated in accordance with Section 4.9. Notwithstanding anything to the contrary in this Agreement, PROTIVA reserves the right to offset any unpaid Patent Prosecution Fees and accrued interest against any payments due by PROTIVA to MARINA hereunder.

(e) Notwithstanding Section 7.4, MARINA shall instruct its patent counsel retained from time to time in the Territory for the filing, prosecution and maintenance of the MARINA Patents to forthwith notify PROTIVA in writing in the event of any of the following:

(i) MARINA fails to pay when due any statement of account or invoice issued by such patent counsel in respect of the MARINA Patents;

(ii) MARINA fails to provide to its patent counsel instructions relating to the filing, prosecution or maintenance of any of the MARINA Patents, or any other proceeding relating thereto, that could reasonably, if left unattended, compromise the continued prosecution of any patent application, the issuance of any patent, the validity of any issued patent, the outcome of any proceeding relating to the MARINA Patent s or otherwise impair any Patent rights under the MARINA Patents; or

(iii) if such patent counsel reasonably believes that a state of facts exists (including, without limitation, delay or lack of funds) that could reasonably, if left unattended, compromise the continued prosecution of any patent application, the issuance of any patent, the validity of any issued patent, the outcome of any proceeding relating to the MARINA Patents or otherwise impair any Patent rights under the MARINA Patents.

7.4 Abandonment, Withdrawal and Discontinuance.

(a) If either Party elects to:

(i) discontinue pursuing one or more Patent applications, Patent protection or Patent maintenance pertaining to any of the MARINA Patents or Patents arising from Joint IP or any continuation, continuation-in-part, divisional, reissue, re-examination or extension thereof for any reason; or

(ii) not pursue Patent protection in relation to any of the MARINA Patents or Patents arising from Joint IP in any specific jurisdiction for any reason;

the Party electing to discontinue Patent filing, prosecution or maintenance will give the

other Party prior written notice of such decision (each, a "**Notice of Abandonment**"), and together with sufficient detail in sufficient time, such time not to be less than *[...***...] prior to any deadline imposed by a patent office, to enable the other Party to assume and continue the filing, prosecution or maintenance of the Patents identified in the Notice of Abandonment (the "**Abandoned Patents**").

(b) The Notice of Abandonment will clearly identify the Patents that are being abandoned, the actions required to assume and continue the filing, prosecution or maintenance of the Patents and the deadlines by which action must be taken to avoid abandonment. The Party in receipt of such notice at its sole cost and expense, and in its sole discretion, may assume and continue the prosecution and/or maintenance of any particular Abandoned Patent identified in such notice (the "**Non-Abandoning Party**").

(c) In addition, if within [...***...] of receiving an Invention disclosure from the Non Abandoning Party, the Abandoning Party does not file a Patent application for the Invention described therein that the Non-Abandoning Party believes could become a Patent:

(i) the Non-Abandoning Party may prepare and file a Patent application for the Invention;

(ii) a Notice of Abandonment will be deemed to have been given upon the Abandoning Party's receipt of the Invention disclosure and the Patent application for the Invention, when filed by the Non-Abandoning Party, will be deemed an Abandoned Patent, including all rights under Patents related thereto, including foreign counterparts.

(d) Both Parties agree that, effective upon [...***...] after the Notice of Abandonment, the Abandoning Party will have no further obligations to assume and continue the filing, prosecution, maintenance, protection and related costs for the Abandoned Patents, provided that if the Non-Abandoning Party assumes and continues the prosecution and/or maintenance of any particular Abandoned Patent, the Abandoning Party will provide the Non-Abandoning Party with all reasonable assistance required for the prosecution, maintenance, defense and/or enforcement of the Abandoned Patent, at the Non Abandoning Party's cost and expense.

7.5 Prosecuting Infringement Proceedings.

During the Term each Party shall promptly report in writing to the other Party any known or suspected infringement in the Field of any MARINA Patents or Patents arising from Joint IP of which it becomes aware, and shall provide the other Party with all available evidence supporting such infringement, or unauthorized use or misappropriation. In the event of such alleged infringement by a Third Party, the following shall apply:

(a) MARINA shall have the first right, in its sole discretion and sole expense and using counsel of its choice and reasonably acceptable to PROTIVA, to initiate an infringement or other appropriate suit against any Third Party anywhere in the Territory who at any time has infringed, or is suspected of infringing, any such Patent in the Field;

(b) if MARINA does not take steps to prosecute such claim or litigation within [...***...] after receipt of notice thereof, PROTIVA may take such legally permissible action as it

deems necessary or appropriate to prosecute such claim or litigation (or defend such litigation in the event of a counterclaim) at its own expense, using counsel of its choice, but shall not be obligated to do so;

(c) the Party prosecuting such litigation (in this Article the "**Litigating Party**") shall have the right to control such litigation and shall bear all legal expenses (including court costs and legal fees), including settlement thereof; provided, however, that no settlement or consent judgment or other voluntary final disposition of any suit or action brought by a Party pursuant to this Section may be entered into without the consent of the other Party if such settlement would require the other Party to be subject to an injunction or to make a monetary payment or would restrict the claims in or admit any invalidity of any such Patent or significantly adversely affect the rights of the other Party to this Agreement (the "**Non-litigating Party**"). By way of example and not by way of limitation there shall be no right of the Litigating Party to stipulate or admit to the invalidity or unenforceability of any such Patents. Before any action is taken by the Litigating Party, the Parties agree to, in good faith, consult with a goal of adopting a mutually satisfactory position;

(d) the Non-litigating Party agrees to co-operate reasonably in any such litigation to the extent of executing all necessary documents, supplying essential documentary evidence and making essential witnesses then in its employment available and to vest in the Litigating Party the right to institute any such suits so long as all the direct or indirect costs and expenses of bringing and conducting any such litigation or settlement shall be borne by the Litigating Party, provided that the Parties shall recover their respective actual out-of-pocket expenses, or equitable proportions thereof: associated with any litigation or settlement thereof from any recovery made by any Party. Any excess amount remaining after satisfaction of the Parties' recovery of their respective actual out-ofpocket expenses (the "**Excess Amount**") shall be shared as follows: (i) * [...***...] to the Litigating Party and (ii) [...***...] to the Non-litigating Party;

(e) the Litigating Party shall keep the Non-litigating Party fully informed of the actions and positions taken or proposed to be taken by the Litigating Party on behalf of itself or a sublicense (if applicable) and actions and positions taken by all other parties to such litigation; and

(f) at any time during the litigation, the Non-litigating Party may elect to participate formally in the litigation to the extent that the court may permit, at its expense (subject to the possibility of recovery of some or all of such additional expenses as described in Subsection 7.5(d) or from such other parties to the litigation).

7.6 Breach of Confidence Proceedings.

In the event of an alleged breach of confidentiality respecting Confidential Information or any Third Party use of Confidential Information if each Party agrees in its sole discretion that the interests of the Parties are aligned in connection with such breach or use, each Party shall reasonably cooperate with the other to enjoin such Third Party's use of such Confidential Information.

7.7 Defense of Infringement Proceedings.

In the event that a Third Party at any time provides written notice of a claim, or brings an action,

suit or proceeding, against any Party or any of their respective Affiliates or Sublicensees, claiming infringement of its Patents or unauthorized use or misappropriation of its know-how, due to the use of the Intellectual Property Rights in and to the MARINA Technology or the making, using or selling of Products covered by the MARINA Patents the Party in receipt of such written notice or claim shall promptly notify the other Party of same, enclosing a copy of the claim and all papers served. ln the event of such alleged infringement, the Parties will assist one another and cooperate in any such litigation and, if applicable, be subject to the indemnification obligations of Article 12.

7.8 Procedures.

If required under applicable law in order for the Litigating Party to initiate and/or maintain such suit, or if the Litigating Party is unable to initiate or prosecute such suit solely in its own name or it is otherwise advisable to obtain an effective legal remedy, in each case, the Non-Litigating Party shall join as a party to the suit and will execute and cause its Affiliates to execute all document necessary for the Litigating Party to initiate litigation to prosecute and maintain such action. ln addition, at the Litigating Party's request, the Non-Litigating Party shall provide reasonable assistance to the Litigating Party in connection with an infringement suit at no charge to the Litigating Party except for reimbursement by the Litigating Party of reasonable out-ofpocket expenses incurred by the Non-Litigating Party in rendering such assistance.

7.9 Product Trademarks.

PROTIVA shall own the trademarks for any PROTIVA Product and shall be solely responsible for filing and maintaining such trademarks in the Territory (including payment of costs associated therewith). PROTIVA shall also assume full responsibility, at its sole cost and expense, for taking legal action against any infringement by a Third Party of any PROTIVA Product trademark, and for claims of infringement of the rights of a Third Party by the use of a PROTIVA Product's trademark.

Article 8 CONFIDENTIALITY

8.1 Duty of Confidence.

Subject to the other provisions of this Article 8, all Confidential Information disclosed by a Party or its Affiliates under this Agreement will be maintained in confidence and otherwise safeguarded by the recipient Party. The recipient Party may only use the Confidential Information for the purposes of this Agreement and pursuant to the rights granted to the recipient Party under this Agreement. Subject to the other provisions of this Article 8, each Party shall hold as confidential such Confidential Information of the other Party or its Affiliates in the same manner and with the same protection as such recipient Party maintains its own confidential information. Subject to the other provisions of this Article 8, a recipient Party may only disclose Confidential Information of the other Party to employees, agents, contractors, consultants and advisers of the Party and its Affiliates and to Third Parties (including, in the case of PROTIVA, Sublicensees and their Affiliates) but in each case only to the extent reasonably necessary for the purposes of, and for those matters undertaken pursuant to, this Agreement and only if such Persons are bound to maintain the confidentiality of the Confidential Information in a manner consistent with the confidentiality provisions of this Agreement.

8.2 Exceptions.

The obligations under this Article 8 shall not apply to any information to the extent the recipient Party can demonstrate by competent evidence that such information:

(a) is (at the time of disclosure) or becomes (after the time of disclosure) generally known to the public or part of the public domain through no breach of this Agreement by the recipient Party or its Affiliates;

(b) was known to, or was otherwise in the possession of, the recipient Party or its Affiliates prior to the time of disclosure by the disclosing Party or any of its Affiliates;

(c) is disclosed to the recipient Party or an Affiliate on a non-confidential basis by a Third Party who is entitled to disclose it without breaching any confidentiality obligation to the disclosing Party or any of its Affiliates; or

(d) is independently developed by or on behalf of the recipient Party or its Affiliates, as evidenced by its written records, without reference to the Confidential Information disclosed by the disclosing Party or its Affiliates under this Agreement.

(e) Specific aspects or details of Confidential! Information shall not be deemed to be within the public domain or in the possession of the recipient Party merely because the Confidential Information is embraced by more general information in the public domain or in the possession of the recipient Party. Further, any combination of Confidential Information shall not be considered in the public domain or in the possession of the recipient Party merely because individual elements of such Confidential Information are in the public domain or in the possession of the recipient Party unless the combination and its principles are in the public domain or in the possession of the recipient Party.

8.3 Authorized Disclosures.

(a) In addition to disclosures allowed under Section 8.2, PROTIVA may disclose Confidential Information belonging to MARINA or its Affiliates to the extent such disclosure is necessary in the following instances:

(i) filing or prosecuting Patents as permitted by this Agreement; and

(ii) in connection with Regulatory Filings for Products.

(b) In addition, PROTIVA may disclose Confidential Information belonging to MARINA or its Affiliates to the extent such disclosure is necessary in connection with prosecuting or defending litigation as permitted by this Agreement; *provided*, that PROTIVA (i) informs MARINA as soon as reasonably practicable of the proposed disclosure; and (ii) shall use commercially reasonable efforts (but in no event less than the efforts used by PROTIVA with respect to confidential information derived from its other drug development and commercialization efforts) to limit the disclosure for the required purpose and to obtain protections to maintain the confidentiality of such MARINA Confidential Information.

(c) In addition, PROTIVA and its Affiliates and Sublicensees may disclose Confidential Information of MARINA to Third Parties (including Sublicensees and their Affiliates) as may be necessary or useful in connection with the development, manufacture or commercialization of Products; *provided*, that such Third Parties are bound in writing to

maintain the confidentiality of such Confidential Information in a manner consistent with the confidentiality provisions of this Agreement.

(d) In the event the recipient Party is required to disclose Confidential Information of the disclosing Party by law or in connection with bona fide legal process, such disclosure shall not be a breach of this Agreement; *provided*, that the recipient Party (i) informs the disclosing Party as soon as reasonably practicable of the required disclosure; (ii) limits the disclosure to the required purpose; and (iii) at the disclosing Party's request and expense, assists in the disclosing Party's attempt to object to or limit the required disclosure.

(e) Notwithstanding anything to the contrary contained in this Article 8 or Article 11, MARINA shall be permitted to disclose a copy of this Agreement to:

(i) MARINA's current or prospective banks, financial institutions, investors or other Third Parties for the purpose of raising capital or borrowing money or maintaining compliance with agreements, arrangements and understandings relating thereto; and

(ii) to any Person who proposes to be an assignee or to purchase or otherwise succeed (by merger, operation of law or otherwise) to all of MARINA's right, title and interest in, to and under this Agreement, if (A) such Person agrees to maintain the confidentiality of this Agreement pursuant to a written agreement at least as protective as the terms set forth in this Article 8 (with the exception of the term of the obligation of confidentiality, which may be for a specified term of years) and (B) any such assignment, purchase or succession would be permitted under Section 13.1.

Article 9 TERM AND TERMINATION

9.1 Term.

The term of this Agreement, as to a particular PROTIVA Product in a particular country, shall expire (on a country-by-country basis) upon the earlier of:

(a) the expiration of the Royalty Term for such PROTIVA Product in such country; or

(b) the end of calendar quarter in which sales in such country of Generic Products exceed *[...***...] (on a "**per unit**" basis) of the sales of the PROTIVA Product in such country.

Upon expiration of the Royalty Term with respect to a PROTIVA Product in a particular country, then the licenses granted in Section 2.1 for such PROTIVA Product in such country shall become fully paid up and irrevocable, and shall survive any expiration or termination of this Agreement. This Agreement shall expire in its entirety upon the expiration of the last Royalty Term for any MARINA Patent with respect to which PROTIVA has a license under this Agreement, unless earlier terminated pursuant to this Article 9.

9.2 Termination.

(a) Termination for Convenience. PROTIVA shall have the right to terminate this Agreement for convenience in its entirety, or in respect of any particular country or countries in the Territory, by giving ninety (90) days prior written notice to MARINA, *provided that* no

* ***** Confidential Treatment Requested**

such termination shall be effective sooner than the date that is nine (9) months after the Effective Date.

(b) Termination for Bankruptcy/Insolvency.

(i) A Party may immediately terminate this Agreement in its entirety, or in respect of any particular country or countries in the Territory, on written notice in the event (each, a "**Financial Event**") any of the following occurs with respect to the other Party (the "**Bankrupt Party**"):

(A) such Bankrupt Party files a petition in bankruptcy or makes a general assignment for the benefit of creditors or otherwise acknowledges in writing insolvency, or is adjudged bankrupt, and such Bankrupt Party (1) fails to assume this Agreement in any such bankruptcy proceeding within thirty (30) days after filing or (2) assumes and assigns this Agreement to a Third Party;

(B) such Bankrupt Party goes into or is placed in a process of complete liquidation;

(C) a trustee or receiver is appointed for any substantial portion of such Bankrupt Party's business and such trustee or receiver is not discharged within sixty (60) days after appointment;

(D) any case or proceeding shall have been commenced or other action taken against such Bankrupt Party in bankruptcy or seeking liquidation, reorganization, dissolution, a winding-up arrangement composition or readjustment of its debts or any other relief under any bankruptcy, insolvency, reorganization or similar act or law of any jurisdiction now or hereafter in effect and is not dismissed or converted into a voluntary proceeding governed by Subparagraph 9.2(b)(i)(A) within sixty (60) days after filing; or

(E) there shall have been issued a warrant of attachment, execution, distraint or similar process against any substantial part of the property of such Bankrupt Party and such event shall have continued for a period of sixty (60) days and none of the following has occurred: (1) it is dismissed, (2) it is bonded in a manner reasonably satisfactory to the other Party, or (3) it is discharged.

(ii) In the event MARINA:

(A) makes an assignment for the benefit of creditors, or petition or applies to any tribunal for the appointment of a custodian, receiver, or trustee for all or a substantial part of its assets;

(B) commences any proceeding under any bankruptcy, dissolution, or liquidation law or statute of any jurisdiction whether now or hereafter in effect;

(C) has any such petition or application filed or any such proceeding commenced against it in which an order for relief is entered or an

adjudication or appointment is made, and which remains undismissed for a period of one hundred twenty (120) calendar days or more;

(D) takes any corporate action indicating its consent to, approval of, or acquiescence in any such petition, application, proceeding, or order for relief or the appointment of a custodian receiver, or trustee for all or substantial part of its assets; or

(E) permits any such custodianship, receivership, or trusteeship to continue undischarged for a period of one hundred twenty (120) calendar days or more;(each, a "**Bankruptcy Action**") and the occurrence of any of the foregoing causes the applicable Party or any Third Party, including, without limitation, a trustee in bankruptcy, to be empowered under state or federal law to reject this Agreement or any Agreement supplementary hereto, then PROTIVA shall have the following rights:

(F) in the event of a rejection of this Agreement or any agreement supplementary hereto, PROTIVA shall be permitted to receive and use any MARINA Technology within the scope of its license hereunder for the purpose of enabling it to mitigate damages caused to PROTIVA because of the rejection of this Agreement;

(G) in the event of a rejection of this Agreement or any Agreement supplementary hereto, PROTIVA may elect to retain its rights under this Agreement or any agreement supplementary hereto as provided in Section 365(n) of the United States Bankruptcy Code or comparable provision of the laws of any other country in the Territory. Upon PROTIVA'S written request to MARINA or the bankruptcy trustee or receiver, MARINA or such bankruptcy trustee or receiver shall not interfere with the rights of PROTIVA as provided in this Agreement or in any agreement supplementary thereto;

(H) in the event of a rejection of this Agreement or any Agreement supplementary hereto, PROTIVA may elect to retain its rights under this Agreement or any agreement supplementary hereto as provided in Section 365(n) of the United States Bankruptcy Code or comparable provision of the laws of any other country in the Territory without prejudice to any of its rights of setoff and/or recoupment with respect to this Agreement under the Bankruptcy Code or applicable non-bankruptcy law; and

(I) in the event of a rejection of this Agreement or any Agreement supplementary hereto, PROTIVA may retain its rights under this Agreement or any agreement supplementary hereto as provided in Section 365(n) of the United States Bankruptcy Code or comparable provision of the laws of any other country in the Territory without prejudice to any of its rights under Section 503(b) of the United States Bankruptcy Code or comparable provision of the laws of any other country.

(iii) Notwithstanding anything to the contrary in this Subsection 9.2(b):

(A) any reorganization or arrangement involving MARINA, its Affiliates and/or its wholly owned subsidiaries which does not prejudice the rights of PROTIVA shall not constitute a Bankruptcy Action for the purposes of this Subsection 9.2(b) and shall not give rise to the remedies set forth in this Subsection 9.2(b); and

(B) if PROTIVA asserts any rights under Subparagraphs 9.2(b)(ii)(F) 9.2(b)(ii)(G), 9.2(b)(ii)(H) or 9.2(b)(ii)(I), PROTIVA shall continue to be bound by all liabilities and obligations imposed upon PROTIVA and its Affiliates and Sublicensees and any remedies available to MARINA under this Agreement.

(c) Termination for PROTIVA Material Breach. Upon any material breach by PROTIVA under this Agreement MARINA may notify PROTIVA in writing of such breach and require that PROTIVA cure such breach within a cure period not shorter than sixty (60) days after receipt of MARINA'S notice for any default of a payment obligation under this Agreement, or one hundred and twenty (120) days after receipt of MARINA'S notice for any other material breach. In the event PROTIVA shall not have cured such breach by the end of the applicable cure period MARINA may terminate this Agreement immediately upon written notice to PROTIVA. Notwithstanding the foregoing cure periods, non-payment of the Upfront Payment in accordance with Section 4.1 shall automatically and immediately terminate this Agreement.

(d) Termination for MARINA Material Breach. Upon any material breach by MARINA under this Agreement, PROTIVA may notify MARINA in writing of such breach and require that MARINA cure such breach within a cure period of one hundred and twenty (120) days after receipt of PROTIVA's notice. In the event MARINA shall not have cured such breach by the end of the cure period, then, at PROTIVA'S sole option:

(i) the license granted by MARINA to PROTIVA shall automatically convert into a worldwide, royalty-free fully paid-up perpetual license• or

(ii) PROTIVA may terminate this Agreement in its entirety or in respect of any particular country or countries in the Territory immediately upon written notice to MARINA.

9.3 Effect of Termination.

(a) Upon termination of this Agreement in its entirety pursuant to this Article 9:

(i) all licenses granted hereunder to PROTIVA shall revert to MARINA;

(ii) all sublicenses granted by PROTIVA under the rights or licenses granted to PROTIVA under this Agreement shall survive such termination, provided that the applicable Sublicensees are not in material breach of such sublicense agreements, and shall become direct licenses with MARINA except that MARINA shall not have any obligations under any such sublicense agreements that are greater than the obligations of MARINA under this Agreement; and

(iii) PROTIVA (and its Affiliates) shall immediately cease all development and Commercialization of any PROTIVA Products that contain MARINA Know-How and/or are claimed by a Valid Claim, and shall return to MARINA all physical manifestations of the MARINA Technology and MARINA Confidential Information.

(b) Upon termination of this Agreement in any particular country in the Territory pursuant to this Article 9, this Agreement shall be amended so as to delete from the Territory, the country that is the subject of the termination.

9.4 Survival.

(a) Notwithstanding any expiration or termination of this Agreement, the provisions of Article 1; Sections 4.8, 4.9 and 4.10; Sections 6.1 and 6.3; Sections 7.1, 7.7, 7.8 and 7.9 and (as to Joint IP only) Sections 7.3, 7.4 and 7.5; Article 8; Article 9; Sections 10.1 and 10.2 (solely for purposes of indemnification from third party claims); Sections 10.3, I0.4(c), 10.5; Article 11; Article 12; Article 13, and any other provisions which by their nature are intended to survive any such expiration or termination shall survive any expiration or termination of this Agreement.. Termination of this Agreement shall not relieve the Parties of any liability which accrued hereunder prior to the effective date of such termination nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach or default of this Agreement nor prejudice either Party's right to obtain performance of any obligation.

(b) Any sublicense contemplated in Section 2.2 shall survive termination of the licenses or other rights granted to PROTIVA under this Agreement and be assumed by MARINA as long as:

(i) the Sublicensee is not then in breach of its license and/or sublicense agreement;

(ii) the Sublicensee agrees in writing to be bound to MARINA as a licensor under the terms and conditions of the license and/or sublicense agreement; and

(iii) the Sublicensee agrees in writing that in no event shall MARINA assume any obligations or liabilities, or be under any obligation or requirement of performance, under any such license and/or sublicense extending beyond MARINA'S obligations and liabilities under this Agreement.

Article 10 REPRESENTATIONS, WARRANTIES AND COVENANTS

10.1 Representations and Warranties by Each Party.

Each Party represents and warrants to the other as of the Effective Date that:

(a) it is a corporation duly organized, validly existing, and in good standing under the laws of its jurisdiction of formation;

(b) it has full corporate power and authority to execute, deliver, and perform this Agreement, and has taken all corporate action required by law and its organizational documents to authorize the execution and delivery of this Agreement and the consummation of the transactions contemplated by this Agreement;

(c) this Agreement constitutes a valid and binding agreement enforceable against it in accordance with its terms;

(d) all consents, approvals and authorizations from all governmental authorities or other Third Parties required to be obtained by such Party in connection with the execution, delivery and performance of this Agreement have been obtained; and

(e) the execution and delivery of this Agreement and all other instruments and documents required to be executed pursuant to this Agreement, and the consummation of the transactions contemplated hereby do not (i) conflict with or result in a breach of any provision of its organizational documents, (ii) result in a breach of any agreement to which it is a party; or (iii) violate any law.

10.2 Representations and Warranties by MARINA.

MARINA represents and warrants to PROTIVA as of the Effective Date that:

(a) Exhibit A sets forth a complete and accurate list of all MARINA Patents;

(b) MARINA has obtained from all individuals who participated in any respect in the invention or authorship of any MARINA Technology effective assignments of all ownership rights of such individuals in such MARINA Technology, either pursuant to written agreement or by operation of law;

(c) All of MARINA's employees, officers, and consultants have executed agreements or have existing obligations under applicable laws requiring assignment to MARINA of all inventions made during the course of and as the result of their association with MARINA and obligating the individual to maintain as confidential MARINA's Confidential Information as well as confidential information of other parties (including PROTIVA and its Affiliates. although they may not be specifically referenced by name) which such individual may receive, to the extent required to support MARINA's obligations under this Agreement;

(d) MARINA has all necessary legal rights and authority to grant the licenses and rights granted under this Agreement and has not assigned, transferred, conveyed or licensed its right, title and interest in the MARINA Technology in any manner inconsistent with such license grant or the other terms of this Agreement;

(e) MARINA has all necessary legal rights and authority to use and disclose and to enable PROTIVA to use and disclose (in each case under appropriate conditions of confidentiality) the MARINA Know-How;

(f) To MARINA's knowledge, the issued Patents in the MARINA Patents are valid and enforceable without any claims, challenges, oppositions, interference or other proceedings pending or, to MARINA's knowledge, threatened and MARINA has filed and prosecuted Patent applications within the MARINA Patents in good faith and, to MARINA's knowledge, complied with all duties of disclosure with respect thereto;

(g) To MARINA's knowledge, MARINA has not committed any act, or omitted to commit any act, that may cause the MARINA Patents to expire prematurely or be declared invalid or unenforceable;

(h) All application, registration, maintenance and renewal fees in respect of the MARINA Patents as of the Effective Date have been paid and all necessary documents and

certificates have been filed with the relevant agencies for the purpose of maintaining the MARINA Patents;

(i) To MARINA'S knowledge, the practice of the MARINA Technology does not infringe Patents or misappropriate Know-How of any Third Party, nor has MARINA received any written notice alleging such infringement or misappropriation;

(j) MARINA has not initiated or been involved in any proceedings or claims in which it alleges that any Third Party is or was infringing the MARINA Patents or misappropriating any MARINA Know-How, nor have any such proceedings been threatened by MARINA, nor does MARINA know of any valid basis for any such proceedings;

(k) MARINA has taken all reasonable precautions to preserve the confidentiality of the MARINA Know-How;

(l) MARINA has not entered into a government funding relationship that would result in rights to any Products residing in the US Government, National Institutes of Health, National Institute for Drug Abuse or other agency, and the licenses granted hereunder are not subject to overriding obligations to the US Government as set forth in Public Law 96-517 (35 U.S.C. 200-204), as amended, or any similar obligations under the laws of any other country;

(m) Subject to Subsection 0, MARINA has not granted any Third Party rights that would otherwise interfere or be inconsistent with PROTJVA's rights hereunder, and there are no agreements or arrangements to which MARINA or any of its Affiliates is a party relating to the Products, MARINA Patents, MARINA Know-How or that would limit the rights granted to PROTIVA under this Agreement or that restrict or will result in a restriction on PROTIVA' ability to develop, manufacture register, use or commercialize the Products in the Territory; and

(n) MARINA has not failed to disclose to PROTIVA any fact or circumstance known to MARINA and relating to any of the MARINA Technology that would be reasonably material to PROTIVA in determining to enter into this Agreement or the transactions contemplated herein.

10.3 Acknowledgements of PROTIVA.

PROTIVA acknowledges that MARINA has granted rights to practice certain MARINA Patents:

(a) to * [...***...] solely in connection with the development and commercialization of a limited number of specified proprietary compounds belonging to [...***...]; and

(b) to [...***...] in connection with DNAi human therapeutic use.

DNAi does not include RNAi, antisense and microRNA oligonucleotides that base pair with mRNAs, microRNAs or pre-mRNAs to affect expression of a gene, directly or indirectly. The Parties agree that the foregoing grants do not interfere with, are not otherwise inconsistent with, and do not limit the rights granted to PROTIVA in Section 2.1.

10.4 Covenants of MARINA.

MARINA covenants and agrees that:

(a) it will not grant any interest in the MARINA Technology which is inconsistent with the terms and conditions of this Agreement;

(b) if, at any time after execution of this Agreement, it becomes aware that it or any employee, agent or subcontractor of MARINA who participated, or is participating, in the development of the MARINA Technology is on, or is being added to the FDA Debarment List, it will provide written notice of this to PROTIVA within two (2) Business Days of its becoming aware of this fact; and

(c) it shall maintain insurance with respect to its indemnification obligations under this Agreement in such amounts as are commercially reasonable in the industry for companies conducting similar business and shall require any of its Affiliates undertaking activities under this Agreement to do the same.

10.5 No Other Warranties.

EXCEPT AS EXPRESSLY STATED IN THIS Article 10:

(a) NO OTHER REPRESENTATION, CONDITION OR WARRANTY WHATSOEVER IS MADE OR GIVEN BY OR ON BEHALF OF PROTIVA OR MARINA; AND

(b) ALL OTHER CONDITIONS AND WARRANTIES WHETHER ARISING BY OPERATION OF LAW OR OTHERWISE ARE HEREBY EXPRESSLY EXCLUDED, INCLUDING ANY CONDITIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT.

Article 11 INDEMNIFICATION; LIABILITY

11.1 Indemnification by MARINA.

MARINA shall defend, indemnify, and hold PROTIVA, its Affiliates, and their respective officers, directors, employees and agents, and all successors and assigns of any of the foregoing ("**PROTIVA Indemnitees**") harmless from and against any Claims against them to the extent arising or resulting from:

(a) the gross negligence or willful misconduct of MARINA or any of its Affiliates; or

(b) the breach of any of the covenants, representations or warranties made by MARINA to PROTIVA under this Agreement;

provided, *however*, that MARINA shall not be obliged to so indemnify, defend and hold harmless the PROTIVA Indemnitees for any Claims to the extent that PROTIVA has an obligation to indemnify MARINA Indemnitees pursuant to Section 11.2 or to the extent that such Claims arise from the breach, gross negligence or willful misconduct of PROTIVA or a PROTIVA Indemnitee.

11.2 Indemnification by PROTIVA.

PROTIVA shall defend, indemnify, and hold MARINA, its Affiliates, and their respective officers, directors, employees and agents, and all successors and assigns of any of the foregoing ("**MARINA Indemnitees**") harmless from and against any Claims against them to the extent arising or resulting from:

(a) the gross negligence or willful misconduct of PROTIVA or any of its Affiliates or Sublicensees;

(b) the breach of any of the covenants, representations or warranties made by PROTIVA to MARINA under this Agreement;

(c) the exercise or practice by PROTIVA, its Affiliates or Sublicensees of the license granted to PROTIVA under Section 2.1 (excluding any such Claim that alleges that the exercise or practice of the MARINA Technology infringes a Patent or misappropriates other Intellectual Property Rights of a Third Party); or

(d) the development, manufacture or commercialization of any PROTIVA Product by or for PROTIVA, its Affiliates or Sublicensees;

provided, *however*, that PROTIVA shall not be obliged to so indemnify, defend and hold harmless the MARINA Indemnitees for any Claims to the extent that MARINA has an obligation to indemnify PROTIVA Indemnitees pursuant to Section 11.l or to the extent that such Claims arise from the breach, gross negligence or willful misconduct of MARINA or a MARINA Indemnitee.

11.3 Indemnification Procedure.

(a) For the avoidance of doubt, all indemnification claims in respect of a PROTIVA Indemnitee or MARINA Indemnitee shall be made solely by PROTIVA or MARINA, respectively, on behalf of the PROTIVA Indemnitee or MARINA Indemnitee, as the case maybe.

(b) A Party seeking indemnification hereunder ("**Indemnified Party**") shall notify the other Party ("**Indemnifying Party**") in writing reasonably promptly after the assertion against the Indemnified Party of any Claim or fact in respect of which the Indemnified Party intends to base a claim for indemnification hereunder ("**Indemnification Claim Notice**"), but the failure or delay to so notify the Indemnifying Party shall not relieve the Indemnifying Party of any obligation or liability that it may have to the Indemnified Party, except to the extent that the Indemnifying Party demonstrates that its ability to defend or resolve such Claim is adversely affected thereby. The Indemnification Claim Notice shall contain a description of the claim and the nature and amount of the Claim (to the extent that the nature and amount of such Claim is known at such time). Upon the request of the Indemnifying Party, the Indemnified Party shall furnish promptly to the Indemnifying Party copies of all correspondence, communications and official documents (including court documents) received or sent in respect of such Claim.

(c) Subject to the provisions of Subsection 11.3(d), the Indemnifying Party shall, within *[...***...] after receipt of the Indemnification Claim Notice, advise the Indemnified Party whether it is assuming the defense and handling of such Claim, at the Indemnifying Party's sole expense. The assumption of the defense of a Claim by the Indemnifying Party shall not be construed as acknowledgement that the Indemnifying Party is liable to indemnify any indemnitee in respect of the Claim, nor shall it constitute a waiver by the Indemnifying Party of any defenses it may assert against any Indemnified Party's claim for indemnification. In the event that it is ultimately decided that the Indemnifying Party is not obligated to indemnify or hold an indemnitee harmless from and against the Claim, the Indemnified Party shall reimburse the Indemnifying Party for any and all reasonable

costs and expenses (including attorneys' fees and costs of suit) incurred by the Indemnifying Party in its defense of the Claim.

(d) Upon assumption of the defense of a Claim by the Indemnifying Party:

(i) the Indemnifying Party shall have the right to and shall assume sole control and responsibility for dealing with the Claim;

(ii) the Indemnifying Party may, at its own cost, appoint as counsel in connection with conducting the defense and handling of such Claim any law firm or counsel reasonably selected by the Indemnifying Party and reasonably satisfactory to the Indemnified Party (such consent not to be unreasonably withheld or delayed);

(iii) the Indemnifying Party shall keep the Indemnified Party informed of the status of such Claim; and

(iv) the Indemnifying Party shall have the right to settle the Claim on any terms the Indemnifying Party chooses; *provided*, *however*, that it shall not, without the prior written consent of the Indemnified Party, agree to a settlement of any Claim which could lead to liability for or create any financial or other obligation or restriction on the Indemnified Party (or abrogate the license rights granted under this Agreement) for which the Indemnified Party is not entitled to indemnification hereunder or which admits any wrongdoing or responsibility for the Claim on behalf of the Indemnified Party. The Indemnified Party shall cooperate with the Indemnifying Party at the Indemnifying Party's expense. In particular, the Indemnified Party shall furnish such records, information and testimony, provide witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith; subject to the right of the Indemnified Party to obtain confidentiality protection in connection therewith consistent with the confidentiality provisions of this Agreement. Such cooperation shall include access during normal business hours by the Indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Claim, and making the Indemnified Party, the PROTIVA Indemnitees or MARINA Indemnitees, as the case may be, and its and their employees and agents available on a mutually convenient basis to provide additional information and explanation of any records or information provided. The Indemnified Party shall be entitled to participate in, but not control, the defense of such Claim with its own counsel and at its own expense; *provided*, *however*, that if the litigants in any such action include both the Indemnified Party and the Indemnifying Party and legal counsel for the Indemnified Party shall have reasonably concluded in a written legal opinion delivered to the Indemnifying Party that, by reason of certain bona fide defenses available to the Indemnified Party which are different from or additional to those available to the Indemnifying Party, the interests of the Indemnified Party materially conflict with the interests of the Indemnifying Party such that it would be unethical under applicable rules relating to attorney conflicts of interest for the Indemnifying Party and such Indemnified Party to be represented by the same counsel with respect to such defense, the Indemnified Party shall have the right to select one separate counsel and to assert such legal defenses, with the reasonable expenses and fees of such separate counsel to be reimbursed by the Indemnifying Party as and when incurred.

(e) If the Indemnifying Party fails to assume or conduct the defense and handling of any Claim in good faith as provided Subsections 11.3(c) and 11.3(d), the Indemnified Party may, at the Indemnifying Party's expense, select counsel reasonably acceptable to the Indemnifying Party (such consent not to be unreasonably withheld or delayed) in connection with conducting the defense and handling of such Claim and defend or handle such Claim in such manner as it may deem appropriate; *provided*, that the foregoing shall not be construed as a limitation on the Indemnified Party's right to claim that the Indemnifying Party has breached its obligations pursuant to this Article 11. In such event, the Indemnified Party shall keep the Indemnifying Party timely apprised of the status of such Claim and the Indemnified Party shall have the right to settle the Claim on any terms the Indemnified Party chooses; *provided*, *however*, that the Indemnified Party shall not, without the prior written consent of the Indemnifying Party, agree to a settlement of any Claim which could lead to liability or create any financial or other obligation on the part of the Indemnifying Party, other than its liability for indemnification of the Indemnified Party as provided in this Article 11, or which admits any wrongdoing or responsibility for the claim on behalf of the Indemnifying Party.

11.4 Mitigation of Loss.

Each Indemnified Party will take and will procure that its Affiliates take all such reasonable steps and action as are necessary or as the Indemnifying Party may reasonably require in order to mitigate any Claims (or potential losses or damages) under this Article 11. Nothing in this Agreement shall or shall be deemed to relieve any Party of any common law or other duty to mitigate any losses incurred by it.

11.5 Insurance.

PROTIVA shall, at its own expense, procure and maintain during the Term and for a period of *[...***...] thereafter, insurance policy/policies, including product liability insurance, adequate to cover its obligations hereunder and which are consistent with normal business practices of prudent companies similarly situated.

11.6 Special, Indirect and Other Losses.

NEITHER PARTY NOR ANY OF ITS AFFILIATES SHALL BE LIABLE IN CONTRACT, TORT, NEGLIGENCE BREACH OF STATUTORY DUTY OR OTHERWISE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR PUNITIVE DAMAGES OR FOR ANY ECONOMIC LOSS OR LOSS OF PROFITS SUFFERED BY THE OTHER PARTY, EXCEPT TO THE EXTENT ANY SUCH DAMAGES ARE REQUIRED TO BE PAID TO A THIRD PARTY AS PART OF A CLAIM FOR WHICH A PARTY PROVIDES INDEMNIFICATION UNDER THIS Article 11.

11.7 No Exclusion.

Neither Party excludes any liability for death or personal bodily injury caused by its negligence or the negligence of its Affiliates or, in the case of PROTIVA, its Sublicensees, or their respective employees, agents or sub-contractors.

Article 12 PUBLICATIONS AND PUBLICITY

12.1 Publications.

For avoidance of doubt, PROTIVA or any of its Affiliates may, without any required consents from MARINA but subject to its confidentiality obligations under Article 8 with respect to the Confidential Information of MARINA :

(a) issue press releases and other public statements as it deems appropriate in connection with the development and commercialization of the Products under this Agreement; and

(b) publish or have published information about clinical trials related to the Products, including the results of such clinical trials

12.2 Publicity

(a) Neither Party shall use the name, symbol, trademark, trade name or logo of the other Party or its Affiliates in any press release publication or other form of public disclosure without the prior written consent of the other Party in each instance (such consent not to be unreasonably withheld or delayed), except for those disclosures for which consent has already been obtained. Notwithstanding the foregoing, PROTIVA shall be entitled, upon reasonable prior notice to MARINA, to use the name of MARINA to identify its licensor to the extent necessary or useful in connection with the development or commercialization of the Products, including in connection with sublicensing and subcontracting transactions.

(b) Subject to Subsection 12.2(c), each Party agrees not to issue any press release or other public statement, whether oral or written, disclosing the existence of this Agreement, the terms hereof or any information relating to this Agreement without the prior written consent of the other Party, which approval shall not be unreasonably withheld, conditioned or delayed; *provided*, *however*, that PROTIVA may issue press releases and other public statements as it deems appropriate in connection with the development and commercialization of Products under this Agreement and *provided further*, that the Parties approve the text of the press releases annexed as Exhibit B to this Agreement.

(c) Notwithstanding the foregoing, each Party may, without the prior approval of the other Party, make any disclosures required of it to comply with any duty of disclosure it may have pursuant to law or governmental regulation or pursuant to the rules of any recognized stock exchange. The Parties shall nevertheless use good faith efforts to coordinate with each other with respect to the timing, form and content of such required disclosure. If so requested by the other Party, the Party subject to such obligation shall use commercially reasonable efforts to obtain an order, agreement or other governmental or Third Party action protecting to the maximum extent possible the confidentiality of such provisions of this Agreement as reasonably requested by the other Party. Unless the Parties otherwise agree, such disclosure shall be limited to the minimum required as determined by the disclosing Party in consultation with its legal counsel. Without limiting the foregoing, each Party shall consult with the other Party on the provisions of this Agreement, together with exhibits or other attachments attached hereto, to be redacted in any filings made by MARINA or PROTIVA with the Securities and Exchange Commission (or other regulatory body) or as otherwise required by law.

Article 13 GENERAL PROVISIONS

13.1 Assignment.

Neither Party may assign its rights and obligations under this Agreement without the other Party's prior written consent, except that:

(a) a Party may assign its rights and obligations under this Agreement or any part hereof to one or more of its Affiliates without the consent of the other Party; and

(b) either Party may assign this Agreement in its entirety to a successor to all or substantially all of its business or assets to which this Agreement relates.

The assigning Party shall provide the other Party with prompt written notice of any such assignment pursuant to Subsection 13.l(b). Any permitted assignee shall assume all obligations of its assignor under this Agreement (or related to the assigned portion in case of a partial assignment to an Affiliate), and no permitted assignment shall relieve the assignor of liability hereunder. Any attempted assignment in contravention of the foregoing shall be void. Subject to the terms of this Agreement, this Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and permitted assigns.

13.2 Extension to Affiliates; Subcontractors.

PROTIVA shall have the right to extend the rights, immunities and obligations granted in this Agreement to one or more of its Affiliates. All applicable terms and provisions of this Agreement shall apply to any such Affiliate to which this Agreement has been extended to the same extent as such terms and provisions apply to PROTIVA. PROTIVA shall remain primarily liable for any acts or omissions of its Affiliates. In addition, PROTIVA may subcontract to Third Parties the performance of any tasks and obligations relating to its exercise of the license and other rights under this Agreement as PROTIVA deems appropriate, subject to its confidentiality obligations pursuant to Article 8.

13.3 Severability.

Should one or more of the provisions of this Agreement become void or unenforceable as a matter of law, then this Agreement shall be construed as if such provision were not contained herein and the remainder of this Agreement shall be in full force and effect, and the Parties will use their commercially reasonable efforts to substitute for the invalid or unenforceable provision a valid and enforceable provision which conforms as nearly as possible with the original intent of the Parties.

13.4 Governing Law and Jurisdiction.

This Agreement shall be governed by and construed under the laws of New York, without giving effect to the conflicts of laws provision thereof. Any disputes between the Parties relating to this Agreement shall be subject to the exclusive jurisdiction and venue of the federal courts located in the Southern District of New York (without restricting any right of appeal), and the Parties hereby waive any objection which they may have now or hereafter to the laying of venue of any proceedings in such courts and to any claim that such proceedings have been brought in an inconvenient forum, and further agree that a judgment or order in any such proceedings shall be binding upon each of them and may be enforced in the courts of any other jurisdiction.

13.5 Force Majeure.

Neither Party shall be responsible to the other for any failure or delay in performing any of its obligations under this Agreement or for other nonperformance hereunder if such delay or nonperformance is caused by strike, stoppage of labor, lockout or other labor trouble, fire, flood, accident, war, act of terrorism, act of God or of the government of any country or of any local government, or by other cause unavoidable or beyond the reasonable control of any Party hereto.

13.6 Waivers and Amendments.

The failure of any Party to assert a right hereunder or to insist upon compliance with any term or condition of this Agreement shall not constitute a waiver of that right or excuse a similar subsequent failure to perform any such term or condition by the other Party. No waiver shall be effective unless it has been given in writing and signed by the Party giving such waiver. No provision of this Agreement may be amended or modified other than by a written document signed by authorized representatives of each Party.

13.7 Relationship of the Parties.

Nothing contained in this Agreement shall be deemed to constitute a partnership, joint venture, or legal entity of any type between MARINA and PROTIVA, or to constitute one as the agent of the other. Moreover, each Party agrees not to construe this Agreement, or any of the transactions contemplated hereby, as a partnership for any tax purposes. Each Party shall act solely as an independent contractor, and nothing in this Agreement shall be construed to give any Party the power or authority to act for, bind, or commit the other.

13.8 Notices.

All notices, consents, waivers, and other communications under this Agreement must be in writing and will be deemed to have been duly given when: (a) delivered by hand (with written confirmation of receipt); (b) sent by fax (with written confirmation of receipt), *provided*, that a copy is immediately sent by an internationally recognized overnight delivery service (receipt requested); or (c) when received by the addressee, if sent by an internationally recognized overnight delivery service (receipt requested), in each case to the appropriate addresses and fax numbers set forth below (or to such other addresses and fax numbers as a Party may designate by notice):

If to MARINA :

MARINA Biotech, Inc.
PO Box 1599
Bothell, Washington
USA 98041

Attn:Mr. J. Michael French
President and CEO

Fax:(206) 830-9424

If to P ROTIVA:

PROTIVA Biotherapeutics Inc.
100 –8900 Glenlyon Parkway
Burnaby, British Columbia
Canada VSJ 5J8

Attn:Dr. Mark Murray
President & CEO

Fax:(604) 419-3201

13.9 Further Assurances.

PROTIVA and MARINA hereby covenant and agree without the necessity of any further

consideration, to execute, acknowledge and deliver any and all such other documents and take any such other action as may be reasonably necessary to carry out the intent and purposes of this Agreement.

13.10 Compliance with Law.

Each Party shall perform its obligations under this Agreement in accordance with all applicable laws. No Party shall, or shall be required to, undertake any activity under or in connection with this Agreement which violates, or which it believes, in good faith, may violate, any applicable law.

13.11 No Third Party Beneficiary Rights.

The provisions of this Agreement are for the sole benefit of the Parties and their successors and permitted assigns, and they shall not be construed as conferring any rights to any Third Party (including any third party beneficiary rights).

13.12 English Language.

This Agreement is written and executed in the English language. Any translation into any other language shall not be an official version of this Agreement and in the event of any conflict in interpretation between the English version and such translation, the English version shall prevail.

13.13 Expenses.

Except as otherwise expressly provided in this Agreement, each Party shall pay the fees and expenses of its respective lawyers and other experts and all other expenses and costs incurred by such Party incidental to the negotiation, preparation, execution and delivery of this Agreement.

13.14 Entire Agreement.

This Agreement, together with its Exhibits, sets forth the entire agreement and understanding of the Parties as to the subject matter hereof and supersedes all proposals, oral or written, and all other prior communications between the Parties, with respect to such subject matter. In the event of any conflict between a substantive provision of this Agreement and any Exhibit hereto, the substantive provisions of this Agreement shall prevail.

13.15 Cumulative Remedies.

No remedy referred to in this Agreement is intended to be exclusive, but each shall be cumulative and in addition to any other remedy referred to in this Agreement or otherwise available under law.

13.16 Counterparts

This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument This Agreement may be executed by the Parties and transmitted by facsimile or other form of electronic transmission and if so executed and transmitted shall be for all purposes as effective as if the Parties had delivered an executed original agreement.

IN WITNESS WHEREOF, the Parties intending to be bound have caused this Agreement to be executed by their duly authorized representatives.

PROTIVA BIOTHERAPEUTICS INC.		**MARINA BIOTECH, INC.**	
By:	*/s/ Paul Brennan*	By:	*/s/ J. Michael French*
Name:	Paul Brennan	Name:	J. Michael French
Title:	SVP Business Dev't	Title:	President & CEO

EXHIBIT A
LIST OF CERTAIN MARINA PATENTS

CONFIDENTIAL*

[...***...]

* ***** Confidential Treatment Requested**

[...***...]

EXHIBIT B
PRESS RELEASES

Tekmira Acquires Worldwide License to Novel RNAi Technology
Tekmira and Marina Biotech Enter into License Agreement for UNA Technology

November 29 2012

Vancouver, BC — Tekmira Pharmaceuticals Corporation (Nasdaq: TKMR, TSX: TKM), a leading developer of RNA interference (RNAi) therapeutics, announced today that it will obtain a worldwide, non-exclusive license to a novel RNAi payload technology called Unlocked Nucleobase Analog (UNA) from Marina Biotech, Inc. (OTCQX:MRNA) for the development of RNAi therapeutics.

UNA technology can be used in the development of RNAi therapeutics, which treat disease by silencing specific disease causing genes. UNAs can be incorporated into RNAi drugs and have the potential to improve them by increasing their stability and reducing off-target effects.

"Our license to MARINA'S UNA technology expands and diversifies our foundation of technologies that enable us to develop RNAi therapeutics. With Tekmira's leading LNP delivery technology, a strong balance sheet, and access to multiple RNAi payload technologies, we are well positioned to aggressively advance multiple products into human clinical trials," said Dr. Mark J. Murray, Tekmira's President and CEO.

"We intend to leverage our expertise in LNP delivery and our broad understanding of therapeutic RNA payload design to optimize the use of UNA in our development pipeline, as well as provide pharmaceutical partners the opportunity to license UNAs combined with our LNP delivery technology to develop RNAi therapeutics," added Dr. Murray.

Under the license agreement, Tekmira will receive a worldwide, non-exclusive rights to MARINA Biotech's UNA technology for the development of RNAi therapeutic products, and MARINA will receive an upfront payment plus milestone and royalty payments on products developed by Tekmira that use UNA technology. Financial terms of the license agreement were not disclosed.

Unlocked Nucleobase Analogs (UNA) are acyclic ribonucleoside analogs in which the bond between C2' and C3' atoms is broken. This change in sugar structure renders this nucleoside analog very flexible. This characteristic is in contrast to the widely used locked nucleosides that lock the sugar conformation by a bridged bond between C2' and C4' atoms. The flexible nature of UNA reduces the binding affinity between two strands of an RNAi drug and gives unique characteristics to its genes silencing abilities. MARINA Biotech has demonstrated that UNA has the potential to improve RNAi therapeutics by increasing stability and reducing sense and antisense mediated off-target effects while retaining potency.

About RNAi and Tekmira's LNP

RNAi therapeutics have the potential to treat a broad number of human diseases by "silencing" disease causing genes. The discoverers of RNAi, a gene silencing mechanism used by all cells, were awarded the 2006 Nobel Prize for Physiology or Medicine. RNAi therapeutics, such as "siRNAs**,**" require delivery technology to be effective systemically. Tekmira believes its LNP technology represents the most widely adopted delivery technology for the systemic delivery of RNAi therapeutics. Tekmira's LNP platform is being utilized in multiple clinical trials by both Tekmira and its partners. Tekmira's LNP technology (formerly referred to as stable nucleic acid-lipid particles or SNALP) encapsulates siRNAs with high

efficiency in uniform lipid nanoparticles that are effective in delivering RNAi therapeutics to disease sites in numerous preclinical models. Tekmira's LNP formulations are manufactured by a proprietary method which is robust, scalable and highly reproducible, and LNP-based products have been reviewed by multiple FDA divisions for use in clinical trials. LNP formulations comprise several lipid components that can be adjusted to suit the specific application.

About Tekmira

Tekmira Pharmaceuticals Corporation is a biopharmaceutical company focused on advancing novel RNAi therapeutics and providing its leading lipid nanoparticle delivery technology to pharmaceutical partners. Tekmira has been working in the field of nucleic acid delivery for over a decade and has broad intellectual property covering LNPs. Further information about Tekmira can be found at www.tekmirapharm.com. Tekmira is based in Vancouver, B.C.

Forward-Looking Statements and Information

This news release contains "forward-looking statements" or "forward-looking information" within the meaning of applicable securities laws (collectively. "forward-looking statements"). Forward-looking statements are generally identifiable by use of the words "believes," "may," "plans," "will," "anticipates," "intends," "budgets," "could," "estimates," "expects," "forecasts," "projects," and similar expressions, and the negative of such expressions. Forward-looking statements in this news release include statements about a worldwide non-exclusive license to UNA technology from Marina Biotech, Inc.; the potential of UNA technology to improve siRNA; the use of UNA technology by Tekmira; the use of UNA technology to lead to future development of RNAi (ribonucleic acid interference) therapeutic products; providing pharmaceutical partners the opportunity to license UNAs combined with Tekmira's LNP delivery technology to develop RNAi therapeutics; delivery of upfront payment plus milestone and royalty payments on products developed by Tekmira that use UNA technology; UNAs potential to improve siRNA therapeutics; Tekmira's aggressive advancement of multiple products into human clinical trials; Tekmira's strategy, future operations, clinical trials, prospects and the plans of management; RNAi product development programs; and expectations regarding the expansion of Tekmira's product pipeline.

With respect to the forward-looking statements contained in this news release, Tekmira has made numerous assumptions regarding, among other things: LNP's status as a leading RNAi delivery technology; Tekmira's research and development capabilities and resources; UNA's compatibility with Tekmira's existing LNP technology platform and other technologies; the potential for UNA technology to lower the potential for off-target effects and increase the specificity of the guide strand; and the opportunity to develop product candidates using UNA technology. While Tekmira considers these assumptions to be reasonable, these assumptions are inherently subject to significant business, economic, competitive, market and social uncertainties and contingencies.

Additionally, there are known and unknown risk factors which could cause Tekmira's actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements contained herein. Known risk factors include, among others: the possibility that UNA technology does not improve siRNA; the possibility that UNA is not compatible with Tekmira's LNP technology and does not result in additional product candidates being developed by Tekmira; the possibility that pharmaceutical companies will not license UNAs combined with Tekmira's LNP delivery technology to develop RNAi therapeutics; the possibility that other organizations have made advancements in RNAi delivery and payload technology that Tekmira is not aware of; and the possibility that Tekmira may not advance any further product candidates or expand its product pipeline.

A more complete discuss ion of the risks and uncertainties facing Tekmira appears in Tekmira's annual report on Form 20-F for the year ended December 31, 2011 (Annual Report), which is available at www.sedar.com or at www.sec.gov/edgar.shtml. All forward-looking statements herein are qualified in their entirety by this cautionary statement, and Tekmira disclaims any obligation to revise or update any such forward-looking statements or to publicly announce the result of any revisions to any of the forward looking statements contained herein to reflect future results, events or developments, except as required by law.

Contact Information

Investors
Jodi Regts
Director, Investor Relations
Phone: 604-419-3234
Email: jregts @tekmirapharm.com

Media
David Ryan
Longview Communications Inc.
Phone: 416-669-7906
Email: dryan@longviewcomms.ca

Marina Biotech Announces Worldwide Non-Exclusive Licensing Agreement for Nucleic Acid Chemistry to Tekmira Pharmaceuticals

Bothell, WA, November 29, 2012 - Marina Biotech, Inc. (OTCQX:MRNA), a leading oligonucleotide based drug discovery and development company, announced today that it has entered into a license agreement with Tekmira Pharmaceuticals Corporation (Nasdaq: TKMR, TSX: TKM), where Marina will provide Tekmira a worldwide, non-exclusive license to Marina Biotech's Unlocked Nucleobase Analog (UNA) technology for the development of RNA interference therapeutics. Tekmira will have full responsibility for the development and commercialization of any products arising under the Agreement. Under terms of the Agreement, Marina Biotech will receive an upfront payment plus milestone and royalty payments on products developed by Tekmira that use UNA technology. Further terms of the Agreement were not disclosed.

"We are pleased to enter into this agreement with Tekmira, a leader in the development of RNAi-based therapeutics," stated J. Michael French, President and Chief Executive Officer of Marina Biotech. "Marina Biotech's UNA technology is quite novel. Besides providing drug-like properties to an RNAi drug, UNAs also eliminate passenger strand activity as well as reduce guide strand mediated microRNA like off-target activity. The result is that UNAs are able to significantly increase target specificity of an RNAi compound to its gene target. We look forward to a continued relationship with the great team at Tekmira."

About Unlocked Nucleobase Analogs

Unlocked Nucleobase Analogs (UNA) are acyclic ribonucleoside analogs in which the bond between C2' and C3' atoms is broken. This change in sugar structure renders this nucleoside analog very flexible. This characteristic is in sharp contrast to the widely used locked nucleosides that lock the sugar conformation by a bridged bond between C2' and C4' atoms. The flexible nature of UNA reduces the binding affinity between two strands of an RNAi drug and gives unique characteristics to its genes silencing abilities. Marina Biotech has demonstrated that UNA has the potential to improve RNAi therapeutics by increasing stability and reducing sense and antisense mediated off-target effects while retaining potency.

About Marina Biotech, Inc.

Marina Biotech is a biotechnology company focused on the development and commercialization of oligonucleotide-based therapeutics utilizing multiple mechanisms of action including RNA interference (RNAi) and messenger RNA translational blocking. The Marina Biotech pipeline currently includes a clinical program in Familial Adenomatous Polyposis (a precancerous syndrome) and two preclinical programs -- in bladder cancer and myotonic dystrophy. Marina Biotech has entered into an agreement with both Mirna Therapeutics and ProNAi Therapeutics to license Marina Biotech's SMARTICLES® technology for the delivery of microRNA mimics and DNAi, respectively. In addition, Marina Biotech announced exclusive licensing agreements with Monsanto Company for Marina Biotech's delivery and chemistry technologies and with Girindus America for the supply of CRN-based oligonucleotides. Marina Biotech recently entered into a non-exclusive agreement with Novartis Institutes for Biomedical Research to license Marina Biotech's CRN technology for development of nucleic acid-based therapeutics. Marina Biotech's goal is to improve human health through the development of RNAi- and oligonucleotide-based compounds and drug delivery technologies that together provide superior therapeutic options for patients. Additional information about Marina Biotech is available at http://www.marinabio.com.

Forward-Looking Statements

Statements made in this news release may be forward-looking statements within the meaning of Federal Securities laws that are subject to certain risks and uncertainties and involve factors that may cause actual results to differ materially from those projected or suggested. Factors that could cause actual results to differ materially from those in forward-looking statements include, but are not limited to: (i) the ability of Marina Biotech to obtain additional and substantial funding in the immediate future; (ii) the ability of Marina Biotech to attract and/or maintain research, development, commercialization and manufacturing partners; (iii) the ability of Marina Biotech and/or a partner to successfully complete product research and development, including preclinical and clinical studies and commercialization; (iv) the ability of Marina Biotech and/or a partner to obtain required governmental approvals; and (v) the ability of Marina Biotech and/or a partner to develop and commercialize products prior to, and that can compete favorably with those of, competitors. Additional factors that could cause actual results to differ materially from those projected or suggested in any forward-looking statements are contained in Marina Biotech's most recent periodic reports on Form 10-K and Form 10-Q that are filed with the Securities and Exchange Commission. Marina Biotech assumes no obligation to update and supplement forward-looking statements because of subsequent events.

Contact:

Michael French
Chief Executive Officer
(425) 892-4322
admin@marinabio.com

Exhibit 4.15

*****Text Omitted and Filed Separately**
with the Securities and Exchange Commission.
Confidential Treatment Requested
Under 17 C.F.R. Sections 200.80(b)(4) and Rule 24b-2

PATENT ASSIGNMENT AND LICENSE AGREEMENT

By and Between

ARCTURUS THERAPEUTICS, INC.

AND

MARINA BIOTECH, INC.

This **PATENT ASSIGNMENT AND LICENSE AGREEMENT**, dated August 9, 2013 ("**Effective Date**"), is entered into by and between Marina Biotech, Inc., a Delaware corporation ("**Assignor**"), and Arcturus Therapeutics, Inc., a Delaware corporation ("**Assignee**").

WHEREAS, Assignor has the right to assign the Assigned Patents (as defined below) and Assignee desires to acquire ownership of the Assigned Patents; and

WHEREAS, Assignor desires to obtain a certain license from Assignee to the Assigned Patents;

NOW THEREFORE, in consideration of the premises and mutual covenants herein contained, Assignor and Assignee agree as follows:

Section 1. Certain Definitions; Interpretation

1.1 For the purposes of this Agreement, unless the context otherwise requires, the following terms will have the respective meanings set out below and grammatical variations of such terms will have corresponding meanings:

"**Agreement**" means this Patent Assignment and License Agreement.

"**Assigned Patents**" means all patents and applications for patent identified in Exhibit A hereto and any existing or future foreign counterpart patents or patent applications claiming priority from any of the patents listed on Exhibit A and any substitutes, divisions, continuations, continuations-in-part, reissues, renewals, extensions, supplementary protection certificates, and the like of any of such patents listed on Exhibit A or foreign counterparts.

"**Affiliate**" means a corporation or business entity that directly or indirectly (1) is controlled by, controls, or is under common control with any entity (which solely for the purpose of this definition means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a corporation or other business entity, whether through the ownership of fifty percent (50%) or more (or the maximum ownership interest permitted by law) of the voting securities or other interest in the corporation or business, by contract, or otherwise) or (2) has the right to be allocated net income or to receive payment of cash equal to fifty percent (50%) or more (or the maximum interest permitted by law) of such net income or cash.

"**Confidential Information**" means all proprietary and non-public business or technical information, whether or not patentable, disclosed by one Party to the other Party either in writing and marked "confidential" or disclosed orally and reduced to a writing marked "confidential" within 30 days after the initial oral disclosure and shall include, without limitation, all Patent-Related Information, which shall be deemed Confidential Information of Assignee from and after the Effective Date. Notwithstanding the foregoing, "Confidential Information" shall not include any information that: (i) was in the public domain as of the Effective Date or comes into the public domain during the term of this Agreement through no act of the receiving Party; (ii) was

independently known to the receiving Party as shown by the receiving Party's written records prior to receipt from the disclosing Party, or made available to the receiving Party by a Third Party without any violation of the obligations of such Third Party or the receiving Party to the other Party; (iii) is independently conceived, invented, or acquired by the receiving Party by persons who were not exposed to Confidential Information.

"**Party**" or "**Parties**" means Assignor or/and Assignee.

"**Patent Agency**" means any federal, national, multinational, state, provincial or local regulatory agency, department, bureau or other governmental entity with authority to grant legally enforceable protection to inventions or discoveries.

"**Patent-Related Information**" means, for each Assigned Patent, the file wrapper and file history for such Assigned Patent, any and all correspondence with any Patent Agency with respect to an Assigned Patent (including any application, whether or not a patent issued), and all internal disclosures, memoranda, legal opinions, prior art, data, lab notes, and otherdocumentation and materials relating to or implementing each invention disclosed in such Assigned Patent.

"**Related Parties**" means the Affiliates and sublicensees of a Party.

"**Third Party**" means any individual, estate, trust, partnership, joint venture, association, firm, corporation, company or other entity which is not a Party hereto or an Affiliate of such Party (or solely for purposes of calculating Net Sales, is not a sublicensee of such Party).

"**Valid Claim**" shall mean (as to whether a molecule, formulation, method of use or other activity is Covered) any claim set forth in an issued and unexpired Assigned Patent or application which Patent or application (i) has not been revoked or held unenforceable, unpatentable or invalid by a final decision of a court or a governmental agency of competent jurisdiction (including without limitation any competent patent office), from which decision no further appeal is possible (ii) has not been withdrawn, disclaimed, denied or admitted by the holder of the application or the patent to be invalid or unenforceable through reissue, re- examination, disclaimer or otherwise and (iii) with respect to a pending Patent application, has not been pending for more than ten (10) years.

1.2 The division of this Agreement into sections and subsections and the insertion of headings are for convenience of reference only and will not affect the interpretation of this Agreement. Unless otherwise indicated, any reference in this Agreement to a section or subsection refers to the specified section or subsection of this Agreement.

1.3 In this Agreement, words importing the singular number only will include the plural and vice versa, words importing gender will include all genders and words importing persons will include individuals, corporations, partnerships, associations, trusts, unincorporated organizations, governmental bodies and other legal or business entities of any kind whatsoever.

1.4 In this Agreement “hereof”, “herein”, “hereby”, “hereto” and similar terms refer to this Agreement and not to any particular clause, paragraph or other part of this Agreement.

References to particular clauses are to clauses of this Agreement unless another document is specified.

1.5 In this Agreement “including” means including without limitation or prejudice to the generality of any description, definition, term or phrase preceding that word, and the word “include” and its derivatives will be construed accordingly.

Section 2. Assignment of Assigned Patents

2.1 For and in consideration of the payments specified in Section 3 and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the Assignor, the Assignor hereby (subject to the terms of this Agreement) by these presents does sell, assign and transfer to Assignee all right, title and interest in the United States of America and throughout the world in and to the Assigned Patents existing now or in the future, the inventions claimed in such Assigned Patents and the Patent-Related Information, including without limitation:

(a) the right to prosecute the Assigned Patents with any Patent Agency, and to do so in its own name;

(b) all right, title and interest in the United States of America and in the world, in, to and under all patents granted directly or indirectly on or as a result of the Assigned Patents and any reissues, reexaminations, renewals or extensions of any thereof;

(c) the right to claim any and all benefits with respect to the Assigned Patents which are or may be available in any country under the International Convention For The Protection of Industrial Property, and any like treaties or laws;

(d) the right to claim and to enjoy the benefit of any priority dates established by the Assigned Patents; and

(e) the right to sue for past, present and future infringements of the Assigned Patents.

Assignor’s rights, title and interest (including in each case with respect to clauses (a) through (e) above) are sold, assigned and transferred free and clear of all encumbrances, said Assigned Patents and the Patent-Related Information to be owned, held and enjoyed by the Assignee and its successors and assigns as fully and exclusively as it would have been held and enjoyed by the Assignor had this assignment and transfer not been made.

2.1.1 As promptly as practicable following the execution of this Agreement, Assignor shall deliver to Assignee all copies and other physical embodiments of the Patent- Related Information in Assignor’s possession or control in such form as they may exist on the Effective Date.

2.1.2 From and after the Effective Date, Assignee shall be solely responsible for all actions and all costs whatsoever, including attorney's fees, arising after the Effective Date and associated with the perfection of rights, title, and interest in and to the Assigned Patents, provided however, that promptly upon request by Assignee but in any event not later than thirty (30) business days after the Effective date, Assignor shall deliver to Assignee an executed recordable assignment document having the form and substance of Exhibit B (including Attachment A thereto). Upon Assignee's written request, Assignor shall execute and deliver to Assignee any written documents necessary or appropriate, in Assignee's sole discretion, to effectuate the assignment to Assignee of any and all of Assignor's rights to the Assigned Patents as provided above, and will, at Assignee's sole expense, execute all papers and perform any other lawful acts requested by Assignee for the preparation, prosecution, procurement, maintenance, enforcement and defense of the Assigned Patents throughout the world, and will execute all documents and perform any other lawful act necessary to vest in Assignee all of Assignor's right, title and interest in and to the Assigned Patents. To the extent that, for any reason or no reason, the Assignor fails to comply with Assignor's obligations described above, Assignor hereby appoints Assignee as the Assignor's attorney in fact to execute and deliver any documents, and perform any acts, that the Assignor would otherwise lawfully be obligated to execute and deliver or perform pursuant to this Section 2.1.

2.1.3 Assignee's representatives shall be responsible for preparing, perfecting, recording and translating any documents that Assignee records to perfect its right, title and interest in Assigned Patents with the Patent Agencies in any jurisdiction. Assignee shall provide Assignor from time to time with any documents requiring Assignor's signature to the extent necessary for recording (together with an English translation thereof, if requested), in a form similar to Exhibit B except for any additional or different terms and conditions as may commonly exist or would be necessitated by law in patent assignments by Assignor under the laws of the local jurisdiction.

2.1.4 Subject to Section 6.4 and 6.5, from and after the Effective Date, Assignee shall have the sole and absolute discretion to control the preparation, filing, prosecution and maintenance of the Assigned Patents, using counsel of its choice, and the Assignor shall cooperate, at the sole expense of the Assignee, with all reasonable requests of the Assignee for assistance in the preparation, filing, prosecution and maintenance of the Assigned Patents. Assignee shall be solely responsible for all costs whatsoever, including attorney's fees, arising after the Effective Date and associated with the preparation, filing, prosecution and maintenance of the Assigned Patents, including any maintenance fees which become due for the Assigned Patents after the Effective date. Assignor agrees to assist Assignee in implementing such rights as follows:

(a) On or prior to the Effective Date, Assignor shall have provided to Assignee a report listing all patent dockets and the names of attorneys, law firms or foreign |patent agents, as the case may be, currently assigned to the preparation and prosecution of all Assigned Patents in the United States and foreign jurisdictions. Such report shall accurately identify (i) all Assigned Patents that have foreign statutory bar dates (i.e., dates by which foreign or international patent applications must be filed), but which have not, as of the Effective Date, been filed in the relevant foreign jurisdictions, and (ii) all maintenance and/or annuity fees

(United States and foreign) on Assigned Patents that are due between the Effective Date and October 1, 2013.

(b) Promptly following execution hereof, Assignor shall notify the attorneys, law firms and foreign patent agents identified on the list referred to in Section 2.1.4(a) of the transactions contemplated by this Agreement, including the assignment hereunder to Assignee to all Assigned Patents.

(c) Upon the written request of Assignee and at Assignee's expense, Assignor will, through its foreign patent agents, provide communications to, and receive communications from, foreign Patent Agencies regarding authorizations, patent filings and prosecution responses for a period of up to ninety (90) days after the Effective Date.

(d) Assignee hereby grants to Assignor a power of attorney to act on behalf of Assignee and to direct attorneys and agents on behalf of Assignee with respect to preparation, filing, prosecution and maintenance, as the case may be, for Assigned Patents for a period of ninety (90) days after the Effective Date to the extent necessary or appropriate to carry out the transition activities contemplated by this Section 2.1.4. This power of attorney may be implemented by any of the patent counsel of Assignor or through the attorneys, law firms and foreign patent agents retained by Assignor (including those persons or law firms expressly identified on the list referred to in Section 2.1.4(a)) such that those persons and law firms are authorized to rely upon this power of attorney. Unless there is insufficient time, prior to exercising a power of attorney, Assignee shall be given the opportunity to comment on any pending action and such comments must be accepted by the person exercising the Power of Attorney.

2.1.5 The Assignor will execute all such documents and do all such acts as may be necessary or proper to support the acceptance of any application included in the Assigned Patents and for procuring the grant of a patent pursuant to such application. In the event that the United States Patent and Trademark Office ("USPTO") or any other Patent Agency sends to either Party an objection, rejection, office action, a query, or a request demanding further information, clarification or explanation, the Assignor shall make available to the Assignee all information and render reasonable assistance with a view to satisfying the USPTO or such Patent Agency that a patent should issue on the disclosed invention in the form applied for.

2.1.6 In the event that the validity, enforceability or ownership of any Assigned Patent is challenged on any point upon which the Assignor has or can procure information or advice which may assist in meeting and defeating or reducing the effect of such challenge, the Assignor agrees and/or undertakes to supply or procure the supply of such information and/or advice without unreasonable delay but subject to the right to charge the Assignee out-of-pocket expenses properly and reasonably incurred in pursuance of this provision.

2.1.7 In support of the patenting and utilization of the inventions disclosed in the Assigned Patents by Assignee, Assignor agrees, upon the written request of Assignee, to make corresponding assignments to Assignee, as may be appropriate, of its rights and remedies against the inventors thereof, or any of them, so far as relating to such inventions and arising by

operation of law, estoppel, implication or express contract, including, without limitation, those rights as expressed in contracts between Assignor and present and past employees and consultants.

2.1.8 Assignor hereby, assigns and transfers to Assignee all of Assignor's right, title and interest in and to the agreements which are listed on Exhibit C to this Agreement (the Transferred Contracts"). Assignee hereby assumes and agrees to perform any and all liabilities and obligations of Assignor under the Transferred Contracts arising after the date hereof with the same force and effect as if Assignee had signed such Transferred Contracts originally in place of Assignor.

2.2 In the event that Assignee shall contemplate or commence any judicial or administrative proceedings under any Assigned Patents, Assignor shall cooperate with Assignee in respect of such proceeding or contemplated proceeding. Assignor's cooperation shall include providing relevant information and documents that are in Assignor's possession and making personnel available on reasonable request for interview by counsel, and for execution of affidavits, depositions and trial testimony if reasonably deemed necessary or desirable. Assignee shall reimburse Assignor for all of Assignor's out-of-pocket expenses with respect to the foregoing.

2.3 Notwithstanding the above, Assignor shall without compensation assist in the assignment of the Assigned Patents to the Assignee to a reasonable extent based on a comparable assignment within the industry. If Assignor assists Assignee beyond such reasonable extent, Assignor shall be entitled to charge Assignee a fee for the assistance based on extra time used in compliance with industry standards. Any out-of-pocket expenses incurred by Assignor shall be reimbursed, if such expense prior was approved by Assignee.

Section 3. <u>Consideration</u>

3.1 (a) As an inducement to Assignor to execute this Patent Assignment and License Agreement, Assignee hereby grants to Assignor a royalty-free, fully-paid, irrevocable, worldwide, non-exclusive license to use the inventions, ideas and information embodied in the Assigned Patents to develop, make, use and sell chemical compounds intended for human or animal therapeutic use. Such license shall include the right to grant sublicenses as provided in paragraph (b) of this Section 3.1. All rights under the Assigned Patents other than those expressly provided in this Section 3.1 are hereby reserved to Assignee.

(b) Assignor may sublicense the rights granted to it by Assignee under paragraph (a) of this Section 3.1 at any time at its sole discretion, but only in connection with the continuing research, development and or commercialization of an Assignor Product or the manufacturing of an Assignor Product by the sublicensee or its Affiliates, either itself or as part of a collaboration with Assignor or any of its Affiliates. For purposes of this paragraph (b), a "Assignor Product" means any product with respect to which Assignor or any of its Affiliates has conducted research, manufacturing, development activities that are related to such Product. For the avoidance of doubt, this Section 3.1 shall not include any right by Assignor to grant a "naked" sublicense of the Assigned Patents.

3.2 As consideration for the sale, assignment and transfer of the Assigned Patents and the Patent-Related Information to Assignee by Assignor, Assignee agrees to pay to Assignor an upfront fee of $[…***…] ([…***…] Dollars) in two payments: (1) $[…***…] ([…***…] Dollars) not later than […***…] and (2) $[…***…] ([…***…] Dollars) not later than […***…].

Section 4. Representations and Warranties of the Assignor

4.1 Assignor represents and warrants to the Assignee as of the Effective Date as follows:

4.1.1 Assignor is a corporation duly incorporated, validly existing, and in good standing and has the power, authority, and capacity to enter into this Agreement and to carry out its terms.

4.1.2 The execution and delivery of this Agreement and the completion of the transactions contemplated hereby have been duly and validly authorized by all necessary corporate action on the part of the Assignor, and this Agreement constitutes a valid and binding obligation of the Assignor enforceable against the Assignor in accordance with its terms.

4.1.3 Assignor is the legal and beneficial owner of the Assigned Patents and the Patent-Related Information, free and clear of all encumbrances whatsoever, and is not a party to or bound by any contract or any other obligation whatsoever that limits or impairs its ability to sell, transfer, assign or convey, or that otherwise affects, the Assigned Patents and the Patent-Related Information.

4.1.4 Assignor has the right to convey, assign and transfer all of the right, title and interest in the Assigned Patents and the Patent-Related Information in the manner provided herein.

4.1.5 Assignor is not aware of any claim of infringement (or the inducing of or contribution to the infringement) of any intellectual property rights of any other person arising from the practice of the Assigned Patents or the use of any inventions, technology or ideas disclosed therein, nor has Assignor received any notice that use of the Assigned Patents infringes upon or breaches or will infringe upon or breach any intellectual property rights of any other person.

4.1.6 Assignor, including its officers, employees and agents, makes no representations or warranties to Assignee that the Assigned Patents are or will be held valid or enforceable, or that the manufacture, importation, use, offer for sale, sale or other distribution of any Covered Products will not infringe any patent or other rights.

Section 5. Representations of Assignee

5.1 Assignee represents and warrants to Assignor as follows:

5.1.1 Assignee is a corporation duly incorporated, validly existing, and in good standing and has the power, authority, and capacity to enter into this Agreement and to carry out its terms.

5.1.2 The execution and delivery of this Agreement and the License Agreement and the completion of the transactions contemplated hereby and thereby has been duly and validly authorized by all necessary corporate action on the part of Assignee, and this Agreement constitutes (and the License Agreement assuming due execution and delivery thereof by Assignor will constitute) a valid and binding obligation of the Assignee, enforceable against the Assignee in accordance with its terms.

5.1.3 Assignee, including its officers, employees and agents, makes no representations or warranties to Assignor that the Assigned Patents are or will be held valid or enforceable, or that the manufacture, importation, use, offer for sale, sale or other distribution of products covered by the Assigned Patents will not infringe any patent or other rights.

Section 6. Enforcement

6.1 Assignor agrees to promptly notify Assignee in writing of any infringement or misappropriation or claim of infringement of Third Party rights in respect of any of the Assigned Patents of which Assignor becomes aware and will provide Assignee with any and all evidence in its possession, if any, of such infringement, misappropriation or breach.

6.2 Assignee agrees to promptly notify Assignor in writing of any infringement or misappropriation or claim of infringement of Third Party rights in respect of any of the Assigned Patents of which Assignee becomes aware and will provide Assignor with any and all evidence in its possession, if any, of such infringement, misappropriation or breach.

6.3 Each Party shall, upon request, provide the other Party with all available evidence in its possession relevant to such infringement or suspected infringement. From and after the Effective Date, Assignee shall have the sole and absolute discretion to control the assertion and defense of the Assigned Patents, using counsel of its choice, and the Assignor shall cooperate, at the sole expense of the Assignee, with all reasonable requests of the Assignee for assistance in the assertion and defense of the Assigned Patents. Assignee shall be solely responsible for all costs whatsoever, including attorney's fees, arising after the Effective Date and associated with the assertion and defense of the Assigned Patents, and in cases of assertion of the Assigned Patents, shall retain all recoveries with respect thereto.

6.4 Assignee will prosecute, maintain and defend the Assigned Patents in the following countries: […***…] (the "Obligatory Patent Maintenance Territories"). Assignee may maintain patents in other countries or regions at own discretion.

Section 7. Breach of Contract

The Parties expressly agree that, in the event a Party violates, defaults or fails to perform any of its respective covenants, obligations, agreements, representations or warranties contained herein, full legal remedy shall remain available to the non-defaulting Party for redress of such violation, default or failure, including the right to recover monetary damages or to secure such other relief appropriate to the circumstances.

Section 8. Governing Law and Jurisdiction

This Agreement shall be governed by and construed under the laws of New York, without giving effect to the conflicts of laws provision thereof. Any disputes between the Parties relating to this Agreement shall be subject to the exclusive jurisdiction and venue of the federal courts located in the Southern District of New York (without restricting any right of appeal), and the Parties hereby waive any objection which they may have now or hereafter to the laying of venue of any proceedings in such courts and to any claim that such proceedings have been brought in an inconvenient forum, and further agree that a judgment or order in any such proceedings shall be binding upon each of them and may be enforced in the courts of any other jurisdiction.

Section 9. Miscellaneous

9.1 Nothing contained in this Agreement shall be construed as conferring upon either Party any right to use in advertising, publicity, or other promotional activities any name, trade name, trademark, trade dress or other designation of the other hereto (including any contraction, abbreviation or simulation of any of the foregoing), save as expressly stated herein. Except as otherwise required by applicable law or regulation, each Party hereto agrees not to use or refer to this Agreement or any provision hereof in any promotional activity without the express written approval of the other Party. In the event any Party proposes to issue any press release or public announcement concerning any provisions of this Agreement or the transactions contemplated hereby, such Party shall so advise the other Parties hereto, and the Parties shall thereafter use all commercially reasonable efforts to cause a mutually agreeable release or announcement to be issued. Except as otherwise required by law or applicable stock exchange regulations, neither Party will publicly or privately disclose or divulge any provisions of this Agreement or the transactions contemplated hereby without the other Party's written consent.

9.2 Neither Assignee nor Assignor shall be liable, whether in contract, tort (including negligence and strict liability) or otherwise, for any special, indirect, incidental, punitive, or consequential damages arising hereunder, including, but not limited to, loss of profits or goodwill, business interruptions or claims of customers, even if advised of the possibility of such damages.

9.3 No amendment, modification or alteration of the terms or provisions of this Agreement will be binding unless the same is in writing and duly executed by each of the Parties hereto, except that any of the terms or provisions of this Agreement may be waived in writing at any time by the Party which is entitled to the benefits of such waived terms or provisions. No

waiver of any of the provisions of this Agreement will be deemed to, or will, constitute a waiver of any other provision hereof (whether or not similar) or of any other present or future right or obligation hereunder. No delay on the part of any Party to this Agreement in exercising any right, power or privilege hereunder will operate as a waiver thereof.

9.4 If any provision of this Agreement or the application of any such provision to any person, Party or circumstance will be held invalid, illegal or unenforceable in any respect by a court of competent jurisdiction, such invalidity, illegality or unenforceability will not affect any other provision of this Agreement and this Agreement will remain in full force and effect and will be effectuated as if such illegal, invalid or unenforceable provision is not part thereof; provided, however, that if such provision is held to be invalid or unenforceable because overbroad as written, such provision shall be deemed amended to narrow its application to the extent necessary to make the provision enforceable according to applicable law and shall be enforced as amended.

9.5 This Agreement (including the Exhibits attached hereto) constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral and written, between the Parties.

9.6 The terms and conditions of this Agreement will inure to the benefit of, and be binding upon, the respective successors and assigns of the Parties hereto. This Agreement and the license and other rights granted or created hereunder may not be assigned, in whole or in part by either Party without the prior written consent of the other Party, and any attempted assignment shall be null and void; provided, however, that either Party may assign or otherwise transfer its rights and obligations under this Agreement to any Affiliate or to any successor in interest to the entire business conducted by the assigning party to which this Agreement relates (whether by merger, share exchange, sale or issuance of stock, sale or other transfer of assets, combination or consolidation of any type, operation of law, purchase, assignment or otherwise), but only if such assignee or successor agrees in writing to be bound by the terms hereof.

9.7 Nothing in this Agreement, express or implied, is intended to confer any rights or remedies hereunder on any person other than Assignee or Assignor or any of their respective successors and permitted assigns.

9.8 The Parties hereto acknowledge and agree that the Exhibits attached hereto are an integral part of this Agreement, and are hereby incorporated by reference herein and made a part hereof.

9.9 The Recitals and the headings of the articles, sections and paragraphs contained in this Agreement are inserted for convenience only and will not be deemed to constitute part of this Agreement or to affect the construction thereof.

9.10 Assignee and Assignor each acknowledge that this Agreement has been prepared jointly by the Parties and shall not be strictly construed against either Party.

9.11 This Agreement may be executed by facsimile or original signature in two or more counterparts, each of which will for all purposes be deemed to be an original but all of which together will constitute one and the same instrument.

9.12 Each Party shall do and execute, or arrange for the doing and executing of, each necessary act, document and thing to implement this Agreement, including without limitation executing and delivering and recording any license required by local law, with terms consistent with this Agreement to the extent permitted by such local law, in the relevant country or jurisdictions.

9.13 All notices which are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by facsimile or electronic mail (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, return receipt requested, addressed as follows:

if to Assignor, to:

Marina Biotech, Inc.
c/o Pryor Cashman LLP
7 Times Square
New York, NY 10016
Attention: Lawrence Remmel
Facsimile No.: +1.212.326.0806

if to Assignor, to:

Arcturus Therapeutics, Inc.
3210 Merryfield Row
San Diego, CA 92121
Attention: Joseph Payne, President and CEO

Facsimile No: +1.858.242.1591

or to such other address(es) as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such notice shall be deemed to have been given: (a) when delivered if personally delivered or sent by facsimile or electronic mail on a business day (or if delivered or sent on a non-business day, then on the next business day); (b) on the business day after dispatch if sent by nationally-recognized overnight courier; or (c) on the fifth (5th) business day following the date of mailing if sent by mail.

9.14 The Parties hereto are independent contractors and nothing contained in this Agreement shall be deemed or construed to create the relationship of a partnership or joint venture or of any association or relationship between the Parties. Assignor and Assignee each acknowledges that it does not have the authority to make (and agrees not to make) any representation to any Third Party, either directly or indirectly, indicating that it has the authority to act for or on behalf of the other Party nor does it have the authority to obligate (nor shall it

obligate or purport to obligate) the other Party in any manner whatsoever, beyond authority expressly granted herein.

9.15 Following the Effective Date, each Party may make a public announcement with respect to the existence of this Agreement subject to the approval of the other Party, which approval shall not be unreasonably withheld, conditioned or delayed. The substance of any such public announcement, once made, may be republished by either Party without the further approval of the other Party. Except with respect to such press release announcing execution and subject matter of this Agreement by the Parties, and except as otherwise required by law or the applicable regulations of any securities exchange, neither Party shall use the name of the other Party or of any staff member or employee of the other Party in any announcement publication, or presentation which relates to the subject matter of this Agreement without the prior written consent of the other Party. Except as expressly provided above, each Party shall keep this Agreement and all of its terms and conditions confidential.

9.16 Each Party shall hold in confidence any Confidential Information of the other Party hereunder, and agrees not to disclose any such Confidential Information to any Third Party without the express written consent of the other Party; provided, however, that either Party may disclose such information: (a) in confidence, to its employees, consultants, attorneys, auditors and professional advisors with a need to know and who agree to appropriate restrictions on use or disclosure other than to further the purposes of this Agreement or (b) to a court or tribunal as necessary to enforce this Agreement.

9.16.1 The Parties shall use the same degree of care in protecting Confidential Information as each uses for its own information of like importance, but not less than a reasonable degree of care. Each Party will use Confidential Information only for purposes of furthering the purposes of this Agreement. With respect to any Confidential Information that is revealed by a Party to the other Party, this confidentiality requirement will remain in force for a period of five years following the expiration or termination of this Agreement.

9.16.2 Notwithstanding any other provision of this Agreement, a Party may disclose Confidential Information which is required to be disclosed by law, rule or regulation (including applicable regulations of any securities exchange), or any, administrative or legal process; provided, however, that the Party proposing to make such disclosure shall give prompt prior written notice to the other Party and agrees to consult with the other Party in good faith regarding the scope of such disclosure. Furthermore, in the case of any administrative or legal process, the Party proposing to make such disclosure shall provide reasonable cooperation to the other Party, at the other Party's expense, in the latter Party's efforts to challenge the basis for such compelled disclosure or limit the scope of disclosure of such information, as the disclosing Party may deem appropriate.

[THE REMAINDER OF THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.]

IN WITNESS WHEREOF, each of the Parties hereto has caused this Agreement to be duly executed in duplicate originals by their duly authorized representatives as of the day and year first above written.

ASSIGNOR:

Marina Biotech, Inc.

By: /s/ J. Michael French
Name: J. Michael French
Title: President and CEO

ASSIGNEE:

Arcturus Therapeutics, Inc.

By: /s/ Joseph Payne
Name: Joseph Payne
Title: President and CEO

Exhibits

A – Assigned Patents
B – Form of Assignment
C – Transferred Agreements

EXHIBIT A

ASSIGNED PATENTS

[…***…]

*****Confidential Treatment Requested**

EXHIBIT A

ASSIGNED PATENTS

[…***…]

*****Confidential Treatment Requested**

EXHIBIT B

Form of Recordable Patent Assignment

For good and valuable consideration, the receipt of which is hereby acknowledged, Marina Biotech, Inc., a Delaware corporation (hereinafter "**Assignor**"), hereby grants and assigns to Arcturus Therapeutics, Inc., a Delaware corporation (hereinafter "**Assignee**"), all of Assignor's right, title and interest in and to the Assigned Patents identified in Attachment A hereto, to have and to hold the same, unto Assignee for its own use and enjoyment and for the use and enjoyment of its successors and assigns, for the full term or terms of all such rights.

IN WITNESS WHEREOF, Assignor has caused this Patent Assignment to be duly signed on its behalf.

Marina Biotech, Inc.

By: _____

Name: J. Michael French
Title: President and CEO

Date: _____

State of)
) S.S.
County of)

Before me this __ day of _____, 2013, personally appeared _____, to me known to be the person(s) who are described in and who signed the foregoing Assignment and acknowledged to me that they signed the same of their own free will for the purpose therein expressed.

_____
Notary Public

ATTACHMENT A [TO EXHIBIT B]

ASSIGNED PATENTS

[…***…]

*****Confidential Treatment Requested**

ATTACHMENT A [TO EXHIBIT B]

ASSIGNED PATENTS

[…***…]

***Confidential Treatment Requested

EXHIBIT C

TRANSFERRED AGREEMENTS

1. […***…]

2. […***…]

3. Protiva Biotherapeutics, Inc. – License Agreement dated 28 November 2012

*****Confidential Treatment Requested**

Exhibit 8.1

Arcturus Therapeutics Ltd.
Subsidiaries

Name	State of Incorporation
Arcturus Therapeutics, Inc.	Delaware
Alcobra Inc.	Delaware

Exhibit 12.1

CERTIFICATION PURSUANT TO EXCHANGE ACT RULE 13a-14(a) or 15d-14(a)

I, Mark R. Herbert, certify that:

1. I have reviewed this annual report on Form 20–F of Arcturus Therapeutics Ltd.;

2. Based on my knowledge, this annual report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this annual report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The Company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a–15(e) and 15d–15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Company and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the Company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the Company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting; and

5. The Company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Company's auditors and the audit committee of the Company's board of directors (or persons performing the equivalent function):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal control over financial reporting.

Date: May 14, 2018

/s/ Mark R. Herbert
Mark R. Herbert
Interim President
(principal executive officer)

Exhibit 12.2

CERTIFICATION PURSUANT TO EXCHANGE ACT RULE 13a-14(a) or 15d-14(a)

I, Rebecque Laba, certify that:

1. I have reviewed this annual report on Form 20–F of Arcturus Therapeutics Ltd.;

2. Based on my knowledge, this annual report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this annual report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The Company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a–15(e) and 15d–15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Company and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the Company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the Company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting; and

5. The Company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Company's auditors and the audit committee of the Company's board of directors (or persons performing the equivalent function):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal control over financial reporting.

Date: May 14, 2018

/s/ Rebecque Laba

Rebecque Laba
Vice President, Finance & Operations
(principal financial officer)

Exhibit 13.1

CERTIFICATION PURSUANT TO
18 U.S.C. Section 1350

In connection with the filing of the Annual Report on Form 20-F for the period ended December 31, 2017 (the “Report”) by Arcturus Therapeutics Ltd. (the "Company"), the undersigned, as Interim President of the Company, hereby certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Mark R. Herbert
Mark R. Herbert
Interim President
(principal executive officer)
May 14, 2018

Exhibit 13.2

CERTIFICATION PURSUANT TO
18 U.S.C. Section 1350

In connection with the filing of the Annual Report on Form 20-F for the period ended December 31, 2017 (the “Report”) by Arcturus Ltd. (the "Company"), the undersigned, as Vice President, Finance & Operations of the Company, hereby certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Rebecque Laba
Rebecque Laba
Vice President, Finance & Operations
(principal financial officer)
May 14, 2018

Exhibit 15.1

CONSENT OF INDEPENDENT REGISTERED ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statement on Form F-3 (Registration No. 333-209960) and Registration Statements on Form S-8 (Registration No's. 333-194875, 333-202394, 333-209947, 333-217556, and 333-221830) of Arcturus Therapeutics Ltd. (formerly Alcobra Ltd.) of our report dated May 14, 2018 with respect to the consolidated financial statements of Arcturus Therapeutics Ltd. and its subsidiaries for the two years ended December 31, 2016 included in this Annual Report on Form 20-F for the year ended December 31, 2017.

/s/ Ernst & Young LLP

San Diego, California
May 14, 2018

Exhibit 15.2

CONSENT OF INDEPENDENT REGISTERED ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statement on Form F-3 (Registration No. 333-209960) and Registration Statements on Form S-8 (Registration No's. 333-194875, 333-202394, 333-209947 333-217556, and 333-221830) of Arcturus Therapeutics Ltd. of our report dated May 14, 2018 with respect to the consolidated financial statements of Arcturus Therapeutics Ltd. and its subsidiaries for the year ended December 31, 2017 included in this Annual Report on Form 20-F for the year ended December 31, 2017.

Tel-Aviv, Israel
May 14, 2018

/s/KOST FORER GABBAY & KASIERER
A member of Ernst & Young global

Exhibit 15.3

Ernst & Young LLP
4370 La Jolla Village Drive
Suite 500
San Diego, CA 92122

Tel: +(858) 535 7200
Fax: +(858) 535 7777
ey.com

May 14, 2018

Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549

Ladies and Gentlemen:

We have read Item 16F of Form 20-F dated May 14, 2018, of Arcturus Therapeutics Ltd. and are in agreement with the statements contained in the first and second sentences of paragraph a(1)(i), paragraphs (a)(1)(ii), (a)(1)(iv), and (a)(1)(v) therein. We have no basis to agree or disagree with other statements of the registrant contained therein.

/s/ Ernst & Young LLP