
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549**

FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

CORBUS PHARMACEUTICALS HOLDINGS, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

46-4348039
(I.R.S. Employer
Identification Number)

Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive
Norwood, MA 02062
(617) 963-0100

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Yuval Cohen
Chief Executive Officer
Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive
Norwood, MA 02062
(617) 963-0100

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies of all communications, including communications sent to the agent for service, to:

Michael J. Lerner, Esq.
Steven M. Skolnick, Esq.
Lowenstein Sandler LLP
1251 Avenue of the Americas
New York, New York 10020
Tel: (212) 262-6700

Approximate date of commencement of proposed sale to the public: From time to time after this Registration Statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box:

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box:

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become

effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

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

Large accelerated filer: Accelerated filer:

Non-accelerated filer: (Do not check if smaller reporting company) Smaller reporting company:

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 7(a)(2)(B) of Securities Act.

CALCULATION OF REGISTRATION FEE

<u>Title of each class of securities to be registered⁽¹⁾</u>	<u>Amount to be registered^{(1) (2)}</u>	<u>Proposed maximum offering price per unit^{(1) (2)}</u>	<u>Proposed maximum aggregate offering price^{(1) (2)}</u>	<u>Amount of registration fee⁽²⁾</u>
Common Stock, par value \$0.0001 per share ⁽³⁾				
Preferred Stock, par value \$0.0001 per share ⁽⁴⁾				
Warrants ⁽⁵⁾				
Debt Securities ⁽⁶⁾				
Subscription Rights ⁽⁷⁾				
Units ⁽⁸⁾				
TOTAL:			\$ 200,000,000	\$ 24,900

(1) In no event will the aggregate offering price of all securities issued from time to time by the registrant under this registration statement exceed \$200,000,000 or its equivalent in any other currency, currency units, or composite currency or currencies. The securities covered by this registration statement may be sold separately, together or as units with other securities registered under this registration statement.

(2) The proposed maximum aggregate price has been estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the “Securities Act”).

(3) Subject to note (1), this registration statement covers such an indeterminate amount of common stock (with accompanying purchase rights, if any) as may be sold, from time to time, at indeterminate prices, by the registrant and such indeterminate number of shares of common stock as may, from time to time, be issued upon conversion or exchange of other securities registered hereunder, to the extent any such securities are, by their terms, convertible or exchangeable for common stock.

(4) Subject to note (1), this registration statement covers such an indeterminate number of shares of preferred stock (with accompanying purchase rights, if any) as may be sold from time to time at indeterminate prices by the registrant. Also covered is such an indeterminate amount of common stock (with accompanying purchase rights, if any) (i) as may be issuable or deliverable upon conversion of shares of preferred stock, and (ii) as may be required for delivery upon conversion of shares of preferred stock as a result of anti-dilution provisions.

(5) Subject to note (1), this registration statement covers such an indeterminate amount and number of warrants (including subscription rights) representing rights to purchase common stock, preferred stock and debt securities registered under this registration statement as may be sold from time to time at indeterminate prices by the registrant. Also covered is such an indeterminate amount of common stock and preferred stock (in each case, with accompanying purchase rights, if any) and debt securities (i) as may be issuable or deliverable upon exercise of warrants, and (ii) as may be required for delivery upon exercise of any warrants as a result of anti-dilution provisions.

(6) Subject to note (1), this registration statement covers such an indeterminate amount of debt securities as may be sold from time to time at indeterminate prices by the registrant. If any debt securities are issued at an original issue discount, then the offering price shall be in such greater principal amount as shall result in an aggregate initial offering price not to exceed \$200,000,000. Also covered is such an indeterminate amount of common stock and preferred stock (in each case, with accompanying purchase rights, if any) (i) as may be issuable or deliverable upon the exercise or conversion of debt securities, and (ii) as may be required for delivery upon exercise or conversion of debt securities as a result of anti-dilution provisions.

(7) Subject to note (1), this registration statement covers such an indeterminate amount and number of subscription rights, representing rights to purchase common stock, preferred stock, warrants and debt securities registered under this registration statement, as may be sold from time to time at indeterminate prices by the registrant. Also covered is such an indeterminate amount of common stock, preferred stock and warrants (in each case, with accompanying purchase rights, if any) and debt securities (i) as may be issuable or

deliverable upon exercise of subscription rights, and (ii) as may be required for delivery upon exercise of any subscription rights as a result of anti-dilution provisions.

- (8) Each unit will represent an interest in two or more securities, which may or may not be separable from one another.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission acting pursuant to said Section 8(a), may determine.



EXPLANATORY NOTE

This registration statement contains two prospectuses:

- a base prospectus which covers the offering, issuance and sale by the registrant of up to a maximum aggregate offering price of \$200,000,000 of the registrant's common stock, preferred stock, debt securities, warrants, subscription rights and/or units; and
- a sales agreement prospectus covering the offering, issuance and sale by the registrant of up to a maximum aggregate offering price of \$50,000,000 of the registrant's common stock that may be issued and sold under a sales agreement with Cantor Fitzgerald & Co.

The base prospectus immediately follows this explanatory note. The specific terms of any securities to be offered pursuant to the base prospectus will be specified in a prospectus supplement to the base prospectus. The sales agreement prospectus immediately follows the base prospectus. The common stock that may be offered, issued and sold by the registrant under the sales agreement prospectus is included in the \$200,000,000 of securities that may be offered, issued and sold by the registrant under the base prospectus. Upon termination of the sales agreement with Cantor Fitzgerald & Co., any portion of the \$50,000,000 included in the sales agreement prospectus that is not sold pursuant to the sales agreement will be available for sale in other offerings pursuant to the base prospectus and a corresponding prospectus supplement, and if no shares are sold under the sales agreement, the full \$50,000,000 of securities may be sold in other offerings pursuant to the base prospectus.

The information in this prospectus is not complete and may be changed. A registration statement relating to these securities has been filed with the Securities and Exchange Commission. These securities may not be sold until the registration statement is effective. This prospectus is not an offer to sell these securities and does not solicit an offer to buy these securities in any state or other jurisdiction where the offer or sale is not permitted.

Subject to completion, dated January 5, 2018

PROSPECTUS

Corbus Pharmaceuticals Holdings, Inc.



\$200,000,000

**Common Stock
Preferred Stock
Warrants
Debt Securities
Subscription Rights
Units**

We may offer, issue and sell from time to time together or separately, in one or more offerings, any combination of (i) our common stock, (ii) our preferred stock, which we may issue in one or more series, (iii) warrants, (iv) senior or subordinated debt securities, (v) subscription rights and (vi) units. The debt securities may consist of debentures, notes, or other types of debt. The debt securities, preferred stock, warrants and subscription rights may be convertible into, or exercisable or exchangeable for, common or preferred stock or other securities of ours. The units may consist of any combination of the securities listed above.

The aggregate public offering price of the securities that we are offering will not exceed \$200,000,000. We will offer the securities in an amount and on terms that market conditions will determine at the time of the offering. Our common stock is listed on the Nasdaq Global Market under the symbol "CRBP." The last reported sale price for our common stock on January 4, 2018 as quoted on the Nasdaq Global Market was \$8.35 per share. You are urged to obtain current market quotations of our common stock. We have no preferred stock, warrants, debt securities, subscription rights or units listed on any market. Each prospectus supplement will indicate if the securities offered thereby will be listed on any securities exchange.

Investing in our securities involves risk. You should carefully consider the risks that we refer you to under the section captioned "Risk Factors" in this prospectus on page 3 before buying our securities.

Should we offer any of the securities described in this prospectus, we will provide you with the specific terms of the particular securities being offered in supplements to this prospectus. You should read this prospectus and any supplement, together with additional information described under the headings "Additional Information" and "Incorporation of Certain Information by Reference" carefully before you invest. This prospectus may not be used to sell securities unless accompanied by a prospectus supplement.

We may sell these securities directly to our stockholders or to other purchasers or through agents on our behalf or through underwriters or dealers as designated from time to time. If any agents or underwriters are involved in the sale of any of these securities, the applicable prospectus supplement will provide the names of the agents or underwriters and any applicable fees, commissions or discounts.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is , 2018

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Corbus Pharmaceuticals Holdings, Inc. is referred to herein as “Corbus,” “the Company,” “we,” “us,” and “our,” unless the context indicates otherwise.

You may only rely on the information contained in this prospectus and the accompanying prospectus supplement or that we have referred you to. We have not authorized anyone to provide you with different information. This prospectus and any prospectus supplement do not constitute an offer to sell or a solicitation of an offer to buy any securities other than the securities offered by this prospectus and the prospectus supplement. This prospectus and any prospectus supplement do not constitute an offer to sell or a solicitation of an offer to buy any securities in any circumstances in which such offer or solicitation is unlawful. Neither the delivery of this prospectus or any prospectus supplement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in our affairs since the date of this prospectus or such prospectus supplement or that the information contained by reference to this prospectus or any prospectus supplement is correct as of any time after its date.

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission (“SEC”) using a “shelf” registration process. Under this shelf registration process, we may from time to time offer and sell, in one or more offerings, any or all of the securities described in this prospectus, separately or together, up to an aggregate offering price of \$200,000,000. This prospectus provides you with a general description of our securities being offered. When we issue the securities being offered by this prospectus, we will provide a prospectus supplement (which term includes, as applicable, the at-the-market sales agreement prospectus filed with the registration statement of which this prospectus forms a part) that will contain specific information about the terms of that offering. The prospectus supplement may also add, update or change information contained in this prospectus. You should read both this prospectus and any prospectus supplement together with additional information described under the heading “Additional Information” and “Incorporation of Certain Information by Reference.”

PROSPECTUS SUMMARY

The following summary highlights some information from this prospectus. It is not complete and does not contain all of the information that you should consider before making an investment decision. You should read this entire prospectus, including the “Risk Factors” section on page 3 and the disclosures to which that section refers you, the financial statements and related notes and the other more detailed information appearing elsewhere or incorporated by reference into this prospectus before investing in any of the securities described in this prospectus.

About Us

We are a clinical stage pharmaceutical company, focused on the development and commercialization of novel therapeutics to treat rare, chronic and serious inflammatory and fibrotic diseases with clear unmet medical needs. Our product anabasum is a novel synthetic oral endocannabinoid-mimetic drug that is intended to resolve chronic inflammation and halt fibrotic processes without causing immunosuppression. Anabasum has generated positive clinical data in three consecutive Phase 2 studies in diffuse cutaneous systemic sclerosis, cystic fibrosis and dermatomyositis. Anabasum is also being evaluated in open-label extension studies in systemic sclerosis and skin-predominant dermatomyositis and in a Phase 3 study in systemic sclerosis, and we are currently planning for and finalizing the design of a Phase 2b study in cystic fibrosis and expect to commence the study in the first quarter of 2018.

Anabasum is a synthetic, rationally-designed oral small molecule drug that selectively binds to the cannabinoid receptor type 2, or CB2, found on activated immune cells, fibroblasts and muscle cells. Anabasum stimulates the production of Specialized Pro-Resolving Lipid Mediators (SPMs) that act to resolve inflammation and halt fibrosis by activating endogenous pathways. These endogenous resolution pathways are normally activated in healthy individuals during the course of normal immune responses but are dysfunctional in patients with chronic inflammatory and fibrotic diseases. Through its activation of the CB2 receptor, anabasum is designed to drive innate immune responses from the activation phase through completion of the resolution phase. The CB2 receptor plays an endogenous role in modulating and resolving inflammation by, in effect, turning heightened inflammation “off” and restoring homeostasis.

We are currently developing anabasum to treat four life-threatening diseases: systemic sclerosis; cystic fibrosis; diffuse cutaneous, skin-predominant dermatomyositis; and systemic lupus erythematosus, or SLE. The United States Food and Drug Administration, or the FDA, has granted anabasum Orphan Designation as well as Fast Track Status for both cystic fibrosis and systemic sclerosis. The European Medicines Authority, or the EMA, has granted anabasum Orphan Designation for both cystic fibrosis and systemic sclerosis.

Recent Developments

Initiation of Phase 3 Clinical Study in Systemic Sclerosis

On December 14, 2017, we announced the initiation of a Phase 3 “RESOLVE-1” clinical study of anabasum for the treatment of diffuse cutaneous systemic sclerosis. The international multicenter Phase 3 RESOLVE-1 study is a double-blind, randomized, placebo-controlled study assessing the efficacy and safety of anabasum for the treatment of systemic sclerosis. The study will enroll approximately 354 subjects at 70 sites in North America, Europe, Israel, Japan, South Korea, and Australia.

The planned duration of treatment with study drug is 52 weeks. Subjects will be randomized 1:1:1 to receive anabasum 5 mg twice per day, anabasum 20 mg twice per day, or placebo twice per day. The primary efficacy outcome of the RESOLVE-1 study will be change from baseline in modified Rodnan Skin Score (“mRSS”), a measure of skin fibrosis and a standard clinical trial outcome in systemic sclerosis. Secondary outcomes of the RESOLVE-1 study include patient- and physician-reported outcomes, forced vital capacity, the American College of Rheumatology Combined Response Index in diffuse cutaneous Systemic Sclerosis (“ACR CRISS”) score, a novel composite measure of clinical improvement from baseline that incorporates change from baseline in mRSS and lung function.

Initiation of Phase 2 Clinical Study in Systemic Lupus Erythematosus

On December 22, 2017, we announced the initiation of a Phase 2 clinical study of anabasum for the treatment of systemic lupus erythematosus, or SLE. This Phase 2 SLE clinical trial is being conducted by the Autoimmunity Centers of Excellence (ACE) program, which is funded by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH).

The randomized, double-blind, placebo-controlled, Phase 2 trial will be conducted at 15 sites in the United States and will enroll 100 adult SLE patients with active musculoskeletal disease. Subjects will be randomized in a 1:1:1:1 ratio to one of four cohorts to receive placebo or three different doses of anabasum for 3 months, with 1-month follow-up. The primary efficacy outcome assesses pain from active musculoskeletal disease, and secondary efficacy outcomes include other assessments of active musculoskeletal disease, overall disease activity using SLE Responder Index, SLE Disease Activity Index and British Isles Lupus Activity Group scoring systems, and patient-reported outcomes.

Intellectual Property Updates

On October 31, 2017, the Company announced that the U.S. Patent and Trademark Office (“USPTO”) issued U.S. Patent No. 9,801,849 to the Company with claims covering the use of pharmaceutical compositions comprising anabasum, Corbus’ lead product in development for the treatment of inflammatory diseases. The patent provides intellectual property protection for Corbus’ use of anabasum to treat inflammatory diseases in the United States through 2034.

On November 27, 2017, the Company announced that the U.S. Patent and Trademark Office (“USPTO”) issued U.S. Patent No. 9,820,964 to the Company with claims covering the use of pharmaceutical compositions comprising anabasum for the treatment of multiple fibrotic diseases, including the Company’s lead indications: systemic sclerosis, dermatomyositis, cystic fibrosis as well as others. The patent provides intellectual property protection in the United States for the use of anabasum through 2034.

Corporate Information

Our principal executive offices are located at 100 River Ridge Drive, Norwood, Massachusetts 02062, and our telephone number is (617) 963-0100. Our website address is www.corbuspharma.com. Our website and the information contained on, or that can be accessed through, our website will not be deemed to be incorporated by reference in, and are not considered part of, this prospectus. You should not rely on our website or any such information in making your decision whether to purchase our securities.

RISK FACTORS

Before purchasing any of the securities you should carefully consider the risk factors set forth below and incorporated by reference in this prospectus from our Annual Report on Form 10-K for the fiscal year ended December 31, 2016 and any subsequent updates described in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as the risks, uncertainties and additional information set forth in our SEC reports on Forms 10-K, 10-Q and 8-K and in the other documents incorporated by reference in this prospectus. For a description of these reports and documents, and information about where you can find them, see “Additional Information” and “Incorporation of Certain Information By Reference.” Additional risks not presently known or that we presently consider to be immaterial could subsequently materially and adversely affect our financial condition, results of operations, business and prospects.

Risk Related to our Company and our Business

Risks Related to Our Financial Position and Need for Capital

We are a clinical stage pharmaceutical company with a limited operating history.

We are a clinical stage pharmaceutical company with a limited operating history. We have to complete clinical studies and receive regulatory approval of a New Drug Application, or NDA, before commercial sales of a product can commence. The likelihood of success of our business plan must be considered in light of the problems, substantial expenses, difficulties, complications and delays frequently encountered in connection with developing and expanding early-stage businesses and the regulatory and competitive environment in which we operate. Pharmaceutical product development is a highly speculative undertaking, involves a substantial degree of risk and is a capital-intensive business.

Accordingly, you should consider our prospects in light of the costs, uncertainties, delays and difficulties frequently encountered by companies in the early stages of development, especially clinical pharmaceutical companies such as ours. Potential investors should carefully consider the risks and uncertainties that a company with a limited operating history will face. In particular, potential investors should consider that we cannot assure you that we will be able to:

- successfully implement or execute our current business plan, and we cannot assure you that our business plan is sound;
- successfully manufacture our clinical product and establish commercial drug supply;
- obtain Drug Enforcement Administration, or DEA, licenses necessary for the manufacturing of anabasum and for evaluating anabasum in our clinical trials;
- successfully complete the clinical trials necessary to obtain regulatory approval for the marketing of anabasum;
- secure market exclusivity and/or adequate intellectual property protection for anabasum;
- attract and retain an experienced management and advisory team;
- secure acceptance of anabasum in the medical community and with third party payors and consumers;
- launch commercial sales of anabasum, whether alone or in collaboration with others; and
- raise sufficient funds in the capital markets to effectuate our business plan.

If we cannot successfully execute any one of the foregoing, our business may not succeed and your investment will be adversely affected.

We have incurred operating losses in each year since our inception and expect to continue to incur substantial losses for the foreseeable future. We may never become profitable or, if we achieve profitability, be able to sustain profitability.

We expect to incur substantial expenses without corresponding revenues unless and until we are able to obtain regulatory approval and successfully commercialize anabasum. We have been engaged in developing anabasum since 2009. To date, we have not generated any revenue from anabasum and we expect to incur significant expense to complete our clinical program for anabasum in the United States and elsewhere. We may never be able to obtain regulatory approval for the marketing of anabasum in any indication in the United States or internationally. Even if we are able to commercialize anabasum or any other product candidate, there can be no assurance that we will generate significant revenues or ever achieve profitability. Our net losses for the nine months ended September 30, 2017 and 2016 and for the years ended December 31, 2016 and December 31, 2015 were approximately \$21,728,000, \$12,428,000, \$19,999,000 and \$8,851,000, respectively. As of September 30, 2017, we had an accumulated deficit of approximately \$55,004,000.

If we were to obtain FDA approval for anabasum, we would expect that our research and development expenses will continue to increase as we advance clinical trials for indications for the treatment of cystic fibrosis, systemic sclerosis, dermatomyositis and systemic lupus erythematosus, or SLE. We may elect to pursue FDA approval for anabasum in other indications, which will result in significant additional research and development expenses. As a result, we expect to continue to incur substantial losses for the foreseeable future, and these losses will increase. We are uncertain when or if we will be able to achieve or sustain profitability. If we achieve profitability in the future, we may not be able to sustain profitability in subsequent periods. Failure to become and remain profitable would impair our ability to sustain operations and adversely affect the price of our common stock and our ability to raise capital.

Our cash or cash equivalents will only fund our operations for a limited time and we will need to raise additional capital to support our development and commercialization efforts.

We are currently operating at a loss and expect our operating costs will increase significantly as we incur further costs related to the clinical trials for anabasum. As of September 30, 2017, we held cash and cash equivalents of approximately \$36.6 million. In October 2017, we completed an underwritten public offering of shares of our common stock pursuant to which we sold an aggregate of 5,347,500 shares of our common stock and received net proceeds of approximately \$35.0 million. We expect our cash and cash equivalents at September 30, 2017 together with the proceeds from the October 2017 offering and the remaining milestone payment of \$500,000 from Cystic Fibrosis Foundation Therapeutics, Inc., which we received in November 2017, to be sufficient to meet our operating and capital requirements into the fourth quarter of 2019 based on current planned expenditures.

Other than the Controlled Equity OfferingSM Sales Agreement, or the Sales Agreement, between us and Cantor Fitzgerald & Co., dated January 5, 2018, pursuant to which we may offer and sell up to \$50.0 million of shares of our common stock from time to time through Cantor Fitzgerald & Co. acting as sales agent, we do not currently have any arrangements or credit facilities in place as a source of funds, and there can be no assurance that we will be able to raise sufficient additional capital on acceptable terms, or at all, including pursuant to the Sales Agreement due to limiting terms contained therein and sales thereunder being subject to market conditions. If we are not successful in raising additional capital, we may not be able to continue as a going concern. We may seek additional capital through a combination of private and public equity offerings, debt financings and strategic collaborations. Debt financing, if obtained, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, and could increase our expenses and require that our assets secure such debt.

Equity financing, if obtained, could result in dilution to our then existing stockholders and/or require such stockholders to waive certain rights and preferences. If such financing is not available on satisfactory terms, or is not available at all, we may be required to delay, scale back or eliminate the development of business opportunities and our operations and financial condition may be materially adversely affected. We can provide no assurances that any additional sources of financing will be available to us on favorable terms, if at all. In addition, if we are unable to secure sufficient capital to fund our operations, we may choose to pursue, as an alternative, strategic collaborations that could require us to share commercial rights to anabasum with third parties in ways that we currently do not intend or on terms that may not be favorable to us. If we choose to pursue additional indications and/or geographies for anabasum or otherwise expand more rapidly than we presently anticipate we may also need to raise additional capital sooner than expected.

Risks Related to Product Development, Regulatory Approval, Manufacturing and Commercialization

We depend entirely on the success of anabasum. If we are unable to generate revenues from anabasum, our ability to create stockholder value will be limited.

Our only product candidate currently is anabasum, for which we have completed Phase 1 safety studies which we are evaluating in subsequent clinical studies. We do not generate revenues from any FDA approved drug products and have no other product candidates in development. There is no guarantee that our clinical trials will be successful or that we will continue with clinical studies to support an approval from the FDA for any indication. We note that most drug candidates never reach the clinical development stage and even those that do have only a small chance of successfully completing clinical development and gaining regulatory approval. Therefore, our business currently depends entirely on the successful development, regulatory approval and commercialization of anabasum, which may never occur.

If we are not able to obtain any required regulatory approvals for anabasum, we will not be able to commercialize our only product candidate and our ability to generate revenue will be limited.

Our clinical trials may be unsuccessful, which would materially harm our business. Even if our ongoing clinical trials are successful, we will be required to conduct additional clinical trials to establish anabasum's safety and efficacy, before a New Drug Application, or NDA, can be filed with the FDA for marketing approval of anabasum.

Clinical testing is expensive, is difficult to design and implement, can take many years to complete and is uncertain as to outcome. Success in early phases of pre-clinical and clinical trials does not ensure that later clinical trials will be successful, and interim results of a clinical trial do not necessarily predict final results. A failure of one or more of our clinical trials can occur at any stage of testing. We may experience numerous unforeseen events during, or as a result of, the clinical trial process that could delay or prevent our ability to receive regulatory approval or commercialize anabasum. The research, testing, manufacturing, labeling, packaging, storage, approval, sale, marketing, advertising and promotion, pricing, export, import and distribution of drug products are subject to extensive regulation by the FDA and other regulatory authorities in the United States and other countries, which regulations differ from country to country. We are not permitted to market anabasum as a prescription pharmaceutical product in the United States until we receive approval of an NDA from the FDA or comparable regulatory agencies for sales in foreign markets until we receive the requisite approval from such countries. In the United States, the FDA generally requires the completion of clinical trials of each drug to establish its safety and efficacy and extensive pharmaceutical development to ensure its quality before an NDA is approved. Regulatory authorities in other jurisdictions impose similar requirements. Of the large number of drugs in development, only a small percentage result in the submission of an NDA to the FDA and even fewer are eventually approved for commercialization. We have never submitted an NDA to the FDA or comparable applications to other regulatory authorities. If our development efforts for anabasum, including regulatory approval, are not successful for its planned indications, or if adequate demand for anabasum is not generated, our business will be harmed.

Receipt of necessary regulatory approval is subject to a number of risks, including the following:

- the FDA or comparable foreign regulatory authorities or institutional review boards, or IRBs, may disagree with the design or implementation of our clinical trials;
- we may not be able to provide acceptable evidence of anabasum's safety and efficacy;
- the results of our clinical trials may not be satisfactory or may not meet the level of statistical or clinical significance required by the FDA, European Medicines Agency, or EMA, or other comparable foreign regulatory authorities for marketing approval;
- the dosing of anabasum in a particular clinical trial may not be at an optimal level;
- patients in our clinical trials may suffer adverse effects for reasons that may or may not be related to anabasum;
- the data collected from clinical trials may not be sufficient to support the submission of an NDA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Failure to obtain regulatory approval for anabasum for the foregoing or any other reasons will prevent us from commercializing this product candidate as a prescription product, and our ability to generate revenue will be materially impaired. We cannot guarantee that regulators will agree with our assessment of the results of our clinical trials or that such trials will be considered by regulators to have shown safety or efficacy of our product candidates. The FDA, EMA and other regulators have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional clinical trials, or pre-clinical or other studies. In addition, varying interpretations of the data obtained from pre-clinical and clinical testing could delay, limit or prevent regulatory approval of a product candidate.

We have only limited experience in filing the applications necessary to gain regulatory approvals and expect to rely on consultants and third party contract research organizations, or CROs, with expertise in this area to assist us in this process. Securing FDA approval requires the submission of pre-clinical, clinical and/or pharmacokinetic data, information about product manufacturing processes and inspection of facilities and supporting information to the FDA for each therapeutic indication to establish a product candidate's safety and efficacy for each indication. Anabasum may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining regulatory approval or prevent or limit commercial use with respect to one or all intended indications.

The process of obtaining regulatory approvals is expensive, often takes many years, if approval is obtained at all, and can vary substantially based upon, among other things, the type, complexity and novelty of the product candidates involved, the jurisdiction in which regulatory approval is sought and the substantial discretion of the regulatory authorities. Changes in the regulatory approval policy during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for a submitted product application may cause delays in the approval or rejection of an application. Regulatory approval obtained in one jurisdiction does not necessarily mean that a product candidate will receive regulatory approval in all jurisdictions in which we may seek approval, but the failure to obtain approval in one jurisdiction may negatively impact our ability to seek approval in a different jurisdiction. Failure to obtain regulatory marketing approval for anabasum in any indication will prevent us from commercializing the product candidate, and our ability to generate revenue will be materially impaired.

Clinical drug development involves a lengthy and expensive process with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results.

Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. The results of pre-clinical studies and early clinical trials may not be predictive of the results of later-stage clinical trials. We cannot assure you that the FDA will view the results as we do or that any future trials of anabasum will achieve positive results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through pre-clinical studies and initial clinical trials. A number of companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier trials. Any future clinical trial results for anabasum may not be successful.

In addition, a number of factors could contribute to a lack of favorable safety and efficacy results for anabasum. For example, such trials could result in increased variability due to varying site characteristics, such as local standards of care, differences in evaluation period and surgical technique, and due to varying patient characteristics, including demographic factors and health status.

Anabasum is our only product candidate in development. If we fail to successfully commercialize anabasum, we may need to acquire additional product candidates and our business will be adversely affected.

We have never commercialized any product candidates and do not have any other compounds in pre-clinical testing, lead optimization or lead identification stages beyond anabasum. We cannot be certain that anabasum will prove to be sufficiently effective and safe to meet applicable regulatory standards for any indication. If we fail to successfully commercialize anabasum as a treatment for cystic fibrosis, systemic sclerosis, dermatomyositis, SLE or any other indication, whether as a stand-alone therapy or in combination with other treatments, our business would be adversely affected.

Even if we receive regulatory approval for anabasum, we still may not be able to successfully commercialize this product, and the revenue that we generate from its sales, if any, may be limited.

If approved for marketing, the commercial success of anabasum will depend upon its acceptance by the medical community, including physicians, patients and health care payors. The degree of market acceptance of anabasum will depend on a number of factors, including:

- demonstration of clinical safety and efficacy;
- relative convenience, pill burden and ease of administration;
- the prevalence and severity of any adverse effects;

- the willingness of physicians to prescribe anabasum and of the target patient population to try new therapies;
- safety, tolerability and efficacy of anabasum compared to competing products;
- the introduction of any new products that may in the future become available to treat indications for which anabasum may be approved;
- new procedures or methods of treatment that may reduce the incidences of any of the indications in which anabasum may show utility;
- pricing and cost-effectiveness;
- the inclusion or omission of anabasum in applicable treatment guidelines;
- the effectiveness of our or any future collaborators' sales and marketing strategies;
- limitations or warnings contained in FDA-approved labeling;
- our ability to obtain and maintain sufficient third-party coverage or reimbursement from government health care programs, including Medicare and Medicaid, private health insurers and other third-party payors; and
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage or reimbursement.

If anabasum is approved, but does not achieve an adequate level of acceptance by physicians, health care payors and patients, we may not generate sufficient revenue and we may not be able to achieve or sustain profitability. Our efforts to educate the medical community and third-party payors on the benefits of anabasum may require significant resources and may never be successful.

In addition, even if we obtain regulatory approvals, the timing or scope of any approvals may prohibit or reduce our ability to commercialize anabasum successfully. For example, if the approval process takes too long, we may miss market opportunities and give other companies the ability to develop competing products or establish market dominance. Any regulatory approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render anabasum not commercially viable. For example, regulatory authorities may approve anabasum for fewer or more limited indications than we request, may not approve the price we intend to charge for anabasum, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve anabasum with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that indication. Further, the FDA or comparable foreign regulatory authorities may place conditions on approvals, such as risk management plans and a Risk Evaluation and Mitigation Strategy, or REMS, 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 an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA may also require a REMS for an approved product when new safety information emerges. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of anabasum. Moreover, product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following the initial marketing of the product. Any of the foregoing scenarios could materially harm the commercial success of anabasum.

Even if we obtain marketing approval for anabasum, we will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. Additionally, anabasum could be subject to labeling and other restrictions and withdrawal from the market and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with anabasum.

Even if we obtain United States regulatory approval of anabasum for an indication, the FDA may still impose significant restrictions on its indicated uses or marketing or the conditions of approval, or impose ongoing requirements for potentially costly and time-consuming post-approval studies, including Phase 4 clinical trials, and post-market surveillance to monitor safety and efficacy. Anabasum will also be subject to ongoing regulatory requirements governing the manufacturing, labeling, packaging, storage, distribution, safety surveillance, advertising, promotion, recordkeeping and reporting of adverse events and other post-market information. These requirements include registration with the FDA, continued compliance with current Good Clinical Practices regulations, or cGCPs, for any clinical trials that we conduct post-approval, continued compliance with the CSA and ongoing review by the DEA. In addition, manufacturers of drug products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with current Good Manufacturing Practices, or cGMP, requirements relating to quality control, quality assurance and corresponding maintenance of records and documents.

With respect to sales and marketing activities by us or any future partner, advertising and promotional materials must comply with FDA rules in addition to other applicable federal, state and local laws in the United States and similar legal requirements in other countries. In the United States, the distribution of product samples to physicians must comply with the requirements of the U.S. Prescription Drug Marketing Act. Application holders must obtain FDA approval for product and manufacturing changes, depending on the nature of the change. We may also be subject, directly or indirectly through our customers and partners, to various fraud and abuse laws, including, without limitation, the U.S. Anti-Kickback Statute, U.S. False Claims Act, and similar state laws, which impact, among other things, our proposed sales, marketing, and scientific/educational grant programs. If we participate in the U.S. Medicaid Drug Rebate Program, the Federal Supply Schedule of the U.S. Department of Veterans Affairs, or other government drug programs, we will be subject to complex laws and regulations regarding reporting and payment obligations. All of these activities are also potentially subject to U.S. federal and state consumer protection and unfair competition laws. Similar requirements exist in many of these areas in other countries.

In addition, if anabasum is approved for an indication, our product labeling, advertising and promotion would be subject to regulatory requirements and continuing regulatory review. The FDA strictly regulates the promotional claims that may be made about prescription products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling. If we receive marketing approval for anabasum, physicians may nevertheless legally prescribe our products to their patients in a manner that is inconsistent with the approved label. However, if we are found to have promoted such off-label uses, we may become subject to significant liability and government fines. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees of permanent injunctions under which specified promotional conduct is changed or curtailed.

If we or a regulatory agency discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency or problems with the facility where the product is manufactured, or if we or our manufacturers fail to comply with applicable regulatory requirements, we may be subject to the following administrative or judicial sanctions:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- issuance of warning letters or untitled letters;

- injunctions or the imposition of civil or criminal penalties or monetary fines;
- suspension of any ongoing clinical trials;
- refusal to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product license approvals;
- suspension of, or imposition of restrictions on, operations, including costly new manufacturing requirements; or
- product seizure or detention or refusal to permit the import or export of product.

The occurrence of any event or penalty described above may inhibit our ability to commercialize anabasum and generate revenue. Adverse regulatory action, whether pre- or post-approval, can also potentially lead to product liability claims and increase our product liability exposure.

We currently have no sales and marketing organization. If we are unable to secure a sales and marketing partner or establish satisfactory sales and marketing capabilities, we may not successfully commercialize anabasum.

At present, we have no sales or marketing personnel. In order to commercialize products that are approved for commercial sales, we must either collaborate with third parties that have such commercial infrastructure or develop our own sales and marketing infrastructure. If we are not successful in entering into appropriate collaboration arrangements, or recruiting sales and marketing personnel or in building a sales and marketing infrastructure, we will have difficulty successfully commercializing anabasum, which would adversely affect our business, operating results and financial condition.

We may not be able to enter into collaboration agreements on terms acceptable to us or at all. In addition, even if we enter into such relationships, we may have limited or no control over the sales, marketing and distribution activities of these third parties. Our future revenues may depend heavily on the success of the efforts of these third parties. If we elect to establish a sales and marketing infrastructure we may not realize a positive return on this investment. In addition, we will have to compete with established and well-funded pharmaceutical and biotechnology companies to recruit, hire, train and retain sales and marketing personnel. Factors that may inhibit our efforts to commercialize anabasum without strategic partners or licensees include:

- our inability to recruit and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to or persuade adequate numbers of physicians to prescribe anabasum;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

We face 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 and subject to rapid and significant technological change. We have competitors in a number of jurisdictions, many of which have substantially greater name recognition, commercial infrastructures and financial, technical and personnel resources than we have. Established competitors may invest heavily to quickly discover and develop novel compounds that could make anabasum obsolete or uneconomical. Any new product that competes with an approved product may need to demonstrate compelling advantages in efficacy, cost, convenience, tolerability and safety to be commercially successful. Other competitive factors, including generic competition, could force us to lower prices or could result in reduced sales. In addition, new products developed by others could emerge as competitors to anabasum. If we are not able to compete effectively against our current and future competitors, our business will not grow and our financial condition and operations will suffer.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize anabasum and affect the prices we may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval for anabasum, restrict or regulate post-approval activities and affect our ability to profitably sell anabasum. Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We do not know whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of anabasum, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

In the United States, the Medicare Modernization Act, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for drugs. In addition, this legislation authorized Medicare Part D prescription drug plans to use formularies where they can limit the number of drugs that will be covered in any therapeutic class. As a result of this legislation and the expansion of federal coverage of drug products, we expect that there will be additional pressure to contain and reduce costs. These cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for anabasum and could seriously harm our business. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates, and any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 or, collectively, the Health Care Reform Law, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Effective October 1, 2010, the Health Care Reform Law revised the definition of "average manufacturer price" for reporting purposes, which could increase the amount of Medicaid drug rebates to states. Further, the new law imposed a significant annual fee on companies that manufacture or import branded prescription drug products. Substantial new provisions affecting compliance have also been enacted, which may require us to modify our business practices with healthcare practitioners, and incur substantial costs to ensure compliance. Subsequent to the 2016 presidential election, some members of the U.S. Congress are working to repeal the Health Care Reform Law. More recently, President Trump and the Republican majorities in both houses of the U.S. Congress have been seeking to repeal or replace all or portions of the Health Care Reform Law, but to date they have been unable to agree on any such legislation. While we are unable to predict what legislation, if any, may potentially be enacted, to the extent that future changes affect how our product candidates could be paid for and/or reimbursed by the government and private payers, our business could be adversely affected.

Despite initiatives to invalidate the Health Care Reform Law, at this time it appears the implementation of the Health Care Reform Law will continue. We will not know the full effects of the Health Care Reform Law until applicable federal and state agencies issue regulations or guidance under the new law. Although it is too early to determine the effect of the Health Care Reform Law, the new law appears likely to continue the pressure on pharmaceutical pricing, especially under the Medicare program, and may also increase our regulatory burdens and operating costs.

In addition, other legislative changes have been proposed and adopted in the United States since the Health Care Reform Law was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013. On January 2, 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, or the ATRA, which delayed for another two months the budget cuts mandated by these sequestration provisions of the Budget Control Act of 2011. The ATRA, among other things, also reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. We expect that additional federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, and in turn could significantly reduce the projected value of certain development projects and reduce our profitability.

Our future growth depends, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future profitability will depend, in part, on our ability to commercialize anabasum in foreign markets for which we intend to rely on collaborations with third parties. If we commercialize anabasum in foreign markets, we would be subject to additional risks and uncertainties, including:

- our customers' ability to obtain reimbursement for anabasum in foreign markets;
- our inability to directly control commercial activities because we are relying on third parties;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements;
- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- import or export licensing requirements;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers for technical training;
- reduced protection of intellectual property rights in some foreign countries;
- foreign currency exchange rate fluctuations; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

Foreign sales of anabasum could also be adversely affected by the imposition of governmental controls, political and economic instability, trade restrictions and changes in tariffs, any of which may adversely affect our results of operations.

If we market anabasum in a manner that violates healthcare fraud and abuse laws, or if we violate government price reporting laws, we may be subject to civil or criminal penalties.

The FDA enforces laws and regulations which require that the promotion of pharmaceutical products be consistent with the approved prescribing information. While physicians may prescribe an approved product for a so-called "off label" use, it is unlawful for a pharmaceutical company to promote its products in a manner that is inconsistent with its approved label and any company which engages in such conduct may be subject to significant liability. Similarly, industry codes in the European Union and other foreign jurisdictions prohibit companies from engaging in off-label promotion and regulatory agencies in various countries enforce violations of the code with civil penalties. While we intend to ensure that our promotional materials are consistent with our label, regulatory agencies may disagree with our assessment and may issue untitled letters, warning letters or may institute other civil or criminal enforcement proceedings. In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal healthcare fraud and abuse laws have been applied in recent years to restrict certain marketing practices in the pharmaceutical industry. These laws include the U.S. Anti-Kickback Statute, U.S. False Claims Act and similar state laws. Because of the breadth of these laws and the narrowness of the safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of these laws.

The U.S. 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. This statute has been interpreted broadly to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Although there are several statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchasing or recommending may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Our practices may not, in all cases, meet all of the criteria for safe harbor protection from anti-kickback liability. Moreover, recent health care reform legislation has strengthened these laws. For example, the Health Care Reform Law, among other things, amends the intent requirement of the U.S. Anti-Kickback Statute and criminal health care fraud statutes; a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it. In addition, the Health Care Reform Law provides that the government may assert that a claim including items or services resulting from a violation of the U.S. Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the U.S. False Claims Act. Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, or causing to be made, a false statement to get a false claim paid.

Over the past few years, pharmaceutical and other healthcare companies have been prosecuted under these laws for a variety of alleged promotional and marketing activities, such as: allegedly providing free trips, free goods, sham consulting fees and grants and other monetary benefits to prescribers; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in off-label promotion that caused claims to be submitted to Medicare or Medicaid for non-covered, off-label uses; and submitting inflated best price information to the Medicaid Rebate Program to reduce liability for Medicaid rebates. Most states also have statutes or regulations similar to the U.S. Anti-Kickback Statute and the U.S. False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. Sanctions under these federal and state laws may include substantial civil monetary penalties, exclusion of a manufacturer's products from reimbursement under government programs, substantial criminal fines and imprisonment.

We are, and will be, completely dependent on third parties to manufacture anabasum, and our commercialization of anabasum could be halted, delayed or made less profitable if those third parties fail to obtain manufacturing approval from the FDA or comparable foreign regulatory authorities, fail to provide us with sufficient quantities of anabasum or fail to do so at acceptable quality levels or prices.

We do not currently have, nor do we plan to acquire, the capability or infrastructure to manufacture the active pharmaceutical ingredient, or the finished anabasum drug product in tablet form, for use in our clinical trials or for commercial product, if any. As a result, we will be obligated to rely on contract manufacturers if and when anabasum is approved for commercialization.

The facilities used by our contract manufacturers to manufacture anabasum must be approved by the FDA pursuant to inspections that will be conducted after we submit our NDA to the FDA. We do not control the manufacturing processes of, and are completely dependent on, our contract manufacturing partners for compliance with cGMPs for manufacture of both active drug substances and finished drug products. These cGMP regulations cover all aspects of the manufacturing, testing, quality control and record keeping relating to anabasum. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of anabasum or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market anabasum, if approved.

Our contract manufacturers will be subject to ongoing periodic unannounced inspections by the FDA and corresponding state and foreign agencies for compliance with cGMPs and similar regulatory requirements. We will not have control over our contract manufacturers' compliance with these regulations and standards. Failure by any of our contract manufacturers to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, failure to grant approval to market anabasum, delays, suspensions or withdrawals of approvals, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect our business. In addition, we will not have control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. Failure by our contract manufacturers to comply with or maintain any of these standards could adversely affect our ability to develop, obtain regulatory approval for or market anabasum.

If for any reason, these third parties are unable or unwilling to perform, we may not be able to terminate our agreements with them, and we may not be able to locate alternative manufacturers or formulators or enter into favorable agreements with them and we cannot be certain that any such third parties will have the manufacturing capacity to meet future requirements. If these manufacturers or any alternate manufacturer of finished drug product experiences any significant difficulties in its respective manufacturing processes for our active pharmaceutical ingredient, or API, or our finished anabasum product or should cease doing business with us, we could experience significant interruptions in the supply of anabasum or may not be able to create a supply of anabasum at all. Were we to encounter manufacturing issues, our ability to produce a sufficient supply of anabasum might be negatively affected. Our inability to coordinate the efforts of our third party manufacturing partners, or the lack of capacity available at our third party manufacturing partners, could impair our ability to supply anabasum at required levels. Because of the significant regulatory requirements that we would need to satisfy in order to qualify a new bulk or finished product manufacturer, if we face these or other difficulties with our current manufacturing partners, we could experience significant interruptions in the supply of anabasum if we decided to transfer the manufacture of anabasum to one or more alternative manufacturers in an effort to deal with the difficulties.

Any manufacturing problem or the loss of a contract manufacturer could be disruptive to our operations and result in lost sales. Additionally, we rely on third parties to supply the raw materials needed to manufacture our potential products. Any reliance on suppliers may involve several risks, including a potential inability to obtain critical materials and reduced control over production costs, delivery schedules, reliability and quality. Any unanticipated disruption to a future contract manufacturer caused by problems at suppliers could delay shipment of anabasum, increase our cost of goods sold and result in lost sales.

We cannot guarantee that our manufacturing and supply partners will be able to manufacture anabasum at commercial scale on a cost-effective basis. If the commercial-scale manufacturing costs of anabasum are higher than expected, these costs may significantly impact our operating results. In order to reduce costs, we may need to develop and implement process improvements. However, in order to do so, we will need, from time to time, to notify or make submissions with regulatory authorities, and the improvements may be subject to approval by such regulatory authorities. We cannot be sure that we will receive these necessary approvals or that these approvals will be granted in a timely fashion. We also cannot guarantee that we will be able to enhance and optimize output in our commercial manufacturing process. If we cannot enhance and optimize output, we may not be able to reduce our costs over time.

Our product candidate, anabasum, is currently classified as a Schedule I controlled substance subject to U.S. controlled substance laws and regulations, including regulations of the Drug Enforcement Agency and the U.S. Food and Drug Administration. Failure to obtain the necessary licenses and registrations and failure to comply with these laws could result in the delay in the manufacturing and distribution of anabasum and could delay the completion of clinical studies. Such delays and the cost of compliance with these laws and regulations, could adversely affect our business operations and our financial condition.

In the United States, our product candidate, anabasum, is currently classified as a Schedule I controlled substance as defined in the Controlled Substance Act ("CSA"). This designation is based on anabasum's chemical structure and pharmacology (namely, it being a synthetic endocannabinoid mimetic that binds to the CB2 receptor). Even though anabasum's mechanism of action is to modulate the immune system and results to date from clinical studies have demonstrated the drug has no psychotropic effects (which we believe is unlike other members of its chemical class), the DEA classifies anabasum as a Schedule I substance.

Schedule I controlled substances are pharmaceutical products subject to specific regulations under the CSA, which establishes, among other things, certain registration, manufacturing quotas, security, recordkeeping, reporting, import, export and other requirements administered by the DEA. All parties responsible for the manufacturing, distribution and testing of the drug in clinical studies must apply for and obtain a license from the DEA before they are permitted to perform these activities with anabasum. Furthermore, these parties must have the security, control, recordkeeping, reporting and inventory mechanisms required by the DEA to prevent drug loss and diversion. All licensed facilities are required to renew their registrations annually if they intend to continue to work with our drug. The DEA conducts periodic inspections of certain registered establishments that handle controlled substances. We have been working with our manufacturers, distributors, exporters and clinical sites to obtain the necessary licenses to work with anabasum. The parties responsible for the manufacturing, distribution and export of anabasum have already applied for and have been granted DEA licenses and a number of institutions responsible for conducting our current clinical studies have also been granted DEA licenses. However, the failure to maintain the necessary registrations, and the delay or failure of additional clinical sites to obtain DEA registrations, could delay the manufacturing, distribution and export of anabasum and could delay the completion of the clinical studies. Furthermore, failure to maintain compliance with the CSA, particularly non-compliance resulting in loss or diversion, could result in regulatory action that could have a material adverse effect on our business, financial condition and results of operations. The DEA may seek civil penalties, refuse to renew necessary registrations, or initiate proceedings to restrict, suspend or revoke those registrations. In certain circumstances, violations could lead to criminal proceedings. In addition, if the FDA, DEA, or any foreign regulatory authority determines that anabasum may have potential for abuse, it may require us to generate more clinical or other data than we currently anticipate to establish whether or to what extent the substance has an abuse potential, which could increase the cost and/or delay the launch of anabasum.

Individual states have also established controlled substance laws and regulations. Though state-controlled substances laws often mirror federal law, because the states are separate jurisdictions, they may separately schedule drugs, as well. While some states automatically schedule a drug based on federal action, other states schedule drugs through rulemaking or a legislative action. The requirement for state registrations could also result in delay of the manufacturing and distribution of anabasum or in the completion of our clinical studies. We and our manufacturing vendors and clinical sites must also obtain separate state registrations, permits or licenses in order to be able to obtain, handle and distribute controlled substances for clinical trials or commercial sale, and failure to meet applicable regulatory requirements could lead to enforcement and sanctions by the states in addition to those from the DEA or otherwise arising under federal law.

The manufacturing and distribution of anabasum is subject to the DEA's annual manufacturing and procurement quota requirements. The annual quota allocated to us or our contract manufacturers for the controlled substances in anabasum may not be sufficient to complete clinical trials. Consequently, any delay or refusal by the DEA in establishing our, or our contract manufacturers', procurement and/or production quota for controlled substances could delay or stop our clinical trials or product launches, which could have a material adverse effect on our business, financial position and operations.

Delays in shipping anabasum could have a material adverse effect on our business, results of operations and financial condition.

The import and export of anabasum requires import and export licenses. However, because anabasum is currently a Schedule I controlled substance in the United States, in addition to the FDA and U.S. Customs and Border Protection, its import and export is also regulated by the DEA. We may not be granted, or if granted, maintain, such licenses for import or export from the authorities these regulatory agencies. Even if we obtain the relevant licenses, shipments of anabasum may be held up in transit by any of these authorities, which could cause significant delays and may lead to product batches which no longer meet specifications for use in clinical trials or commercial distribution. Such events could result in delayed development timelines, increased expenses and partial or total loss of revenue from anabasum.

We expect that we will rely on third parties to assist us in conducting clinical trials for anabasum. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize anabasum and our business would be substantially harmed.

We expect to enter into agreements with third-party CROs to assist us in conducting and managing our clinical programs, including contracting with clinical sites to perform our clinical studies. We plan to rely on these parties for execution of clinical studies for anabasum and we will control only certain aspects of conducting the clinical studies. Nevertheless, we will be responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on CROs and clinical sites will not relieve us of our regulatory responsibilities. We and our CROs will be required to comply with cGCPs, which are regulations and guidelines enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area and comparable foreign regulatory authorities for any products in clinical development. The FDA enforces these cGCP regulations through periodic inspections of trial sponsors, principal investigators and trial sites. If we or our CROs fail to comply with applicable cGCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that, upon inspection, the FDA will determine that any of our clinical trials comply with cGCPs. In addition, our clinical trials must be conducted with products produced under cGMP regulations and will require a large number of test subjects. Our failure or the failure of our CROs or clinical sites to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process and could also subject us to enforcement action up to and including civil and criminal penalties.

Although we intend to design the clinical trials for anabasum in consultation with CROs, we expect that the CROs will manage all of the clinical trials conducted at contracted clinical sites. As a result, many important aspects of our drug development programs would be outside of our direct control. In addition, the CROs and clinical sites may not perform all of their obligations under arrangements with us or in compliance with regulatory requirements. If the CROs or clinical sites do not perform clinical trials in a satisfactory manner, or if they breach their obligations to us or fail to comply with regulatory requirements, the development and commercialization of anabasum for the subject indication may be delayed or our development program materially and irreversibly harmed. We cannot control the amount and timing of resources these CROs and clinical sites will devote to our program or anabasum. If we are unable to rely on clinical data collected by our CROs, we could be required to repeat, extend the duration of, or increase the size of our clinical trials, which could significantly delay commercialization and require significantly greater expenditures.

If any of our relationships with these third-party CROs or clinical sites terminate, we may not be able to enter into arrangements with alternative CROs or clinical sites. If CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements or for other reasons, any such clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize anabasum. As a result, our financial results and the commercial prospects for anabasum would be harmed, our costs could increase and our ability to generate revenue could be delayed.

Any termination or suspension of or delays in the commencement or completion of any necessary studies of anabasum for any indications could result in increased costs to us, delay or limit our ability to generate revenue and adversely affect our commercial prospects.

The commencement and completion of clinical studies can be delayed for a number of reasons, including delays related to:

- the FDA failing to grant permission to proceed and placing the clinical study on hold;
- subjects failing to enroll or remain in our trials at the rate we expect;

- a facility manufacturing anabasum being ordered by the FDA or other government or regulatory authorities to temporarily or permanently shut down due to violations of cGMP requirements or other applicable requirements, or cross-contaminations of product in the manufacturing process;
- any changes to our manufacturing process that may be necessary or desired;
- subjects choosing an alternative treatment for the indications for which we are developing anabasum, or participating in competing clinical studies;
- subjects experiencing severe or unexpected drug-related adverse effects;
- reports of similar technologies and products raising safety and/or efficacy concerns;
- third-party clinical investigators losing their license or permits necessary to perform our clinical trials, not performing our clinical trials on our anticipated schedule or employing methods consistent with the clinical trial protocol, cGCP requirements, or other third parties not performing data collection and analysis in a timely or accurate manner;
- inspections of clinical study sites by the FDA or IRBs finding regulatory violations that require us to undertake corrective action, result in suspension or termination of one or more sites or the imposition of a clinical hold on the entire study, or that prohibit us from using some or all of the data in support of our marketing applications;
- third-party contractors becoming debarred or suspended or otherwise penalized by the FDA or other government or regulatory authorities for violations of regulatory requirements, in which case we may need to find a substitute contractor, and we may not be able to use some or any of the data produced by such contractors in support of our marketing applications;
- one or more IRBs refusing to approve, suspending or terminating the study at an investigational site precluding enrollment of additional subjects, or withdrawing its approval of the trial; reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- deviations of the clinical sites from trial protocols or dropping out of a trial;
- adding new clinical trial sites;
- the inability of the CRO to execute any clinical trials for any reason; and
- government or regulatory delays or “clinical holds” requiring suspension or termination of a trial.

Product development costs for anabasum will increase if we have delays in testing or approval or if we need to perform more or larger clinical studies than planned. Additionally, changes in regulatory requirements and policies may occur and we may need to amend study protocols to reflect these changes. Amendments may require us to resubmit our study protocols to the FDA and IRBs for reexamination, which may impact the costs, timing or successful completion of that study. If we experience delays in completion of, or if we, the FDA or other regulatory authorities, the IRB, or other reviewing entities, or any of our clinical study sites suspend or terminate any of our clinical studies of anabasum, its commercial prospects may be materially harmed and our ability to generate product revenues will be delayed. Any delays in completing our clinical trials will increase our costs, slow down our development and approval process and jeopardize our ability to commence product sales and generate revenues. Any of these occurrences may harm our business, financial condition and prospects significantly. In addition, many of the factors that cause, or lead to, termination or suspension of, or a delay in the commencement or completion of, clinical studies may also ultimately lead to the denial of regulatory approval of anabasum. In addition, if one or more clinical studies are delayed, our competitors may be able to bring products to market before we do, and the commercial viability of anabasum could be significantly reduced.

We may not be able to obtain or maintain orphan drug designation or exclusivity for our product candidates.

We have been granted orphan drug designation in the United States and in the European Union for anabasum for the treatment of cystic fibrosis and systemic sclerosis. We also intend to seek orphan drug status for anabasum for the treatment of dermatomyositis. Upon receipt of regulatory approval, orphan drug status will provide us with seven years of market exclusivity in the United States under the Orphan Drug Act. However, there is no guarantee that the FDA will grant orphan drug designation for anabasum for dermatomyositis or any other indication, which would make us ineligible for the additional exclusivity and other benefits of orphan drug designation. Moreover, there can be no assurance that another company also holding orphan drug designation for the same indication or which may receive orphan drug designation in the future will not receive approval prior to us, in which case our competitor would have the benefit of the seven years of market exclusivity, and we would be unable to commercialize our product for the same indication until the expiration of the seven-year period. Even if we are the first to obtain approval for the orphan drug indication, there are circumstances under which a competing product may be approved for the same indication during our seven-year period of exclusivity.

Under the Orphan Drug Act, the FDA may grant orphan drug designation to a drug 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 and for which there is no reasonable expectation that the cost of developing and making a drug available in the United States for this type of disease or condition will be recovered from sales of the product. Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan designation does not convey any advantage in or shorten the duration of regulatory review and approval process. In addition to the potential period of exclusivity, orphan designation makes a company eligible for grant funding of up to \$400,000 per year for four years to defray costs of clinical trial expenses, tax credits for clinical research expenses and potential exemption from the FDA application user fee.

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 drug exclusivity, which means the FDA may not approve any other applications to market the same drug for the same indication for seven years, except in limited circumstances, such as (i) the drug's orphan designation is revoked; (ii) its marketing approval is withdrawn; (iii) the orphan exclusivity holder consents to the approval of another applicant's product; (iv) the orphan exclusivity holder is unable to assure the availability of a sufficient quantity of drug; or (v) a showing of clinical superiority to the product with orphan exclusivity by a competitor product. If a drug designated as an orphan product receives marketing approval for an indication broader than what is designated, it may not be entitled to orphan drug exclusivity. There can be no assurance that we will receive orphan drug designation for anabasum for the treatment of dermatomyositis, or other inflammatory disease indications, if we elect to seek such applications.

Any fast track designation or grant of priority review status by the FDA may not actually lead to a faster development or regulatory review or approval process, nor will it assure FDA approval of our product candidates. Additionally, our product candidates may treat indications that do not qualify for priority review vouchers.

We have received fast track designation for anabasum for the treatment of cystic fibrosis and systemic sclerosis in the United States and European Union and may seek fast track designation or priority review of applications for approval of our product candidate for future indications. If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA fast track designation. If a product candidate offers major advances in treatment, the FDA may designate it eligible for priority review. The FDA has broad discretion whether or not to grant these designations, so even if we believe a particular product candidate is eligible for these designations, we cannot assure you that the FDA would decide to grant them. Even if we do receive fast track designation or priority review, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program.

Any breakthrough therapy designation granted by the FDA for our product candidate may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidate will receive marketing approval.

We have applied for, and may in the future apply for, a breakthrough therapy designation for our product candidate. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs and biologics that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA may also be eligible for accelerated approval if the relevant criteria are met.

Designation of a product candidate as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe our product candidate meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as breakthrough therapies, the FDA may later decide that the products no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Third-party coverage and reimbursement and health care cost containment initiatives and treatment guidelines may constrain our future revenues.

Our ability to successfully market anabasum will depend in part on the level of reimbursement that government health administration authorities, private health coverage insurers and other organizations provide for the cost of our products and related treatments. Countries in which anabasum is expected to be sold through reimbursement schemes under national health insurance programs frequently require that manufacturers and sellers of pharmaceutical products obtain governmental approval of initial prices and any subsequent price increases. In certain countries, including the United States, government-funded and private medical care plans can exert significant indirect pressure on prices. We may not be able to sell anabasum profitably if adequate prices are not approved or coverage and reimbursement is unavailable or limited in scope. Increasingly, third-party payors attempt to contain health care costs in ways that are likely to impact our development of products including:

- failing to approve or challenging the prices charged for health care products;
- introducing reimportation schemes from lower priced jurisdictions;

- limiting both coverage and the amount of reimbursement for new therapeutic products;
- denying or limiting coverage for products that are approved by the regulatory agencies but are considered to be experimental or investigational by third-party payors; and
- refusing to provide coverage when an approved product is used in a way that has not received regulatory marketing approval.

Risks Relating to Our Intellectual Property Rights

It is difficult and costly to protect our intellectual property rights, and we cannot ensure the protection of these rights.

Our commercial success will depend, in part, on maintaining and obtaining additional patent protection for our technologies, products and processes, successfully defending these patents against third-party challenges and successfully enforcing these patents against third party competitors. The patent positions of pharmaceutical companies can be highly uncertain and involve complex legal, scientific and factual questions for which important legal principles remain unresolved. Changes in either the patent laws or in interpretations of patent laws may diminish the value of our intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowable in our pending applications or, the enforceability of our existing and future patents. Our pending patent applications for anabasum and its uses may never be approved by United States or foreign patent offices and the existing patents and patent applications relating to anabasum and related technologies may be challenged, invalidated or circumvented by third parties and may not protect us against competitors with similar products or technologies.

The degree of our current and future protection for our proprietary rights is uncertain, because legal means afford only limited protection and may not adequately protect our rights, permit us to gain or keep our competitive advantage, or provide us with any competitive advantage at all. For example, others have filed, and in the future are likely to file, patent applications covering products and technologies that are similar, identical or competitive to anabasum, or important to our business. We cannot be certain that any patents or patent application owned by a third party will not have priority over patents and patent applications filed by us, or that we will not be involved in interference, opposition or invalidity proceedings before United States or foreign patent offices.

We also rely on trade secrets to protect technology, especially in cases when we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. While we require employees, academic collaborators, consultants and other contractors to enter into confidentiality agreements, we may not be able to adequately protect our trade secrets or other proprietary or licensed information. Typically, research collaborators and scientific advisors have rights to publish data and information in which we may have rights. If we cannot maintain the confidentiality of our proprietary technology and other confidential information, our ability to receive patent protection and our ability to protect valuable information owned by us may be imperiled. Enforcing a claim that a third-party entity illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts are sometimes less willing to protect trade secrets than patents. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how.

If we fail to maintain or obtain additional patent protection or trade secret protection for anabasum or our technologies, third parties could use our proprietary information, which could impair our ability to compete in the market and adversely affect our ability to generate revenues and attain profitability.

We may also rely on the trademarks we may develop to distinguish our products from the products of our competitors. We cannot guarantee that any trademark applications filed by us or our business partners will be approved. Third parties may also oppose such trademark applications, or otherwise challenge our use of the trademarks. In the event that the trademarks we use are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition, and could require us to devote resources to advertising and marketing new brands. Further, we cannot provide assurance that competitors will not infringe the trademarks we use, or that we will have adequate resources to enforce these trademarks.

Anabasum may infringe the intellectual property rights of others, which could increase our costs and delay or prevent our development and commercialization efforts.

Our success depends in part on avoiding infringement of the proprietary technologies of others. The pharmaceutical industry has been characterized by frequent litigation regarding patent and other intellectual property rights. Identification of third party patent rights that may be relevant to our proprietary technology is difficult because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. Additionally, because patent applications are maintained in secrecy until the application is published, we may be unaware of third-party patents that may be infringed by commercialization of anabasum or any future product candidate. There may be certain issued patents and patent applications claiming subject matter that we may be required to license in order to research, develop or commercialize anabasum, and we do not know if such patents and patent applications would be available to license on commercially reasonable terms, or at all. Any claims of patent infringement asserted by third parties would be time-consuming and may:

- result in costly litigation;
- divert the time and attention of our technical personnel and management;
- prevent us from commercializing a product until the asserted patent expires or is held finally invalid or not infringed in a court of law;
- require us to cease or modify our use of the technology and/or develop non-infringing technology; or
- require us to enter into royalty or licensing agreements.

Although no third party has asserted a claim of infringement against us, others may hold proprietary rights that could prevent anabasum from being marketed. Any patent-related legal action against us claiming damages and seeking to enjoin commercial activities relating to anabasum or our processes could subject us to potential liability for damages and require us to obtain a license to continue to manufacture or market anabasum or any future product candidates. We cannot predict whether we would prevail in any such actions or that any license required under any of these patents would be made available on commercially acceptable terms, if at all. In addition, we cannot be sure that we could redesign anabasum or any future product candidates or processes to avoid infringement, if necessary. Accordingly, an adverse determination in a judicial or administrative proceeding, or the failure to obtain necessary licenses, could prevent us from developing and commercializing anabasum or a future product candidate, which could harm our business, financial condition and operating results.

A number of companies, including several major pharmaceutical companies, have conducted research on anti-inflammatory and anti-fibrosis therapies which resulted in the filing of many patent applications related to this research. If we were to challenge the validity of these or any issued United States patent in court, we would need to overcome a statutory presumption of validity that attaches to every issued United States patent. This means that, in order to prevail, we would have to present clear and convincing evidence as to the invalidity of the patent's claims.

If we were to challenge the validity of these or any issued United States patent in an administrative trial before the Patent Trial and Appeal Board in the United States Patent and Trademark Office, we would have to prove that the claims are unpatentable by a preponderance of the evidence. There is no assurance that a jury and/or court would find in our favor on questions of infringement, validity or enforceability.

We may be subject to claims that we have wrongfully hired an employee from a competitor or that we or our employees have wrongfully used or disclosed alleged confidential information or trade secrets of their former employers.

As is commonplace in our industry, we employ individuals who were previously employed at other pharmaceutical companies, including our competitors or potential competitors. Although no claims against us are currently pending, we may be subject in the future to claims that our employees or prospective employees are subject to a continuing obligation to their former employers (such as non-competition or non-solicitation obligations) or claims that our employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

We may be subject to claims challenging the inventorship of our patents and other intellectual property.

Although we are not aware of any asserted third-party claims challenging inventorship on our patents or ownership of our intellectual property, we may in the future be subject to claims that former employees, strategic partners, commercial counterparties or other third parties have an interest in our patents or other intellectual property as an inventor or co-inventor. While it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we cannot fully control the enforcement of these policies by third parties with which we contract, nor can we be certain that assignment agreements between us and our employees, between us and our counterparties, or between our counterparties and their employees, will effectively protect our interests as to any party who conceives or develops intellectual property that we regard as our own. Among other issues, the assignment of intellectual property rights may not be self-executing, the assignment agreements may be breached, or we may have disputes arise from conflicting obligations of consultants or others who are involved in developing our product candidates. As we approach potential commercialization of our product candidates, we are more closely analyzing all facts that we believe might be used to assert an inventorship claim against us. Determinations like these involve complex sets of fact and applications of sometimes-unsettled patent law, resulting in inherent uncertainties regarding ownership rights. Determining the history of development of certain of our intellectual property is made more difficult by the fact that certain of our intellectual property was developed by other companies for other indications before being acquired by us. Consequently, we cannot be sure that we have all of the documentary records relevant to such an analysis.

If claims challenging inventorship are made against us, we may need to resort to litigation to resolve those claims. If we fail in defending against any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of valuable intellectual property rights or the right to assert those rights against third-parties marketing competing products. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

General Company-Related Risks

We will need to grow the size of our organization, and we may experience difficulties in managing this growth.

As of January 4, 2018, we had 48 full-time employees. As our development and commercialization plans and strategies develop, we will need to expand the size of our employee base for managerial, operational, sales, marketing, financial and other resources. Future growth would impose significant added responsibilities on members of management, including the need to identify, recruit, maintain, motivate and integrate additional employees. In addition, our management may have 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. Our future financial performance and our ability to commercialize anabasum and any other future product candidates and our ability to compete effectively will depend, in part, on our ability to effectively manage our future growth.

Future capital raises may dilute our existing stockholders' ownership and/or have other adverse effects on our operations.

If we raise additional capital by issuing equity securities, our existing stockholders' percentage ownership will be reduced and these stockholders may experience substantial dilution. We may also issue equity securities that provide for rights, preferences and privileges senior to those of our common stock. If we raise additional funds by issuing debt securities, these debt securities would have rights senior to those of our common stock and the terms of the debt securities issued could impose significant restrictions on our operations, including liens on our assets. If we raise additional funds through collaborations and licensing arrangements, we may be required to relinquish some rights to our technologies or candidate products, or to grant licenses on terms that are not favorable to us.

If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy. In addition, the loss of the services of certain key employees, including Yuval Cohen, our Chief Executive Officer, Mark Tepper, our President and Chief Scientific Officer, Barbara White, our Chief Medical Officer and Sean Moran, our Chief Financial Officer would adversely impact our business prospects.

Our ability to compete in the highly competitive pharmaceuticals industry depends in large part upon our ability to attract highly qualified managerial, scientific and medical personnel. In order to induce valuable employees to remain with us, we intend to provide employees with stock options that vest over time. The value to employees of stock options that vest over time will be significantly affected by movements in the price of our common stock that we will not be able to control and may at any time be insufficient to counteract more lucrative offers from other companies.

Our management team has expertise in many different aspects of drug development and commercialization. However, we will need to hire additional personnel as we further develop anabasum. Competition for skilled personnel in our market is intense and competition for experienced scientists may limit our ability to hire and retain highly qualified personnel on acceptable terms. Despite our efforts to retain valuable employees, members of our management, scientific and medical teams may terminate their employment with us on short notice. In connection with the merger in April 2014 with Corbus Pharmaceuticals, Inc., our wholly-owned subsidiary, we entered into employment agreements with certain of our executive officers. However, these employment arrangements provide for at-will employment, which means that any of our employees could leave our employment at any time, with or without notice. The loss of the services of any of our executive officers or other key employees could potentially harm our business, operating results or financial condition. In particular, we believe that the loss of the services of Yuval Cohen, Ph.D., our Chief Executive Officer, Mark Tepper, Ph.D., our President and Chief Scientific Officer, Barbara White, M.D., our Chief Medical Officer and Sean Moran, C.P.A., M.B.A., our Chief Financial Officer, would have a material adverse effect on our business. Our success also depends on our ability to continue to attract, retain and motivate highly skilled junior, mid-level, and senior managers as well as junior, mid-level, and senior scientific and medical personnel.

Other pharmaceutical companies with which we compete for qualified personnel have greater financial and other resources, different risk profiles, and a longer history in the industry than we do. They also may provide more diverse opportunities and better chances for career advancement. Some of these characteristics may be more appealing to high-quality candidates than what we have to offer. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can develop and commercialize product candidates would be limited.

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of anabasum.

We face a potential risk of product liability as a result of the clinical testing of anabasum and will face an even greater risk if we commercialize anabasum or any other future product. For example, we may be sued if any product we develop, including anabasum, or any materials that we use in our products allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of anabasum. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for anabasum or any future products that we may develop;
- injury to our reputation;
- withdrawal of clinical trial participants;
- costs to defend the related litigation;

- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- the inability to commercialize anabasum; and
- a decline in the value of our stock.

Our inability to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. We intend to obtain product liability insurance covering our clinical trials. Although we will maintain such insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

We may acquire businesses, assets or products, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire additional businesses, assets or products, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

Risks Related to our Common Stock

Our affiliates may control our company for the foreseeable future, including the outcome of matters requiring stockholder approval.

Our officers, directors, and five percent stockholders collectively owned approximately 12.6% of our outstanding shares of common stock as of January 4, 2018. This concentration of voting power and control could have a significant effect in delaying, deferring or preventing an action that might otherwise be beneficial to our other stockholders and be disadvantageous to our stockholders with interests different from those entities and individuals. Certain of these individuals also have significant control over our business, policies and affairs as officers or directors of our company. Therefore, you should not invest in reliance on your ability to have any control over our company.

An active, liquid trading market for our common stock may not be sustained.

Presently, our common stock is traded on the Nasdaq Global Market, or Nasdaq, and as we are in our early stages, an investment in our company may require a long-term commitment, with no certainty of return. If we are unable to maintain an active, liquid active trading market:

- investors may have difficulty buying and selling or obtaining market quotations;
- market visibility for shares of our common stock may be limited; and
- a lack of visibility for shares of our common stock may have a depressive effect on the market price for shares of our common stock.

The lack of an active market could impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair market value of your shares. An inactive market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to acquire additional intellectual property assets by using our shares as consideration.

We are currently listed on the Nasdaq Global Market. If we are unable to maintain listing of our securities on the Nasdaq Global Market or any stock exchange, our stock price could be adversely affected and the liquidity of our stock and our ability to obtain financing could be impaired and it may be more difficult for our stockholders to sell their securities.

Although our common stock is currently listed on the Nasdaq Global Market, we may not be able to continue to meet the exchange's minimum listing requirements or those of any other national exchange. If we are unable to maintain listing on Nasdaq or if a liquid market for our common stock does not develop or is sustained, our common stock may remain thinly traded.

The Listing Rules of Nasdaq require listing issuers to comply with certain standards in order to remain listed on its exchange. If, for any reason, we should fail to maintain compliance with these listing standards and Nasdaq should delist our securities from trading on its exchange and we are unable to obtain listing on another national securities exchange, a reduction in some or all of the following may occur, each of which could have a material adverse effect on our stockholders:

- the liquidity of our common stock;
- the market price of our common stock;
- our ability to obtain financing for the continuation of our operations;
- the number of institutional and general investors that will consider investing in our common stock;
- the number of investors in general that will consider investing in our common stock;
- the number of market makers in our common stock;
- the availability of information concerning the trading prices and volume of our common stock; and
- the number of broker-dealers willing to execute trades in shares of our common stock.

The market price of our common stock may be significantly volatile.

Even if an active market for our common stock develops, of which no assurances can be given, the market price for our common stock may be volatile and subject to wide fluctuations in response to factors including the following:

- actual or anticipated fluctuations in our quarterly or annual operating results;
- changes in financial or operational estimates or projections;
- conditions in markets generally;
- changes in the economic performance or market valuations of companies similar to ours; and
- general economic or political conditions in the United States or elsewhere.

In particular, the market prices of biotechnology companies like ours have been highly volatile due to factors, including, but not limited to:

- any delay or failure to conduct a clinical trial for our product or receive approval from the FDA and other regulatory agencies;
- developments or disputes concerning a company's intellectual property rights;
- technological innovations of such companies or their competitors;
- changes in market valuations of similar companies;
- announcements by such companies or their competitors of significant contracts, acquisitions, strategic partnerships, joint ventures, capital commitments, new technologies, or patents; and
- failure to complete significant transactions or collaborate with vendors in manufacturing a product.

The securities market has from time to time experienced significant price and volume fluctuations that are not related to the operating performance of particular companies. These market fluctuations may also materially and adversely affect the market price of shares of our common stock.

Future sales of shares by existing stockholders could cause our stock price to decline.

As of September 30, 2017, we had outstanding options to purchase an aggregate of 7,724,779 shares of our common stock at a weighted average exercise price of \$3.66 per share and warrants to purchase an aggregate of 1,288,500 shares of our common stock at a weighted average exercise price of \$1.00 per share. The exercise of such outstanding options and warrants will result in further dilution of your investment. If our existing stockholders sell substantial amounts of our common stock in the public market, or if the public perceives that such sales could occur, this could have an adverse impact on the market price of our common stock, even if there is no relationship between such sales and the performance of our business.

We do not currently intend to pay dividends on our common stock in the foreseeable future, and consequently, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

We have never declared or paid cash dividends on our common stock and do not anticipate paying any cash dividends to holders of our common stock in the foreseeable future. Consequently, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments. There is no guarantee that shares of our common stock will appreciate in value or even maintain the price at which our investors have purchased their shares.

We are an "emerging growth company," and will be able take advantage of reduced disclosure requirements applicable to "emerging growth companies," which could make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act, and, for as long as we continue to be an "emerging growth company," we intend to take advantage of certain exemptions from various reporting requirements applicable to other public companies but not to "emerging growth companies," including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We will remain an emerging growth company until the earlier of (1) January 1, 2020, (2) the last day of the first fiscal year in which our annual gross revenues exceed \$1.07 billion, (3) the date on which we become a "large accelerated filer" as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended, which would occur if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the last business day of our most recently completed second fiscal quarter or (4) the date on which we have issued more than \$1 billion in non-convertible debt during the preceding three-year period.

We intend to take advantage of these reporting exemptions described above until we are no longer an "emerging growth company." Under the JOBS Act, "emerging growth companies" can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not "emerging growth companies."

We cannot predict if investors will find our common stock less attractive if we choose to rely on these exemptions. If some investors find our common stock less attractive as a result of any choices to reduce future disclosure, there may be a less active trading market for our common stock and our stock price may be more volatile.

We will incur significantly increased costs and devote substantial management time as a result of operating as a public company, particularly after we are no longer an “emerging growth company.”

As a public company, we incur significant legal, accounting and other expenses that we did not incur as a private company. For example, we are required to comply with certain of the requirements of the Sarbanes-Oxley Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act, as well as rules and regulations subsequently implemented by the SEC, including the establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. We expect that compliance with these requirements will increase our legal and financial compliance costs and will make some activities more time consuming and costly. In addition, we expect that our management and other personnel will need to divert attention from operational and other business matters to devote substantial time to these public company requirements. In particular, we expect to incur significant expenses and devote substantial management effort toward ensuring compliance with the requirements of Section 404 of the Sarbanes-Oxley Act. In addition, after we are no longer qualify as an “emerging growth company,” we expect to incur additional management time and cost to comply with the more stringent reporting requirements applicable to companies that are deemed accelerated filers or large accelerated filers, including complying with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act. We currently do not have an internal audit function, and we will need to hire or contract for additional accounting and financial staff with appropriate public company experience and technical accounting knowledge.

We cannot predict or estimate the amount of additional costs we may incur as a result of becoming a public company or the timing of such costs.

There may be limitations on the effectiveness of our internal controls, and a failure of our control systems to prevent error or fraud may materially harm our company.

Proper systems of internal controls over financial accounting and disclosure are critical to the operation of a public company. As of January 4, 2018, we had 48 full-time employees, which results in a lack of segregation of duties, and we may be unable to effectively establish such systems, especially in light of the fact that we expect to operate as a publicly reporting company. This would leave us without the ability to reliably assimilate and compile financial information about our company and significantly impair our ability to prevent error and detect fraud, all of which would have a negative impact on our company from many perspectives.

Moreover, we do not expect that disclosure controls or internal control over financial reporting will prevent all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system’s objectives will be met. Further, the design of a control system must reflect the fact that there are resource constraints and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Failure of our control systems to detect or prevent error or fraud could materially adversely impact us.

We may be unable to complete our analysis of our internal controls over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our common stock.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by our management on, among other things, the effectiveness of our internal control over financial reporting. This assessment will need to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

We may not be able to complete our evaluation, testing and any required remediation in a timely fashion. During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal controls are effective.

If we are unable to assert that our internal control over financial reporting is effective, or, if applicable, our independent registered public accounting firm is unable to express an opinion on the effectiveness of our internal controls, we could lose investor confidence in the accuracy and completeness of our financial reports, which would cause the price of our common stock to decline, and we may be subject to investigation or sanctions by the SEC. We will also be required to disclose changes made in our internal control and procedures on a quarterly basis.

Our remediation efforts may not enable us to avoid a material weakness in our internal control over financial reporting in the future. Any of the foregoing occurrences, should they come to pass, could negatively impact the public perception of our company, which could have a negative impact on our stock price.

Upon dissolution of our company, you may not recoup all or any portion of your investment.

In the event of a liquidation, dissolution or winding-up of our company, whether voluntary or involuntary, the proceeds and/or assets of our company remaining after giving effect to such transaction, and the payment of all of our debts and liabilities and distributions required to be made to holders of any outstanding preferred stock will then be distributed to the stockholders of common stock on a pro rata basis. There can be no assurance that we will have available assets to pay to the holders of common stock, or any amounts, upon such a liquidation, dissolution or winding-up of our Company. In this event, you could lose some or all of your investment.

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

As a result of our merger in April 2014 with Corbus Pharmaceuticals, Inc., our wholly-owned subsidiary, our ability to utilize our federal net operating loss, carryforwards and federal tax credit prior to that date may be limited under Sections 382 of the Internal Revenue Code. The limitations apply if an "ownership change," as defined by Section 382, occurs. Generally, an ownership change occurs if the percentage of the value of the stock that is owned by one or more direct or indirect "five percent shareholders" increases by more than 50 percentage points over their lowest ownership percentage at any time during the applicable testing period (typically three years). In addition, future changes in our stock ownership, which may be outside of our control, may trigger an "ownership change" and, consequently, Section 382 limitations. As a result, if we earn net taxable income, our ability to use our pre-change net operating loss carryforwards and other tax attributes to offset United States federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us.

Our certificate of incorporation, as amended, allows for our board to create new series of preferred stock without further approval by our stockholders, which could adversely affect the rights of the holders of our common stock.

Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. We anticipate that our board of directors will have the authority to issue up to 10,000,000 shares of our preferred stock without further stockholder approval. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders the preferred right to our assets upon liquidation and the right to receive dividend payments before dividends are distributed to the holders of common stock. In addition, our board of directors could authorize the issuance of a series of preferred stock that has greater voting power than our common stock or that is convertible into our common stock, which could decrease the relative voting power of our common stock or result in dilution to our existing stockholders.

FORWARD-LOOKING STATEMENTS

This prospectus, including the documents that we incorporate by reference, contains forward-looking statements as that term is defined in the federal securities laws. The events described in forward-looking statements contained in this prospectus, including the documents that we incorporate by reference, may not occur. Generally, these statements relate to our business plans or strategies, projected or anticipated benefits or other consequences of our plans or strategies, financing plans, projected or anticipated benefits from acquisitions that we may make, or projections involving anticipated revenues, earnings or other aspects of our operating results or financial position, and the outcome of any contingencies. Any such forward-looking statements are based on current expectations, estimates and projections of management. We intend for these forward-looking statements to be covered by the safe-harbor provisions for forward-looking statements. Words such as “may,” “expect,” “believe,” “anticipate,” “project,” “plan,” “intend,” “estimate,” and “continue,” and their opposites and similar expressions are intended to identify forward-looking statements. We caution you that these statements are not guarantees of future performance or events and are subject to a number of uncertainties, risks and other influences, many of which are beyond our control that may influence the accuracy of the statements and the projections upon which the statements are based. Factors that may affect our results include, but are not limited to, the risks and uncertainties discussed in the “Risk Factors” section on page 3 of this prospectus, in our Annual Report on Form 10-K or in other reports we file with the Securities and Exchange Commission.

Any one or more of these uncertainties, risks and other influences could materially affect our results of operations and whether forward-looking statements made by us ultimately prove to be accurate. Our actual results, performance and achievements could differ materially from those expressed or implied in these forward-looking statements. We undertake no obligation to publicly update or revise any forward-looking statements, whether from new information, future events or otherwise.

You should rely only on the information in this prospectus. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely upon it.

USE OF PROCEEDS

Unless we inform you otherwise in the prospectus supplement, we will use the net proceeds from the sale of the securities offered by this prospectus and the exercise price from the exercise of any convertible securities, if any, for general corporate purposes, which may include funding research, development and product manufacturing, clinical trials, acquisitions or investments in businesses, products or technologies that are complementary to our own, increasing our working capital, reducing indebtedness, and capital expenditures.

When particular securities are offered, the prospectus supplement relating to that offering will set forth our intended use of the net proceeds received from the sale of those securities we sell. Pending the application of the net proceeds for these purposes, we expect to invest the proceeds in short-term, interest-bearing instruments or other investment-grade securities.

RATIOS OF COMBINED FIXED CHARGES AND PREFERRED STOCK DIVIDENDS TO EARNINGS

The following table sets forth our consolidated ratios of earnings to combined fixed charges and preferred stock dividends for the nine months ended September 30, 2017 and for the years ended December 31, 2016, 2015, 2014, 2013 and 2012. We do not have any outstanding shares of preferred stock and therefore have not paid any preferred stock dividends.

Ratios of Combined Fixed Charges and Preferred Stock Dividends to Earnings

Nine months ended September 30,	Year ended December 31,				
2017	2016	2015	2014	2013	2012
(1)	(1)	(1)	(1)	(1)	(1)

(1) Due to our losses from continuing operations for the nine months ended September 30, 2017 and for the years ended December 31, 2016, 2015, 2014, 2013 and 2012, earnings were insufficient to cover fixed charges by \$21.7 million, \$20.0 million, \$8.9 million, \$2.5 million, \$0.6 million, and \$0.0 million, respectively. For this reason, no ratios are provided.

THE SECURITIES WE MAY OFFER

General

The descriptions of the securities contained in this prospectus, together with the applicable prospectus supplements, summarize all of the material terms and provisions of the various types of securities that we may offer. We will describe in the applicable prospectus supplement relating to any securities the particular terms of the securities offered by that prospectus supplement. If we indicate in the applicable prospectus supplement, the terms of the securities may differ from the terms we have summarized below. We may also include in the prospectus supplement information about material United States federal income tax considerations relating to the securities, and the securities exchange, if any, on which the securities will be listed.

We may sell from time to time, in one or more offerings:

- common stock;
- preferred stock;
- debt securities;
- subscription rights to purchase shares of common stock, preferred stock or debt securities;
- warrants to purchase shares of common stock or preferred stock; and
- units consisting of any combination of the securities listed above.

In this prospectus, we refer to the common stock, preferred stock, debt securities, subscription rights, warrants and units collectively as “securities.” The total dollar amount of all securities that we may sell will not exceed \$200,000,000.

If we issue debt securities at a discount from their original stated principal amount, then, for purposes of calculating the total dollar amount of all securities issued under this prospectus, we will treat the initial offering price of the debt securities as the total original principal amount of the debt securities.

This prospectus may not be used to consummate a sale of securities unless it is accompanied by a prospectus supplement.

DESCRIPTION OF CAPITAL STOCK

General

Our authorized capital stock consists of:

- 150,000,000 shares of common stock, par value \$0.0001 per share; and
- 10,000,000 shares of preferred stock, par value \$0.0001 per share, of which, as of the date of this prospectus, none of which shares have been designated.

As of close of business on January 4, 2018, 55,603,427 shares of common stock were issued and outstanding and no shares of preferred stock were issued and outstanding.

The additional shares of our authorized capital stock available for issuance may be issued at times and under circumstances so as to have a dilutive effect on earnings per share and on the equity ownership of the holders of our common stock. The ability of our board of directors to issue additional shares of stock could enhance the board’s ability to negotiate on behalf of the stockholders in a takeover situation but could also be used by the board to make a change-in-control more difficult, thereby denying stockholders the potential to sell their shares at a premium and entrenching current management. The following description is a summary of the material provisions of our capital stock. You should refer to our certificate of incorporation, as amended and bylaws, both of which are on file with the SEC as exhibits to previous SEC filings, for additional information. The summary below is qualified by provisions of applicable law.

Common Stock

Voting. The holders of the common stock are entitled to one vote for each share held of record on all matters on which the holders are entitled to vote (or consent pursuant to written consent). Directors are elected by a plurality of the votes present in person or represented by proxy and entitled to vote.

Dividends. The holders of the common stock are entitled to receive, ratably, dividends only if, when and as declared by the Registrant's board of directors out of funds legally available therefor and after provision is made for each class of capital stock having preference over the common stock.

Liquidation Rights. In the event of our liquidation, dissolution or winding-up, the holders of common stock are entitled to share, ratably, in all assets remaining available for distribution after payment of all liabilities and after provision is made for each class of capital stock having preference over the common stock.

Conversion Right. The holders of the common stock have no conversion rights.

Preemptive and Similar Rights. The holders of the common stock have no preemptive or similar rights.

Redemption/Put Rights. There are no redemption or sinking fund provisions applicable to the common stock. All of the outstanding shares of our common stock are fully-paid and nonassessable.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Continental Stock Transfer & Trust Company, LLC.

Preferred Stock

We are authorized to issue up to 10,000,000 shares of preferred stock, all of which are undesignated. Our board of directors has the authority, within the limitations and restrictions prescribed by law and without stockholder approval, to provide by resolution for the issuance of shares of preferred stock, and to fix the rights, preferences, privileges and restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preference and the number of shares constituting any series of the designation of such series, by delivering an appropriate certificate of amendment to our amended and restated certificate of incorporation to the Delaware Secretary of State pursuant to the Delaware General Corporation Law (the "DGCL"). The issuance of preferred stock could have the effect of decreasing the market price of the common stock, impeding or delaying a possible takeover and adversely affecting the voting and other rights of the holders of our common stock.

If we offer a specific series of preferred stock under this prospectus, we will describe the terms of the preferred stock in the prospectus supplement for such offering and will file a copy of the certificate establishing the terms of the preferred stock with the SEC. To the extent required, this description will include:

- the title and stated value;
- the number of shares offered, the liquidation preference per share and the purchase price;
- the dividend rate(s), period(s) and/or payment date(s), or method(s) of calculation for such dividends;
- whether dividends will be cumulative or non-cumulative and, if cumulative, the date from which dividends will accumulate;
- the procedures for any auction and remarketing, if any;
- the provisions for a sinking fund, if any;
- the provisions for redemption, if applicable;
- any listing of the preferred stock on any securities exchange or market;
- whether the preferred stock will be convertible into our common stock, and, if applicable, the conversion price (or how it will be calculated) and conversion period;
- whether the preferred stock will be exchangeable into debt securities, and, if applicable, the exchange price (or how it will be calculated) and exchange period;
- voting rights, if any, of the preferred stock;
- a discussion of any material and/or special U.S. federal income tax considerations applicable to the preferred stock;
- the relative ranking and preferences of the preferred stock as to dividend rights and rights upon liquidation, dissolution or winding up of the affairs of Corbus; and
- any material limitations on issuance of any class or series of preferred stock ranking senior to or on a parity with the series of preferred stock as to dividend rights and rights upon liquidation, dissolution or winding up of Corbus.

Transfer Agent and Registrar for Preferred Stock

The transfer agent and registrar for any series or class of preferred stock will be set forth in each applicable prospectus supplement.

Anti-takeover Effects of Delaware Law and our Certificate of Incorporation, as amended

Our certificate of incorporation, as amended, and bylaws contain provisions that could have the effect of discouraging potential acquisition proposals or tender offers or delaying or preventing a change of control. These provisions are as follows:

- they provide that special meetings of stockholders may be called only by the board of directors acting pursuant to a resolution approved by the affirmative vote of a majority of the board of directors;
- they do not include a provision for cumulative voting in the election of directors. Under cumulative voting, a minority stockholder holding a sufficient number of shares may be able to ensure the election of one or more directors. The absence of cumulative voting may have the effect of limiting the ability of minority stockholders to effect changes to the our board of directors; and
- they allow us to issue, without stockholder approval, up to 10,000,000 shares of preferred stock, with such designations, rights, and preferences as may be determined from time to time by our board of directors that could adversely affect the rights and powers of the holders of the common stock, including dividend, liquidation, conversion, voting, or other rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock could have the effect of restricting dividends on our common stock, diluting the voting power of our common stock, impairing the liquidation rights of our common stock, or delaying or preventing a change in control of our company, all without further action by our stockholders.

We are subject to the provisions of Section 203 of the General Corporation Law of the State of Delaware, an anti-takeover law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in the following prescribed manner:

- prior to the time of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; and
- on or subsequent to the time of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, for purposes of Section 203, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An “interested stockholder” is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, owned 15% or more of a corporation’s outstanding voting securities.

Stockholder Action by Written Consent

Our certificate of incorporation, as amended, specifically denies the ability of stockholders to take action by written consent of the stockholders in lieu of a meeting.

Potential Effects of Authorized but Unissued Stock

We have shares of common stock and preferred stock available for future issuance without stockholder approval. We may utilize these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital, to facilitate corporate acquisitions or payment as a dividend on the capital stock.

The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could render more difficult or discourage a third-party attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of our management. In addition, the board of directors has the discretion to determine designations, rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of each series of preferred stock, all to the fullest extent permissible under the DGCL and subject to any limitations set forth in our certificate of incorporation, as amended. The purpose of authorizing the board of directors to issue preferred stock and to determine the rights and preferences applicable to such preferred stock is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible financings, acquisitions and other corporate purposes, could have the effect of making it more difficult for a third-party to acquire, or could discourage a third-party from acquiring, a majority of our outstanding voting stock.

DESCRIPTION OF STOCK WARRANTS

We summarize below some of the provisions that will apply to the warrants unless the applicable prospectus supplement provides otherwise. This summary may not contain all information that is important to you. The complete terms of the warrants will be contained in the applicable warrant certificate and warrant agreement. These documents have been or will be included or incorporated by reference as exhibits to the registration statement of which this prospectus is a part. You should read the warrant certificate and the warrant agreement. You should also read the prospectus supplement, which will contain additional information and which may update or change some of the information below.

General

We may issue, together with common or preferred stock as units or separately, warrants for the purchase of shares of our common or preferred stock. The terms of each warrant will be discussed in the applicable prospectus supplement relating to the particular series of warrants. The form(s) of certificate representing the warrants and/or the warrant agreement will be, in each case, filed with the SEC as an exhibit to a document incorporated by reference in the registration statement of which this prospectus is a part on or prior to the date of any prospectus supplement relating to an offering of the particular warrant. The following summary of material provisions of the warrants and the warrant agreements are subject to, and qualified in their entirety by reference to, all the provisions of the warrant agreement and warrant certificate applicable to a particular series of warrants.

The prospectus supplement relating to any series of warrants that are offered by this prospectus will describe, among other things, the following terms to the extent they are applicable to that series of warrants:

- the procedures and conditions relating to the exercise of the warrants;
- the number of shares of our common or preferred stock, if any, issued with the warrants;
- the date, if any, on and after which the warrants and any related shares of our common or preferred stock will be separately transferable;
- the offering price of the warrants, if any;
- the number of shares of our common or preferred stock which may be purchased upon exercise of the warrants and the price or prices at which the shares may be purchased upon exercise;
- the date on which the right to exercise the warrants will begin and the date on which the right will expire;
- a discussion of the material United States federal income tax considerations applicable to the exercise of the warrants;
- anti-dilution provisions of the warrants, if any;
- call provisions of the warrants, if any; and
- any other material terms of the warrants.

Each warrant may entitle the holder to purchase for cash, or, in limited circumstances, by effecting a cashless exercise for, the number of shares of our common or preferred stock at the exercise price that is described in the applicable prospectus supplement. Warrants will be exercisable during the period of time described in the applicable prospectus supplement. After that period, unexercised warrants will be void. Warrants may be exercised in the manner described in the applicable prospectus supplement.

A holder of a warrant will not have any of the rights of a holder of our common or preferred stock before the stock is purchased upon exercise of the warrant. Therefore, before a warrant is exercised, the holder of the warrant will not be entitled to receive any dividend payments or exercise any voting or other rights associated with shares of our common or preferred stock which may be purchased when the warrant is exercised.

Transfer Agent and Registrar

The transfer agent and registrar, if any, for any warrants will be set forth in the applicable prospectus supplement.

DESCRIPTION OF DEBT SECURITIES

This prospectus describes certain general terms and provisions of debt securities that we may offer. The debt securities may be issued pursuant to, in the case of senior debt securities, a senior indenture, and in the case of subordinated debt securities, a subordinated indenture, in each case in the forms filed as exhibits to this registration statement, which we refer to as the "indentures." The indentures will be entered into between us and a trustee to be named prior to the issuance of any debt securities, which we refer to as the "trustee." The indentures will not limit the amount of debt securities that can be issued thereunder and will provide that the debt securities may be issued from time to time in one or more series pursuant to the terms of one or more securities resolutions or supplemental indentures creating such series.

We have summarized below the material provisions of the indentures and the debt securities or indicated which material provisions will be described in the related prospectus supplement for any offering of debt securities. These descriptions are only summaries, and you should refer to the relevant indenture for the particular offering of debt securities itself which will describe completely the terms and definitions of the offered debt securities and contain additional information about the debt securities.

Terms

When we offer to sell a particular series of debt securities, we will describe the specific terms of the securities in a prospectus supplement. The prospectus supplement will set forth the following terms, as applicable, of the debt securities offered thereby:

- the designation, aggregate principal amount, currency or composite currency and denominations;
- the price at which such debt securities will be issued and, if an index formula or other method is used, the method for determining amounts of principal or interest;
- the maturity date and other dates, if any, on which principal will be payable;
- whether or not the debt securities will be secured or unsecured, and the terms of any secured debt;
- whether the debt securities rank as senior debt, senior subordinated debt, subordinated debt or any combination thereof, and the terms of any subordination;
- the interest rate (which may be fixed or variable), if any;
- the date or dates from which interest will accrue and on which interest will be payable, and the record dates for the payment of interest;
- the manner of paying principal and interest;
- the place or places where principal and interest will be payable;
- the terms of any mandatory or optional redemption by us or any third party including any sinking fund;
- the terms of any conversion or exchange;
- the terms of any redemption at the option of holders or put by the holders;
- any tax indemnity provisions;
- if the debt securities provide that payments of principal or interest may be made in a currency other than that in which the debt securities are denominated, the manner for determining such payments;
- the portion of principal payable upon acceleration of a Discounted Debt Security (as defined below);
- whether and upon what terms debt securities may be defeased;
- any events of default or covenants in addition to or in lieu of those set forth in the indentures;
- provisions for electronic issuance of debt securities or for the issuance of debt securities in uncertificated form; and
- any additional provisions or other special terms not inconsistent with the provisions of the indentures, including any terms that may be required or advisable under United States or other applicable laws or regulations, or advisable in connection with the marketing of the debt securities.

Debt securities of any series may be issued as registered debt securities or uncertificated debt securities, in such denominations as specified in the terms of the series.

Securities may be issued under the indentures as Discounted Debt Securities to be offered and sold at a substantial discount from the principal amount thereof. Special United States federal income tax and other considerations applicable thereto will be described in the prospectus supplement relating to such Discounted Debt Securities. "Discounted Debt Security" means a security where the amount of principal due upon acceleration is less than the stated principal amount.

We are not obligated to issue all debt securities of one series at the same time and, unless otherwise provided in the prospectus supplement, we may reopen a series, without the consent of the holders of the debt securities of that series, for the issuance of additional debt securities of that series. Additional debt securities of a particular series will have the same terms and conditions as outstanding debt securities of such series, except for the date of original issuance and the offering price, and will be consolidated with, and form a single series with, such outstanding debt securities.

Ranking

The senior debt securities will rank equally with all of our other senior and unsubordinated debt. Our secured debt, if any, will be effectively senior to the senior debt securities to the extent of the value of the assets securing such debt. The subordinated debt securities will be subordinate and junior in right of payment to all of our present and future senior indebtedness to the extent and in the manner described in the prospectus supplement and as set forth in the board resolution, officer's certificate or supplemental indenture relating to such offering.

We have only a stockholder's claim on the assets of our subsidiaries. This stockholder's claim is junior to the claims that creditors of our subsidiaries have against our subsidiaries. Holders of our debt securities will be our creditors and not creditors of any of our subsidiaries. As a result, all the existing and future liabilities of our subsidiaries, including any claims of their creditors, will effectively be senior to the debt securities with respect to the assets of our subsidiaries. In addition, to the extent that we issue any secured debt, the debt securities will be effectively subordinated to such secured debt to the extent of the value of the assets securing such secured debt.

The debt securities will be obligations exclusively of Corbus Pharmaceuticals Holdings, Inc. To the extent that our ability to service our debt, including the debt securities, may be dependent upon the earnings of our subsidiaries, our ability to do so will be dependent on the ability of our subsidiaries to distribute those earnings to us as dividends, loans or other payments.

Certain Covenants

Any covenants that may apply to a particular series of debt securities will be described in the prospectus supplement relating thereto.

Successor Obligor

The indentures provide that, unless otherwise specified in the securities resolution or supplemental indenture establishing a series of debt securities, we shall not consolidate with or merge into, or transfer all or substantially all of our assets to, any person in any transaction in which we are not the survivor, unless:

- the person is organized under the laws of the United States or a jurisdiction within the United States;
- the person assumes by supplemental indenture all of our obligations under the relevant indenture, the debt securities and any coupons;
- immediately after the transaction no Default (as defined below) exists; and
- we deliver to the trustee an officers' certificate and opinion of counsel stating that the transaction complies with the foregoing requirements and that all conditions precedent provided for in the indenture relating to the transaction have been complied with.

In such event, the successor will be substituted for us, and thereafter all of our obligations under the relevant indenture, the debt securities and any coupons will terminate.

The indentures provide that these limitations shall not apply if our board of directors makes a good faith determination that the principal purpose of the transaction is to change our state of incorporation.

Exchange of Debt Securities

Registered debt securities may be exchanged for an equal aggregate principal amount of registered debt securities of the same series and date of maturity in such authorized denominations as may be requested upon surrender of the registered debt securities at an agency of the Company maintained for such purpose and upon fulfillment of all other requirements of such agent.

Default and Remedies

Unless the securities resolution or supplemental indenture establishing the series otherwise provides (in which event the prospectus supplement will so state), an “Event of Default” with respect to a series of debt securities will occur if:

- (1) we default in any payment of interest on any debt securities of such series when the same becomes due and payable and the default continues for a period of 30 days;
- (2) we default in the payment of all or any part of the principal and premium, if any, of any debt securities of such series when the same becomes due and payable at maturity or upon redemption, acceleration or otherwise and such default shall continue for five or more days;
- (3) we default in the performance of any of our other agreements applicable to the series and the default continues for 30 days after the notice specified below;
- (4) a court of competent jurisdiction enters an order or decree under any Bankruptcy Law (as defined below) that:
 - (A) is for relief against us in an involuntary case,
 - (B) appoints a Custodian (as defined below) for us or for any substantial part of our property, or
 - (C) orders the winding up or liquidation of us, and the order or decree remains unstayed and in effect for 90 days;
- (5) we, pursuant to or within the meaning of any Bankruptcy Law:
 - (A) commence a voluntary case,
 - (B) consent to the entry of an order for relief against us in an involuntary case,
 - (C) consent to the appointment of a Custodian for us or for any substantial part of our property, or
 - (D) make a general assignment for the benefit of our creditors; or
- (6) there occurs any other Event of Default provided for in such series.

The term “Bankruptcy Law” means Title 11 of the United States Code or any similar Federal or State law for the relief of debtors. The term “Custodian” means any receiver, trustee, assignee, liquidator or a similar official under any Bankruptcy Law.

“Default” means any event which is, or after notice or passage of time would be, an Event of Default. A Default under subparagraph (3) above is not an Event of Default until the trustee or the holders of at least 25% in principal amount of the series notify us of the Default and we do not cure the Default within the time specified after receipt of the notice.

The trustee may require indemnity satisfactory to it before it enforces the indentures or the debt securities of the series. Subject to certain limitations, holders of a majority in principal amount of the debt securities of the series may direct the trustee in its exercise of any trust or power with respect to such series. Except in the case of Default in payment on a series, the trustee may withhold from securityholders of such series notice of any continuing Default if the trustee determines that withholding notice is in the interest of such securityholders. We are required to furnish the trustee annually a brief certificate as to our compliance with all conditions and covenants under the indentures.

The indentures do not have cross-default provisions. Thus, a default by us on any other debt, including any other series of debt securities, would not constitute an Event of Default.

Amendments and Waivers

The indentures and the debt securities or any coupons of the series may be amended, and any Default may be waived as follows:

Unless the securities resolution or supplemental indenture otherwise provides (in which event the applicable prospectus supplement will so state), the debt securities and the indentures may be amended with the consent of the holders of a majority in principal amount of the debt securities of all series affected voting as one class. Unless the securities resolution or supplemental indenture otherwise provides (in which event the applicable prospectus supplement will so state), a Default other than a Default in payment on a particular series may be waived with the consent of the holders of a majority in principal amount of the debt securities of the series. However, without the consent of each securityholder affected, no amendment or waiver may:

- change the fixed maturity of or the time for payment of interest on any debt security;
- reduce the principal, premium or interest payable with respect to any debt security;
- change the place of payment of a debt security or the currency in which the principal or interest on a debt security is payable;
- change the provisions for calculating any redemption or repurchase price with respect to any debt security;
- adversely affect any holder’s right to receive payment of principal and interest or to institute suit for the enforcement of any such payment;

- reduce the amount of debt securities whose holders must consent to an amendment or waiver;
- make any change that materially adversely affects the right to convert any debt security;
- waive any Default in payment of principal of or interest on a debt security; or
- adversely affect any holder's rights with respect to redemption or repurchase of a debt security.

Without the consent of any securityholder, the indentures or the debt securities may be amended to:

- provide for assumption of our obligations to securityholders in the event of a merger or consolidation requiring such assumption;
- cure any ambiguity, omission, defect or inconsistency;
- conform the terms of the debt securities to the description thereof in the prospectus and prospectus supplement offering such debt securities;
- create a series and establish its terms;
- provide for the acceptance of appointment by a successor trustee or to facilitate the administration of the trusts by more than one trustee;
- provide for uncertificated or unregistered securities;
- make any change that does not adversely affect the rights of any securityholder;
- add to our covenants; or
- make any other change to the indentures so long as no debt securities are outstanding.

Conversion Rights

Any securities resolution or supplemental indenture establishing a series of debt securities may provide that the debt securities of such series will be convertible at the option of the holders thereof into or for our common stock or other equity or debt instruments. The securities resolution or supplemental indenture may establish, among other things, (1) the number or amount of shares of common stock or other equity or debt instruments for which \$1,000 aggregate principal amount of the debt securities of the series is convertible, as may be adjusted pursuant to the terms of the relevant indenture and the securities resolution; and (2) provisions for adjustments to the conversion rate and limitations upon exercise of the conversion right. The indentures provide that we will not be required to make an adjustment in the conversion rate unless the adjustment would require a cumulative change of at least 1% in the conversion rate. However, we will carry forward any adjustments that are less than 1% of the conversion rate and take them into account in any subsequent adjustment of the conversion rate.

Legal Defeasance and Covenant Defeasance

Debt securities of a series may be defeased in accordance with their terms and, unless the securities resolution or supplemental indenture establishing the terms of the series otherwise provides, as set forth below. We at any time may terminate as to a series all of our obligations (except for certain obligations, including obligations with respect to the defeasance trust and obligations to register the transfer or exchange of a debt security, to replace destroyed, lost or stolen debt securities and coupons and to maintain paying agencies in respect of the debt securities) with respect to the debt securities of the series and any related coupons and the relevant indenture, which we refer to as legal defeasance. We at any time may terminate as to a series our obligations with respect to any restrictive covenants which may be applicable to a particular series, which we refer to as covenant defeasance.

We may exercise our legal defeasance option notwithstanding our prior exercise of our covenant defeasance option. If we exercise our legal defeasance option, a series may not be accelerated because of an Event of Default. If we exercise our covenant defeasance option, a series may not be accelerated by reference to any covenant which may be applicable to a series.

To exercise either defeasance option as to a series, we must (1) irrevocably deposit in trust with the trustee (or another trustee) money or U.S. Government Obligations (as defined below), deliver a certificate from a nationally recognized firm of independent accountants expressing their opinion that the payments of principal and interest when due on the deposited U.S. Government Obligations, without reinvestment, plus any deposited money without investment will provide cash at such times and in such amounts as will be sufficient to pay the principal and interest when due on all debt securities of such series to maturity or redemption, as the case may be; and (2) comply with certain other conditions. In particular, we must obtain an opinion of tax counsel that the defeasance will not result in recognition of any gain or loss to holders for federal income tax purposes.

“U.S. Government Obligations” means direct obligations of the United States or any agency or instrumentality of the United States, the payment of which is unconditionally guaranteed by the United States, which, in either case, have the full faith and credit of the United States pledged for payment and which are not callable at the issuer’s option, or certificates representing an ownership interest in such obligations.

Regarding the Trustee

Unless otherwise indicated in a prospectus supplement, the trustee will also act as depository of funds, transfer agent, paying agent and conversion agent, as applicable, with respect to the debt securities. In certain circumstances, we or the securityholders may remove the trustee as the trustee under a given indenture. The indenture trustee may also provide additional unrelated services to us as a depository of funds, registrar, trustee and similar services.

Governing Law

The indentures and the debt securities will be governed by New York law, except to the extent that the Trust Indenture Act of 1939 is applicable.

DESCRIPTION OF SUBSCRIPTION RIGHTS

We may issue subscription rights to purchase our common stock or debt securities. These subscription rights may be offered independently or together with any other security offered hereby and may or may not be transferable by the stockholder receiving the subscription rights in such offering. In connection with any offering of subscription rights, we may enter into a standby arrangement with one or more underwriters or other purchasers pursuant to which the underwriters or other purchasers may be required to purchase any securities remaining unsubscribed for after such offering.

The prospectus supplement relating to any subscription rights we offer, if any, will, to the extent applicable, include specific terms relating to the offering, including some or all of the following:

- the price, if any, for the subscription rights;
- the exercise price payable for our common stock or debt securities upon the exercise of the subscription rights;
- the number of subscription rights to be issued to each stockholder;
- the number and terms of our common stock or debt securities which may be purchased per each subscription right;
- the extent to which the subscription rights are transferable;
- any other terms of the subscription rights, including the terms, procedures and limitations relating to the exchange and exercise of the subscription rights;
- the date on which the right to exercise the subscription rights shall commence, and the date on which the subscription rights shall expire;
- the extent to which the subscription rights may include an over-subscription privilege with respect to unsubscribed securities or an over-allotment privilege to the extent the securities are fully subscribed; and
- if applicable, the material terms of any standby underwriting or purchase arrangement which may be entered into by us in connection with the offering of subscription rights.

DESCRIPTION OF UNITS

We may issue units comprised of one or more of the other securities described in this prospectus in any combination. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security (but, to the extent convertible securities are included in the units, the holder of the units will be deemed the holder of the convertible securities and not the holder of the underlying securities). The unit agreement under which a unit is issued, if any, may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date. The applicable prospectus supplement may describe:

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units;
- the terms of the unit agreement governing the units;
- United States federal income tax considerations relevant to the units; and
- whether the units will be issued in fully registered global form.

This summary of certain general terms of units and any summary description of units in the applicable prospectus supplement do not purport to be complete and are qualified in their entirety by reference to all provisions of the applicable unit agreement and, if applicable, collateral arrangements and depositary arrangements relating to such units. The forms of the unit agreements and other documents relating to a particular issue of units will be filed with the SEC each time we issue units, and you should read those documents for provisions that may be important to you.

FORMS OF SECURITIES

Each debt security and, to the extent applicable, warrant, subscription right and unit, will be represented either by a certificate issued in definitive form to a particular investor or by one or more global securities representing the entire issuance of securities. Certificated securities in definitive form and global securities will be issued in registered form. Definitive securities name you or your nominee as the owner of the security, and in order to transfer or exchange these securities or to receive payments other than interest or other interim payments, you or your nominee must physically deliver the securities to the trustee, registrar, paying agent or other agent, as applicable. Global securities name a depositary or its nominee as the owner of the debt securities or warrants represented by these global securities. The depositary maintains a computerized system that will reflect each investor's beneficial ownership of the securities through an account maintained by the investor with its broker/dealer, bank, trust company or other representative, as we explain more fully below.

Global Securities

Registered Global Securities. We may issue the registered debt securities and, to the extent applicable, warrants, subscription rights and units, in the form of one or more fully registered global securities that will be deposited with a depositary or its nominee identified in the applicable prospectus supplement and registered in the name of that depositary or nominee. In those cases, one or more registered global securities will be issued in a denomination or aggregate denominations equal to the portion of the aggregate principal or face amount of the securities to be represented by registered global securities. Unless and until it is exchanged in whole for securities in definitive registered form, a registered global security may not be transferred except as a whole by and among the depositary for the registered global security, the nominees of the depositary or any successors of the depositary or those nominees.

If not described below, any specific terms of the depositary arrangement with respect to any securities to be represented by a registered global security will be described in the prospectus supplement relating to those securities. We anticipate that the following provisions will apply to all depositary arrangements.

Ownership of beneficial interests in a registered global security will be limited to persons, called participants, that have accounts with the depositary or persons that may hold interests through participants. Upon the issuance of a registered global security, the depositary will credit, on its book-entry registration and transfer system, the participants' accounts with the respective principal or face amounts of the securities beneficially owned by the participants. Any dealers, underwriters or agents participating in the distribution of the securities will designate the accounts to be credited. Ownership of beneficial interests in a registered global security will be shown on, and the transfer of ownership interests will be effected only through, records maintained by the depositary, with respect to interests of participants, and on the records of participants, with respect to interests of persons holding through participants. The laws of some states may require that some purchasers of securities take physical delivery of these securities in definitive form. These laws may impair your ability to own, transfer or pledge beneficial interests in registered global securities.

So long as the depository, or its nominee, is the registered owner of a registered global security, that depository or its nominee, as the case may be, will be considered the sole owner or holder of the securities represented by the registered global security for all purposes under the applicable indenture or warrant agreement. Except as described below, owners of beneficial interests in a registered global security will not be entitled to have the securities represented by the registered global security registered in their names, will not receive or be entitled to receive physical delivery of the securities in definitive form and will not be considered the owners or holders of the securities under the applicable indenture or warrant agreement. Accordingly, each person owning a beneficial interest in a registered global security must rely on the procedures of the depository for that registered global security and, if that person is not a participant, on the procedures of the participant through which the person owns its interest, to exercise any rights of a holder under the applicable indenture or warrant agreement. We understand that under existing industry practices, if we request any action of holders or if an owner of a beneficial interest in a registered global security desires to give or take any action that a holder is entitled to give or take under the applicable indenture or warrant agreement, the depository for the registered global security would authorize the participants holding the relevant beneficial interests to give or take that action, and the participants would authorize beneficial owners owning through them to give or take that action or would otherwise act upon the instructions of beneficial owners holding through them.

Principal, premium, if any, interest payments on debt securities and any payments to holders with respect to warrants represented by a registered global security registered in the name of a depository or its nominee will be made to the depository or its nominee, as the case may be, as the registered owner of the registered global security. None of the Company, the trustees, the warrant agents or any other agent of the Company, the trustees or the warrant agents will have any responsibility or liability for any aspect of the records relating to payments made on account of beneficial ownership interests in the registered global security or for maintaining, supervising or reviewing any records relating to those beneficial ownership interests.

We expect that the depository for any of the securities represented by a registered global security, upon receipt of any payment of principal, premium, interest or other distribution of underlying securities or other property to holders on that registered global security, will immediately credit participants' accounts in amounts proportionate to their respective beneficial interests in that registered global security as shown on the records of the depository. We also expect that payments by participants to owners of beneficial interests in a registered global security held through participants will be governed by standing customer instructions and customary practices, as is now the case with the securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of those participants.

If the depository for any of these securities represented by a registered global security is at any time unwilling or unable to continue as depository or ceases to be a clearing agency registered under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and a successor depository registered as a clearing agency under the Exchange Act is not appointed by us within 90 days, we will issue securities in definitive form in exchange for the registered global security that had been held by the depository. Any securities issued in definitive form in exchange for a registered global security will be registered in the name or names that the depository gives to the relevant trustee or warrant agent or other relevant agent of ours or theirs. It is expected that the depository's instructions will be based upon directions received by the depository from participants with respect to ownership of beneficial interests in the registered global security that had been held by the depository.

PLAN OF DISTRIBUTION

Initial Offering and Sale of Securities

Unless otherwise set forth in a prospectus supplement accompanying this prospectus, we may sell the securities being offered hereby, from time to time, by one or more of the following methods:

- to or through underwriting syndicates represented by managing underwriters;
- through one or more underwriters without a syndicate for them to offer and sell to the public;
- through dealers or agents; and
- to investors directly in negotiated sales or in competitively bid transactions.

Offerings of securities covered by this prospectus also may be made into an existing trading market for those securities in transactions at other than a fixed price, either:

- on or through the facilities of the Nasdaq Global Market or any other securities exchange or quotation or trading service on which those securities may be listed, quoted, or traded at the time of sale; and/or
- to or through a market maker other than on the securities exchanges or quotation or trading services set forth above.

Those at-the-market offerings, if any, will be conducted by underwriters acting as principal or agent of the Company, who may also be third-party sellers of securities as described above. The prospectus supplement with respect to the offered securities will set forth the terms of the offering of the offered securities, including:

- the name or names of any underwriters, dealers or agents;
- the purchase price of the offered securities and the proceeds to us from such sale;
- any underwriting discounts and commissions or agency fees and other items constituting underwriters' or agents' compensation;
- any initial public offering price and any discounts or concessions allowed or reallocated or paid to dealers;
- any securities exchange on which such offered securities may be listed; and
- any underwriter, agent or dealer involved in the offer and sale of any series of the securities.

The distribution of the securities may be effected from time to time in one or more transactions:

- at fixed prices, which may be changed;
- at market prices prevailing at the time of the sale;
- at varying prices determined at the time of sale; or
- at negotiated prices.

Each prospectus supplement will set forth the manner and terms of an offering of securities including:

- whether that offering is being made to underwriters, through agents or directly to the public;
- the rules and procedures for any auction or bidding process, if used;
- the securities' purchase price or initial public offering price; and
- the proceeds we anticipate from the sale of the securities, if any.

In addition, we may enter into derivative or hedging transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. The applicable prospectus supplement may indicate, in connection with such a transaction, that the third parties may sell securities covered by and pursuant to this prospectus and an applicable prospectus supplement. If so, the third party may use securities pledged by us or borrowed from us or others to settle such sales and may use securities received from us to close out any related short positions. We may also loan or pledge securities covered by this prospectus and an applicable prospectus supplement to third parties, who may sell the loaned securities or, in an event of default in the case of a pledge, sell the pledged securities pursuant to this prospectus and the applicable prospectus supplement.

Sales Through Underwriters

If underwriters are used in the sale of some or all of the securities covered by this prospectus, the underwriters will acquire the securities for their own account. The underwriters may resell the securities, either directly to the public or to securities dealers, at various times in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to certain conditions. Unless indicated otherwise in a prospectus supplement, the underwriters will be obligated to purchase all the securities of the series offered if any of the securities are purchased.

Any initial public offering price and any concessions allowed or reallocated to dealers may be changed intermittently.

Sales Through Agents

Unless otherwise indicated in the applicable prospectus supplement, when securities are sold through an agent, the designated agent will agree, for the period of its appointment as agent, to use specified efforts to sell the securities for our account and will receive commissions from us as will be set forth in the applicable prospectus supplement.

Securities bought in accordance with a redemption or repayment under their terms also may be offered and sold, if so indicated in the applicable prospectus supplement, in connection with a remarketing by one or more firms acting as principals for their own accounts or as agents for us. Any remarketing firm will be identified and the terms of its agreement, if any, with us and its compensation will be described in the prospectus supplement. Remarketing firms may be deemed to be underwriters in connection with the securities remarketed by them.

If so indicated in the applicable prospectus supplement, we may authorize agents, underwriters or dealers to solicit offers by certain specified institutions to purchase securities at a price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a future date specified in the prospectus supplement. These contracts will be subject only to those conditions set forth in the applicable prospectus supplement, and the prospectus supplement will set forth the commissions payable for solicitation of these contracts.

Direct Sales

We may also sell offered securities directly to institutional investors or others. In this case, no underwriters or agents would be involved. The terms of such sales will be described in the applicable prospectus supplement.

General Information

Broker-dealers, agents or underwriters may receive compensation in the form of discounts, concessions or commissions from us and/or the purchasers of securities for whom such broker-dealers, agents or underwriters may act as agents or to whom they sell as principal, or both. This compensation to a particular broker-dealer might be in excess of customary commissions.

Underwriters, dealers and agents that participate in any distribution of the offered securities may be deemed "underwriters" within the meaning of the Securities Act of 1933, as amended (the "Securities Act"), so any discounts or commissions they receive in connection with the distribution may be deemed to be underwriting compensation. Those underwriters and agents may be entitled, under their agreements with us, to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, or to contribution by us to payments that they may be required to make in respect of those civil liabilities. Certain of those underwriters or agents may be customers of, engage in transactions with, or perform services for, us or our affiliates in the ordinary course of business. We will identify any underwriters or agents, and describe their compensation, in a prospectus supplement. Any institutional investors or others that purchase offered securities directly, and then resell the securities, may be deemed to be underwriters, and any discounts or commissions received by them from us and any profit on the resale of the securities by them may be deemed to be underwriting discounts and commissions under the Securities Act.

We will file a supplement to this prospectus, if required, pursuant to Rule 424(b) under the Securities Act, if we enter into any material arrangement with a broker, dealer, agent or underwriter for the sale of securities through a block trade, special offering, exchange distribution or secondary distribution or a purchase by a broker or dealer. Such prospectus supplement will disclose:

- the name of any participating broker, dealer, agent or underwriter;
- the number and type of securities involved;
- the price at which such securities were sold;
- any securities exchanges on which such securities may be listed;
- the commissions paid or discounts or concessions allowed to any such broker, dealer, agent or underwriter, where applicable; and
- other facts material to the transaction.

In order to facilitate the offering of certain securities under this prospectus or an applicable prospectus supplement, certain persons participating in the offering of those securities may engage in transactions that stabilize, maintain or otherwise affect the price of those securities during and after the offering of those securities. Specifically, if the applicable prospectus supplement permits, the underwriters of those securities may over-allot or otherwise create a short position in those securities for their own account by selling more of those securities than have been sold to them by us and may elect to cover any such short position by purchasing those securities in the open market.

In addition, the underwriters may stabilize or maintain the price of those securities by bidding for or purchasing those securities in the open market and may impose penalty bids, under which selling concessions allowed to syndicate members or other broker-dealers participating in the offering are reclaimed if securities previously distributed in the offering are repurchased in connection with stabilization transactions or otherwise. The effect of these transactions may be to stabilize or maintain the market price of the securities at a level above that which might otherwise prevail in the open market. The imposition of a penalty bid may also affect the price of securities to the extent that it discourages resales of the securities. No representation is made as to the magnitude or effect of any such stabilization or other transactions. Such transactions, if commenced, may be discontinued at any time.

In order to comply with the securities laws of certain states, if applicable, the securities must be sold in such jurisdictions only through registered or licensed brokers or dealers. In addition, in certain states the securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Rule 15c6-1 under the Exchange Act generally requires that trades in the secondary market settle in two business days, unless the parties to any such trade expressly agree otherwise. Your prospectus supplement may provide that the original issue date for your securities may be more than two scheduled business days after the trade date for your securities. Accordingly, in such a case, if you wish to trade securities on any date prior to the second business day before the original issue date for your securities, you will be required, by virtue of the fact that your securities initially are expected to settle in more than two scheduled business days after the trade date for your securities, to make alternative settlement arrangements to prevent a failed settlement.

This prospectus, any applicable prospectus supplement and any applicable pricing supplement in electronic format may be made available on the Internet sites of, or through other online services maintained by, us and/or one or more of the agents and/or dealers participating in an offering of securities, or by their affiliates. In those cases, prospective investors may be able to view offering terms online and, depending upon the particular agent or dealer, prospective investors may be allowed to place orders online.

Other than this prospectus, any applicable prospectus supplement and any applicable pricing supplement in electronic format, the information on our website or the website of any agent or dealer, and any information contained in any other website maintained by any agent or dealer:

- is not part of this prospectus, any applicable prospectus supplement or any applicable pricing supplement or the registration statement of which they form a part;
- has not been approved or endorsed by us or by any agent or dealer in its capacity as an agent or dealer, except, in each case, with respect to the respective website maintained by such entity; and
- should not be relied upon by investors.

There can be no assurance that we will sell all or any of the securities offered by this prospectus.

This prospectus may also be used in connection with any issuance of common stock or preferred stock upon exercise of a warrant if such issuance is not exempt from the registration requirements of the Securities Act.

In addition, we may issue the securities as a dividend or distribution or in a subscription rights offering to our existing securityholders. In some cases, we or dealers acting with us or on our behalf may also purchase securities and reoffer them to the public by one or more of the methods described above. This prospectus may be used in connection with any offering of our securities through any of these methods or other methods described in the applicable prospectus supplement.

LEGAL MATTERS

Unless otherwise indicated in the applicable prospectus supplement, the validity of the securities offered hereby will be passed upon for us by Lowenstein Sandler LLP, New York, New York. If the validity of the securities offered hereby in connection with offerings made pursuant to this prospectus are passed upon by counsel for the underwriters, dealers or agents, if any, such counsel will be named in the prospectus supplement relating to such offering.

EXPERTS

The consolidated balance sheets of Corbus Pharmaceuticals Holdings, Inc. and subsidiary as of December 31, 2016 and 2015 and the related consolidated statements of operations, stockholders' equity and cash flows for each of the years then ended, have been audited by EisnerAmper LLP, an independent registered public accounting firm as stated in their report dated March 8, 2017, which is incorporated herein by reference. Such consolidated financial statements have been incorporated herein by reference in reliance on the report of such firm, given upon their authority as experts in auditing and accounting.

DISCLOSURE OF COMMISSION POSITION ON INDEMNIFICATION FOR SECURITIES ACT LIABILITIES

Section 145 of the DGCL provides that we may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal or investigative (other than an action by us or in our right) by reason of the fact that he is or was our director, officer, employee or agent, or is or was serving at our request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by him or her in connection with such action, suit or proceeding if he acted in good faith and in a manner he or she reasonably believed to be in or not opposed to our best interests, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. Section 145 further provides that we similarly may indemnify any such person serving in any such capacity who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by us or in our right to procure judgment in our favor, against expenses actually and reasonably incurred in connection with the defense or settlement of such action or suit if he or she acted in good faith and in a manner he reasonably believed to be in or not opposed to our best interests and except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to us unless and only to the extent that the Delaware Court of Chancery or such other court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Our certificate of incorporation, as amended, limits the liability of our directors to the fullest extent permitted by Delaware law. In addition, we have entered into indemnification agreements with certain of our directors and officers whereby we have agreed to indemnify those directors and officers to the fullest extent permitted by law, including indemnification against expenses and liabilities incurred in legal proceedings to which the director or officer was, or is threatened to be made, a party by reason of the fact that such director or officer is or was a director, officer, employee or agent of the Company, provided that such director or officer acted in good faith and in a manner that the director or officer reasonably believed to be in, or not opposed to, the best interests of the Company.

We have director and officer liability insurance to cover liabilities our directors and officers may incur in connection with their services to us, including matters arising under the Securities Act. Our certificate of incorporation and bylaws also provide that we will indemnify our directors and officers who, by reason of the fact that he or she is one of our officers or directors of our company, is involved in any action, suit or proceeding, whether civil, criminal, administrative or investigative, related to their board role with the company.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers and controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, we will, unless in the opinion of our counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by us is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

ADDITIONAL INFORMATION

This prospectus is part of a Registration Statement on Form S-3 that we have filed with the SEC relating to the shares of our securities being offered hereby. This prospectus does not contain all of the information in the Registration Statement and its exhibits. The Registration Statement, its exhibits and the documents incorporated by reference in this prospectus and their exhibits, all contain information that is material to the offering of the Securities hereby. Whenever a reference is made in this prospectus to any of our contracts or other documents, the reference may not be complete. You should refer to the exhibits that are a part of the Registration Statement in order to review a copy of the contract or documents. The Registration Statement and the exhibits are available at the SEC's Public Reference Room or through its Website.

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You can read and copy any materials we file with the SEC at its Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549 and at its regional offices, a list of which is available on the Internet at <http://www.sec.gov/contact/addresses.htm>. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC maintains an Internet site at <http://www.sec.gov> that contains reports, proxy and information statements, and other information regarding issuers, such as us, that file electronically with the SEC. Additionally, you may access our filings with the SEC through our website at <http://www.corbuspharma.com>. The information on our website is not part of this prospectus.

We will provide you without charge, upon your oral or written request, with a copy of any or all reports, proxy statements and other documents we file with the SEC, as well as any or all of the documents incorporated by reference in this prospectus or the Registration Statement (other than exhibits to such documents unless such exhibits are specifically incorporated by reference into such documents). Requests for such copies should be directed to:

Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive
Norwood, MA 02062
Telephone number: (617) 963-0100

You should rely only on the information in this prospectus and the additional information described above and under the heading "Incorporation of Certain Information by Reference" below. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely upon it. We are not making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information in this prospectus was accurate on the date of the front cover of this prospectus only. Our business, financial condition, results of operations and prospects may have changed since that date.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” information that we file with it into this prospectus, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. The information incorporated by reference is considered to be a part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement.

We incorporate by reference the documents listed below that we have previously filed with the SEC:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, filed with the SEC on March 8, 2017;
- our Quarterly Reports on Form 10-Q for the fiscal quarters ended March 31, 2017, filed with the SEC on May 9, 2017, June 30, 2017, filed with the SEC on August 9, 2017 and September 30, 2017, filed with the SEC on November 8, 2017;
- our Proxy Statement on Schedule 14A filed with the SEC on April 10, 2017;
- our Current Reports on Form 8-K filed with the SEC on February 28, 2017, March 30, 2017, May 26, 2017, August 22, 2017, October 17, 2017, October 19, 2017, October 24, 2017 and November 27, 2017 (other than any portions thereof deemed furnished and not filed); and
- the description of our common stock contained in our Registration Statement on Form 8-A, filed on April 14, 2015, including any amendments thereto or reports filed for the purposes of updating this description.

All reports and other documents that we file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus but before the termination of the offering of the securities hereunder will also be considered to be incorporated by reference into this prospectus from the date of the filing of these reports and documents, and will supersede the information herein; provided, however, that all reports, exhibits and other information that we “furnish” to the SEC will not be considered incorporated by reference into this prospectus. We undertake to provide without charge to each person (including any beneficial owner) who receives a copy of this prospectus, upon written or oral request, a copy of all of the preceding documents that are incorporated by reference (other than exhibits, unless the exhibits are specifically incorporated by reference into these documents). You may request a copy of these materials in the manner set forth under the heading “Additional Information,” above.

\$200,000,000

**Common Stock
Preferred Stock
Warrants
Debt Securities
Subscription Rights
Units**



PROSPECTUS

_____, 2018

The information contained in this prospectus is not complete and may be changed. A registration statement relating to these securities has been filed with the Securities and Exchange Commission. These securities may not be sold nor may offers to buy be accepted prior to the time the registration statement becomes effective. This prospectus is not an offer to sell these securities, and is not soliciting an offer to buy these securities, nor shall there be any sale of these securities, in any jurisdiction where such offer, solicitation or sale is not permitted or would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction.

Subject to completion, dated January 5, 2018

PROSPECTUS



Up to \$50,000,000

Common Stock

We have entered into a Controlled Equity OfferingSM Sales Agreement, or sales agreement, with Cantor Fitzgerald & Co. relating to shares of our common stock offered by this prospectus. In accordance with the terms of the sales agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to \$50.0 million from time to time through Cantor Fitzgerald & Co., acting as sales agent.

Our common stock is listed on the Nasdaq Global Market under the symbol "CRBP." On January 4, 2018, the last reported sales price of our common stock on the Nasdaq Global Market was \$8.35 per share.

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 and, as such, we have elected to comply with certain reduced public company reporting requirements for this prospectus and may elect to comply with certain reduced public company reporting requirements for future filings.

Investing in our common stock involves risks. Before buying any shares, you should read the discussion of material risks of investing in our common stock in "Risk Factors" beginning on page 4 of this prospectus and in the documents incorporated by reference in this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

Upon delivery of a placement notice, and subject to our instructions in that notice and the terms and conditions of the sales agreement generally, Cantor Fitzgerald & Co. may sell our common stock by any method permitted by law deemed to be an "at the market offering" as defined by Rule 415(a)(4) promulgated under the Securities Act of 1933, as amended, or the Securities Act. Cantor Fitzgerald & Co. is not required to sell any specific number or dollar amount of securities, but will act as a sales agent using commercially reasonable efforts consistent with its normal trading and sales practices, on mutually agreed terms between Cantor Fitzgerald & Co. and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

Cantor Fitzgerald & Co. will be entitled to compensation at a fixed commission rate equal to 3% of the gross sales price per share sold. In connection with the sale of our common stock on our behalf, Cantor Fitzgerald & Co. will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of Cantor Fitzgerald & Co. will be deemed to be underwriting commissions or discounts. See "Plan of Distribution" beginning on page 37 for additional information regarding the compensation to be paid to Cantor Fitzgerald & Co.



The date of this prospectus is _____, 2018.

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ABOUT THIS PROSPECTUS

This prospectus is part of registration statement on Form S-3 that we have filed with the Securities and Exchange Commission, or the SEC, using a “shelf” registration process. Under the shelf registration process, we may offer shares of our common stock having an aggregate offering price of up to \$50,000,000 from time to time under this prospectus at prices and on terms to be determined by market conditions at the time of the offering.

We provide information to you about this offering of shares of our common stock in this at the market sales agreement prospectus, which describes the specific terms of this offering of common stock. To the extent there is a conflict between the information contained in this at the market sales agreement prospectus, on the one hand, and the information contained in any document incorporated by reference that was filed with the SEC before the date of this prospectus, on the other hand, you should rely on the information in this at the market sales agreement prospectus. If any statement in one of these documents is inconsistent with a statement in another document having a later date — for example, a document incorporated by reference in this prospectus — the statement in the document having the later date modifies or supersedes the earlier statement.

We have not authorized anyone to provide you with information different from or inconsistent with the information contained in or incorporated by reference in this prospectus. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. You should assume that the information appearing in this prospectus and the documents incorporated by reference in this prospectus is accurate only as of the date of those respective documents, regardless of the time of delivery of those respective documents. Our business, financial condition, results of operations and prospects may have changed since those dates. You should read this prospectus and the documents incorporated by reference in this prospectus in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus entitled “Additional Information” and “Incorporation of Certain Information by Reference.”

We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus and the offering of our common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of our common stock and the distribution of this prospectus outside the United States. This prospectus does not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

All references in this prospectus to “Corbus,” the “Company,” “we,” “us,” or “our” mean Corbus Pharmaceuticals Holdings, Inc. and its subsidiaries unless we state otherwise or the context otherwise indicates. This prospectus and the information incorporated herein by reference contain references to trademarks, service marks and trade names owned by us or other companies. Solely for convenience, trademarks, service marks and trade names referred to in this prospectus and the information incorporated herein, including logos, artwork, and other visual displays, may appear without the ® or ™ symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks, service marks and trade names. We do not intend our use or display of other companies’ trade names, service marks or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Other trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners.

SUMMARY

This summary highlights selected information about us and this common stock offering. This summary is not complete and may not contain all of the information that is important to you. We encourage you to read this prospectus, including the information under the caption “Risk Factors” and the information we incorporate by reference, in its entirety.

Overview

We are a clinical stage pharmaceutical company, focused on the development and commercialization of novel therapeutics to treat rare, chronic and serious inflammatory and fibrotic diseases with clear unmet medical needs. Our product anabasum is a novel synthetic oral endocannabinoid-mimetic drug that is intended to resolve chronic inflammation and halt fibrotic processes without causing immunosuppression. Anabasum has generated positive clinical data in three consecutive Phase 2 studies in diffuse cutaneous systemic sclerosis, cystic fibrosis and dermatomyositis. Anabasum is also being evaluated in open-label extension studies in systemic sclerosis and skin-predominant dermatomyositis and in a Phase 3 study in systemic sclerosis, and we are currently planning for and finalizing the design of a Phase 2b study in cystic fibrosis and expect to commence the study in the first quarter of 2018.

Anabasum is a synthetic, rationally-designed oral small molecule drug that selectively binds to the cannabinoid receptor type 2, or CB2, found on activated immune cells, fibroblasts and muscle cells. Anabasum stimulates the production of Specialized Pro-Resolving Lipid Mediators (SPMs) that act to resolve inflammation and halt fibrosis by activating endogenous pathways. These endogenous resolution pathways are normally activated in healthy individuals during the course of normal immune responses but are dysfunctional in patients with chronic inflammatory and fibrotic diseases. Through its activation of the CB2 receptor, anabasum is designed to drive innate immune responses from the activation phase through completion of the resolution phase. The CB2 receptor plays an endogenous role in modulating and resolving inflammation by, in effect, turning heightened inflammation “off” and restoring homeostasis.

We are currently developing anabasum to treat four life-threatening diseases: systemic sclerosis; cystic fibrosis; diffuse cutaneous, skin-predominant dermatomyositis; and systemic lupus erythematosus, or SLE. The United States Food and Drug Administration, or the FDA, has granted anabasum Orphan Designation as well as Fast Track Status for both cystic fibrosis and systemic sclerosis. The European Medicines Authority, or the EMA, has granted anabasum Orphan Designation for both cystic fibrosis and systemic sclerosis.

Recent Developments

Initiation of Phase 3 Clinical Study in Systemic Sclerosis

On December 14, 2017, we announced the initiation of a Phase 3 “RESOLVE-1” clinical study of anabasum for the treatment of diffuse cutaneous systemic sclerosis. The international multicenter Phase 3 RESOLVE-1 study is a double-blind, randomized, placebo-controlled study assessing the efficacy and safety of anabasum for the treatment of systemic sclerosis. The study will enroll approximately 354 subjects at 70 sites in North America, Europe, Israel, Japan, South Korea, and Australia.

The planned duration of treatment with study drug is 52 weeks. Subjects will be randomized 1:1:1 to receive anabasum 5 mg twice per day, anabasum 20 mg twice per day, or placebo twice per day. The primary efficacy outcome of the RESOLVE-1 study will be change from baseline in modified Rodnan Skin Score (“mRSS”), a measure of skin fibrosis and a standard clinical trial outcome in systemic sclerosis. Secondary outcomes of the RESOLVE-1 study include patient- and physician-reported outcomes, forced vital capacity, the American College of Rheumatology Combined Response Index in diffuse cutaneous Systemic Sclerosis (“ACR CRISS”) score, a novel composite measure of clinical improvement from baseline that incorporates change from baseline in mRSS and lung function.

Initiation of Phase 2 Clinical Study in Systemic Lupus Erythematosus

On December 22, 2017, we announced the initiation of a Phase 2 clinical study of anabasum for the treatment of systemic lupus erythematosus, or SLE. This Phase 2 SLE clinical trial is being conducted by the Autoimmunity Centers of Excellence (ACE) program, which is funded by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH).

The randomized, double-blind, placebo-controlled, Phase 2 trial will be conducted at 15 sites in the United States and will enroll 100 adult SLE patients with active musculoskeletal disease. Subjects will be randomized in a 1:1:1:1 ratio to one of four cohorts to receive placebo or three different doses of anabasum for 3 months, with 1-month follow-up. The primary efficacy outcome assesses pain from active musculoskeletal disease, and secondary efficacy outcomes include other assessments of active musculoskeletal disease, overall disease activity using SLE Responder Index, SLE Disease Activity Index and British Isles Lupus Activity Group scoring systems, and patient-reported outcomes.

Intellectual Property Updates

On October 31, 2017, the Company announced that the U.S. Patent and Trademark Office (“USPTO”) issued U.S. Patent No. 9,801,849 to the Company with claims covering the use of pharmaceutical compositions comprising anabasum, Corbus’ lead product in development for the treatment of inflammatory diseases. The patent provides intellectual property protection for Corbus’ use of anabasum to treat inflammatory diseases in the United States through 2034.

On November 27, 2017, the Company announced that the U.S. Patent and Trademark Office (“USPTO”) issued U.S. Patent No. 9,820,964 to the Company with claims covering the use of pharmaceutical compositions comprising anabasum for the treatment of multiple fibrotic diseases, including the Company’s lead indications: systemic sclerosis, dermatomyositis, cystic fibrosis as well as others. The patent provides intellectual property protection in the United States for the use of anabasum through 2034.

Corporate Information

Our principal executive offices are located at 100 River Ridge Drive, Norwood, Massachusetts 02062, and our telephone number is (617) 963-0100. Our website address is www.corbuspharma.com. Our website and the information contained on, or that can be accessed through, our website will not be deemed to be incorporated by reference in, and are not considered part of, this prospectus. You should not rely on our website or any such information in making your decision whether to purchase our securities.

THE OFFERING

Common stock offered by us	Shares of our common stock having an aggregate offering price of up to \$50.0 million.
Common stock to be outstanding after this offering	Up to 61,591,450 shares of common stock, assuming sales of 5,988,023 shares in this offering at a public offering price of \$8.35 per share, which was the closing price of our common stock on the Nasdaq Global Market, or Nasdaq, on January 4, 2018. The actual number of shares issued will vary depending on the sales price under this offering.
Manner of offering	“At the market” offering that may be made from time to time through our sales agent, Cantor Fitzgerald & Co. See “Plan of Distribution” beginning on page 37 of this prospectus.
Use of Proceeds	We currently intend to use the net proceeds from this offering to fund our continued development of anabasum and for general corporate purposes, which may include funding preclinical studies, clinical trials, the manufacturing of anabasum for clinical trials and commercial launch, and acquisitions or investments in businesses, products or technologies that are complementary, and to increase our working capital and fund capital expenditures. See “Use of Proceeds” on page 32 of this prospectus.
Risk Factors	Investing in our common stock involves a high degree of risk. See “Risk Factors” beginning on page 4 of this prospectus and under similar headings in the other documents that are filed after the date hereof and incorporated by reference in this prospectus for a discussion of factors to consider before deciding to purchase shares of our common stock.
Nasdaq Global Market symbol	“CRBP”

The number of shares of common stock to be outstanding after this offering is based on 55,603,427 shares of common stock outstanding on January 4, 2018 and excludes:

- 7,724,779 shares of common stock issuable upon the exercise of outstanding options at a weighted average exercise price of \$3.66 per share, of which 4,055,877 options were vested as of September 30, 2017;
- 1,288,500 shares of common stock issuable upon the exercise of outstanding warrants at a weighted average exercise price of \$1.00 per share, of which 1,288,500 warrants were exercisable as of September 30, 2017; and
- 5,425,834 shares of our common stock available for future issuance under our 2014 Equity Incentive Plan as of January 4, 2018.

RISK FACTORS

An investment in our shares of common stock involves a high degree of risk. Prior to making a decision about investing in our shares of common stock, you should carefully consider the risks, uncertainties and assumptions discussed under Item 1A, "Risk Factors," in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016 and any subsequent updates described in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, all of which are incorporated herein by reference and may be amended, supplemented or superseded from time to time by other reports we file with the SEC in the future, together with information in this prospectus and any other information incorporated by reference into this prospectus, including the risk factors set forth below. See the sections of this prospectus entitled "Additional Information" and "Incorporation of Certain Information by Reference." Additional risks and uncertainties not presently known to us, or that we currently see as immaterial, may also harm our business. If any of these risks occur, our business, financial condition and operating results could be harmed, the trading price of our common stock could decline and you could lose part or all of your investment.

This prospectus also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks faced by us described below and elsewhere in this prospectus. See "Special Note Regarding Forward-Looking Statements" for information relating to these forward-looking statements.

Risk Related to our Company and our Business

Risks Related to Our Financial Position and Need for Capital

We are a clinical stage pharmaceutical company with a limited operating history.

We are a clinical stage pharmaceutical company with a limited operating history. We have to complete clinical studies and receive regulatory approval of a New Drug Application, or NDA, before commercial sales of a product can commence. The likelihood of success of our business plan must be considered in light of the problems, substantial expenses, difficulties, complications and delays frequently encountered in connection with developing and expanding early-stage businesses and the regulatory and competitive environment in which we operate. Pharmaceutical product development is a highly speculative undertaking, involves a substantial degree of risk and is a capital-intensive business.

Accordingly, you should consider our prospects in light of the costs, uncertainties, delays and difficulties frequently encountered by companies in the early stages of development, especially clinical pharmaceutical companies such as ours. Potential investors should carefully consider the risks and uncertainties that a company with a limited operating history will face. In particular, potential investors should consider that we cannot assure you that we will be able to:

- successfully implement or execute our current business plan, and we cannot assure you that our business plan is sound;
- successfully manufacture our clinical product and establish commercial drug supply;
- obtain Drug Enforcement Administration, or DEA, licenses necessary for the manufacturing of anabasum and for evaluating anabasum in our clinical trials;
- successfully complete the clinical trials necessary to obtain regulatory approval for the marketing of anabasum;
- secure market exclusivity and/or adequate intellectual property protection for anabasum;
- attract and retain an experienced management and advisory team;
- secure acceptance of anabasum in the medical community and with third party payors and consumers;
- launch commercial sales of anabasum, whether alone or in collaboration with others; and
- raise sufficient funds in the capital markets to effectuate our business plan.

If we cannot successfully execute any one of the foregoing, our business may not succeed and your investment will be adversely affected.

We have incurred operating losses in each year since our inception and expect to continue to incur substantial losses for the foreseeable future. We may never become profitable or, if we achieve profitability, be able to sustain profitability.

We expect to incur substantial expenses without corresponding revenues unless and until we are able to obtain regulatory approval and successfully commercialize anabasum. We have been engaged in developing anabasum since 2009. To date, we have not generated any revenue from anabasum and we expect to incur significant expense to complete our clinical program for anabasum in the United States and elsewhere. We may never be able to obtain regulatory approval for the marketing of anabasum in any indication in the United States or internationally. Even if we are able to commercialize anabasum or any other product candidate, there can be no assurance that we will generate significant revenues or ever achieve profitability. Our net losses for the nine months ended September 30, 2017 and 2016 and for the years ended December 31, 2016 and December 31, 2015 were approximately \$21,728,000, \$12,428,000, \$19,999,000 and \$8,851,000, respectively. As of September 30, 2017, we had an accumulated deficit of approximately \$55,004,000.

If we were to obtain FDA approval for anabasum, we would expect that our research and development expenses will continue to increase as we advance clinical trials for indications for the treatment of cystic fibrosis, systemic sclerosis, dermatomyositis and systemic lupus erythematosus, or SLE. We may elect to pursue FDA approval for anabasum in other indications, which will result in significant additional research and development expenses. As a result, we expect to continue to incur substantial losses for the foreseeable future, and these losses will increase. We are uncertain when or if we will be able to achieve or sustain profitability. If we achieve profitability in the future, we may not be able to sustain profitability in subsequent periods. Failure to become and remain profitable would impair our ability to sustain operations and adversely affect the price of our common stock and our ability to raise capital.

Our cash or cash equivalents will only fund our operations for a limited time and we will need to raise additional capital to support our development and commercialization efforts.

We are currently operating at a loss and expect our operating costs will increase significantly as we incur further costs related to the clinical trials for anabasum. As of September 30, 2017, we held cash and cash equivalents of approximately \$36.6 million. In October 2017, we completed an underwritten public offering of shares of our common stock pursuant to which we sold an aggregate of 5,347,500 shares of our common stock and received net proceeds of approximately \$35.0 million. We expect our cash and cash equivalents at September 30, 2017 together with the proceeds from the October 2017 offering and the remaining milestone payment of \$500,000 from Cystic Fibrosis Foundation Therapeutics, Inc., which we received in November 2017, to be sufficient to meet our operating and capital requirements into the fourth quarter of 2019 based on current planned expenditures.

Other than the Controlled Equity OfferingSM Sales Agreement, or the Sales Agreement, between us and Cantor Fitzgerald & Co., dated January 5, 2018, pursuant to which we may offer and sell up to \$50.0 million of shares of our common stock from time to time through Cantor Fitzgerald & Co. acting as sales agent, we do not currently have any arrangements or credit facilities in place as a source of funds, and there can be no assurance that we will be able to raise sufficient additional capital on acceptable terms, or at all, including pursuant to the Sales Agreement due to limiting terms contained therein and sales thereunder being subject to market conditions. If we are not successful in raising additional capital, we may not be able to continue as a going concern. We may seek additional capital through a combination of private and public equity offerings, debt financings and strategic collaborations. Debt financing, if obtained, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, and could increase our expenses and require that our assets secure such debt.

Equity financing, if obtained, could result in dilution to our then existing stockholders and/or require such stockholders to waive certain rights and preferences. If such financing is not available on satisfactory terms, or is not available at all, we may be required to delay, scale back or eliminate the development of business opportunities and our operations and financial condition may be materially adversely affected. We can provide no assurances that any additional sources of financing will be available to us on favorable terms, if at all. In addition, if we are unable to secure sufficient capital to fund our operations, we may choose to pursue, as an alternative, strategic collaborations that could require us to share commercial rights to anabasum with third parties in ways that we currently do not intend or on terms that may not be favorable to us. If we choose to pursue additional indications and/or geographies for anabasum or otherwise expand more rapidly than we presently anticipate we may also need to raise additional capital sooner than expected.

Risks Related to Product Development, Regulatory Approval, Manufacturing and Commercialization

We depend entirely on the success of anabasum. If we are unable to generate revenues from anabasum, our ability to create stockholder value will be limited.

Our only product candidate currently is anabasum, for which we have completed Phase 1 safety studies which we are evaluating in subsequent clinical studies. We do not generate revenues from any FDA approved drug products and have no other product candidates in development. There is no guarantee that our clinical trials will be successful or that we will continue with clinical studies to support an approval from the FDA for any indication. We note that most drug candidates never reach the clinical development stage and even those that do have only a small chance of successfully completing clinical development and gaining regulatory approval. Therefore, our business currently depends entirely on the successful development, regulatory approval and commercialization of anabasum, which may never occur.

If we are not able to obtain any required regulatory approvals for anabasum, we will not be able to commercialize our only product candidate and our ability to generate revenue will be limited.

Our clinical trials may be unsuccessful, which would materially harm our business. Even if our ongoing clinical trials are successful, we will be required to conduct additional clinical trials to establish anabasum's safety and efficacy, before a New Drug Application, or NDA, can be filed with the FDA for marketing approval of anabasum.

Clinical testing is expensive, is difficult to design and implement, can take many years to complete and is uncertain as to outcome. Success in early phases of pre-clinical and clinical trials does not ensure that later clinical trials will be successful, and interim results of a clinical trial do not necessarily predict final results. A failure of one or more of our clinical trials can occur at any stage of testing. We may experience numerous unforeseen events during, or as a result of, the clinical trial process that could delay or prevent our ability to receive regulatory approval or commercialize anabasum. The research, testing, manufacturing, labeling, packaging, storage, approval, sale, marketing, advertising and promotion, pricing, export, import and distribution of drug products are subject to extensive regulation by the FDA and other regulatory authorities in the United States and other countries, which regulations differ from country to country. We are not permitted to market anabasum as a prescription pharmaceutical product in the United States until we receive approval of an NDA from the FDA or comparable regulatory agencies for sales in foreign markets until we receive the requisite approval from such countries. In the United States, the FDA generally requires the completion of clinical trials of each drug to establish its safety and efficacy and extensive pharmaceutical development to ensure its quality before an NDA is approved. Regulatory authorities in other jurisdictions impose similar requirements. Of the large number of drugs in development, only a small percentage result in the submission of an NDA to the FDA and even fewer are eventually approved for commercialization. We have never submitted an NDA to the FDA or comparable applications to other regulatory authorities. If our development efforts for anabasum, including regulatory approval, are not successful for its planned indications, or if adequate demand for anabasum is not generated, our business will be harmed.

Receipt of necessary regulatory approval is subject to a number of risks, including the following:

- the FDA or comparable foreign regulatory authorities or institutional review boards, or IRBs, may disagree with the design or implementation of our clinical trials;
- we may not be able to provide acceptable evidence of anabasum's safety and efficacy;
- the results of our clinical trials may not be satisfactory or may not meet the level of statistical or clinical significance required by the FDA, European Medicines Agency, or EMA, or other comparable foreign regulatory authorities for marketing approval;
- the dosing of anabasum in a particular clinical trial may not be at an optimal level;
- patients in our clinical trials may suffer adverse effects for reasons that may or may not be related to anabasum;
- the data collected from clinical trials may not be sufficient to support the submission of an NDA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Failure to obtain regulatory approval for anabasum for the foregoing or any other reasons will prevent us from commercializing this product candidate as a prescription product, and our ability to generate revenue will be materially impaired. We cannot guarantee that regulators will agree with our assessment of the results of our clinical trials or that such trials will be considered by regulators to have shown safety or efficacy of our product candidates. The FDA, EMA and other regulators have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional clinical trials, or pre-clinical or other studies. In addition, varying interpretations of the data obtained from pre-clinical and clinical testing could delay, limit or prevent regulatory approval of a product candidate.

We have only limited experience in filing the applications necessary to gain regulatory approvals and expect to rely on consultants and third party contract research organizations, or CROs, with expertise in this area to assist us in this process. Securing FDA approval requires the submission of pre-clinical, clinical and/or pharmacokinetic data, information about product manufacturing processes and inspection of facilities and supporting information to the FDA for each therapeutic indication to establish a product candidate's safety and efficacy for each indication. Anabasum may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining regulatory approval or prevent or limit commercial use with respect to one or all intended indications.

The process of obtaining regulatory approvals is expensive, often takes many years, if approval is obtained at all, and can vary substantially based upon, among other things, the type, complexity and novelty of the product candidates involved, the jurisdiction in which regulatory approval is sought and the substantial discretion of the regulatory authorities. Changes in the regulatory approval policy during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for a submitted product application may cause delays in the approval or rejection of an application. Regulatory approval obtained in one jurisdiction does not necessarily mean that a product candidate will receive regulatory approval in all jurisdictions in which we may seek approval, but the failure to obtain approval in one jurisdiction may negatively impact our ability to seek approval in a different jurisdiction. Failure to obtain regulatory marketing approval for anabasum in any indication will prevent us from commercializing the product candidate, and our ability to generate revenue will be materially impaired.

Clinical drug development involves a lengthy and expensive process with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results.

Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. The results of pre-clinical studies and early clinical trials may not be predictive of the results of later-stage clinical trials. We cannot assure you that the FDA will view the results as we do or that any future trials of anabasum will achieve positive results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through pre-clinical studies and initial clinical trials. A number of companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier trials. Any future clinical trial results for anabasum may not be successful.

In addition, a number of factors could contribute to a lack of favorable safety and efficacy results for anabasum. For example, such trials could result in increased variability due to varying site characteristics, such as local standards of care, differences in evaluation period and surgical technique, and due to varying patient characteristics, including demographic factors and health status.

Anabasum is our only product candidate in development. If we fail to successfully commercialize anabasum, we may need to acquire additional product candidates and our business will be adversely affected.

We have never commercialized any product candidates and do not have any other compounds in pre-clinical testing, lead optimization or lead identification stages beyond anabasum. We cannot be certain that anabasum will prove to be sufficiently effective and safe to meet applicable regulatory standards for any indication. If we fail to successfully commercialize anabasum as a treatment for cystic fibrosis, systemic sclerosis, dermatomyositis, SLE or any other indication, whether as a stand-alone therapy or in combination with other treatments, our business would be adversely affected.

Even if we receive regulatory approval for anabasum, we still may not be able to successfully commercialize this product, and the revenue that we generate from its sales, if any, may be limited.

If approved for marketing, the commercial success of anabasum will depend upon its acceptance by the medical community, including physicians, patients and health care payors. The degree of market acceptance of anabasum will depend on a number of factors, including:

- demonstration of clinical safety and efficacy;
- relative convenience, pill burden and ease of administration;
- the prevalence and severity of any adverse effects;

- the willingness of physicians to prescribe anabasum and of the target patient population to try new therapies;
- safety, tolerability and efficacy of anabasum compared to competing products;
- the introduction of any new products that may in the future become available to treat indications for which anabasum may be approved;
- new procedures or methods of treatment that may reduce the incidences of any of the indications in which anabasum may show utility;
- pricing and cost-effectiveness;
- the inclusion or omission of anabasum in applicable treatment guidelines;
- the effectiveness of our or any future collaborators' sales and marketing strategies;
- limitations or warnings contained in FDA-approved labeling;
- our ability to obtain and maintain sufficient third-party coverage or reimbursement from government health care programs, including Medicare and Medicaid, private health insurers and other third-party payors; and
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage or reimbursement.

If anabasum is approved, but does not achieve an adequate level of acceptance by physicians, health care payors and patients, we may not generate sufficient revenue and we may not be able to achieve or sustain profitability. Our efforts to educate the medical community and third-party payors on the benefits of anabasum may require significant resources and may never be successful.

In addition, even if we obtain regulatory approvals, the timing or scope of any approvals may prohibit or reduce our ability to commercialize anabasum successfully. For example, if the approval process takes too long, we may miss market opportunities and give other companies the ability to develop competing products or establish market dominance. Any regulatory approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render anabasum not commercially viable. For example, regulatory authorities may approve anabasum for fewer or more limited indications than we request, may not approve the price we intend to charge for anabasum, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve anabasum with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that indication. Further, the FDA or comparable foreign regulatory authorities may place conditions on approvals, such as risk management plans and a Risk Evaluation and Mitigation Strategy, or REMS, 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 an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA may also require a REMS for an approved product when new safety information emerges. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of anabasum. Moreover, product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following the initial marketing of the product. Any of the foregoing scenarios could materially harm the commercial success of anabasum.

Even if we obtain marketing approval for anabasum, we will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. Additionally, anabasum could be subject to labeling and other restrictions and withdrawal from the market and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with anabasum.

Even if we obtain United States regulatory approval of anabasum for an indication, the FDA may still impose significant restrictions on its indicated uses or marketing or the conditions of approval, or impose ongoing requirements for potentially costly and time-consuming post-approval studies, including Phase 4 clinical trials, and post-market surveillance to monitor safety and efficacy. Anabasum will also be subject to ongoing regulatory requirements governing the manufacturing, labeling, packaging, storage, distribution, safety surveillance, advertising, promotion, recordkeeping and reporting of adverse events and other post-market information. These requirements include registration with the FDA, continued compliance with current Good Clinical Practices regulations, or cGCPs, for any clinical trials that we conduct post-approval, continued compliance with the CSA and ongoing review by the DEA. In addition, manufacturers of drug products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with current Good Manufacturing Practices, or cGMP, requirements relating to quality control, quality assurance and corresponding maintenance of records and documents.

With respect to sales and marketing activities by us or any future partner, advertising and promotional materials must comply with FDA rules in addition to other applicable federal, state and local laws in the United States and similar legal requirements in other countries. In the United States, the distribution of product samples to physicians must comply with the requirements of the U.S. Prescription Drug Marketing Act. Application holders must obtain FDA approval for product and manufacturing changes, depending on the nature of the change. We may also be subject, directly or indirectly through our customers and partners, to various fraud and abuse laws, including, without limitation, the U.S. Anti-Kickback Statute, U.S. False Claims Act, and similar state laws, which impact, among other things, our proposed sales, marketing, and scientific/educational grant programs. If we participate in the U.S. Medicaid Drug Rebate Program, the Federal Supply Schedule of the U.S. Department of Veterans Affairs, or other government drug programs, we will be subject to complex laws and regulations regarding reporting and payment obligations. All of these activities are also potentially subject to U.S. federal and state consumer protection and unfair competition laws. Similar requirements exist in many of these areas in other countries.

In addition, if anabasum is approved for an indication, our product labeling, advertising and promotion would be subject to regulatory requirements and continuing regulatory review. The FDA strictly regulates the promotional claims that may be made about prescription products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling. If we receive marketing approval for anabasum, physicians may nevertheless legally prescribe our products to their patients in a manner that is inconsistent with the approved label. However, if we are found to have promoted such off-label uses, we may become subject to significant liability and government fines. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees of permanent injunctions under which specified promotional conduct is changed or curtailed.

If we or a regulatory agency discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency or problems with the facility where the product is manufactured, or if we or our manufacturers fail to comply with applicable regulatory requirements, we may be subject to the following administrative or judicial sanctions:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- issuance of warning letters or untitled letters;

- injunctions or the imposition of civil or criminal penalties or monetary fines;
- suspension of any ongoing clinical trials;
- refusal to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product license approvals;
- suspension of, or imposition of restrictions on, operations, including costly new manufacturing requirements; or
- product seizure or detention or refusal to permit the import or export of product.

The occurrence of any event or penalty described above may inhibit our ability to commercialize anabasum and generate revenue. Adverse regulatory action, whether pre- or post-approval, can also potentially lead to product liability claims and increase our product liability exposure.

We currently have no sales and marketing organization. If we are unable to secure a sales and marketing partner or establish satisfactory sales and marketing capabilities, we may not successfully commercialize anabasum.

At present, we have no sales or marketing personnel. In order to commercialize products that are approved for commercial sales, we must either collaborate with third parties that have such commercial infrastructure or develop our own sales and marketing infrastructure. If we are not successful in entering into appropriate collaboration arrangements, or recruiting sales and marketing personnel or in building a sales and marketing infrastructure, we will have difficulty successfully commercializing anabasum, which would adversely affect our business, operating results and financial condition.

We may not be able to enter into collaboration agreements on terms acceptable to us or at all. In addition, even if we enter into such relationships, we may have limited or no control over the sales, marketing and distribution activities of these third parties. Our future revenues may depend heavily on the success of the efforts of these third parties. If we elect to establish a sales and marketing infrastructure we may not realize a positive return on this investment. In addition, we will have to compete with established and well-funded pharmaceutical and biotechnology companies to recruit, hire, train and retain sales and marketing personnel. Factors that may inhibit our efforts to commercialize anabasum without strategic partners or licensees include:

- our inability to recruit and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to or persuade adequate numbers of physicians to prescribe anabasum;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

We face 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 and subject to rapid and significant technological change. We have competitors in a number of jurisdictions, many of which have substantially greater name recognition, commercial infrastructures and financial, technical and personnel resources than we have. Established competitors may invest heavily to quickly discover and develop novel compounds that could make anabasum obsolete or uneconomical. Any new product that competes with an approved product may need to demonstrate compelling advantages in efficacy, cost, convenience, tolerability and safety to be commercially successful. Other competitive factors, including generic competition, could force us to lower prices or could result in reduced sales. In addition, new products developed by others could emerge as competitors to anabasum. If we are not able to compete effectively against our current and future competitors, our business will not grow and our financial condition and operations will suffer.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize anabasum and affect the prices we may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval for anabasum, restrict or regulate post-approval activities and affect our ability to profitably sell anabasum. Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We do not know whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of anabasum, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

In the United States, the Medicare Modernization Act, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for drugs. In addition, this legislation authorized Medicare Part D prescription drug plans to use formularies where they can limit the number of drugs that will be covered in any therapeutic class. As a result of this legislation and the expansion of federal coverage of drug products, we expect that there will be additional pressure to contain and reduce costs. These cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for anabasum and could seriously harm our business. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates, and any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 or, collectively, the Health Care Reform Law, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Effective October 1, 2010, the Health Care Reform Law revised the definition of "average manufacturer price" for reporting purposes, which could increase the amount of Medicaid drug rebates to states. Further, the new law imposed a significant annual fee on companies that manufacture or import branded prescription drug products. Substantial new provisions affecting compliance have also been enacted, which may require us to modify our business practices with healthcare practitioners, and incur substantial costs to ensure compliance. Subsequent to the 2016 presidential election, some members of the U.S. Congress are working to repeal the Health Care Reform Law. More recently, President Trump and the Republican majorities in both houses of the U.S. Congress have been seeking to repeal or replace all or portions of the Health Care Reform Law, but to date they have been unable to agree on any such legislation. While we are unable to predict what legislation, if any, may potentially be enacted, to the extent that future changes affect how our product candidates could be paid for and/or reimbursed by the government and private payers, our business could be adversely affected.

Despite initiatives to invalidate the Health Care Reform Law, at this time it appears the implementation of the Health Care Reform Law will continue. We will not know the full effects of the Health Care Reform Law until applicable federal and state agencies issue regulations or guidance under the new law. Although it is too early to determine the effect of the Health Care Reform Law, the new law appears likely to continue the pressure on pharmaceutical pricing, especially under the Medicare program, and may also increase our regulatory burdens and operating costs.

In addition, other legislative changes have been proposed and adopted in the United States since the Health Care Reform Law was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013. On January 2, 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, or the ATRA, which delayed for another two months the budget cuts mandated by these sequestration provisions of the Budget Control Act of 2011. The ATRA, among other things, also reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. We expect that additional federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, and in turn could significantly reduce the projected value of certain development projects and reduce our profitability.

Our future growth depends, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future profitability will depend, in part, on our ability to commercialize anabasum in foreign markets for which we intend to rely on collaborations with third parties. If we commercialize anabasum in foreign markets, we would be subject to additional risks and uncertainties, including:

- our customers' ability to obtain reimbursement for anabasum in foreign markets;
- our inability to directly control commercial activities because we are relying on third parties;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements;
- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- import or export licensing requirements;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers for technical training;
- reduced protection of intellectual property rights in some foreign countries;
- foreign currency exchange rate fluctuations; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

Foreign sales of anabasum could also be adversely affected by the imposition of governmental controls, political and economic instability, trade restrictions and changes in tariffs, any of which may adversely affect our results of operations.

If we market anabasum in a manner that violates healthcare fraud and abuse laws, or if we violate government price reporting laws, we may be subject to civil or criminal penalties.

The FDA enforces laws and regulations which require that the promotion of pharmaceutical products be consistent with the approved prescribing information. While physicians may prescribe an approved product for a so-called "off label" use, it is unlawful for a pharmaceutical company to promote its products in a manner that is inconsistent with its approved label and any company which engages in such conduct may be subject to significant liability. Similarly, industry codes in the European Union and other foreign jurisdictions prohibit companies from engaging in off-label promotion and regulatory agencies in various countries enforce violations of the code with civil penalties. While we intend to ensure that our promotional materials are consistent with our label, regulatory agencies may disagree with our assessment and may issue untitled letters, warning letters or may institute other civil or criminal enforcement proceedings. In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal healthcare fraud and abuse laws have been applied in recent years to restrict certain marketing practices in the pharmaceutical industry. These laws include the U.S. Anti-Kickback Statute, U.S. False Claims Act and similar state laws. Because of the breadth of these laws and the narrowness of the safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of these laws.

The U.S. 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. This statute has been interpreted broadly to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Although there are several statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchasing or recommending may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Our practices may not, in all cases, meet all of the criteria for safe harbor protection from anti-kickback liability. Moreover, recent health care reform legislation has strengthened these laws. For example, the Health Care Reform Law, among other things, amends the intent requirement of the U.S. Anti-Kickback Statute and criminal health care fraud statutes; a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it. In addition, the Health Care Reform Law provides that the government may assert that a claim including items or services resulting from a violation of the U.S. Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the U.S. False Claims Act. Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, or causing to be made, a false statement to get a false claim paid.

Over the past few years, pharmaceutical and other healthcare companies have been prosecuted under these laws for a variety of alleged promotional and marketing activities, such as: allegedly providing free trips, free goods, sham consulting fees and grants and other monetary benefits to prescribers; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in off-label promotion that caused claims to be submitted to Medicare or Medicaid for non-covered, off-label uses; and submitting inflated best price information to the Medicaid Rebate Program to reduce liability for Medicaid rebates. Most states also have statutes or regulations similar to the U.S. Anti-Kickback Statute and the U.S. False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. Sanctions under these federal and state laws may include substantial civil monetary penalties, exclusion of a manufacturer's products from reimbursement under government programs, substantial criminal fines and imprisonment.

We are, and will be, completely dependent on third parties to manufacture anabasum, and our commercialization of anabasum could be halted, delayed or made less profitable if those third parties fail to obtain manufacturing approval from the FDA or comparable foreign regulatory authorities, fail to provide us with sufficient quantities of anabasum or fail to do so at acceptable quality levels or prices.

We do not currently have, nor do we plan to acquire, the capability or infrastructure to manufacture the active pharmaceutical ingredient, or the finished anabasum drug product in tablet form, for use in our clinical trials or for commercial product, if any. As a result, we will be obligated to rely on contract manufacturers if and when anabasum is approved for commercialization.

The facilities used by our contract manufacturers to manufacture anabasum must be approved by the FDA pursuant to inspections that will be conducted after we submit our NDA to the FDA. We do not control the manufacturing processes of, and are completely dependent on, our contract manufacturing partners for compliance with cGMPs for manufacture of both active drug substances and finished drug products. These cGMP regulations cover all aspects of the manufacturing, testing, quality control and record keeping relating to anabasum. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of anabasum or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market anabasum, if approved.

Our contract manufacturers will be subject to ongoing periodic unannounced inspections by the FDA and corresponding state and foreign agencies for compliance with cGMPs and similar regulatory requirements. We will not have control over our contract manufacturers' compliance with these regulations and standards. Failure by any of our contract manufacturers to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, failure to grant approval to market anabasum, delays, suspensions or withdrawals of approvals, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect our business. In addition, we will not have control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. Failure by our contract manufacturers to comply with or maintain any of these standards could adversely affect our ability to develop, obtain regulatory approval for or market anabasum.

If for any reason, these third parties are unable or unwilling to perform, we may not be able to terminate our agreements with them, and we may not be able to locate alternative manufacturers or formulators or enter into favorable agreements with them and we cannot be certain that any such third parties will have the manufacturing capacity to meet future requirements. If these manufacturers or any alternate manufacturer of finished drug product experiences any significant difficulties in its respective manufacturing processes for our active pharmaceutical ingredient, or API, or our finished anabasum product or should cease doing business with us, we could experience significant interruptions in the supply of anabasum or may not be able to create a supply of anabasum at all. Were we to encounter manufacturing issues, our ability to produce a sufficient supply of anabasum might be negatively affected. Our inability to coordinate the efforts of our third party manufacturing partners, or the lack of capacity available at our third party manufacturing partners, could impair our ability to supply anabasum at required levels. Because of the significant regulatory requirements that we would need to satisfy in order to qualify a new bulk or finished product manufacturer, if we face these or other difficulties with our current manufacturing partners, we could experience significant interruptions in the supply of anabasum if we decided to transfer the manufacture of anabasum to one or more alternative manufacturers in an effort to deal with the difficulties.

Any manufacturing problem or the loss of a contract manufacturer could be disruptive to our operations and result in lost sales. Additionally, we rely on third parties to supply the raw materials needed to manufacture our potential products. Any reliance on suppliers may involve several risks, including a potential inability to obtain critical materials and reduced control over production costs, delivery schedules, reliability and quality. Any unanticipated disruption to a future contract manufacturer caused by problems at suppliers could delay shipment of anabasum, increase our cost of goods sold and result in lost sales.

We cannot guarantee that our manufacturing and supply partners will be able to manufacture anabasum at commercial scale on a cost-effective basis. If the commercial-scale manufacturing costs of anabasum are higher than expected, these costs may significantly impact our operating results. In order to reduce costs, we may need to develop and implement process improvements. However, in order to do so, we will need, from time to time, to notify or make submissions with regulatory authorities, and the improvements may be subject to approval by such regulatory authorities. We cannot be sure that we will receive these necessary approvals or that these approvals will be granted in a timely fashion. We also cannot guarantee that we will be able to enhance and optimize output in our commercial manufacturing process. If we cannot enhance and optimize output, we may not be able to reduce our costs over time.

Our product candidate, anabasum, is currently classified as a Schedule I controlled substance subject to U.S. controlled substance laws and regulations, including regulations of the Drug Enforcement Agency and the U.S. Food and Drug Administration. Failure to obtain the necessary licenses and registrations and failure to comply with these laws could result in the delay in the manufacturing and distribution of anabasum and could delay the completion of clinical studies. Such delays and the cost of compliance with these laws and regulations, could adversely affect our business operations and our financial condition.

In the United States, our product candidate, anabasum, is currently classified as a Schedule I controlled substance as defined in the Controlled Substance Act ("CSA"). This designation is based on anabasum's chemical structure and pharmacology (namely, it being a synthetic endocannabinoid mimetic that binds to the CB2 receptor). Even though anabasum's mechanism of action is to modulate the immune system and results to date from clinical studies have demonstrated the drug has no psychotropic effects (which we believe is unlike other members of its chemical class), the DEA classifies anabasum as a Schedule I substance.

Schedule I controlled substances are pharmaceutical products subject to specific regulations under the CSA, which establishes, among other things, certain registration, manufacturing quotas, security, recordkeeping, reporting, import, export and other requirements administered by the DEA. All parties responsible for the manufacturing, distribution and testing of the drug in clinical studies must apply for and obtain a license from the DEA before they are permitted to perform these activities with anabasum. Furthermore, these parties must have the security, control, recordkeeping, reporting and inventory mechanisms required by the DEA to prevent drug loss and diversion. All licensed facilities are required to renew their registrations annually if they intend to continue to work with our drug. The DEA conducts periodic inspections of certain registered establishments that handle controlled substances. We have been working with our manufacturers, distributors, exporters and clinical sites to obtain the necessary licenses to work with anabasum. The parties responsible for the manufacturing, distribution and export of anabasum have already applied for and have been granted DEA licenses and a number of institutions responsible for conducting our current clinical studies have also been granted DEA licenses. However, the failure to maintain the necessary registrations, and the delay or failure of additional clinical sites to obtain DEA registrations, could delay the manufacturing, distribution and export of anabasum and could delay the completion of the clinical studies. Furthermore, failure to maintain compliance with the CSA, particularly non-compliance resulting in loss or diversion, could result in regulatory action that could have a material adverse effect on our business, financial condition and results of operations. The DEA may seek civil penalties, refuse to renew necessary registrations, or initiate proceedings to restrict, suspend or revoke those registrations. In certain circumstances, violations could lead to criminal proceedings. In addition, if the FDA, DEA, or any foreign regulatory authority determines that anabasum may have potential for abuse, it may require us to generate more clinical or other data than we currently anticipate to establish whether or to what extent the substance has an abuse potential, which could increase the cost and/or delay the launch of anabasum.

Individual states have also established controlled substance laws and regulations. Though state-controlled substances laws often mirror federal law, because the states are separate jurisdictions, they may separately schedule drugs, as well. While some states automatically schedule a drug based on federal action, other states schedule drugs through rulemaking or a legislative action. The requirement for state registrations could also result in delay of the manufacturing and distribution of anabasum or in the completion of our clinical studies. We and our manufacturing vendors and clinical sites must also obtain separate state registrations, permits or licenses in order to be able to obtain, handle and distribute controlled substances for clinical trials or commercial sale, and failure to meet applicable regulatory requirements could lead to enforcement and sanctions by the states in addition to those from the DEA or otherwise arising under federal law.

The manufacturing and distribution of anabasum is subject to the DEA's annual manufacturing and procurement quota requirements. The annual quota allocated to us or our contract manufacturers for the controlled substances in anabasum may not be sufficient to complete clinical trials. Consequently, any delay or refusal by the DEA in establishing our, or our contract manufacturers', procurement and/or production quota for controlled substances could delay or stop our clinical trials or product launches, which could have a material adverse effect on our business, financial position and operations.

Delays in shipping anabasum could have a material adverse effect on our business, results of operations and financial condition.

The import and export of anabasum requires import and export licenses. However, because anabasum is currently a Schedule I controlled substance in the United States, in addition to the FDA and U.S. Customs and Border Protection, its import and export is also regulated by the DEA. We may not be granted, or if granted, maintain, such licenses for import or export from the authorities these regulatory agencies. Even if we obtain the relevant licenses, shipments of anabasum may be held up in transit by any of these authorities, which could cause significant delays and may lead to product batches which no longer meet specifications for use in clinical trials or commercial distribution. Such events could result in delayed development timelines, increased expenses and partial or total loss of revenue from anabasum.

We expect that we will rely on third parties to assist us in conducting clinical trials for anabasum. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize anabasum and our business would be substantially harmed.

We expect to enter into agreements with third-party CROs to assist us in conducting and managing our clinical programs, including contracting with clinical sites to perform our clinical studies. We plan to rely on these parties for execution of clinical studies for anabasum and we will control only certain aspects of conducting the clinical studies. Nevertheless, we will be responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on CROs and clinical sites will not relieve us of our regulatory responsibilities. We and our CROs will be required to comply with cGCPs, which are regulations and guidelines enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area and comparable foreign regulatory authorities for any products in clinical development. The FDA enforces these cGCP regulations through periodic inspections of trial sponsors, principal investigators and trial sites. If we or our CROs fail to comply with applicable cGCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that, upon inspection, the FDA will determine that any of our clinical trials comply with cGCPs. In addition, our clinical trials must be conducted with products produced under cGMP regulations and will require a large number of test subjects. Our failure or the failure of our CROs or clinical sites to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process and could also subject us to enforcement action up to and including civil and criminal penalties.

Although we intend to design the clinical trials for anabasum in consultation with CROs, we expect that the CROs will manage all of the clinical trials conducted at contracted clinical sites. As a result, many important aspects of our drug development programs would be outside of our direct control. In addition, the CROs and clinical sites may not perform all of their obligations under arrangements with us or in compliance with regulatory requirements. If the CROs or clinical sites do not perform clinical trials in a satisfactory manner, or if they breach their obligations to us or fail to comply with regulatory requirements, the development and commercialization of anabasum for the subject indication may be delayed or our development program materially and irreversibly harmed. We cannot control the amount and timing of resources these CROs and clinical sites will devote to our program or anabasum. If we are unable to rely on clinical data collected by our CROs, we could be required to repeat, extend the duration of, or increase the size of our clinical trials, which could significantly delay commercialization and require significantly greater expenditures.

If any of our relationships with these third-party CROs or clinical sites terminate, we may not be able to enter into arrangements with alternative CROs or clinical sites. If CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements or for other reasons, any such clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize anabasum. As a result, our financial results and the commercial prospects for anabasum would be harmed, our costs could increase and our ability to generate revenue could be delayed.

Any termination or suspension of or delays in the commencement or completion of any necessary studies of anabasum for any indications could result in increased costs to us, delay or limit our ability to generate revenue and adversely affect our commercial prospects.

The commencement and completion of clinical studies can be delayed for a number of reasons, including delays related to:

- the FDA failing to grant permission to proceed and placing the clinical study on hold;
- subjects failing to enroll or remain in our trials at the rate we expect;

- a facility manufacturing anabasum being ordered by the FDA or other government or regulatory authorities to temporarily or permanently shut down due to violations of cGMP requirements or other applicable requirements, or cross-contaminations of product in the manufacturing process;
- any changes to our manufacturing process that may be necessary or desired;
- subjects choosing an alternative treatment for the indications for which we are developing anabasum, or participating in competing clinical studies;
- subjects experiencing severe or unexpected drug-related adverse effects;
- reports of similar technologies and products raising safety and/or efficacy concerns;
- third-party clinical investigators losing their license or permits necessary to perform our clinical trials, not performing our clinical trials on our anticipated schedule or employing methods consistent with the clinical trial protocol, cGCP requirements, or other third parties not performing data collection and analysis in a timely or accurate manner;
- inspections of clinical study sites by the FDA or IRBs finding regulatory violations that require us to undertake corrective action, result in suspension or termination of one or more sites or the imposition of a clinical hold on the entire study, or that prohibit us from using some or all of the data in support of our marketing applications;
- third-party contractors becoming debarred or suspended or otherwise penalized by the FDA or other government or regulatory authorities for violations of regulatory requirements, in which case we may need to find a substitute contractor, and we may not be able to use some or any of the data produced by such contractors in support of our marketing applications;
- one or more IRBs refusing to approve, suspending or terminating the study at an investigational site precluding enrollment of additional subjects, or withdrawing its approval of the trial; reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- deviations of the clinical sites from trial protocols or dropping out of a trial;
- adding new clinical trial sites;
- the inability of the CRO to execute any clinical trials for any reason; and
- government or regulatory delays or “clinical holds” requiring suspension or termination of a trial.

Product development costs for anabasum will increase if we have delays in testing or approval or if we need to perform more or larger clinical studies than planned. Additionally, changes in regulatory requirements and policies may occur and we may need to amend study protocols to reflect these changes. Amendments may require us to resubmit our study protocols to the FDA and IRBs for reexamination, which may impact the costs, timing or successful completion of that study. If we experience delays in completion of, or if we, the FDA or other regulatory authorities, the IRB, or other reviewing entities, or any of our clinical study sites suspend or terminate any of our clinical studies of anabasum, its commercial prospects may be materially harmed and our ability to generate product revenues will be delayed. Any delays in completing our clinical trials will increase our costs, slow down our development and approval process and jeopardize our ability to commence product sales and generate revenues. Any of these occurrences may harm our business, financial condition and prospects significantly. In addition, many of the factors that cause, or lead to, termination or suspension of, or a delay in the commencement or completion of, clinical studies may also ultimately lead to the denial of regulatory approval of anabasum. In addition, if one or more clinical studies are delayed, our competitors may be able to bring products to market before we do, and the commercial viability of anabasum could be significantly reduced.

We may not be able to obtain or maintain orphan drug designation or exclusivity for our product candidates.

We have been granted orphan drug designation in the United States and in the European Union for anabasum for the treatment of cystic fibrosis and systemic sclerosis. We also intend to seek orphan drug status for anabasum for the treatment of dermatomyositis. Upon receipt of regulatory approval, orphan drug status will provide us with seven years of market exclusivity in the United States under the Orphan Drug Act. However, there is no guarantee that the FDA will grant orphan drug designation for anabasum for dermatomyositis or any other indication, which would make us ineligible for the additional exclusivity and other benefits of orphan drug designation. Moreover, there can be no assurance that another company also holding orphan drug designation for the same indication or which may receive orphan drug designation in the future will not receive approval prior to us, in which case our competitor would have the benefit of the seven years of market exclusivity, and we would be unable to commercialize our product for the same indication until the expiration of the seven-year period. Even if we are the first to obtain approval for the orphan drug indication, there are circumstances under which a competing product may be approved for the same indication during our seven-year period of exclusivity.

Under the Orphan Drug Act, the FDA may grant orphan drug designation to a drug 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 and for which there is no reasonable expectation that the cost of developing and making a drug available in the United States for this type of disease or condition will be recovered from sales of the product. Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan designation does not convey any advantage in or shorten the duration of regulatory review and approval process. In addition to the potential period of exclusivity, orphan designation makes a company eligible for grant funding of up to \$400,000 per year for four years to defray costs of clinical trial expenses, tax credits for clinical research expenses and potential exemption from the FDA application user fee.

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 drug exclusivity, which means the FDA may not approve any other applications to market the same drug for the same indication for seven years, except in limited circumstances, such as (i) the drug's orphan designation is revoked; (ii) its marketing approval is withdrawn; (iii) the orphan exclusivity holder consents to the approval of another applicant's product; (iv) the orphan exclusivity holder is unable to assure the availability of a sufficient quantity of drug; or (v) a showing of clinical superiority to the product with orphan exclusivity by a competitor product. If a drug designated as an orphan product receives marketing approval for an indication broader than what is designated, it may not be entitled to orphan drug exclusivity. There can be no assurance that we will receive orphan drug designation for anabasum for the treatment of dermatomyositis, or other inflammatory disease indications, if we elect to seek such applications.

Any fast track designation or grant of priority review status by the FDA may not actually lead to a faster development or regulatory review or approval process, nor will it assure FDA approval of our product candidates. Additionally, our product candidates may treat indications that do not qualify for priority review vouchers.

We have received fast track designation for anabasum for the treatment of cystic fibrosis and systemic sclerosis in the United States and European Union and may seek fast track designation or priority review of applications for approval of our product candidate for future indications. If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA fast track designation. If a product candidate offers major advances in treatment, the FDA may designate it eligible for priority review. The FDA has broad discretion whether or not to grant these designations, so even if we believe a particular product candidate is eligible for these designations, we cannot assure you that the FDA would decide to grant them. Even if we do receive fast track designation or priority review, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program.

Any breakthrough therapy designation granted by the FDA for our product candidate may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidate will receive marketing approval.

We have applied for, and may in the future apply for, a breakthrough therapy designation for our product candidate. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs and biologics that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA may also be eligible for accelerated approval if the relevant criteria are met.

Designation of a product candidate as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe our product candidate meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as breakthrough therapies, the FDA may later decide that the products no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Third-party coverage and reimbursement and health care cost containment initiatives and treatment guidelines may constrain our future revenues.

Our ability to successfully market anabasum will depend in part on the level of reimbursement that government health administration authorities, private health coverage insurers and other organizations provide for the cost of our products and related treatments. Countries in which anabasum is expected to be sold through reimbursement schemes under national health insurance programs frequently require that manufacturers and sellers of pharmaceutical products obtain governmental approval of initial prices and any subsequent price increases. In certain countries, including the United States, government-funded and private medical care plans can exert significant indirect pressure on prices. We may not be able to sell anabasum profitably if adequate prices are not approved or coverage and reimbursement is unavailable or limited in scope. Increasingly, third-party payors attempt to contain health care costs in ways that are likely to impact our development of products including:

- failing to approve or challenging the prices charged for health care products;
- introducing reimportation schemes from lower priced jurisdictions;

- limiting both coverage and the amount of reimbursement for new therapeutic products;
- denying or limiting coverage for products that are approved by the regulatory agencies but are considered to be experimental or investigational by third-party payors; and
- refusing to provide coverage when an approved product is used in a way that has not received regulatory marketing approval.

Risks Relating to Our Intellectual Property Rights

It is difficult and costly to protect our intellectual property rights, and we cannot ensure the protection of these rights.

Our commercial success will depend, in part, on maintaining and obtaining additional patent protection for our technologies, products and processes, successfully defending these patents against third-party challenges and successfully enforcing these patents against third party competitors. The patent positions of pharmaceutical companies can be highly uncertain and involve complex legal, scientific and factual questions for which important legal principles remain unresolved. Changes in either the patent laws or in interpretations of patent laws may diminish the value of our intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowable in our pending applications or, the enforceability of our existing and future patents. Our pending patent applications for anabasum and its uses may never be approved by United States or foreign patent offices and the existing patents and patent applications relating to anabasum and related technologies may be challenged, invalidated or circumvented by third parties and may not protect us against competitors with similar products or technologies.

The degree of our current and future protection for our proprietary rights is uncertain, because legal means afford only limited protection and may not adequately protect our rights, permit us to gain or keep our competitive advantage, or provide us with any competitive advantage at all. For example, others have filed, and in the future are likely to file, patent applications covering products and technologies that are similar, identical or competitive to anabasum, or important to our business. We cannot be certain that any patents or patent application owned by a third party will not have priority over patents and patent applications filed by us, or that we will not be involved in interference, opposition or invalidity proceedings before United States or foreign patent offices.

We also rely on trade secrets to protect technology, especially in cases when we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. While we require employees, academic collaborators, consultants and other contractors to enter into confidentiality agreements, we may not be able to adequately protect our trade secrets or other proprietary or licensed information. Typically, research collaborators and scientific advisors have rights to publish data and information in which we may have rights. If we cannot maintain the confidentiality of our proprietary technology and other confidential information, our ability to receive patent protection and our ability to protect valuable information owned by us may be imperiled. Enforcing a claim that a third-party entity illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts are sometimes less willing to protect trade secrets than patents. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how.

If we fail to maintain or obtain additional patent protection or trade secret protection for anabasum or our technologies, third parties could use our proprietary information, which could impair our ability to compete in the market and adversely affect our ability to generate revenues and attain profitability.

We may also rely on the trademarks we may develop to distinguish our products from the products of our competitors. We cannot guarantee that any trademark applications filed by us or our business partners will be approved. Third parties may also oppose such trademark applications, or otherwise challenge our use of the trademarks. In the event that the trademarks we use are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition, and could require us to devote resources to advertising and marketing new brands. Further, we cannot provide assurance that competitors will not infringe the trademarks we use, or that we will have adequate resources to enforce these trademarks.

Anabasum may infringe the intellectual property rights of others, which could increase our costs and delay or prevent our development and commercialization efforts.

Our success depends in part on avoiding infringement of the proprietary technologies of others. The pharmaceutical industry has been characterized by frequent litigation regarding patent and other intellectual property rights. Identification of third party patent rights that may be relevant to our proprietary technology is difficult because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. Additionally, because patent applications are maintained in secrecy until the application is published, we may be unaware of third-party patents that may be infringed by commercialization of anabasum or any future product candidate. There may be certain issued patents and patent applications claiming subject matter that we may be required to license in order to research, develop or commercialize anabasum, and we do not know if such patents and patent applications would be available to license on commercially reasonable terms, or at all. Any claims of patent infringement asserted by third parties would be time-consuming and may:

- result in costly litigation;
- divert the time and attention of our technical personnel and management;
- prevent us from commercializing a product until the asserted patent expires or is held finally invalid or not infringed in a court of law;
- require us to cease or modify our use of the technology and/or develop non-infringing technology; or
- require us to enter into royalty or licensing agreements.

Although no third party has asserted a claim of infringement against us, others may hold proprietary rights that could prevent anabasum from being marketed. Any patent-related legal action against us claiming damages and seeking to enjoin commercial activities relating to anabasum or our processes could subject us to potential liability for damages and require us to obtain a license to continue to manufacture or market anabasum or any future product candidates. We cannot predict whether we would prevail in any such actions or that any license required under any of these patents would be made available on commercially acceptable terms, if at all. In addition, we cannot be sure that we could redesign anabasum or any future product candidates or processes to avoid infringement, if necessary. Accordingly, an adverse determination in a judicial or administrative proceeding, or the failure to obtain necessary licenses, could prevent us from developing and commercializing anabasum or a future product candidate, which could harm our business, financial condition and operating results.

A number of companies, including several major pharmaceutical companies, have conducted research on anti-inflammatory and anti-fibrosis therapies which resulted in the filing of many patent applications related to this research. If we were to challenge the validity of these or any issued United States patent in court, we would need to overcome a statutory presumption of validity that attaches to every issued United States patent. This means that, in order to prevail, we would have to present clear and convincing evidence as to the invalidity of the patent's claims.

If we were to challenge the validity of these or any issued United States patent in an administrative trial before the Patent Trial and Appeal Board in the United States Patent and Trademark Office, we would have to prove that the claims are unpatentable by a preponderance of the evidence. There is no assurance that a jury and/or court would find in our favor on questions of infringement, validity or enforceability.

We may be subject to claims that we have wrongfully hired an employee from a competitor or that we or our employees have wrongfully used or disclosed alleged confidential information or trade secrets of their former employers.

As is commonplace in our industry, we employ individuals who were previously employed at other pharmaceutical companies, including our competitors or potential competitors. Although no claims against us are currently pending, we may be subject in the future to claims that our employees or prospective employees are subject to a continuing obligation to their former employers (such as non-competition or non-solicitation obligations) or claims that our employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

We may be subject to claims challenging the inventorship of our patents and other intellectual property.

Although we are not aware of any asserted third-party claims challenging inventorship on our patents or ownership of our intellectual property, we may in the future be subject to claims that former employees, strategic partners, commercial counterparties or other third parties have an interest in our patents or other intellectual property as an inventor or co-inventor. While it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we cannot fully control the enforcement of these policies by third parties with which we contract, nor can we be certain that assignment agreements between us and our employees, between us and our counterparties, or between our counterparties and their employees, will effectively protect our interests as to any party who conceives or develops intellectual property that we regard as our own. Among other issues, the assignment of intellectual property rights may not be self-executing, the assignment agreements may be breached, or we may have disputes arise from conflicting obligations of consultants or others who are involved in developing our product candidates. As we approach potential commercialization of our product candidates, we are more closely analyzing all facts that we believe might be used to assert an inventorship claim against us. Determinations like these involve complex sets of fact and applications of sometimes-unsettled patent law, resulting in inherent uncertainties regarding ownership rights. Determining the history of development of certain of our intellectual property is made more difficult by the fact that certain of our intellectual property was developed by other companies for other indications before being acquired by us. Consequently, we cannot be sure that we have all of the documentary records relevant to such an analysis.

If claims challenging inventorship are made against us, we may need to resort to litigation to resolve those claims. If we fail in defending against any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of valuable intellectual property rights or the right to assert those rights against third-parties marketing competing products. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

General Company-Related Risks

We will need to grow the size of our organization, and we may experience difficulties in managing this growth.

As of January 4, 2018, we had 48 full-time employees. As our development and commercialization plans and strategies develop, we will need to expand the size of our employee base for managerial, operational, sales, marketing, financial and other resources. Future growth would impose significant added responsibilities on members of management, including the need to identify, recruit, maintain, motivate and integrate additional employees. In addition, our management may have 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. Our future financial performance and our ability to commercialize anabasum and any other future product candidates and our ability to compete effectively will depend, in part, on our ability to effectively manage our future growth.

Future capital raises may dilute our existing stockholders' ownership and/or have other adverse effects on our operations.

If we raise additional capital by issuing equity securities, our existing stockholders' percentage ownership will be reduced and these stockholders may experience substantial dilution. We may also issue equity securities that provide for rights, preferences and privileges senior to those of our common stock. If we raise additional funds by issuing debt securities, these debt securities would have rights senior to those of our common stock and the terms of the debt securities issued could impose significant restrictions on our operations, including liens on our assets. If we raise additional funds through collaborations and licensing arrangements, we may be required to relinquish some rights to our technologies or candidate products, or to grant licenses on terms that are not favorable to us.

If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy. In addition, the loss of the services of certain key employees, including Yuval Cohen, our Chief Executive Officer, Mark Tepper, our President and Chief Scientific Officer, Barbara White, our Chief Medical Officer and Sean Moran, our Chief Financial Officer would adversely impact our business prospects.

Our ability to compete in the highly competitive pharmaceuticals industry depends in large part upon our ability to attract highly qualified managerial, scientific and medical personnel. In order to induce valuable employees to remain with us, we intend to provide employees with stock options that vest over time. The value to employees of stock options that vest over time will be significantly affected by movements in the price of our common stock that we will not be able to control and may at any time be insufficient to counteract more lucrative offers from other companies.

Our management team has expertise in many different aspects of drug development and commercialization. However, we will need to hire additional personnel as we further develop anabasum. Competition for skilled personnel in our market is intense and competition for experienced scientists may limit our ability to hire and retain highly qualified personnel on acceptable terms. Despite our efforts to retain valuable employees, members of our management, scientific and medical teams may terminate their employment with us on short notice. In connection with the merger in April 2014 with Corbus Pharmaceuticals, Inc., our wholly-owned subsidiary, we entered into employment agreements with certain of our executive officers. However, these employment arrangements provide for at-will employment, which means that any of our employees could leave our employment at any time, with or without notice. The loss of the services of any of our executive officers or other key employees could potentially harm our business, operating results or financial condition. In particular, we believe that the loss of the services of Yuval Cohen, Ph.D., our Chief Executive Officer, Mark Tepper, Ph.D., our President and Chief Scientific Officer, Barbara White, M.D., our Chief Medical Officer and Sean Moran, C.P.A., M.B.A., our Chief Financial Officer, would have a material adverse effect on our business. Our success also depends on our ability to continue to attract, retain and motivate highly skilled junior, mid-level, and senior managers as well as junior, mid-level, and senior scientific and medical personnel.

Other pharmaceutical companies with which we compete for qualified personnel have greater financial and other resources, different risk profiles, and a longer history in the industry than we do. They also may provide more diverse opportunities and better chances for career advancement. Some of these characteristics may be more appealing to high-quality candidates than what we have to offer. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can develop and commercialize product candidates would be limited.

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of anabasum.

We face a potential risk of product liability as a result of the clinical testing of anabasum and will face an even greater risk if we commercialize anabasum or any other future product. For example, we may be sued if any product we develop, including anabasum, or any materials that we use in our products allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of anabasum. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for anabasum or any future products that we may develop;
- injury to our reputation;
- withdrawal of clinical trial participants;
- costs to defend the related litigation;

- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- the inability to commercialize anabasum; and
- a decline in the value of our stock.

Our inability to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. We intend to obtain product liability insurance covering our clinical trials. Although we will maintain such insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

We may acquire businesses, assets or products, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire additional businesses, assets or products, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

Risks Related to our Common Stock

Our affiliates may control our company for the foreseeable future, including the outcome of matters requiring stockholder approval.

Our officers, directors, and five percent stockholders collectively owned approximately 12.6% of our outstanding shares of common stock as of January 4, 2018. This concentration of voting power and control could have a significant effect in delaying, deferring or preventing an action that might otherwise be beneficial to our other stockholders and be disadvantageous to our stockholders with interests different from those entities and individuals. Certain of these individuals also have significant control over our business, policies and affairs as officers or directors of our company. Therefore, you should not invest in reliance on your ability to have any control over our company.

An active, liquid trading market for our common stock may not be sustained.

Presently, our common stock is traded on the Nasdaq Global Market, or Nasdaq, and as we are in our early stages, an investment in our company may require a long-term commitment, with no certainty of return. If we are unable to maintain an active, liquid active trading market:

- investors may have difficulty buying and selling or obtaining market quotations;
- market visibility for shares of our common stock may be limited; and
- a lack of visibility for shares of our common stock may have a depressive effect on the market price for shares of our common stock.

The lack of an active market could impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair market value of your shares. An inactive market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to acquire additional intellectual property assets by using our shares as consideration.

We are currently listed on the Nasdaq Global Market. If we are unable to maintain listing of our securities on the Nasdaq Global Market or any stock exchange, our stock price could be adversely affected and the liquidity of our stock and our ability to obtain financing could be impaired and it may be more difficult for our stockholders to sell their securities.

Although our common stock is currently listed on the Nasdaq Global Market, we may not be able to continue to meet the exchange's minimum listing requirements or those of any other national exchange. If we are unable to maintain listing on Nasdaq or if a liquid market for our common stock does not develop or is sustained, our common stock may remain thinly traded.

The Listing Rules of Nasdaq require listing issuers to comply with certain standards in order to remain listed on its exchange. If, for any reason, we should fail to maintain compliance with these listing standards and Nasdaq should delist our securities from trading on its exchange and we are unable to obtain listing on another national securities exchange, a reduction in some or all of the following may occur, each of which could have a material adverse effect on our stockholders:

- the liquidity of our common stock;
- the market price of our common stock;
- our ability to obtain financing for the continuation of our operations;
- the number of institutional and general investors that will consider investing in our common stock;
- the number of investors in general that will consider investing in our common stock;
- the number of market makers in our common stock;
- the availability of information concerning the trading prices and volume of our common stock; and
- the number of broker-dealers willing to execute trades in shares of our common stock.

The market price of our common stock may be significantly volatile.

Even if an active market for our common stock develops, of which no assurances can be given, the market price for our common stock may be volatile and subject to wide fluctuations in response to factors including the following:

- actual or anticipated fluctuations in our quarterly or annual operating results;
- changes in financial or operational estimates or projections;
- conditions in markets generally;
- changes in the economic performance or market valuations of companies similar to ours; and
- general economic or political conditions in the United States or elsewhere.

In particular, the market prices of biotechnology companies like ours have been highly volatile due to factors, including, but not limited to:

- any delay or failure to conduct a clinical trial for our product or receive approval from the FDA and other regulatory agencies;
- developments or disputes concerning a company's intellectual property rights;
- technological innovations of such companies or their competitors;
- changes in market valuations of similar companies;
- announcements by such companies or their competitors of significant contracts, acquisitions, strategic partnerships, joint ventures, capital commitments, new technologies, or patents; and
- failure to complete significant transactions or collaborate with vendors in manufacturing a product.

The securities market has from time to time experienced significant price and volume fluctuations that are not related to the operating performance of particular companies. These market fluctuations may also materially and adversely affect the market price of shares of our common stock.

Future sales of shares by existing stockholders could cause our stock price to decline.

As of September 30, 2017, we had outstanding options to purchase an aggregate of 7,724,779 shares of our common stock at a weighted average exercise price of \$3.66 per share and warrants to purchase an aggregate of 1,288,500 shares of our common stock at a weighted average exercise price of \$1.00 per share. The exercise of such outstanding options and warrants will result in further dilution of your investment. If our existing stockholders sell substantial amounts of our common stock in the public market, or if the public perceives that such sales could occur, this could have an adverse impact on the market price of our common stock, even if there is no relationship between such sales and the performance of our business.

We do not currently intend to pay dividends on our common stock in the foreseeable future, and consequently, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

We have never declared or paid cash dividends on our common stock and do not anticipate paying any cash dividends to holders of our common stock in the foreseeable future. Consequently, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments. There is no guarantee that shares of our common stock will appreciate in value or even maintain the price at which our investors have purchased their shares.

We are an "emerging growth company," and will be able take advantage of reduced disclosure requirements applicable to "emerging growth companies," which could make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act, and, for as long as we continue to be an "emerging growth company," we intend to take advantage of certain exemptions from various reporting requirements applicable to other public companies but not to "emerging growth companies," including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We will remain an emerging growth company until the earlier of (1) January 1, 2020, (2) the last day of the first fiscal year in which our annual gross revenues exceed \$1.07 billion, (3) the date on which we become a "large accelerated filer" as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended, which would occur if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the last business day of our most recently completed second fiscal quarter or (4) the date on which we have issued more than \$1 billion in non-convertible debt during the preceding three-year period.

We intend to take advantage of these reporting exemptions described above until we are no longer an "emerging growth company." Under the JOBS Act, "emerging growth companies" can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not "emerging growth companies."

We cannot predict if investors will find our common stock less attractive if we choose to rely on these exemptions. If some investors find our common stock less attractive as a result of any choices to reduce future disclosure, there may be a less active trading market for our common stock and our stock price may be more volatile.

We will incur significantly increased costs and devote substantial management time as a result of operating as a public company, particularly after we are no longer an “emerging growth company.”

As a public company, we incur significant legal, accounting and other expenses that we did not incur as a private company. For example, we are required to comply with certain of the requirements of the Sarbanes-Oxley Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act, as well as rules and regulations subsequently implemented by the SEC, including the establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. We expect that compliance with these requirements will increase our legal and financial compliance costs and will make some activities more time consuming and costly. In addition, we expect that our management and other personnel will need to divert attention from operational and other business matters to devote substantial time to these public company requirements. In particular, we expect to incur significant expenses and devote substantial management effort toward ensuring compliance with the requirements of Section 404 of the Sarbanes-Oxley Act. In addition, after we are no longer qualify as an “emerging growth company,” we expect to incur additional management time and cost to comply with the more stringent reporting requirements applicable to companies that are deemed accelerated filers or large accelerated filers, including complying with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act. We currently do not have an internal audit function, and we will need to hire or contract for additional accounting and financial staff with appropriate public company experience and technical accounting knowledge.

We cannot predict or estimate the amount of additional costs we may incur as a result of becoming a public company or the timing of such costs.

There may be limitations on the effectiveness of our internal controls, and a failure of our control systems to prevent error or fraud may materially harm our company.

Proper systems of internal controls over financial accounting and disclosure are critical to the operation of a public company. As of January 4, 2018, we had 48 full-time employees, which results in a lack of segregation of duties, and we may be unable to effectively establish such systems, especially in light of the fact that we expect to operate as a publicly reporting company. This would leave us without the ability to reliably assimilate and compile financial information about our company and significantly impair our ability to prevent error and detect fraud, all of which would have a negative impact on our company from many perspectives.

Moreover, we do not expect that disclosure controls or internal control over financial reporting will prevent all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system’s objectives will be met. Further, the design of a control system must reflect the fact that there are resource constraints and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Failure of our control systems to detect or prevent error or fraud could materially adversely impact us.

We may be unable to complete our analysis of our internal controls over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our common stock.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by our management on, among other things, the effectiveness of our internal control over financial reporting. This assessment will need to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

We may not be able to complete our evaluation, testing and any required remediation in a timely fashion. During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal controls are effective.

If we are unable to assert that our internal control over financial reporting is effective, or, if applicable, our independent registered public accounting firm is unable to express an opinion on the effectiveness of our internal controls, we could lose investor confidence in the accuracy and completeness of our financial reports, which would cause the price of our common stock to decline, and we may be subject to investigation or sanctions by the SEC. We will also be required to disclose changes made in our internal control and procedures on a quarterly basis.

Our remediation efforts may not enable us to avoid a material weakness in our internal control over financial reporting in the future. Any of the foregoing occurrences, should they come to pass, could negatively impact the public perception of our company, which could have a negative impact on our stock price.

Upon dissolution of our company, you may not recoup all or any portion of your investment.

In the event of a liquidation, dissolution or winding-up of our company, whether voluntary or involuntary, the proceeds and/or assets of our company remaining after giving effect to such transaction, and the payment of all of our debts and liabilities and distributions required to be made to holders of any outstanding preferred stock will then be distributed to the stockholders of common stock on a pro rata basis. There can be no assurance that we will have available assets to pay to the holders of common stock, or any amounts, upon such a liquidation, dissolution or winding-up of our Company. In this event, you could lose some or all of your investment.

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

As a result of our merger in April 2014 with Corbus Pharmaceuticals, Inc., our wholly-owned subsidiary, our ability to utilize our federal net operating loss, carryforwards and federal tax credit prior to that date may be limited under Sections 382 of the Internal Revenue Code. The limitations apply if an “ownership change,” as defined by Section 382, occurs. Generally, an ownership change occurs if the percentage of the value of the stock that is owned by one or more direct or indirect “five percent shareholders” increases by more than 50 percentage points over their lowest ownership percentage at any time during the applicable testing period (typically three years). In addition, future changes in our stock ownership, which may be outside of our control, may trigger an “ownership change” and, consequently, Section 382 limitations. As a result, if we earn net taxable income, our ability to use our pre-change net operating loss carryforwards and other tax attributes to offset United States federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us.

Our certificate of incorporation, as amended, allows for our board to create new series of preferred stock without further approval by our stockholders, which could adversely affect the rights of the holders of our common stock.

Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. We anticipate that our board of directors will have the authority to issue up to 10,000,000 shares of our preferred stock without further stockholder approval. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders the preferred right to our assets upon liquidation and the right to receive dividend payments before dividends are distributed to the holders of common stock. In addition, our board of directors could authorize the issuance of a series of preferred stock that has greater voting power than our common stock or that is convertible into our common stock, which could decrease the relative voting power of our common stock or result in dilution to our existing stockholders.

Additional Risks Relating to The Offering

You may experience immediate and substantial dilution in the book value per share of the common stock you purchase.

Because the price per share of our common stock being offered may be higher than the book value per share of our common stock, you may suffer substantial dilution in the net tangible book value of the common stock you purchase in this offering. See the section entitled “Dilution” below for a more detailed discussion of the dilution you will incur if you purchase common stock in this offering. In addition, we have a significant number of options and restricted stock outstanding. If the holders of these securities exercise them or become vested in them, as applicable, you may incur further dilution.

Sales of a significant number of shares of our common stock in the public markets, or the perception that such sales could occur, could depress the market price of our common stock.

Sales of a substantial number of shares of our common stock in the public markets, or the perception that such sales could occur, could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity securities. We have agreed, without the prior written consent of Cantor Fitzgerald & Co. and subject to certain exceptions set forth in the sales agreement, not to sell or otherwise dispose of any common stock or securities convertible into or exchangeable for shares of common stock, warrants or any rights to purchase or acquire common stock during the period beginning on the fifth trading day immediately prior to the delivery of any placement notice delivered by us to Cantor Fitzgerald & Co. and ending on the fifth trading day immediately following the final settlement date with respect to the shares sold pursuant to such notice. We have further agreed, subject to certain exceptions set forth in the sales agreement, not to sell or otherwise dispose of any common stock or securities convertible into or exchangeable for shares of common stock, warrants or any rights to purchase or acquire common stock in any other “at-the-market” or continuous equity transaction prior to the termination of the sales agreement with Cantor Fitzgerald & Co. Therefore, it is possible that we could issue and sell additional shares of our common stock in the public markets. We cannot predict the effect that future sales of our common stock would have on the market price of our common stock.

Our share price has been and could remain volatile.

The market price of our common stock has historically experienced and may continue to experience significant volatility. From January 2015 through January 4, 2018, the market price of our common stock has fluctuated from a high of \$10.78 per share in the fourth quarter of 2016, to a low of \$1.01 per share in the first quarter of 2016. Our progress in developing and commercializing our products, the impact of government regulations on our products and industry, the potential sale of a large volume of our common stock by stockholders, our quarterly operating results, changes in general conditions in the economy or the financial markets and other developments affecting us or our competitors could cause the market price of our common stock to fluctuate substantially with significant market losses. If our stockholders sell a substantial number of shares of common stock, especially if those sales are made during a short period of time, those sales could adversely affect the market price of our common stock and could impair our ability to raise capital. In addition, in recent years, the stock market has experienced significant price and volume fluctuations. This volatility has affected the market prices of securities issued by many companies for reasons unrelated to their operating performance and may adversely affect the price of our common stock. In addition, we could be subject to a securities class action litigation as a result of volatility in the price of our stock, which could result in substantial costs and diversion of management’s attention and resources and could harm our stock price, business, prospects, results of operations and financial condition.

Our management team may invest or spend the proceeds of this offering in ways with which you may not agree or in ways which may not yield a significant return.

Our management will have broad discretion over the use of proceeds from this offering. The net proceeds from this offering will be used to fund our continued development of anabasum and for general corporate purposes, which may include funding preclinical studies, clinical trials, the manufacturing of anabasum for clinical trials and commercial launch, and acquisitions or investments in businesses, products or technologies that are complementary, and to increase our working capital and fund capital expenditures. We may also use a portion of the net proceeds to in-license, acquire or invest in complementary businesses or products; however, we have no current commitments or obligations to do so.

Our management will have considerable discretion in the application of the net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. The net proceeds may be used for corporate purposes that do not increase our operating results or enhance the value of our common stock. Pending their use, we may invest the net proceeds from this offering in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return to our stockholders. If we do not invest or apply the net proceeds from this offering in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause our stock price to decline.

Future sales of shares by existing stockholders could cause our stock price to decline.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares of common stock intend to sell shares, could reduce the market price of our common stock.

As of September 30, 2017, we had outstanding options to purchase an aggregate of 7,724,779 shares of our common stock at a weighted average exercise price of \$3.66 per share and warrants to purchase an aggregate of 1,288,500 shares of our common stock at a weighted average exercise price of \$1.00 per share. The exercise of such outstanding options and warrants will result in further dilution of your investment. If our existing stockholders sell substantial amounts of our common stock in the public market, or if the public perceives that such sales could occur, this could have an adverse impact on the market price of our common stock, even if there is no relationship between such sales and the performance of our business.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the information incorporated herein by reference contain forward-looking statements within the meaning of the federal securities laws, which statements involve substantial risks and uncertainties. All statements, other than statements of historical facts, included or incorporated by reference in this prospectus regarding our strategy, future events, future operations, future financial position, future revenue, projected costs, prospects, plans, objectives of management and expected market growth are forward-looking statements. The words “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “project,” “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. These forward-looking statements include, among other things, statements about:

- our limited operating history;
- our anticipated timing for clinical development, regulatory submissions, commencement and completion of clinical trials and product approvals;
- the results of our clinical trials, including the possibility of unfavorable clinical trial results or that results from our clinical trials will reach similar results in future trials;
- actual or anticipated variations in our operating results;
- our cash position;
- market conditions in our industry;
- our ability to complete required clinical trials of our product and obtain approval from the FDA or other regulatory agents in different jurisdictions;
- our ability to maintain or protect the validity of our patents and other intellectual property other proprietary rights;
- our ability to retain key personnel;
- our ability to internally develop new inventions and intellectual property;
- interpretations of current laws and the passages of future laws;
- acceptance of our business model by investors;
- the accuracy of our estimates regarding expenses and capital requirements; and
- our ability to adequately support growth.
- our expectations related to the use of proceeds from this offering and prior offerings and other financing efforts; and
- our estimates regarding expenses, future revenue, capital requirements and ability to satisfy our capital needs.

Forward-looking statements may also concern our expectations relating to our subsidiaries and other affiliates. We caution you that the foregoing list may not contain all of the forward-looking statements made in this prospectus and the information incorporated herein.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this prospectus and the information incorporated herein, particularly in “Risk Factors,” that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments that we may make.

You should read this prospectus, the documents that we incorporate by reference into this prospectus, including our Annual Report on Form 10-K for the year ended December 31, 2016, our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, and the documents that we have filed as exhibits to our filings with the SEC completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

USE OF PROCEEDS

The amount of proceeds from this offering will depend upon the number of shares of our common stock sold and the market price at which they are sold. There can be no assurance that we will be able to sell any shares under or fully utilize the sales agreement with Cantor Fitzgerald & Co. as a source of financing. We currently intend to use the net proceeds from this offering to fund our continued development of anabasum and for general corporate purposes, which may include funding preclinical studies, clinical trials, the manufacturing of anabasum for clinical trials and commercial launch, and acquisitions or investments in businesses, products or technologies that are complementary, and to increase our working capital and fund capital expenditures. Until we use the net proceeds of this offering, we intend to invest the funds in short-term, investment grade, interest-bearing securities.

The amount and timing of actual expenditures for the purposes set forth above may vary based on several factors, and our management will retain broad discretion as to the ultimate allocation of the proceeds.

MARKET PRICE OF OUR COMMON STOCK

Our common stock is listed on the Nasdaq Global Market under the symbol "CRBP." Our shares of common stock began trading on the Nasdaq Global Market under the symbol "CRBP" effective April 16, 2015. Prior to April 16, 2015, our common stock was quoted on the Over-the Counter Markets (the "OTC.QB") under the symbol "CRBP." Our shares of common stock began being quoted on the OTC.QB effective October 24, 2014.

The following table contains information about the range of high and low sale prices for our common stock for periods indicated. The source of these high and low sales prices was the Nasdaq Global Market and the OTC.QB.

	High Sales Price	Low Sales Price
Fiscal Year Ended December 31, 2017		
First Quarter	\$ 10.50	\$ 6.15
Second Quarter	\$ 8.45	\$ 5.30
Third Quarter	\$ 7.90	\$ 5.60
Fourth Quarter	\$ 8.75	\$ 6.40
Fiscal Year Ended December 31, 2016		
First Quarter	\$ 1.95	\$ 1.01
Second Quarter	\$ 3.85	\$ 1.78
Third Quarter	\$ 7.88	\$ 2.68
Fourth Quarter	\$ 10.78	\$ 4.65
Fiscal Year Ended December 31, 2015		
First Quarter	\$ 3.25	\$ 2.00
Second Quarter	\$ 4.31	\$ 2.63
Third Quarter	\$ 4.22	\$ 1.45
Fourth Quarter	\$ 2.55	\$ 1.50

DILUTION

If you invest in our common stock in this offering, your ownership interest will be diluted to the extent of the difference between the price per share you pay in this offering and our pro forma net tangible book value per share after this offering. We calculate net tangible book value per share by dividing our net tangible book value, which is tangible assets less total liabilities, by the number of outstanding shares of our common stock.

Our net tangible book value as of September 30, 2017 was approximately \$32.0 million, or \$0.64 per share. Net tangible book value per share after this offering gives effect to the sale of \$50.0 million of common stock in this offering at an assumed offering price of \$8.35 per share, which was the closing price of our common stock as reported on Nasdaq on January 4, 2018, after deducting offering commissions and estimated expenses payable by us. Our net tangible book value as of September 30, 2017, after giving effect to this offering as described above, would have been approximately \$80.4 million, or \$1.43 per share of common stock. This represents an immediate increase in pro forma net tangible book value of \$0.79 per share to existing stockholders and an immediate dilution of \$6.92 per share to new investors purchasing our common stock in this offering. The following table illustrates the per share dilution:

Assumed offering price per share		\$	8.35
Net tangible book value per share as of September 30, 2017	\$	0.64	
Increase in net tangible book value per share attributable to new investors	\$	<u>0.79</u>	
Pro forma net tangible book value per share as of September 30, 2017, after giving effect to this offering		\$	<u>1.43</u>
Dilution per share to new investors in this offering		\$	<u>6.92</u>

The above discussion and table are based on 50,223,010 shares of our common stock outstanding as of September 30, 2017 and excludes, as of that date:

- 7,724,779 shares of common stock issuable upon the exercise of outstanding options at a weighted average exercise price of \$3.66 per share, of which 4,055,877 options were vested as of September 30, 2017;
- 1,288,500 shares of common stock issuable upon the exercise of outstanding warrants at a weighted average exercise price of \$1.00 per share, of which 1,288,500 warrants were exercisable as of September 30, 2017; and
- 4,613,438 shares of our common stock available for future issuance under our 2014 Equity Incentive Plan as of September 30, 2017.

To the extent that options or warrants are exercised, new options are issued under our 2014 Equity Incentive Plan, or we issue additional shares of common stock in the future, there may be further dilution to investors participating in this offering. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

DESCRIPTION OF CAPITAL STOCK

General

Our authorized capital stock consists of:

- 150,000,000 shares of common stock, par value \$0.0001 per share; and
- 10,000,000 shares of preferred stock, par value \$0.0001 per share, of which, as of the date of this prospectus, none of which shares have been designated.

As of close of business on January 4, 2018, 55,603,427 shares of common stock were issued and outstanding and no shares of preferred stock were issued and outstanding.

The additional shares of our authorized capital stock available for issuance may be issued at times and under circumstances so as to have a dilutive effect on earnings per share and on the equity ownership of the holders of our common stock. The ability of our board of directors to issue additional shares of stock could enhance the board's ability to negotiate on behalf of the stockholders in a takeover situation but could also be used by the board to make a change-in-control more difficult, thereby denying stockholders the potential to sell their shares at a premium and entrenching current management. The following description is a summary of the material provisions of our capital stock. You should refer to our certificate of incorporation, as amended and bylaws, both of which are on file with the SEC as exhibits to previous SEC filings, for additional information. The summary below is qualified by provisions of applicable law.

Common Stock

Voting. The holders of the common stock are entitled to one vote for each share held of record on all matters on which the holders are entitled to vote (or consent pursuant to written consent). Directors are elected by a plurality of the votes present in person or represented by proxy and entitled to vote.

Dividends. The holders of the common stock are entitled to receive, ratably, dividends only if, when and as declared by the Registrant's board of directors out of funds legally available therefor and after provision is made for each class of capital stock having preference over the common stock.

Liquidation Rights. In the event of our liquidation, dissolution or winding-up, the holders of common stock are entitled to share, ratably, in all assets remaining available for distribution after payment of all liabilities and after provision is made for each class of capital stock having preference over the common stock.

Conversion Right. The holders of the common stock have no conversion rights.

Preemptive and Similar Rights. The holders of the common stock have no preemptive or similar rights.

Redemption/Put Rights. There are no redemption or sinking fund provisions applicable to the common stock. All of the outstanding shares of our common stock are fully-paid and nonassessable.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Continental Stock Transfer & Trust Company, LLC.

Preferred Stock

We are authorized to issue up to 10,000,000 shares of preferred stock, all of which are undesignated. Our board of directors has the authority, within the limitations and restrictions prescribed by law and without stockholder approval, to provide by resolution for the issuance of shares of preferred stock, and to fix the rights, preferences, privileges and restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preference and the number of shares constituting any series of the designation of such series, by delivering an appropriate certificate of amendment to our amended and restated certificate of incorporation to the Delaware Secretary of State pursuant to the Delaware General Corporation Law (the "DGCL"). The issuance of preferred stock could have the effect of decreasing the market price of the common stock, impeding or delaying a possible takeover and adversely affecting the voting and other rights of the holders of our common stock.

Anti-takeover Effects of Delaware Law and our Certificate of Incorporation, as amended

Our certificate of incorporation, as amended, and bylaws contain provisions that could have the effect of discouraging potential acquisition proposals or tender offers or delaying or preventing a change of control. These provisions are as follows:

- they provide that special meetings of stockholders may be called only by the board of directors acting pursuant to a resolution approved by the affirmative vote of a majority of the board of directors;
- they do not include a provision for cumulative voting in the election of directors. Under cumulative voting, a minority stockholder holding a sufficient number of shares may be able to ensure the election of one or more directors. The absence of cumulative voting may have the effect of limiting the ability of minority stockholders to effect changes to the our board of directors; and
- they allow us to issue, without stockholder approval, up to 10,000,000 shares of preferred stock, with such designations, rights, and preferences as may be determined from time to time by our board of directors that could adversely affect the rights and powers of the holders of the common stock, including dividend, liquidation, conversion, voting, or other rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock could have the effect of restricting dividends on our common stock, diluting the voting power of our common stock, impairing the liquidation rights of our common stock, or delaying or preventing a change in control of our company, all without further action by our stockholders.

We are subject to the provisions of Section 203 of the General Corporation Law of the State of Delaware, an anti-takeover law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in the following prescribed manner:

- prior to the time of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; and
- on or subsequent to the time of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, for purposes of Section 203, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An “interested stockholder” is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, owned 15% or more of a corporation’s outstanding voting securities.

Stockholder Action by Written Consent

Our certificate of incorporation, as amended, specifically denies the ability of stockholders to take action by written consent of the stockholders in lieu of a meeting.

Potential Effects of Authorized but Unissued Stock

We have shares of common stock and preferred stock available for future issuance without stockholder approval. We may utilize these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital, to facilitate corporate acquisitions or payment as a dividend on the capital stock.

The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could render more difficult or discourage a third-party attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of our management. In addition, the board of directors has the discretion to determine designations, rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of each series of preferred stock, all to the fullest extent permissible under the DGCL and subject to any limitations set forth in our certificate of incorporation, as amended. The purpose of authorizing the board of directors to issue preferred stock and to determine the rights and preferences applicable to such preferred stock is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible financings, acquisitions and other corporate purposes, could have the effect of making it more difficult for a third-party to acquire, or could discourage a third-party from acquiring, a majority of our outstanding voting stock.

PLAN OF DISTRIBUTION

We have entered into a Controlled Equity OfferingSM sales agreement with Cantor Fitzgerald & Co. pursuant to which we may offer and sell up to \$50.0 million of shares of our common stock, par value \$0.0001 per share, from time to time through Cantor Fitzgerald & Co. acting as sales agent. This summary of the material provisions of the sales agreement does not purport to be a complete statement of its terms and conditions. The sales agreement has been filed with the SEC and is included as an exhibit to the registration statement of which this prospectus is a part.

Upon delivery of a placement notice, and subject to the Company's instructions in that notice, and the terms and conditions of the sales agreement generally, Cantor Fitzgerald & Co. may sell our common stock by any method permitted by law deemed to be an "at the market offering" as defined by Rule 415(a)(4) promulgated under the Securities Act.

We will pay Cantor Fitzgerald & Co. in cash, upon each sale of our common stock pursuant to the sales agreement, a commission in an amount equal to 3.0% of the aggregate gross proceeds from each sale of our common stock. Because there is no minimum offering amount required as a condition to this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time. We have agreed to reimburse a portion of Cantor Fitzgerald & Co.'s expenses, including legal fees, in connection with this offering up to a maximum of \$25,000. In accordance with FINRA Rule 5110 these reimbursed fees and expenses are deemed sales compensation to Cantor Fitzgerald & Co. in connection with this offering. We estimate that the total expenses for the offering, excluding compensation and expense reimbursement payable to Cantor Fitzgerald & Co. under the terms of the sales agreement, will be approximately \$105,000.

Settlement for sales of common stock will occur on the second trading day following the date on which any sales are made, or on some other date that is agreed upon by us and Cantor Fitzgerald & Co. in connection with a particular transaction, in return for payment of the net proceeds to us. There is no arrangement for funds to be received in an escrow, trust or similar arrangement. Sales of our common stock as contemplated in this prospectus will be settled through the facilities of The Depository Trust Company or by such other means as we and Cantor Fitzgerald & Co. may agree upon.

Cantor Fitzgerald & Co. will act as sales agent on a commercially reasonable efforts basis consistent with its normal trading and sales practices and applicable state and federal laws, rules and regulations and the rules of Nasdaq. In connection with the sale of the common stock on our behalf, Cantor Fitzgerald & Co. will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of Cantor Fitzgerald & Co. will be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to Cantor Fitzgerald & Co. against certain civil liabilities, including liabilities under the Securities Act.

The offering of our common stock pursuant to the sales agreement will terminate as permitted therein. We or Cantor Fitzgerald & Co. may terminate the sales agreement at any time upon ten (10) days' prior notice.

Cantor Fitzgerald & Co. and its affiliates may in the future provide various investment banking, commercial banking and other financial services for us and our affiliates, for which services they may in the future receive customary fees. To the extent required by Regulation M, Cantor Fitzgerald & Co. will not engage in any market making activities involving our common stock while the offering is ongoing under this prospectus.

This prospectus in electronic format may be made available on a website maintained by Cantor Fitzgerald & Co. and Cantor Fitzgerald & Co. may distribute this prospectus electronically.

LEGAL MATTERS

The validity of the common stock being offered will be passed upon for us by Lowenstein Sandler LLP, New York, New York. Covington & Burling LLP, New York, New York is counsel for Cantor Fitzgerald & Co. in connection with this offering.

EXPERTS

The consolidated balance sheets of Corbus Pharmaceuticals Holdings, Inc. and subsidiary as of December 31, 2016 and 2015 and the related consolidated statements of operations, stockholders' equity and cash flows for each of the years then ended, have been audited by EisnerAmper LLP, an independent registered public accounting firm, as stated in their report dated March 8, 2017 which is incorporated herein by reference. Such consolidated financial statements have been incorporated herein by reference in reliance on the report of such firm, given upon their authority as experts in auditing and accounting.

ADDITIONAL INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You can read and copy any materials we file with the SEC at its Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549 and at its regional offices, a list of which is available on the Internet at <http://www.sec.gov/contact/addresses.htm>. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC maintains an Internet site at <http://www.sec.gov> that contains reports, proxy and information statements, and other information regarding issuers, such as us, that file electronically with the SEC. Additionally, you may access our filings with the SEC through our website at <http://www.corbuspharma.com>. The information on our website is not part of this prospectus.

We will provide you without charge, upon your oral or written request, with a copy of any or all reports, proxy statements and other documents we file with the SEC, as well as any or all of the documents incorporated by reference in this prospectus (other than exhibits to such documents unless such exhibits are specifically incorporated by reference into such documents). Requests for such copies should be directed to:

Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive
Norwood, MA 02062
Telephone number: (617) 963-0100

We have filed with the SEC a registration statement on Form S-3 under the Securities Act with respect to the common stock offered with this prospectus. This prospectus does not contain all of the information in the registration statement, parts of which we have omitted, as allowed under the rules and regulations of the SEC. You should refer to the registration statement for further information with respect to us and the common stock. Copies of the registration statement, including exhibits, may be inspected without charge at the SEC's Public Reference Room and on the SEC's website at the addresses set forth above.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" information that we file with it into this prospectus, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. The information incorporated by reference is considered to be a part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement.

We incorporate by reference the documents listed below that we have previously filed with the SEC:

- Our Annual Report on Form 10-K for the year ended December 31, 2016, filed with the SEC on March 8, 2017;
- our Quarterly Reports on Form 10-Q for the fiscal quarters ended March 31, 2017, filed with the SEC on May 9, 2017, June 30, 2017, filed with the SEC on August 9, 2017, and September 30, 2017, filed with the SEC on November 8, 2017;
- our Current Reports on Form 8-K filed with the SEC on February 28, 2017, March 30, 2017, May 26, 2017, August 22, 2017, October 17, 2017, October 19, 2017, October 24, 2017 and November 27, 2017 (other than any portions thereof deemed furnished and not filed);

- the information specifically incorporated by reference into our Annual Report on Form 10-K from our Definitive Proxy Statement on Schedule 14A filed with the SEC on April 10, 2017; and
- the description of our common stock, par value \$0.0001 per share, contained in our Form 8-A filed on April 14, 2015, including any amendment or report filed for the purpose of updating such description.

All reports and other documents that we file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act between the date of the initial registration statement and the effectiveness of the registration statement, and following the effectiveness of the registration statement until the termination of the offering of the securities hereunder, will also be considered to be incorporated by reference into this prospectus from the date of the filing of these reports and documents, and will supersede the information herein; provided, however, that all reports, exhibits and other information that we “furnish” to the SEC will not be considered incorporated by reference into this prospectus. We undertake to provide without charge to each person (including any beneficial owner) who receives a copy of this prospectus, upon written or oral request, a copy of all of the preceding documents that are incorporated by reference (other than exhibits, unless the exhibits are specifically incorporated by reference into these documents). You may request a copy of these materials in the manner set forth under the heading “Additional Information,” above.

Any statements contained in a document incorporated by reference in this prospectus shall be deemed to be modified, superseded or replaced for purposes of this prospectus to the extent that a statement contained in this prospectus (or in any other subsequently filed document which also is incorporated by reference in this prospectus) modifies, supersedes or replaces such statement. Any statement so modified, superseded or replaced shall not be deemed, except as so modified, superseded or replaced, to constitute a part of this prospectus. Statements contained in this prospectus and any document incorporated by reference as to the contents of any contract, agreement or other document referred to are not necessarily complete, and in each instance reference is made to the copy of the contract, agreement or other document filed as an exhibit to the registration statement or any incorporated document, each statement being so qualified by this reference.



Up to \$50,000,000

Common Stock

PROSPECTUS



, 2018

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth the costs and expenses payable by Corbus in connection with the sale of securities being registered. All amounts are estimates except the SEC registration fee (which has previously been paid).

SEC Registration Fee	\$	24,900
Legal Fees and Expenses		10,000*
Accounting Fees and Expenses		5,000*
Printing and Engraving		2,000*
Miscellaneous		380*
Total:	\$	42,280*

* Estimated

Item 15. Indemnification of Directors and Officers

The Delaware General Corporation Law authorizes corporations to limit or eliminate, subject to certain conditions, the personal liability of directors to corporations and their stockholders for monetary damages for breach of their fiduciary duties. Our certificate of incorporation, as amended, limits the liability of our directors to the fullest extent permitted by Delaware law. In addition, we have entered into indemnification agreements with certain of our directors and officers whereby we have agreed to indemnify those directors and officers to the fullest extent permitted by law, including indemnification against expenses and liabilities incurred in legal proceedings to which the director or officer was, or is threatened to be made, a party by reason of the fact that such director or officer is or was a director, officer, employee or agent of the Company, provided that such director or officer acted in good faith and in a manner that the director or officer reasonably believed to be in, or not opposed to, the best interests of the Company.

We have director and officer liability insurance to cover liabilities our directors and officers may incur in connection with their services to us, including matters arising under the Securities Act. Our certificate of incorporation, as amended, and bylaws also provide that we will indemnify our directors and officers who, by reason of the fact that he or she is one of our officers or directors of our company, is involved in any action, suit or proceeding, whether civil, criminal, administrative or investigative related to their board role with the company.

Item 16. Exhibits

Exhibit No.	Description
1.1	Form of Underwriting Agreement.**
1.2	<u>Sales Agreement, dated January 5, 2018, by and between the Registrant and Cantor Fitzgerald & Co.*</u>
3.1	<u>Amended and Restated Certificate of Incorporation (incorporated herein by reference to Exhibit 3.1 to our Current Report on Form 8-K filed with the SEC on May 26, 2017).</u>
3.2	<u>Amended and Restated Bylaws (incorporated herein by reference to Exhibit 3.2 to our Current Report on Form 8-K filed with the SEC on May 26, 2017).</u>
4.1	<u>Specimen Common Stock Certificate, \$0.0001 par value (incorporated herein by reference to Exhibit 4.4 to our Registration Statement on Form S-8 filed with the SEC on November 18, 2014).</u>
4.2	Specimen Preferred Stock Certificate.**
4.3	Form of Warrant Agreement.**
4.4	Form of Warrant Certificate.**

- 4.5 [Form of Senior Debt Indenture.](#)^{*}
- 4.6 [Form of Subordinated Debt Indenture.](#)^{*}
- 4.7 Form of Senior Note (included in Exhibit 4.5).^{**}
- 4.8 Form of Subordinated Note (included in Exhibit 4.6).^{**}
- 4.9 Form of Unit Agreement.^{**}
- 4.10 Form of Subscription Agreement.^{**}
- 5.1 [Legal opinion of Lowenstein Sandler LLP.](#)^{*}
- 12.1 [Computation of Ratio of Earnings to Combined Fixed Charges.](#)^{*}
- 23.1 [Consent of EisnerAmper LLP.](#)^{*}
- 23.2 [Consent of Lowenstein Sandler LLP \(included in Exhibit 5.1\).](#)^{*}
- 24.1 [Power of Attorney \(included on the signature page\).](#)^{*}
- 25.1 Statement of Eligibility on Form T-1 of the Trustee for the Senior Debt Indenture.^{***}
- 25.2 Statement of Eligibility on Form T-1 of the Trustee for the Subordinated Debt Indenture.^{***}

* Filed herewith.

** To be filed, if applicable, by amendment or by a report filed under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, and incorporated herein by reference.

*** To be filed pursuant to Section 305(b)(2) of the Trust Indenture Act of 1939, as amended.

Item 17. Undertakings

The undersigned Registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:
- (a) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933,

(b) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement,

(c) To include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the Registration Statement.

Provided, however, that paragraphs (1)(a), (1)(b) and (1)(c) above do not apply if the registration statement is on Form S-3 and the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(a) If the Registrant is relying on Rule 430B:

(i) Each prospectus filed by the Registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(b) If the Registrant is subject to Rule 430C, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be a part of and included in the registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

(5) That, for the purpose of determining liability of the Registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the Registrant undertakes that in a primary offering of securities of the Registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the Registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the Registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the Registrant or used or referred to by the Registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about Registrant or its securities provided by or on behalf of the Registrant; and

(iv) Any other communication that is an offer in the offering made by the Registrant to the purchaser.

(6) The Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the Registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(7) The undersigned registrant hereby undertakes to supplement the prospectus, after the expiration of the subscription period, to set forth the results of the subscription offer, the transactions by the underwriters during the subscription period, the amount of unsubscribed securities to be purchased by the underwriters, and the terms of any subsequent reoffering thereof. If any public offering by the underwriters is to be made on terms differing from those set forth on the cover page of the prospectus, a post-effective amendment will be filed to set forth the terms of such offering.

(8) The undersigned hereby undertakes to file an application for the purpose of determining the eligibility of the trustee to act under subsection (a) of Section 310 of the Trust Indenture Act in accordance with the rules and regulations prescribed by the Commission under Section 305(b)(2) of the Act.

(9) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the Registrant pursuant to the forgoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Norwood, Commonwealth of Massachusetts, on this 5th day of January, 2018.

CORBUS PHARMACEUTICALS HOLDINGS, INC.

By: /s/ Yuval Cohen

Yuval Cohen, Ph.D.

Chief Executive Officer (Principal Executive Officer)

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Yuval Cohen and Sean Moran, and each of them, each with full power to act without the other, his true and lawful attorneys-in-fact and agents, each with full power of substitution and resubstitution, for such person and in his name, place and stead, in any and all capacities, to sign any amendments to this Registration Statement, and to sign any registration statement for the same offering covered by this Registration Statement, including post-effective amendments or registration statements filed pursuant to Rule 462(b) under the Securities Act of 1933, and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming that each of said such attorneys-in-fact and agents or his substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Yuval Cohen</u> Yuval Cohen, Ph. D.	Chief Executive Officer and Director (Principal Executive Officer)	January 5, 2018
<u>/s/ Sean Moran</u> Sean Moran	Chief Financial Officer (Principal Financial and Accounting Officer)	January 5, 2018
<u>/s/ Alan Holmer</u> Alan Holmer	Director	January 5, 2018
<u>/s/ Avery W. Catlin</u> Avery W. Catlin	Director	January 5, 2018
<u>/s/ Renu Gupta</u> Renu Gupta, M.D.	Director	January 5, 2018
<u>/s/ David Hochman</u> David Hochman	Director	January 5, 2018
<u>/s/ Paris Panayiotopoulos</u> Paris Panayiotopoulos	Director	January 5, 2018

CORBUS PHARMACEUTICALS HOLDINGS, INC.

Shares of Common Stock
(par value \$0.0001 per share)

Controlled Equity OfferingSM

Sales Agreement

January 5, 2018

Cantor Fitzgerald & Co.
499 Park Avenue
New York, NY 10022

Ladies and Gentlemen:

Corbus Pharmaceuticals Holdings, Inc., a Delaware corporation (the "**Company**"), confirms its agreement (this "**Agreement**") with Cantor Fitzgerald & Co. (the "**Agent**"), as follows:

1. **Issuance and Sale of Shares.** The Company agrees that, from time to time during the term of this Agreement, on the terms and subject to the conditions set forth herein, it may issue and sell through the Agent shares of common stock (the "**Placement Shares**") of the Company, par value \$0.0001 per share (the "**Common Stock**"); *provided, however*, that in no event shall the Company issue or sell through the Agent such number or dollar amount of Placement Shares that would (a) exceed the number or dollar amount of shares of Common Stock registered on the effective Registration Statement (as defined below) pursuant to which the offering is being made, (b) exceed the number of authorized but unissued shares of Common Stock (less shares of Common Stock issuable upon exercise, conversion or exchange of any outstanding securities of the Company or otherwise reserved from the Company's authorized capital stock), (c) exceed the number or dollar amount of shares of Common Stock permitted to be sold under Form S-3 (including General Instruction I.B.6 thereof, if applicable) or (d) exceed the number or dollar amount of shares of Common Stock for which the Company has filed a prospectus or prospectus supplement relating to the Placement Shares (the lesser of (a), (b), (c) and (d), the "**Maximum Amount**"). Notwithstanding anything to the contrary contained herein, the parties hereto agree that compliance with the limitations set forth in this **Section 1** on the amount of Placement Shares issued and sold under this Agreement shall be the sole responsibility of the Company and that the Agent shall have no obligation in connection with such compliance; provided that the Agent follows, in all material respects, the trading instructions provided pursuant to any Placement Notice (as defined below). The offer and sale of Placement Shares through the Agent will be effected pursuant to the Registration Statement (as defined below) to be filed by the Company and only after such registration statement has been declared effective by the Securities and Exchange Commission (the "**Commission**"), although nothing in this Agreement shall be construed as requiring the Company to use the Registration Statement to issue Common Stock.

The Company has prepared and will file, in accordance with the provisions of the Securities Act of 1933, as amended (the “**Securities Act**”), and the rules and regulations thereunder (the “**Securities Act Regulations**”), with the Commission a registration statement on Form S-3, including a base prospectus relating to several different classes of securities, as well as a prospectus relating specifically to the Placement Shares to be issued from time to time by the Company, and each of which will incorporate by reference documents that the Company has filed or will file in accordance with the provisions of the Securities Exchange Act of 1934, as amended (the “**Exchange Act**”), and the rules and regulations thereunder. The Company will furnish to the Agent, for use by the Agent, copies of the prospectus included as part of such registration statement relating to the Placement Shares to be issued from time to time by the Company. The Company may file one or more additional registration statements from time to time that will contain a prospectus relating to the Placement Shares, or a base prospectus and a prospectus supplement relating to the Placement Shares. Except where the context otherwise requires, all such registration statement(s), as any of them may be amended from time to time, including all documents filed as part thereof or incorporated by reference therein, and including any information contained in a prospectus or a prospectus supplement relating to the Placement Shares subsequently filed with the Commission pursuant to Rule 424(b) under the Securities Act Regulations or deemed to be a part of such registration statement(s) pursuant to Rule 430B of the Securities Act Regulations, is herein called the “**Registration Statement**.” The base prospectus and prospectus supplement relating to the Placement Shares, or the prospectus relating to the Placement Shares (as the case may be), including all documents incorporated therein by reference, included in the Registration Statement, as any such prospectus or prospectus supplement may be supplemented, in the form in which such prospectus or prospectus supplement has most recently been filed by the Company with the Commission pursuant to Rule 424(b) under the Securities Act Regulations, is herein called the “**Prospectus**.”

Any reference herein to the Registration Statement or the Prospectus shall be deemed to refer to and include the documents, if any, incorporated by reference therein (the “**Incorporated Documents**”), including, unless the context otherwise requires, the documents, if any, filed as exhibits to such Incorporated Documents. Any reference herein to the terms “amend,” “amendment” or “supplement” with respect to the Registration Statement or the Prospectus shall be deemed to refer to and include the filing after the execution hereof of any document with the Commission deemed to be incorporated by reference therein. For purposes of this Agreement, all references to the Registration Statement, the Prospectus or any amendment or supplement thereto shall be deemed to include the most recent copy filed with the Commission pursuant to its Electronic Data Gathering Analysis and Retrieval system, or if applicable, the Interactive Data Electronic Application system when used by the Commission (collectively, “**EDGAR**”).

2. **Placements.** Each time that the Company wishes to issue and sell Placement Shares hereunder (each, a “**Placement**”) it will notify the Agent by email notice (or other method mutually agreed to by the parties) of the number of Placement Shares to be issued, the time period during which sales are requested to be made, any limitation on the number of Placement Shares that may be sold in any one day and any minimum price below which sales may not be made, the form of which is attached hereto as Schedule 1 (a “**Placement Notice**”). The Placement Notice shall originate from any of the individuals from the Company set forth on Schedule 3 (with a copy to each of the other individuals from the Company listed on such schedule), and shall be addressed to each of the individuals from the Agent set forth on Schedule 3, as such Schedule 3 may be amended from time to time. The Placement Notice shall be effective unless and until (i) the Agent declines to accept the terms contained therein for any reason, in its sole discretion, (ii) the entire amount of the Placement Shares thereunder have been sold, (iii) the Company suspends or terminates the Placement Notice or (iv) this Agreement has been terminated under the provisions of Section 12. The Company may not deliver a Placement Notice, and the Agent will have no obligation with respect to any Placement Notice, unless and until the Registration Statement has been declared effective by the Commission. The amount of any discount, commission or other compensation to be paid by the Company to the Agent in connection with the sale of the Placement Shares shall be calculated in accordance with the terms set forth in Schedule 2. It is expressly acknowledged and agreed that neither the Company nor the Agent will have any obligation whatsoever with respect to a Placement or any Placement Shares unless and until the Company delivers a Placement Notice to the Agent and the Agent does not decline such Placement Notice pursuant to the terms set forth above, and then only upon the terms specified therein and herein. In the event of a conflict between the terms of this Agreement and the terms of a Placement Notice, the terms of the Placement Notice will control.

3. Sale of Placement Shares by Agent. Subject to the provisions of Section 5(a), and in no event prior to the Effective Time (as defined below), the Agent, for the period specified in the Placement Notice, will use its commercially reasonable efforts consistent with its normal trading and sales practices and applicable state and federal laws, rules and regulations and the rules of The Nasdaq Global Market (the “Exchange”) to sell the Placement Shares up to the amount specified and otherwise in accordance with the terms of such Placement Notice. The Agent will provide written confirmation to the Company no later than the opening of the Trading Day (as defined below) immediately following the Trading Day on which it has made sales of Placement Shares hereunder setting forth the number of Placement Shares sold on such day, the compensation payable by the Company to the Agent pursuant to Section 2 with respect to such sales, and the Net Proceeds (as defined below) payable to the Company, with an itemization of the deductions made by the Agent (as set forth in Section 5(b)) from the gross proceeds that it receives from such sales. Subject to the terms of the Placement Notice, the Agent may sell Placement Shares by any method permitted by law deemed to be an “at the market offering” as defined in Rule 415(a)(4) of the Securities Act Regulations, including sales made directly on or through the Exchange or any other existing trading market for the Common Stock, in negotiated transactions at market prices prevailing at the time of sale or at prices related to such prevailing market prices and/or any other method permitted by law. “Trading Day” means any day on which Common Stock is traded on the Exchange.

4. Suspension of Sales. The Company or the Agent may, upon notice to the other party in writing (including by email correspondence to each of the individuals of the other party set forth on Schedule 3, if receipt of such correspondence is actually acknowledged by any of the individuals to whom the notice is sent, other than via auto-reply) or by telephone (confirmed immediately by verifiable facsimile transmission or email correspondence to each of the individuals of the other party set forth on Schedule 3), suspend any sale of Placement Shares (a “Suspension”); *provided, however*, that such Suspension shall not affect or impair any party’s obligations with respect to any Placement Shares sold hereunder prior to the receipt of such notice. While a Suspension is in effect any obligation under Section 7(l), Section 7(m) and Section 7(n) with respect to the delivery of certificates, opinions or comfort letters to the Agent shall be waived. Each of the parties agrees that no such notice under this Section 4 shall be effective against any other party unless it is made to one of the individuals named on Schedule 3 hereto, as such Schedule may be amended from time to time.

5. Sale and Delivery to the Agent; Settlement.

(a) Sale of Placement Shares. On the basis of the representations and warranties herein contained and subject to the terms and conditions herein set forth, upon the Agent's acceptance of the terms of a Placement Notice, and unless the sale of the Placement Shares described therein has been declined, suspended, or otherwise terminated in accordance with the terms of this Agreement, the Agent, for the period specified in the Placement Notice, will use its commercially reasonable efforts consistent with its normal trading and sales practices and applicable law and regulations to sell such Placement Shares up to the amount specified, and otherwise in accordance with the terms of such Placement Notice. The Company acknowledges and agrees that (i) there can be no assurance that the Agent will be successful in selling Placement Shares, (ii) the Agent will incur no liability or obligation to the Company or any other person or entity if it does not sell Placement Shares for any reason other than a failure by the Agent to use its commercially reasonable efforts consistent with its normal trading and sales practices and applicable law and regulations to sell such Placement Shares as required under this Agreement, and (iii) the Agent shall be under no obligation to purchase Placement Shares on a principal basis pursuant to this Agreement, except as otherwise agreed by the Agent and the Company.

(b) Settlement of Placement Shares. Unless otherwise specified in the applicable Placement Notice, settlement for sales of Placement Shares will occur on the second (2nd) Trading Day (or such earlier day as is industry practice for regular-way trading) following the date on which such sales are made (each, a "**Settlement Date**"). The amount of proceeds to be delivered to the Company on a Settlement Date against receipt of the Placement Shares sold (the "**Net Proceeds**") will be equal to the aggregate sales price received by the Agent, after deduction for (i) the Agent's commission, discount or other compensation for such sales payable by the Company pursuant to Section 2 hereof, and (ii) any transaction fees imposed by any governmental or self-regulatory organization in respect of such sales.

(c) Delivery of Placement Shares. On or before each Settlement Date, the Company will, or will cause its transfer agent to, electronically transfer the Placement Shares being sold by crediting the Agent's or its designee's account (provided the Agent shall have given the Company written notice of such designee at least one Trading Day prior to the Settlement Date) at The Depository Trust Company through its Deposit and Withdrawal at Custodian System or by such other means of delivery as may be mutually agreed upon by the parties hereto, which in all cases shall be freely tradable, transferable, registered shares in good deliverable form. On each Settlement Date, the Agent will deliver the related Net Proceeds in same day funds to an account designated by the Company on, or prior to, the Settlement Date. The Company agrees that if the Company, or its transfer agent (if applicable), defaults in its obligation to deliver Placement Shares on a Settlement Date, through no fault of the Agent, the Company agrees that, in addition to and in no way limiting the rights and obligations set forth in Section 10(a) hereto, it will (i) hold the Agent harmless against any loss, claim, damage or expense (including reasonable legal fees and expenses), as incurred, arising out of or in connection with such default by the Company or its transfer agent (if applicable) and (ii) pay to the Agent any commission, discount or other compensation to which it would otherwise have been entitled absent such default.

(d) Denominations; Registration. Certificates for the Placement Shares, if any, shall be in such denominations and registered in such names as the Agent may request in writing at least one full Business Day (as defined below) before the Settlement Date. The certificates for the Placement Shares, if any, will be made available by the Company for examination and packaging by the Agent in The City of New York not later than noon (New York time) on the Business Day prior to the Settlement Date.

(e) Limitations on Offering Size. Under no circumstances shall the Company cause or request the offer or sale of any Placement Shares if, after giving effect to the sale of such Placement Shares, the aggregate gross sales proceeds of Placement Shares sold pursuant to this Agreement would exceed the lesser of (i) together with all sales of Placement Shares under this Agreement, the Maximum Amount, (ii) the amount available for offer and sale under the currently effective Registration Statement, and (iii) the amount authorized from time to time to be issued and sold under this Agreement by the Company's board of directors, a duly authorized committee thereof or a duly authorized executive committee, and notified to the Agent in writing. Under no circumstances shall the Company cause or request the offer or sale of any Placement Shares pursuant to this Agreement at a price lower than the minimum price authorized from time to time by the Company's board of directors, a duly authorized committee thereof or a duly authorized executive committee, and notified to the Agent in writing.

6. Representations and Warranties of the Company. The Company represents and warrants to, and agrees with Agent that as of the date of this Agreement and as of each Applicable Time (as defined below), unless such representation, warranty or agreement speaks as of a different time:

(a) Registration Statement and Prospectus.

(i) The Company and the transactions contemplated by this Agreement meet the requirements for and comply with the applicable conditions set forth in Form S-3 (including General Instructions I.A and I.B) under the Securities Act. The Registration Statement has been prepared and will be filed with the Commission. The prospectus or prospectus supplement relating to the Placement Shares will name the Agent as the agent in the section entitled "Plan of Distribution." The Company has not received, and has no notice of, any order of the Commission preventing or suspending the use of the Registration Statement, or threatening or instituting proceedings for that purpose. The Registration Statement and the offer and sale of Placement Shares as contemplated hereby will meet the requirements of Rule 415 under the Securities Act and will comply in all material respects with Rule 415. Any statutes, regulations, contracts or other documents that are required to be described in the Registration Statement or the Prospectus or to be filed as exhibits to the Registration Statement will be so described or filed.

(ii) The Company has provided to the Agent and its counsel, at least 48 hours prior to its initial filing with the Commission, a draft of the Registration Statement (including the base prospectus and the prospectus or prospectus supplement relating to the Placement Shares) in the form to be filed with the Commission. Subject to clause (iii) of this Section 6(a), the Company will promptly file the Registration Statement with the Commission and thereafter use its commercially reasonable efforts to cause the Registration Statement to be declared effective under the Securities Act by the Commission. The date and time that the Registration Statement is initially declared effective by the Commission is herein called the "Effective Time."

(iii) Prior to the Effective Time, the Company will not make any amendment to the Registration Statement, or make any modification to, or supplement, the Prospectus without the prior written consent of the Agent, which consent shall not be unreasonably delayed, conditioned or withheld. Prior to the Effective Time, the Company will (x) cause the Registration Statement to be amended and/or the Prospectus to be modified or supplemented, in accordance with the reasonable request of the Agent, and (y) deliver or cause to be delivered to the Agent any amendment to the Registration Statement as initially filed with the Commission, any supplement to the Prospectus included therein, and any document incorporated by reference in the Registration Statement or the Prospectus, to the extent any such document is not available through EDGAR. The Company has not distributed and, prior to the later to occur of each Settlement Date and completion of the distribution of the Placement Shares, will not distribute any offering material in connection with the offering or sale of the Placement Shares other than the Registration Statement and the Prospectus. The Common Stock is registered pursuant to Section 12(b) of the Exchange Act and is currently listed on the Exchange under the trading symbol "CRBP." The Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act or delisting the Common Stock from the Exchange, nor has the Company received any notification that the Commission or the Exchange is contemplating terminating such registration or listing. To the Company's knowledge, it is in compliance with all applicable listing requirements of the Exchange.

(b) No Misstatement or Omission. The Registration Statement, when it became or becomes effective, did not, and will not, contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The Prospectus and any amendment and supplement thereto, on the date thereof and at each Applicable Time (as defined below), did not or will not include an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading. The documents incorporated by reference in the Registration Statement or the Prospectus at the Effective Time did not, and any further documents filed and incorporated by reference in the Registration Statement, the Prospectus or any amendment or supplement thereto will not, when filed with the Commission, contain an untrue statement of a material fact or omit to state a material fact required to be stated in such document or necessary to make the statements in such document, in light of the circumstances under which they were made, not misleading. The foregoing shall not apply to statements in, or omissions from, any such document made in reliance upon, and in conformity with, the Agent Information (as defined below).

(c) Conformity with Securities Act and Exchange Act. The Registration Statement, the Prospectus and any amendment or supplement thereto, and the documents incorporated by reference in the Registration Statement, the Prospectus or any amendment or supplement thereto, when such documents were or are filed with the Commission under the Securities Act or the Exchange Act or became or become effective under the Securities Act, as the case may be, conformed or will conform in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable. At each Settlement Date, the Registration Statement, the Prospectus and any amendment or supplement thereto, and the documents incorporated by reference in the Registration Statement, the Prospectus or any amendment or supplement thereto, as of such date, will conform in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable.

(d) Conformity with EDGAR Filing. The Prospectus delivered to the Agent for use in connection with the sale of the Placement Shares pursuant to this Agreement will be identical to the versions of the Prospectus transmitted to the Commission for filing via EDGAR, except to the extent permitted by Regulation S-T.

(e) Free Writing Prospectus. Other than the Registration Statement and the Prospectus, the Company (including its agents and representatives, other than the Agent in its capacity as such) has not prepared, used, authorized, approved or referred to and will not prepare, use, authorize, approve or refer to any “written communication” (as defined in Rule 405 under the Securities Act) that constitutes an offer to sell or solicitation of an offer to buy the Shares other than (i) any document not constituting a prospectus pursuant to Section 2(a)(10)(a) of the Securities Act or Rule 134 under the Securities Act or (ii) any electronic road show.

(f) Emerging Growth Company. From the time of the initial filing of the Registration Statement with the Commission through the date hereof, the Company has been and is an “emerging growth company,” as defined in Section 2(a)(19) of the Securities Act (an “**Emerging Growth Company**”).

(g) No Material Adverse Change. Since the date of the most recent financial statements of the Company included or incorporated by reference in the Registration Statement and the Prospectus, (i) there has not been any change in the capital stock (other than the issuance of shares of Common Stock upon exercise of stock options and warrants described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement and the Prospectus), short-term debt or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock, or any material adverse change, or any development that could reasonably be expected to result in a prospective material adverse change, in or affecting the business, properties, management, financial position, prospects, shareholders’ equity or results of operations of the Company and its subsidiaries taken as a whole; (ii) neither the Company nor any of its subsidiaries has entered into any transaction or agreement (whether or not in the ordinary course of business) or incurred any liability or obligation, direct or contingent; and (iii) neither the Company nor any of its subsidiaries has sustained any loss or interference with its business that is material to the Company and its subsidiaries taken as a whole and that is either from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor disturbance or dispute or any action, order or decree of any court or arbitrator or governmental or regulatory authority, except in each of clauses (i) through (iii) as otherwise disclosed in the Registration Statement and the Prospectus.

(h) Organization and Good Standing. The Company and each of its subsidiaries have been duly organized and are validly existing and in good standing (or jurisdictional equivalent) under the laws of their respective jurisdictions of organization, are duly qualified to do business and are in good standing in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all corporate power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to be so qualified or in good standing or have such power or authority could not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the business, properties, management, financial position, prospects, shareholders' equity or results of operations of the Company and its subsidiaries taken as a whole or on the performance by the Company of its obligations under this Agreement (a "**Material Adverse Effect**"). The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to its Annual Report on Form 10-K for the year ended December 31, 2016.

(i) Title to Real and Personal Property. The Company owns no real property and the Company and its subsidiaries have valid rights to lease or otherwise use, all items of real and personal property that are material to the respective businesses of the Company and its subsidiaries, in each case free and clear of all liens, encumbrances, claims and defects and imperfections of title except those that (i) do not materially interfere with the use made and proposed to be made of such property by the Company and its subsidiaries or (ii) would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(j) Due Authorization. The Company has full corporate right, power and authority to execute and deliver this Agreement and to perform its obligations hereunder; and all corporate action required to be taken for the due and proper authorization, execution and delivery by it of this Agreement and the consummation by it of the transactions contemplated hereby has been duly and validly taken.

(k) Sales Agreement. This Agreement has been duly authorized, executed and delivered by the Company.

(l) Capitalization. The Company has an authorized capitalization as set forth in the Registration Statement and the Prospectus under the heading "Description of Capital Stock"; all the outstanding shares of capital stock of the Company have been duly and validly authorized and issued and are fully paid and non-assessable and are not subject to any pre-emptive or similar rights that have not been duly waived or satisfied; except as described in or expressly contemplated by the Registration Statement and the Prospectus, there are no outstanding rights (including, without limitation, pre-emptive rights), warrants or options to acquire, or instruments convertible into or exchangeable for, any shares of capital stock or other equity interest in the Company or any of its wholly owned subsidiaries, or any contract, commitment, agreement, understanding or arrangement of any kind relating to the issuance of any capital stock of the Company or any of its wholly owned subsidiaries, any such convertible or exchangeable securities or any such rights, warrants or options; the capital stock of the Company conforms in all material respects to the descriptions thereof contained in the Registration Statement and the Prospectus; and all the outstanding shares of capital stock or other equity interests of each subsidiary owned, directly or indirectly, by the Company have been duly and validly authorized and issued, are fully paid and non-assessable and are owned directly or indirectly by the Company, free and clear of any lien, charge, encumbrance, security interest, restriction on voting or transfer or any other claim of any third party.

(m) Stock Options. With respect to the outstanding stock options (the “**Stock Options**”) granted pursuant to the stock-based compensation plans of the Company and its subsidiaries (the “**Company Stock Plans**”), (i) each grant of a Stock Option was duly authorized no later than the date on which the grant of such Stock Option was by its terms to be effective (the “**Grant Date**”) by all necessary corporate action, including, as applicable, approval by the board of directors of the Company (or a duly constituted and authorized committee thereof) and any required shareholder approval by the necessary number of votes or written consents, and the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (ii) each such grant was made in all material respects in accordance with the terms of the Company Stock Plans, the Exchange Act and all applicable laws and regulatory rules or requirements, including the rules of the Exchange and any other exchange on which the Company’s securities are traded, to the extent applicable, and (iii) each such grant was properly accounted for in accordance with generally accepted accounting principles in the United States (“**GAAP**”) in the financial statements (including the related notes) of the Company, except as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(n) The Placement Shares. The Placement Shares to be issued and sold by the Company hereunder have been duly authorized and, when issued and delivered and paid for as provided herein, will be duly and validly issued, will be fully paid and non-assessable and will conform to the descriptions thereof in the Registration Statement and the Prospectus; and the issuance of the Placement Shares is not subject to any preemptive or similar rights that have not been duly waived.

(o) No Conflicts. The execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Placement Shares by the Company and the consummation by the Company of the transactions contemplated by this Agreement will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws or similar organizational documents of the Company or any of its subsidiaries or (iii) result in the violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation or default that could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(p) No Violation or Default. Neither the Company nor any of its subsidiaries is (i) in violation of its charter or bylaws or similar organizational documents, (ii) in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject (collectively, “**Company Contracts**”), or (iii) in violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (ii) and (iii) above, for any such default or violation that could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. To the knowledge of the Company, all third parties that are parties to any Company Contracts are in compliance with the terms, covenants and conditions contained in such Company Contracts, except for any violation that could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(q) No Consents Required. No consent, approval, authorization, order, license, registration or qualification of or with any court or arbitrator or governmental or regulatory authority is required for the execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Placement Shares and the consummation of the transactions contemplated by this Agreement, except for the registration of the Placement Shares under the Securities Act and such consents, approvals, authorizations, orders and registrations or qualifications as may be required by the Financial Industry Regulatory Authority, Inc. (“**FINRA**”), by the Exchange, and under applicable state securities laws in connection with the purchase and distribution of the Placement Shares by the Agent.

(r) Legal Proceedings. Except as described in the Registration Statement and the Prospectus, there are no legal, governmental or regulatory investigations, actions, suits or proceedings pending to which the Company or any of its subsidiaries is a party or to which any property of the Company or any of its subsidiaries is the subject, including any proceeding before the United States Food and Drug Administration of the U.S. Department of Health and Human Services (the “**FDA**”) or comparable Governmental Authority relating to an alleged failure to comply, or deficiency in compliance, with the requirements of the FDA or other Governmental Authority that, individually or in the aggregate, if determined adversely to the Company or any of its subsidiaries, could reasonably be expected to have a Material Adverse Effect; to the knowledge of the Company, no such investigations, actions, suits or proceedings are threatened or contemplated by any governmental or regulatory authority or threatened by others; and there are no current or pending legal, governmental or regulatory actions, suits or proceedings that are required under the Securities Act to be described in the Registration Statement or the Prospectus that are not so described in the Registration Statement and the Prospectus.

(s) No Undisclosed Relationships. No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries, on the one hand, and the directors, officers, shareholders, customers or suppliers of the Company, or any of its subsidiaries or any other related party, on the other, that is required by the Securities Act to be described in the Registration Statement and the Prospectus and that is not so described in such documents.

(t) Investment Company Act. The Company is not and, after giving effect to the offering and sale of the Placement Shares and the application of the proceeds thereof as described in the Registration Statement and the Prospectus, will not be required to register as an “investment company” or an entity “controlled” by an “investment company” within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder (the “**Investment Company Act**”).

(u) Taxes. The Company and its subsidiaries have timely filed all material tax returns that are required to have been filed by them pursuant to applicable state, local or foreign law, and have paid all taxes shown thereon or otherwise assessed, which are due and payable, except assessments against which appeals have been or will be promptly taken and as to which adequate reserves have been provided; and except as otherwise disclosed, or incorporated by reference, in the Registration Statement and the Prospectus, there is no material tax deficiency that has been, or would reasonably be expected to be, asserted against the Company or any of its subsidiaries or any of their respective properties or assets.

(v) Status under the Securities Act. As of January 1, 2018, the Company will not be an “ineligible issuer” as defined in Rule 405 under the Securities Act.

(w) Independent Accountants. EisnerAmper LLP, who have certified certain financial statements of the Company and its subsidiaries, is an independent registered public accounting firm with respect to the Company and its subsidiaries within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(x) Financial Statements. The financial statements (including the related notes thereto) of the Company and its consolidated subsidiaries included or incorporated by reference in the Registration Statement and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and the Exchange Act, as applicable, and present fairly in all material respects the financial position of the Company and its consolidated subsidiaries as of the dates indicated and the results of their operations and the changes in their cash flows for the periods specified; such financial statements have been prepared in conformity with GAAP applied on a consistent basis throughout the periods covered thereby, except in the case of any unaudited financial statements, which are subject to normal year-end adjustments and do not contain certain footnotes as permitted by the applicable rules of the Commission, and any supporting schedules included or incorporated by reference in the Registration Statement present fairly in all material respects the information required to be stated therein; and the other financial information included or incorporated by reference in the Registration Statement and the Prospectus has been derived from the accounting records of the Company and its consolidated subsidiaries and presents fairly the information shown thereby.

(y) Sarbanes-Oxley Act. There is and has been no failure on the part of the Company or, to the knowledge of the Company, any of the Company’s directors or officers, in their capacities as such, to comply with any applicable provision of the Sarbanes-Oxley Act of 2002, as amended and the rules and regulations promulgated in connection therewith, including Section 402 related to loans and Sections 302 and 906 related to certifications.

(z) Accounting Controls. The Company and its subsidiaries maintain systems of “internal control over financial reporting” (as defined in Rule 13a-15(f) of the Exchange Act) that have been designed to comply in all material respects with the requirements of the Exchange Act and have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or persons performing similar functions, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management’s general or specific authorizations, (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability, (iii) access to assets is permitted only in accordance with management’s general or specific authorization, (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences, and (v) interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and is prepared in accordance with the Commission’s rules and guidelines applicable thereto. Except as disclosed in the Registration Statement and the Prospectus, there are no material weaknesses in the Company’s internal control over financial reporting. The Company’s auditors and the audit committee of the board of directors of the Company have been advised of: (x) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which have adversely affected or are reasonably likely to adversely affect the Company’s ability to record, process, summarize and report financial information; and (y) 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. Since the date of the latest audited financial statements included in the Prospectus, there has been no change in the Company’s internal control over financial reporting that has materially and adversely affected, or is reasonably likely to materially and adversely affect, the Company’s internal control over financial reporting.

(aa) eXtensible Business Reporting Language. The interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and has been prepared in accordance with the Commission’s rules and guidelines applicable thereto.

(bb) Disclosure Controls. The Company and its subsidiaries maintain an effective system of “disclosure controls and procedures” (as defined in Rule 13a-15(e) of the Exchange Act) that complies in all material respects with the requirements of the Exchange Act and that has been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission’s rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company’s management as appropriate to allow timely decisions regarding required disclosure.

(cc) No Unlawful Payments. Neither the Company nor any of its subsidiaries nor, to the knowledge of the Company, any director, officer, agent, employee, affiliate or other person authorized to act on behalf of the Company or any of its subsidiaries has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity, (ii) made any direct or indirect unlawful payment to any foreign or domestic government official or employee from corporate funds, (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977, as amended, or any applicable law or regulation implementing the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, or committed an offence under the Bribery Act 2010 of the United Kingdom or any other applicable anti-bribery or anti-corruption law, or (iv) made, offered, agreed to or requested any unlawful bribe or other unlawful benefit, including, without limitation, any rebate, payoff, influence payment, kickback or other unlawful or improper payment or benefit. The Company and its subsidiaries have instituted, maintain and enforce, and will continue to maintain and enforce policies and procedures designed to promote and ensure compliance with all applicable anti-bribery and anti-corruption laws.

(dd) Compliance with Anti-Money Laundering Laws. The operations of the Company and its subsidiaries are and have been conducted at all times in material compliance with applicable financial recordkeeping and reporting requirements, including those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the applicable money laundering statutes of all jurisdictions where the Company or any of its subsidiaries conducts business, the rules and regulations thereunder and any related or similar rules, regulations or guidelines issued, administered or enforced by any governmental agency (collectively, the “**Anti-Money Laundering Laws**”) and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(ee) No Conflicts with Sanctions Laws. None of the Company, any of its subsidiaries or, to the knowledge of the Company, any director, officer, agent, employee, affiliate or other person associated with or authorized to act on behalf of the Company or any of its subsidiaries is currently the subject or the target of any sanctions administered or enforced by the U.S. government (including, without limitation, the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State and including, without limitation, the designation as a “specially designated national” or “blocked person”), the United Nations Security Council, the European Union, Her Majesty’s Treasury or other relevant sanctions authority (collectively, “**Sanctions**”), nor is the Company or any of its subsidiaries located, organized or resident in a country or territory that is the subject or target of Sanctions, including, without limitation, Burma/Myanmar, Cuba, Iran, North Korea, Sudan, Syria and the Crimea region of Ukraine (each, a “**Sanctioned Country**”); and the Company will not directly or indirectly use the proceeds of the offering of the Placement Shares hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity (i) to fund or facilitate any activities of or business with any person that, at the time of such funding or facilitation, is the subject or target of Sanctions, (ii) to fund or facilitate any activities of or business in any Sanctioned Country or (iii) in any other manner that will result in a violation by any person (including any person participating in the transaction, whether as underwriter, advisor, investor or otherwise) of Sanctions. For the past five years, the Company and its subsidiaries have not knowingly engaged in and are not now knowingly engaged in any dealings or transactions with any person that at the time of the dealing or transaction is or was the subject or the target of Sanctions or with any Sanctioned Country.

(ff) No Registration Rights. Except as described in the Registration Statement and the Prospectus, no person has the right to require the Company or any of its subsidiaries to register any securities for sale under the Securities Act by reason of the filing of the Registration Statement with the Commission or the issuance and sale of the Placement Shares, except for such rights that have been waived.

(gg) No Labor Disputes. No labor disturbance by or dispute with employees of the Company or any of its subsidiaries exists or, to the knowledge of the Company, is threatened, and to the knowledge of the Company, there is no existing or imminent labor disturbance by, or dispute with, the employees of any of its or its subsidiaries' principal suppliers, contractors or customers, except as would not, individually or in the aggregate, have a Material Adverse Effect.

(hh) Compliance with ERISA. Except, in each case, for any such matter as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, (i) each employee benefit plan, within the meaning of Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), for which the Company or any member of its "Controlled Group" (defined as any organization which is a member of a controlled group of corporations within the meaning of Section 414 (b), (c), (m) or (o) of the Internal Revenue Code of 1986, as amended (the "Code")) would have any liability (each, a "Plan") has been maintained in compliance with its terms and the requirements of any applicable statutes, orders, rules and regulations, including but not limited to ERISA and the Code; (ii) no prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code, has occurred with respect to any Plan excluding transactions effected pursuant to a statutory or administrative exemption; (iii) for each Plan that is subject to the funding rules of Section 412 of the Code or Section 302 of ERISA, the minimum funding standard of Section 412 of the Code or Section 302 of ERISA, as applicable, has been satisfied (without taking into account any waiver thereof or extension of any amortization period) and to the knowledge of the Company is reasonably expected to be satisfied in the future (without taking into account any waiver thereof or extension of any amortization period); (iv) the fair market value of the assets of each Plan that is subject to the funding rules of Section 412 of the Code or Section 302 of ERISA exceeds the present value of all benefits accrued under such Plan (determined based on those assumptions used to fund such Plan); (v) no "reportable event" (within the meaning of Section 4043(c) of ERISA) has occurred or to the knowledge of the Company is reasonably expected to occur; (vi) neither the Company nor any member of the Controlled Group has incurred, nor to the knowledge of the Company reasonably expects to incur, any liability under Title IV of ERISA (other than contributions to the Plan or premiums to the Pension Benefit Guaranty Corporation, in the ordinary course and without default) in respect of a Plan (including a "multiemployer plan", within the meaning of Section 4001(a)(3) of ERISA); and (vii) to the knowledge of the Company, there is no pending audit or investigation by the Internal Revenue Service, the U.S. Department of Labor, the Pension Benefit Guaranty Corporation or any other governmental agency or any foreign regulatory agency with respect to any Plan. None of the following events has occurred or, to the knowledge of the Company, is reasonably likely to occur: (x) a material increase in the aggregate amount of contributions required to be made to all Plans by the Company or its subsidiaries in the current fiscal year of the Company and its subsidiaries compared to the amount of such contributions made in the Company and its subsidiaries' most recently completed fiscal year, or (y) an increase that is material to the Company and its subsidiaries, taken as a whole, in the Company and its subsidiaries' "accumulated post-retirement benefit obligations" (within the meaning of Statement of Financial Accounting Standards 106) compared to the amount of such obligations in the Company and its subsidiaries' most recently completed fiscal year.

(ii) Compliance with and Liability under Environmental Laws (i) The Company and its subsidiaries (v) are, and, during the past five years, were, in compliance with any and all applicable federal, state, local and foreign laws, rules, regulations, requirements, decisions, judgments, decrees, orders and the common law relating to pollution or the protection of the environment, natural resources or human health or safety, including those relating to the generation, storage, treatment, use, handling, transportation, Release (as defined below) or threat of Release of Hazardous Materials (as defined below) (collectively, “**Environmental Laws**”), (w) have received and are in compliance with all permits, licenses, certificates or other authorizations or approvals required of them under applicable Environmental Laws to conduct their respective businesses, (x) have not received notice of any actual or potential liability under or relating to, or actual or potential violation of, any Environmental Laws, including for the investigation or remediation of any Release or threat of Release of Hazardous Materials, and have no knowledge of any event or condition that would reasonably be expected to result in any such notice, (y) are not conducting or paying for, in whole or in part, any investigation, remediation or other corrective action pursuant to any Environmental Law at any location, and (z) are not a party to any order, decree or agreement that imposes any obligation or liability under any Environmental Law; (ii) there are no costs or liabilities associated with Environmental Laws of or relating to the Company or its subsidiaries, except in the case of each of (v) and (w) above, for any such matter, as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and (iii) except as described in the Registration Statement and the Prospectus, (x) there are no proceedings that are pending, or that are known by the Company to be contemplated, against the Company or any of its subsidiaries under any Environmental Laws in which a governmental entity is also a party, other than such proceedings regarding which it is reasonably believed no monetary sanctions of \$100,000 or more will be imposed against the Company or any of its subsidiaries, (y) to the knowledge of the Company, there are no facts or issues regarding compliance with Environmental Laws, or liabilities or other obligations under Environmental Laws, including the Release or threat of Release of Hazardous Materials, that would reasonably be expected to have a Material Adverse Effect, and (z) none of the Company and its subsidiaries anticipates material capital expenditures relating to any Environmental Laws.

(jj) Regulatory Compliance. Other than those FDA and healthcare compliance matters that are addressed in Section 6(II), and except as described in the Registration Statement and the Prospectus, to the knowledge of the Company, all third parties that are collaborating with the Company are (i) in material compliance with all applicable statutes, rules and regulations of the applicable regulatory authorities (collectively, “**Applicable Laws**”) and (ii) have not received any notice of adverse finding, warning letter, untitled letter or other correspondence or notice from any regulatory authority alleging or asserting material noncompliance with any Applicable Laws or any licenses, certificates, approvals, clearances, exemptions, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws, in either case of (i) or (ii) above, solely related to products being developed in collaboration with the Company.

(kk) Hazardous Materials. To the knowledge of the Company, there has been no storage, generation, transportation, use, handling, treatment, Release (as defined below) or threat of Release of Hazardous Materials (as defined below) by, relating to or caused by the Company or any of its subsidiaries (or, to the knowledge of the Company and its subsidiaries, any other entity (including any predecessor) for whose acts or omissions the Company or any of its subsidiaries is or would reasonably be expected to be liable) at, on, under or from any property or facility now or, to the knowledge of the Company, previously owned, operated or leased by the Company or any of its subsidiaries, or, to the knowledge of the Company, at, on, under or from any other property or facility, in violation of any Environmental Laws or in a manner or amount or to a location that would reasonably be expected to result in any liability under any Environmental Law, except for any violation or liability which would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. “Hazardous Materials” means any material, chemical, substance, waste, pollutant, contaminant, compound, mixture or constituent thereof, in any form or amount, including petroleum (including crude oil or any fraction thereof) and petroleum products, natural gas liquids, asbestos and asbestos containing materials, naturally occurring radioactive materials, brine and drilling mud, regulated or which can give rise to liability under any Environmental Law. “Release” means any spilling, leaking, seepage, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, disposing, depositing, dispersing or migrating in, into or through the environment, or in, into, from or through any building or structure.

(ll) Insurance. The Company and its subsidiaries have insurance covering their respective properties, operations, personnel and businesses, including business interruption insurance, which insurance is in amounts and insures against such losses and risks as the Company reasonably believes are adequate to protect the Company and its subsidiaries and their respective businesses; and neither the Company nor any of its subsidiaries has (i) received notice from any insurer or agent of such insurer that capital improvements or other expenditures are required or necessary to be made in order to continue such insurance or (ii) any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage at reasonable cost from similar insurers as may be necessary to continue its business in all material respects.

(mm) FDA and Healthcare Compliance. Except as described in the Registration Statement and the Prospectus, and except where such noncompliance would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, the Company: (i) is and at all times has been in compliance with all statutes, rules and regulations of the FDA and any other Governmental Authority applicable to the ownership, testing, development, manufacture, packaging, processing, use, distribution, storage, import, export or disposal of any product under development, manufactured or distributed by the Company, including, without limitation, the federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 301 et seq. (“FDCA”), the Controlled Substances Act, 21 U.S.C. § 801 et. seq. (“CSA”), the False Claims Act, 31 U.S.C. §§ 3729-3733, the Health Insurance Portability and Accountability Act (“HIPAA”), and the Health Information Technology for Economic and Clinical Health Act (“HITECH Act”) (collectively, “Applicable FDA Laws”); (ii) to the knowledge of the Company, has not received any FDA Form 483, notice of adverse finding, warning letter, untitled letter or other correspondence or notice from the FDA or any Governmental Authority alleging or asserting material noncompliance with any Applicable FDA Laws or any licenses, certificates, approvals, clearances, exemptions, authorizations, permits and supplements or amendments thereto required by any such Applicable FDA Laws (“Authorizations”); (iii) possesses all Authorizations and the Company is in compliance with the terms of such Authorizations; (iv) has not received written notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from the FDA or any Governmental Authority or third party alleging that any product, operation or activity is in material violation of any Applicable FDA Laws or Authorizations and has no knowledge that the FDA or any Governmental Authority or third party is considering any such claim, litigation, arbitration, action, suit, investigation or proceeding; (v) has not received notice that the FDA or any Governmental Authority has taken, is taking or intends to take action to limit, suspend, modify or revoke any material Authorizations and has no knowledge that the FDA or any Governmental Authority is considering such action; and (vi) has filed, obtained, maintained or submitted all reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Applicable FDA Laws or Authorizations and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were materially complete and correct on the date filed (or were corrected or supplemented by a subsequent submission).

(nn) Licenses and Permits. The Company and its subsidiaries possess all licenses, certificates, permits and other authorizations issued by, and have made all declarations and filings with, the appropriate federal, state, local or foreign governmental or regulatory authorities that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses as described in the Registration Statement and the Prospectus (including, without limitation, those administered by the FDA, the U.S. Drug Enforcement Administration or by any other Governmental Authority), except where the failure to possess or make the same would not, individually or in the aggregate, have a Material Adverse Effect; and except as described in the Registration Statement and the Prospectus, neither the Company nor any of its subsidiaries has received notice of any revocation or modification of any such license, certificate, permit or authorization or has any reason to believe that any such license, certificate, permit or authorization will not be renewed in the ordinary course, except where such revocation, modification or nonrenewal would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(oo) Clinical Studies. The studies, tests and preclinical and clinical trials conducted by or, to the Company's knowledge, on behalf of the Company that are described in the Registration Statement and the Prospectus, or the results of which are referred to in the Registration Statement and the Prospectus, as applicable, were and, if still ongoing, are being conducted in all material respects in accordance with Applicable FDA Laws; the descriptions of the results of such studies, tests and trials contained in the Registration Statement and the Prospectus are, to the Company's knowledge, accurate and complete in all material respects and fairly present the data derived from such studies, tests and trials; except to the extent disclosed in the Registration Statement and the Prospectus, the Company is not aware of any studies, tests or trials, the results of which the Company believes reasonably call into question the study, test or trial results described or referred to in the Registration Statement and the Prospectus when viewed in the context in which such results are described and the clinical state of development; and, except to the extent disclosed in the Registration Statement or the Prospectus, the Company has not received any notices or correspondence from the FDA or any Governmental Authority requiring the termination or suspension of any studies, tests or preclinical or clinical trials conducted by or on behalf of the Company that are described in the Registration Statement and the Prospectus or the results of which are referred to in the Registration Statement and the Prospectus, other than ordinary course communications with respect to modifications in connection with the design and implementation of such trials.

(pp) Intellectual Property. The Company and its subsidiaries own, or have obtained valid and enforceable licenses for, the inventions, patent applications, patents, trademarks, trade names, service names, copyrights, trade secrets and other intellectual property (i) described in the Registration Statement and the Prospectus as being owned or licensed by them or (ii) which, to their knowledge, are necessary for the conduct of their respective businesses as currently conducted or as currently proposed in the Registration Statement and the Prospectus to be conducted (collectively, “**Intellectual Property**”) except in the case of clause (ii) where the failure to own, possess or acquire such rights could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. Except as described in the Registration Statement and the Prospectus or as could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, to the Company’s knowledge: (x) there are no third parties who have rights to any Intellectual Property, except for Intellectual Property rights which are licensed by the Company from or granted by the Company to its partners, licensors and licensees and customary reversionary rights of third-party licensors with respect to Intellectual Property that is licensed to the Company or one or more of its subsidiaries, and (y) there is no infringement by third parties of any Intellectual Property. Except as could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect there is no pending or, to the Company’s knowledge, threatened action, suit, proceeding or claim by others: (A) challenging the Company’s rights in or to any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; (B) challenging the validity, enforceability or scope of any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; or (C) asserting that the Company or any of its subsidiaries infringes or otherwise violates, or would, upon the commercialization of any product or service described in the Registration Statement or the Prospectus as under development, infringe or violate, any patent, trademark, trade name, service name, copyright, trade secret or other proprietary rights of others, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim. Except as could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, the Company and its subsidiaries have complied with the terms of each agreement pursuant to which Intellectual Property has been licensed to the Company or any subsidiary, and all such agreements are in full force and effect. The product candidates described in the Registration Statement and the Prospectus as under development by the Company or any subsidiary fall within the scope of the claims of one or more patents or patent applications owned by, or exclusively licensed to, the Company or any subsidiary.

(qq) Statistical and Market Data. Nothing has come to the attention of the Company that has caused the Company to believe that the statistical and market-related data included or incorporated by reference in the Registration Statement and the Prospectus is not based on or derived from sources that are reliable and accurate in all material respects.

(rr) No Restrictions on Subsidiaries. Except as prohibited by law, no wholly owned subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such wholly owned subsidiary’s capital stock, from repaying to the Company any loans or advances to such wholly owned subsidiary from the Company or from transferring any of such wholly owned subsidiary’s properties or assets to the Company or any other subsidiary of the Company.

(ss) No Broker's Fees. Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or the Agent for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Placement Shares.

(tt) No Stabilization. Neither the Company, nor any of its subsidiaries, nor any of their respective directors, officers or controlling persons has taken, directly or indirectly, any action that has constituted or is designed to or that would reasonably be expected to cause or result in, under the Exchange Act or otherwise, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Placement Shares.

(uu) Forward-Looking Statements. No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in the Registration Statement or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(vv) Margin Rules. The application of the proceeds received by the Company from the issuance, sale and delivery of the Placement Shares as described in the Registration Statement and the Prospectus will not violate Regulation T, U or X of the Board of Governors of the Federal Reserve System or any other regulation of such Board of Governors.

(ww) Stock Exchange Listing. The Placement Shares are registered pursuant to Section 12(b) or 12(g) of the Exchange Act and are listed on the Exchange, and the Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Placement Shares under the Exchange Act or delisting the Placement Shares from the Exchange, nor has the Company received any notification that the Commission or the Exchange is contemplating terminating such registration or listing. To the Company's knowledge, it is in compliance with all applicable listing requirements of the Exchange.

(xx) Related-Party Transactions. There are no business relationships or related-party transactions involving the Company or any of its subsidiaries or any other person required to be described in the Registration Statement or the Prospectus that have not been described as required.

(yy) No Contract Termination. The Company has not sent or received any communication regarding termination of, or intent not to renew, any of the contracts or agreements referred to or described in the Prospectus or referred to or described in, or filed as an exhibit to, the Registration Statement, and no such termination or non-renewal has been threatened by the Company or, to the Company's knowledge, any other party to any such contract or agreement, which threat of termination or non-renewal has not been rescinded as of the date hereof.

(zz) Market Capitalization. At the time the Registration Statement is declared effective, and at the time the Company's most recent Annual Report on Form 10-K was filed with the Commission, the Company met and will meet the then applicable requirements for the use of Form S-3 under the Securities Act, including, but not limited to, General Instruction I.B.1 of Form S-3. The Company is not a shell company (as defined in Rule 405 under the Securities Act) and has not been a shell company for at least 12 calendar months previously and at any time previously.

(aaa) Stock Transfer Taxes. On each Settlement Date, all stock transfer or other taxes (other than income taxes) which are required to be paid in connection with the sale and transfer of the Placement Shares to be sold hereunder will be, or will have been, fully paid or provided for by the Company and all laws imposing such taxes will be or will have been fully complied with.

(bbb) Underwriter Agreements. The Company is not a party to any agreement with an agent or underwriter for any other "at the market" or continuous equity transaction.

(ccc) Agent Purchases. The Company acknowledges and agrees that the Agent has informed the Company that the Agent may, to the extent permitted under the Securities Act and the Exchange Act, purchase and sell Common Stock for its own account while this Agreement is in effect, *provided*, that (i) no such purchase or sales shall take place while a Placement Notice is in effect (except to the extent the Agent may engage in sales of Placement Shares purchased or deemed purchased from the Company as a "riskless principal" or in a similar capacity) and (ii) the Company shall not be deemed to have authorized or consented to any such purchases or sales by the Agent.

(ddd) No Reliance. The Company has not relied upon the Agent or legal counsel for the Agent for any legal, tax or accounting advice in connection with the offering and sale of the Placement Shares.

(eee) Broker/Dealer Relationships. Neither the Company nor any of the subsidiaries (i) is required to register as a "broker" or "dealer" in accordance with the provisions of the Exchange Act or (ii) directly or indirectly through one or more intermediaries, controls or is a "person associated with a member" or "associated person of a member" (within the meaning set forth in the FINRA Manual).

(fff) Off-Balance Sheet Arrangements. There are no transactions, arrangements and other relationships between and/or among the Company, and/or any of its affiliates and any unconsolidated entity, including, but not limited to, any structural finance, special purpose or limited purpose entity (each, an "**Off-Balance Sheet Transaction**") that could, individually or in the aggregate, reasonably be expected to affect materially the Company's liquidity or the availability of or requirements for its capital resources, including those Off-Balance Sheet Transactions described in the Commission's Statement about Management's Discussion and Analysis of Financial Conditions and Results of Operations (Release Nos. 33-8056; 34-45321; FR-61), required to be described in the Prospectus which have not been described as required.

Any certificate signed by an officer of the Company and delivered to the Agent or to counsel for the Agent pursuant to or in connection with this Agreement shall be deemed to be a representation and warranty by the Company, as applicable, to the Agent as to the matters set forth therein.

7. Covenants of the Company. The Company covenants and agrees with Agent that:

(a) Registration Statement Amendments. After the Effective Time and during any period in which a Prospectus relating to any Placement Shares is required to be delivered by Agent under the Securities Act (including in circumstances where such requirement may be satisfied pursuant to Rule 172 under the Securities Act or similar rule), (i) the Company will notify the Agent promptly of the time when any amendment to the Registration Statement, other than documents incorporated by reference, has been filed with the Commission and/or has become effective or any subsequent supplement to the Prospectus has been filed and of any request by the Commission for any amendment or supplement to the Registration Statement or Prospectus or for additional information; (ii) the Company will prepare and file with the Commission, promptly upon the Agent's request, any amendments or supplements to the Registration Statement or Prospectus that, in the Agent's reasonable opinion, may be necessary or advisable in connection with the distribution of the Placement Shares by the Agent (*provided, however*, that the failure of the Agent to make such request shall not relieve the Company of any obligation or liability hereunder, or affect the Agent's right to rely on the representations and warranties made by the Company in this Agreement and *provided, further*, that the only remedy the Agent shall have with respect to the failure to make such filing shall be to cease making sales under this Agreement until such amendment or supplement is filed); (iii) the Company will not file any amendment or supplement to the Registration Statement or Prospectus relating to the Placement Shares or a security convertible into the Placement Shares unless a copy thereof has been submitted to Agent within a reasonable period of time before the filing and the Agent has not reasonably objected thereto (*provided, however*, that the failure of the Agent to make such objection shall not relieve the Company of any obligation or liability hereunder, or affect the Agent's right to rely on the representations and warranties made by the Company in this Agreement and *provided, further*, that the only remedy the Agent shall have with respect to the failure by the Company to obtain such consent shall be to cease making sales under this Agreement) and the Company will furnish to the Agent at the time of filing thereof a copy of any document that upon filing is deemed to be incorporated by reference into the Registration Statement or Prospectus, except for those documents available via EDGAR; and (iv) the Company will cause each amendment or supplement to the Prospectus to be filed with the Commission as required pursuant to the applicable paragraph of Rule 424(b) of the Securities Act or, in the case of any document to be incorporated therein by reference, to be filed with the Commission as required pursuant to the Exchange Act, within the time period prescribed (the determination to file or not file any amendment or supplement with the Commission under this Section 7(a), based on the Company's reasonable opinion or reasonable objections, shall be made exclusively by the Company).

(b) Notice of Commission Stop Orders. The Company will advise the Agent, promptly after it receives notice or obtains knowledge thereof, (i) of any order of the Commission declaring the Registration Statement to be effective, (ii) of the issuance or threatened issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement, and (iii) of the suspension of the qualification of the Placement Shares for offering or sale in any jurisdiction, or of the initiation or threatening of any proceeding for any such purpose. The Company will promptly use its commercially reasonable efforts to prevent the issuance of any stop order suspending the effectiveness of the Registration Statement and to obtain its withdrawal if such a stop order should be issued. The Company will advise the Agent promptly after it receives any request by the Commission for any amendments to the Registration Statement or any amendment or supplements to the Prospectus or for additional information related to the offering of the Placement Shares or for additional information related to the Registration Statement or the Prospectus.

(c) Delivery of Prospectus; Subsequent Changes. During any period in which a Prospectus relating to the Placement Shares is required to be delivered by the Agent under the Securities Act with respect to the offer and sale of the Placement Shares (including in circumstances where such requirement may be satisfied pursuant to Rule 172 under the Securities Act), the Company will comply with all requirements imposed upon it by the Securities Act, as from time to time in force, and to file on or before their respective due dates all reports and any definitive proxy or information statements required to be filed by the Company with the Commission pursuant to Sections 13(a), 13(c), 14, 15(d) or any other provision of or under the Exchange Act. If the Company has omitted any information from the Registration Statement pursuant to Rule 430B under the Securities Act, it will use its best efforts to comply with the provisions of and make all requisite filings with the Commission pursuant to said Rule 430B and to notify the Agent promptly of all such filings. If during such period any event occurs as a result of which the Prospectus as then amended or supplemented would include an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances then existing, not misleading, or if during such period it is necessary to amend or supplement the Registration Statement or Prospectus to comply with the Securities Act, the Company will promptly notify the Agent to suspend the offering of Placement Shares during such period and the Company will promptly amend or supplement the Registration Statement or Prospectus (at the expense of the Company) so as to correct such statement or omission or effect such compliance, *provided, however*, that the Company may delay any such amendment or supplement, if, in the reasonable judgment of the Company, it is in the best interests of the Company to do so.

(d) Listing of Placement Shares. Prior to the date of the first Placement Notice, the Company will use its reasonable best efforts to cause the Placement Shares to be listed on the Exchange.

(e) Delivery of Registration Statement and Prospectus. The Company will furnish to the Agent and its counsel (at the expense of the Company) copies of the Registration Statement, the Prospectus (including all documents incorporated by reference therein) and all amendments and supplements to the Registration Statement or Prospectus that are filed with the Commission during any period in which a Prospectus relating to the Placement Shares is required to be delivered under the Securities Act (including all documents filed with the Commission during such period that are deemed to be incorporated by reference therein), in each case as soon as reasonably practicable and in such quantities as the Agent may from time to time reasonably request and, at the Agent's request, will also furnish copies of the Prospectus to each exchange or market on which sales of the Placement Shares may be made; *provided, however*, that the Company shall not be required to furnish any document (other than the Prospectus) to the Agent to the extent such document is available on EDGAR.

(f) Earnings Statement. The Company will make generally available to its security holders as soon as practicable, but in any event not later than 15 months after the end of the Company's current fiscal quarter, an earnings statement covering a 12-month period that satisfies the provisions of Section 11(a) and Rule 158 of the Securities Act.

(g) Use of Proceeds. The Company will use the Net Proceeds as described in the Prospectus in the section entitled "Use of Proceeds."

(h) Notice of Other Sales. Without the prior written consent of the Agent, the Company will not, directly or indirectly, offer to sell, sell, contract to sell, grant any option to sell or otherwise dispose of any Common Stock (other than the Placement Shares offered pursuant to this Agreement) or securities convertible into or exchangeable for Common Stock, warrants or any rights to purchase or acquire, Common Stock during the period beginning on the fifth (5th) Trading Day immediately prior to the date on which any Placement Notice is delivered to the Agent hereunder and ending on the fifth (5th) Trading Day immediately following the final Settlement Date with respect to Placement Shares sold pursuant to such Placement Notice (or, if the Placement Notice has been terminated or suspended prior to the sale of all Placement Shares covered by a Placement Notice, the date of such suspension or termination); and will not directly or indirectly in any other "at the market" or continuous equity transaction offer to sell, sell, contract to sell, grant any option to sell or otherwise dispose of any Common Stock (other than the Placement Shares offered pursuant to this Agreement) or securities convertible into or exchangeable for Common Stock, warrants or any rights to purchase or acquire, Common Stock prior to the later of the termination of this Agreement and the sixtieth (60th) day immediately following the final Settlement Date with respect to Placement Shares sold pursuant to such Placement Notice; *provided, however*, that such restrictions will not be required in connection with the Company's issuance or sale of (i) Common Stock, options to purchase Common Stock or Common Stock issuable upon the exercise of options or any other type of stock-based award, pursuant to any employee or director stock option or benefits plan, stock ownership plan or dividend reinvestment plan (but not Common Stock subject to a waiver to exceed plan limits in its dividend reinvestment plan) of the Company whether now in effect or hereafter implemented, (ii) Common Stock issuable upon conversion of securities or the exercise of warrants, options or other rights in effect or outstanding, and disclosed in filings by the Company available on EDGAR or otherwise in writing to the Agent, and (iii) Common Stock or securities convertible into or exchangeable for shares of Common Stock as consideration for mergers, acquisitions, other business combinations, license agreements or strategic alliances occurring after the date of this Agreement which are not issued for capital raising purposes.

(i) Change of Circumstances. The Company will, at any time during the pendency of a Placement Notice, advise the Agent promptly after it shall have received notice or obtained knowledge thereof, of any information or fact that would alter or affect in any material respect any opinion, certificate, letter or other document required to be provided to the Agent pursuant to this Agreement.

(j) Due Diligence Cooperation. The Company will cooperate with any reasonable due diligence review conducted by the Agent or its representatives in connection with the transactions contemplated hereby, including, without limitation, providing information and making available documents and senior corporate officers, during regular business hours and at the Company's principal offices, as the Agent may reasonably request.

(k) Required Filings Relating to Placement of Placement Shares. The Company agrees that on such dates as the Securities Act shall require, the Company will (i) file a prospectus or prospectus supplement with the Commission under the applicable paragraph of Rule 424(b) under the Securities Act (each and every filing date under Rule 424(b), a “**Filing Date**”), which prospectus or prospectus supplement will set forth, within the relevant period, the amount of Placement Shares sold through the Agent, the Net Proceeds to the Company and the compensation payable by the Company to the Agent with respect to such Placement Shares, and (ii) deliver such number of copies of each such prospectus or prospectus supplement to each exchange or market on which such sales were effected as may be required by the rules or regulations of such exchange or market.

(l) Representation Dates; Certificate. (1) Prior to the date of the first Placement Notice and (2) each time the Company:

(i) files the Prospectus relating to the Placement Shares or amends or supplements (other than a prospectus supplement relating solely to an offering of securities other than the Placement Shares) the Registration Statement or the Prospectus relating to the Placement Shares by means of a post-effective amendment, sticker or supplement but not by means of incorporation of documents by reference into the Registration Statement or the Prospectus relating to the Placement Shares;

(ii) files an annual report on Form 10-K under the Exchange Act (including any Form 10-K/A containing amended financial information or a material amendment to the previously filed Form 10-K);

(iii) files its quarterly reports on Form 10-Q under the Exchange Act; or

(iv) files a current report on Form 8-K containing amended financial information (other than information “furnished” pursuant to Items 2.02 or 7.01 of Form 8-K or to provide disclosure pursuant to Item 8.01 of Form 8-K relating to the reclassification of certain properties as discontinued operations in accordance with Statement of Financial Accounting Standards No. 144) under the Exchange Act (each date of filing of one or more of the documents referred to in clauses (i) through (iv) shall be a “**Representation Date**”);

the Company shall furnish the Agent (but in the case of clause (iv) above only if the Agent reasonably determines that the information contained in such Form 8-K is material) with a certificate dated the Representation Date, in the form and substance satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as amended or supplemented. The requirement to provide a certificate under this Section 7(l) shall be waived for any Representation Date occurring at a time a Suspension is in effect, which waiver shall continue until the earlier to occur of the date the Company delivers instructions for the sale of Placement Shares hereunder (which for such calendar quarter shall be considered a Representation Date) and the next occurring Representation Date. Notwithstanding the foregoing, if the Company subsequently decides to sell Placement Shares following a Representation Date when a Suspension was in effect and did not provide the Agent with a certificate under this Section 7(l), then before the Company delivers the instructions for the sale of Placement Shares or the Agent sells any Placement Shares pursuant to such instructions, the Company shall provide the Agent with a certificate in conformity with this Section 7(l) dated as of the date that the instructions for the sale of Placement Shares are issued.

(m) Legal Opinion. (1) Prior to the date of the first Placement Notice and (2) within five (5) Trading Days of each Representation Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 7(l) for which no waiver is applicable and excluding the date of this Agreement, the Company shall cause to be furnished to the Agent a written opinion and 10b-5 statement of Lowenstein Sandler LLP (“Company Counsel”) and a written opinion of Clark & Elbing LLP (“Company IP Counsel”), or other counsel satisfactory to the Agent, in form and substance satisfactory to the Agent and its counsel, substantially similar to the forms previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as then amended or supplemented; *provided, however*, the Company shall be required to furnish to the Agent no more than one opinion from each counsel hereunder per calendar quarter; *provided, further*, that in lieu of such opinions for subsequent periodic filings under the Exchange Act, counsel may furnish the Agent with a letter (a “Reliance Letter”) to the effect that the Agent may rely on a prior opinion delivered under this Section 7(m) to the same extent as if it were dated the date of such letter (except that statements in such prior opinion shall be deemed to relate to the Registration Statement and the Prospectus as amended or supplemented as of the date of the Reliance Letter).

(n) Comfort Letter. (1) Prior to the date of the first Placement Notice and (2) within five (5) Trading Days of each Representation Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 7(l) for which no waiver is applicable and excluding the date of this Agreement, the Company shall cause its independent registered public accounting firm to furnish the Agent letters (the “Comfort Letters”), dated the date the Comfort Letter is delivered, which shall meet the requirements set forth in this Section 7(n); *provided*, that if requested by the Agent, the Company shall cause a Comfort Letter to be furnished to the Agent within ten (10) Trading Days of the date of occurrence of any material transaction or event, including the restatement of the Company’s financial statements. The Comfort Letter from the Company’s independent registered public accounting firm shall be in a form and substance reasonably satisfactory to the Agent, (i) confirming that they are an independent registered public accounting firm within the meaning of the Securities Act and the Public Company Accounting Oversight Board, (ii) stating, as of such date, the conclusions and findings of such firm with respect to the financial information and other matters ordinarily covered by accountants’ “comfort letters” to underwriters in connection with registered public offerings (the first such letter, the “Initial Comfort Letter”) and (iii) updating the Initial Comfort Letter with any information that would have been included in the Initial Comfort Letter had it been given on such date and modified as necessary to relate to the Registration Statement and the Prospectus, as amended and supplemented to the date of such letter.

(o) Market Activities. The Company will not, directly or indirectly, (i) take any action designed to cause or result in, or that constitutes or would reasonably be expected to constitute, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of Common Stock or (ii) sell, bid for or purchase Common Stock in violation of Regulation M, or pay anyone any compensation for soliciting purchases of the Placement Shares other than the Agent.

(p) Investment Company Act. The Company will conduct its affairs in such a manner so as to reasonably ensure that neither it nor any of its subsidiaries will be or become, at any time prior to the termination of this Agreement, required to register as an “investment company,” as such term is defined in the Investment Company Act.

(q) No Offer to Sell. Neither the Agent nor the Company (including its agents and representatives, other than the Agent in its capacity as such) will make, use, prepare, authorize, approve or refer to any written communication (as defined in Rule 405 under the Securities Act), required to be filed with the Commission, that constitutes an offer to sell or solicitation of an offer to buy Placement Shares hereunder.

(r) Blue Sky and Other Qualifications. The Company will use its commercially reasonable efforts, in cooperation with the Agent, to qualify the Placement Shares for offering and sale, or to obtain an exemption for the Placement Shares to be offered and sold, under the applicable securities laws of such states and other jurisdictions (domestic or foreign) as the Agent may designate and to maintain such qualifications and exemptions in effect for so long as required for the distribution of the Placement Shares (but in no event for less than one year from the date of this Agreement); *provided, however*, that the Company shall not be obligated to file any general consent to service of process or to qualify as a foreign corporation or as a dealer in securities in any jurisdiction in which it is not so qualified or to subject itself to taxation in respect of doing business in any jurisdiction in which it is not otherwise so subject. In each jurisdiction in which the Placement Shares have been so qualified or exempt, the Company will file such statements and reports as may be required by the laws of such jurisdiction to continue such qualification or exemption, as the case may be, in effect for so long as required for the distribution of the Placement Shares (but in no event for less than one year from the date of this Agreement).

(s) Sarbanes-Oxley Act. The Company and the subsidiaries will maintain and keep accurate books and records reflecting their assets and maintain internal accounting controls in a manner designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP and including those policies and procedures that (i) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company, (ii) provide reasonable assurance that transactions are recorded as necessary to permit the preparation of the Company’s consolidated financial statements in accordance with GAAP, (iii) ensure receipts and expenditures of the Company are being made only in accordance with management’s and the Company’s directors’ authorization, and (iv) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company’s assets that could have a material effect on its financial statements. The Company and its subsidiaries will maintain such controls and other procedures, including, without limitation, those required by Sections 302 and 906 of the Sarbanes-Oxley Act, and the applicable regulations thereunder that are designed to ensure that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission’s rules and forms, including, without limitation, controls and procedures designed to ensure that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the Company’s management, including its principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure and to ensure that material information relating to the Company or the subsidiaries is made known to them by others within those entities, particularly during the period in which such periodic reports are being prepared.

(t) Secretary's Certificate; Further Documentation. Prior to the date of the first Placement Notice, the Company shall deliver to the Agent a certificate of the Secretary of the Company and attested to by an executive officer of the Company, dated as of such date, certifying as to (i) the certificate of incorporation of the Company, (ii) the bylaws of the Company, (iii) the resolutions of the board of directors of the Company authorizing the execution, delivery and performance of this Agreement and the issuance of the Placement Shares and (iv) the incumbency of the officers duly authorized to execute this Agreement and the other documents contemplated by this Agreement. Within five (5) Trading Days of each Representation Date, the Company shall have furnished to the Agent such further information, certificates and documents as the Agent may reasonably request.

(u) Emerging Growth Company Status. The Company will promptly notify the Agent if the Company ceases to be an Emerging Growth Company at any time during the term of this Agreement.

8. Payment of Expenses. The Company will pay all expenses incident to the performance of its obligations under this Agreement, including (i) the preparation and filing of the Registration Statement, including any fees required by the Commission, and the printing or electronic delivery of the Prospectus as originally filed and of each amendment and supplement thereto, in such number as the Agent shall deem reasonably necessary, (ii) the printing and delivery to the Agent of this Agreement and such other documents as may be required in connection with the offering, purchase, sale, issuance or delivery of the Placement Shares, (iii) the preparation, issuance and delivery of the certificates, if any, for the Placement Shares to the Agent, including any stock or other transfer taxes and any capital duties, stamp duties or other duties or taxes payable upon the sale, issuance or delivery of the Placement Shares to the Agent, (iv) the fees and disbursements of the counsel, accountants and other advisors to the Company, (v) the fees and expenses of Agent including but not limited to the fees and expenses of the counsel to the Agent, payable upon the execution of this Agreement, in an amount not to exceed \$25,000 (including the counsel fees set forth in clause (x) below), (vi) the qualification or exemption of the Placement Shares under state securities laws in accordance with the provisions of Section 7(r) hereof, including filing fees, but excluding fees of the Agent's counsel, (vii) the printing and delivery to the Agent of copies of the Prospectus and any amendments or supplements thereto in such number as the Agent shall deem necessary, (viii) the preparation, printing and delivery to the Agent of copies of the blue sky survey, (ix) the fees and expenses of the transfer agent and registrar for the Common Stock, (x) the filing and other fees incident to any review by FINRA of the terms of the sale of the Placement Shares including the fees of the Agent's counsel (such counsel fees subject to the cap set forth in clause (v) above), and (xi) the fees and expenses incurred in connection with the listing of the Placement Shares on the Exchange.

9. Conditions to Agent's Obligations. The obligations of the Agent hereunder with respect to a Placement will be subject to the continuing accuracy and completeness of the representations and warranties made by the Company herein, to the due performance by the Company of its obligations hereunder, to the completion by the Agent of a due diligence review satisfactory to it in its reasonable judgment, and to the continuing satisfaction (or waiver by the Agent in its sole discretion) of the following additional conditions:

(a) Registration Statement Effective. The Registration Statement shall have become effective and shall be available for the (i) resale of all Placement Shares issued to the Agent and not yet sold by the Agent and (ii) sale of all Placement Shares contemplated to be issued by any Placement Notice.

(b) No Material Events. None of the following events shall have occurred and be continuing: (i) receipt by the Company of any request for additional information from the Commission or any other federal or state Governmental Authority during the period of effectiveness of the Registration Statement, the response to which would require any post-effective amendments or supplements to the Registration Statement or the Prospectus; (ii) the issuance by the Commission or any other federal or state Governmental Authority of any stop order suspending the effectiveness of the Registration Statement or the initiation of any proceedings for that purpose; (iii) receipt by the Company of any notification with respect to the suspension of the qualification or exemption from qualification of any of the Placement Shares for sale in any jurisdiction or the initiation or threatening of any proceeding for such purpose; or (iv) the occurrence of any event that makes any material statement made in the Registration Statement or the Prospectus or any material document incorporated or deemed to be incorporated therein by reference untrue in any material respect or that requires the making of any changes in the Registration Statement, the Prospectus or documents so that, in the case of the Registration Statement, it will not contain any materially untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein not misleading and, in the case of the Prospectus, it will not contain any materially untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(c) No Misstatement or Material Omission. The Agent shall not have advised the Company that the Registration Statement or Prospectus, or any amendment or supplement thereto, contains an untrue statement of fact that in the Agent's reasonable opinion is material, or omits to state a fact that in the Agent's reasonable opinion is material and is required to be stated therein or is necessary to make the statements therein not misleading.

(d) Material Changes. Except as contemplated in the Prospectus or disclosed in the Company's reports filed with the Commission, there shall not have been any material adverse change in the authorized capital stock of the Company or any Material Adverse Effect or any development that could, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, or a downgrading in or withdrawal of the rating assigned to any of the Company's securities (other than asset backed securities) by any rating organization or a public announcement by any rating organization that it has under surveillance or review its rating of any of the Company's securities (other than asset backed securities), the effect of which, in the case of any such action by a rating organization described above, in the reasonable judgment of the Agent (without relieving the Company of any obligation or liability it may otherwise have), is so material as to make it impracticable or inadvisable to proceed with the offering of the Placement Shares on the terms and in the manner contemplated in the Prospectus.

(e) Company Counsel Legal Opinion. The Agent shall have received the opinions of Company Counsel and Company IP Counsel required to be delivered pursuant to Section 7(m) on or before the date on which such delivery of such opinion is required pursuant to Section 7(m).

(f) Comfort Letter. The Agent shall have received the Comfort Letter required to be delivered pursuant to Section 7(n) on or before the date on which such delivery of such Comfort Letter is required pursuant to Section 7(n).

(g) Representation Certificate. The Agent shall have received the certificate required to be delivered pursuant to Section 7(l) on or before the date on which delivery of such certificate is required pursuant to Section 7(l).

(h) No Suspension. Trading in the Common Stock shall not have been suspended on the Exchange and the Common Stock shall not have been delisted from the Exchange.

(i) Other Materials. On each date on which the Company is required to deliver a certificate pursuant to Section 7(l), the Company shall have furnished to the Agent such appropriate further information, opinions, certificates, letters and other documents as the Agent may reasonably request. All such opinions, certificates, letters and other documents will be in compliance with the provisions hereof.

(j) Securities Act Filings Made. All filings with the Commission required by Rule 424 under the Securities Act to have been filed prior to the issuance of any Placement Notice hereunder shall have been made within the applicable time period prescribed for such filing by Rule 424.

(k) Approval for Listing. The Placement Shares shall either have been (i) approved for listing on the Exchange, subject only to notice of issuance, or (ii) the Company shall have filed an application for listing of the Placement Shares on the Exchange at, or prior to, the issuance of any Placement Notice and the Exchange shall have reviewed such application and not provided any objections thereto.

(l) FINRA. If applicable, FINRA shall have raised no objection to the terms of this offering and the amount of compensation allowable or payable to the Agent as described in the Prospectus.

(m) No Termination Event. There shall not have occurred any event that would permit the Agent to terminate this Agreement pursuant to Section 12(a).

If any condition specified in this Section 9 is not satisfied when and as required to be satisfied, this Agreement may be terminated by the Agent by notice from the Agent to the Company at any time, which termination shall be without liability on the part of any party to any other party, except that Section 8, Section 10, Section 11, Section 17 and Section 18 shall at all times be effective and shall survive such termination.

10. Indemnification and Contribution.

(a) Company Indemnification. The Company agrees to indemnify and hold harmless the Agent, its affiliates and their respective partners, members, directors, officers, employees and agents and each person, if any, who controls the Agent or any affiliate within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act as follows:

(i) against any and all loss, liability, claim, damage and expense whatsoever, as incurred, joint or several, arising out of or based upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement (or any amendment thereto), or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading, or arising out of any untrue statement or alleged untrue statement of a material fact included in the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(ii) against any and all loss, liability, claim, damage and expense whatsoever, as incurred, joint or several, to the extent of the aggregate amount paid in settlement of any litigation, or any investigation or proceeding by any governmental agency or body, commenced or threatened, or of any claim whatsoever based upon any such untrue statement or omission, or any such alleged untrue statement or omission; *provided* that (subject to Section 10(d) below) any such settlement is effected with the written consent of the Company, which consent shall not unreasonably be delayed, conditioned or withheld;

(iii) against any and all expense whatsoever, as incurred (including the fees and disbursements of counsel), reasonably incurred in investigating, preparing or defending against any litigation, or any investigation or proceeding by any governmental agency or body, commenced or threatened, or any claim whatsoever based upon any such untrue statement or omission, or any such alleged untrue statement or omission (whether or not a party), to the extent that any such expense is not paid under (i) or (ii) above; and

(iv) against any and all loss, liability, claim, damage and expense whatsoever, as incurred, joint or several, arising out of or based upon any breach of a representation, warranty or covenant made by the Company in this Agreement,

provided, however, that this indemnity agreement shall not apply to any loss, liability, claim, damage or expense to the extent arising out of any untrue statement or omission or alleged untrue statement or omission made solely in reliance upon and in conformity with the Agent Information (as defined below).

(b) Agent Indemnification. The Agent agrees to indemnify and hold harmless the Company and its directors and each officer of the Company who signed the Registration Statement, and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act against any and all loss, liability, claim, damage and expense described in the indemnity contained in Section 10(a), as incurred, but only with respect to untrue statements or omissions, or alleged untrue statements or omissions, made in the Registration Statement (or any amendments thereto) or the Prospectus (or any amendment or supplement thereto) in reliance upon and in conformity with information relating to the Agent and furnished to the Company in writing by the Agent expressly for use therein. The Company hereby acknowledges that the only information that the Agent has furnished to the Company expressly for use in the Registration Statement or the Prospectus (or any amendment or supplement thereto) are the statements set forth in the seventh and eighth paragraphs under the caption “Plan of Distribution” in the Prospectus (the “Agent Information”).

(c) Procedure. Any party that proposes to assert the right to be indemnified under this Section 10 will, promptly after receipt of notice of commencement of any action against such party in respect of which a claim is to be made against an indemnifying party or parties under this Section 10, notify each such indemnifying party of the commencement of such action, enclosing a copy of all papers served, but the omission so to notify such indemnifying party will not relieve the indemnifying party from (i) any liability that it might have to any indemnified party otherwise than under this Section 10 and (ii) any liability that it may have to any indemnified party under the foregoing provision of this Section 10 unless, and only to the extent that, such omission results in the forfeiture of substantive rights or defenses by the indemnifying party. Upon request of the indemnified party, the indemnifying party shall retain counsel reasonably satisfactory to the indemnified party to represent the indemnified party that the indemnified party may designate in such proceeding and shall pay the actual and reasonable fees and disbursements of such counsel related to such proceeding as incurred. If any such action is brought against any indemnified party and the indemnified party notifies the indemnifying party of its commencement, the indemnifying party will be entitled to participate in and, to the extent that it elects by delivering written notice to the indemnified party promptly after receiving notice of the commencement of the action from the indemnified party, jointly with any other indemnifying party similarly notified, to assume the defense of the action, with counsel reasonably satisfactory to the indemnified party, and after notice from the indemnifying party to the indemnified party of its election to assume the defense, the indemnifying party will not be liable to the indemnified party for any legal or other expenses except as provided below and except for the reasonable costs of investigation subsequently incurred by the indemnified party in connection with the defense. The indemnified party will have the right to employ its own counsel in any such action, but the fees, expenses and other charges of such counsel will be at the expense of such indemnified party unless (w) the employment of counsel by the indemnified party has been authorized in writing by the indemnifying party, (x) the indemnified party has reasonably concluded (based on advice of counsel) that there may be legal defenses available to it or other indemnified parties that are different from or in addition to those available to the indemnifying party, (y) a conflict or potential conflict exists (based on advice of counsel to the indemnified party) between the indemnified party and the indemnifying party (in which case the indemnifying party will not have the right to direct the defense of such action on behalf of the indemnified party), or (z) the indemnifying party has not in fact employed counsel to assume the defense of such action or counsel reasonably satisfactory to the indemnified party, in each case, within a reasonable time after receiving notice of the commencement of the action; in each of which cases the reasonable fees, disbursements and other charges of counsel will be at the expense of the indemnifying party or parties. It is understood that the indemnifying party or parties shall not, in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the reasonable fees, disbursements and other charges of more than one separate firm admitted to practice in such jurisdiction (plus local counsel) at any one time for all such indemnified party or parties. All such fees, disbursements and other charges will be reimbursed by the indemnifying party promptly after the indemnifying party receives a written invoice relating to fees, disbursements and other charges in reasonable detail. An indemnifying party will not, in any event, be liable for any settlement of any action or claim effected without its written consent. No indemnifying party shall, without the prior written consent of each indemnified party, settle or compromise or consent to the entry of any judgment in any pending or threatened claim, action or proceeding relating to the matters contemplated by this Section 10 (whether or not any indemnified party is a party thereto), unless such settlement, compromise or consent (A) includes an unconditional release of each indemnified party, in form and substance reasonably satisfactory to such indemnified party, from all liability arising out of such litigation, investigation, proceeding or claim and (B) does not include a statement as to or an admission of fault, culpability or a failure to act by or on behalf of any indemnified party.

(d) Settlement Without Consent if Failure to Reimburse. If an indemnified party shall have requested an indemnifying party to reimburse the indemnified party for reasonable fees and expenses of counsel, such indemnifying party agrees that it shall be liable for any settlement of the nature contemplated by Section 10(a)(ii) effected without its written consent if (i) such settlement is entered into more than forty-five (45) days after receipt by such indemnifying party of the aforesaid request, (ii) such indemnifying party shall have received notice of the terms of such settlement at least thirty (30) days prior to such settlement being entered into and (iii) such indemnifying party shall not have reimbursed such indemnified party in accordance with such request prior to the date of such settlement.

(e) Contribution. In order to provide for just and equitable contribution in circumstances in which the indemnification provided for in the foregoing paragraphs of this Section 10 is applicable in accordance with its terms but for any reason is held to be unavailable from the Company or the Agent, the Company and the Agent will contribute to the total losses, claims, liabilities, expenses and damages (including any investigative, legal and other expenses reasonably incurred in connection with, and any amount paid in settlement of, any action, suit or proceeding or any claim asserted, but after deducting any contribution received by the Company from persons other than the Agent, such as persons who control the Company within the meaning of the Securities Act, officers of the Company who signed the Registration Statement and directors of the Company, who also may be liable for contribution) to which the Company and the Agent may be subject in such proportion as shall be appropriate to reflect the relative benefits received by the Company on the one hand and the Agent on the other hand. The relative benefits received by the Company on the one hand and the Agent on the other hand shall be deemed to be in the same proportion as the total net proceeds from the sale of the Placement Shares (before deducting expenses) received by the Company bear to the total compensation received by the Agent (before deducting expenses) from the sale of Placement Shares on behalf of the Company. If, but only if, the allocation provided by the foregoing sentence is not permitted by applicable law, the allocation of contribution shall be made in such proportion as is appropriate to reflect not only the relative benefits referred to in the foregoing sentence but also the relative fault of the Company, on the one hand, and the Agent, on the other hand, with respect to the statements or omission that resulted in such loss, claim, liability, expense or damage, or action in respect thereof, as well as any other relevant equitable considerations with respect to such offering. Such relative fault shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact relates to information supplied by the Company or the Agent, the intent of the parties and their relative knowledge, access to information and opportunity to correct or prevent such statement or omission. The Company and the Agent agree that it would not be just and equitable if contributions pursuant to this Section 10(e) were to be determined by pro rata allocation or by any other method of allocation that does not take into account the equitable considerations referred to herein. The amount paid or payable by an indemnified party as a result of the loss, claim, liability, expense or damage, or action in respect thereof, referred to above in this Section 10(e) shall be deemed to include, for the purpose of this Section 10(e), any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim to the extent consistent with Section 10(c) hereof. Notwithstanding the foregoing provisions of this Section 10(e), the Agent shall not be required to contribute any amount in excess of the commissions received by it under this Agreement and no person found guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. For purposes of this Section 10(e), any person who controls a party to this Agreement within the meaning of the Securities Act, and any officers, directors, partners, employees or agents of the Agent, will have the same rights to contribution as that party, and each director of the Company and each officer of the Company who signed the Registration Statement will have the same rights to contribution as the Company, subject in each case to the provisions hereof. Any party entitled to contribution, promptly after receipt of notice of commencement of any action against such party in respect of which a claim for contribution may be made under this Section 10(e), will notify any such party or parties from whom contribution may be sought, but the omission to so notify will not relieve that party or parties from whom contribution may be sought from any other obligation it or they may have under this Section 10(e) except to the extent that the failure to so notify such other party materially prejudiced the substantive rights or defenses of the party from whom contribution is sought. Except for a settlement entered into pursuant to the last sentence of Section 10(c) hereof, no party will be liable for contribution with respect to any action or claim settled without its written consent if such consent is required pursuant to Section 10(c) hereof.

(f) Non-Exclusive Remedies. The remedies provided for in this Section 10 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any indemnified party at law or in equity.

11. Representations and Agreements to Survive Delivery. The indemnity and contribution agreements contained in Section 10 of this Agreement and all representations and warranties of the Company herein or in certificates delivered pursuant hereto shall survive, as of their respective dates, regardless of (i) any investigation made by or on behalf of the Agent, any controlling persons, or the Company (or any of their respective officers, directors or controlling persons), (ii) delivery and acceptance of the Placement Shares and payment therefor or (iii) any termination of this Agreement.

12. Termination.

(a) The Agent may terminate this Agreement, by notice to the Company, as hereinafter specified at any time (i) if there has been, since the time of execution of this Agreement or since the date as of which information is given in the Prospectus, any change, or any development or event or condition of a type described in Section 6(f), whether or not arising in the ordinary course of business, which individually or in the aggregate, in the sole judgment of the Agent is material and adverse and makes it impractical or inadvisable to market the Placement Shares or to enforce contracts for the sale of the Placement Shares, (ii) if there has occurred any material adverse change in the financial markets in the United States or the international financial markets, any outbreak of hostilities or escalation thereof or other calamity or crisis or any change or development involving a prospective change in national or international political, financial or economic conditions, in each case the effect of which is such as to make it, in the judgment of the Agent, impracticable or inadvisable to market the Placement Shares or to enforce contracts for the sale of the Placement Shares, (iii) if trading in the Common Stock has been suspended or limited by the Commission or the Exchange, or if trading generally on the Exchange has been suspended or limited, or minimum prices for trading have been fixed on the Exchange, (iv) if any suspension of trading of any securities of the Company on any exchange or in the over-the-counter market shall have occurred and be continuing, (v) if a major disruption of securities settlements or clearance services in the United States shall have occurred and be continuing, or (vi) if a banking moratorium has been declared by either U.S. Federal or New York authorities. Any such termination shall be without liability of any party to any other party except that the provisions of Section 8 (Payment of Expenses), Section 10 (Indemnification and Contribution), Section 11 (Representations and Agreements to Survive Delivery), Section 17 (Governing Law and Time; Waiver of Jury Trial) and Section 18 (Consent to Jurisdiction) hereof shall remain in full force and effect notwithstanding such termination. If the Agent elects to terminate this Agreement as provided in this Section 12(a), the Agent shall provide the required notice as specified in Section 13 (Notices).

(b) The Company shall have the right to terminate this Agreement in its sole discretion (i) at any time prior to the initial effectiveness of the Registration Statement by giving one (1) day's notice as specified herein, or (ii) at any time after the date of this Agreement by giving ten (10) days' notice as specified herein. Any such termination shall be without liability of any party to any other party except that the provisions of Section 8, Section 10, Section 11, Section 17 and Section 18 hereof shall remain in full force and effect notwithstanding such termination.

(c) The Agent shall have the right to terminate this Agreement in its sole discretion (i) at any time prior to the initial effectiveness of the Registration Statement by giving one (1) day's notice as specified herein, or (ii) at any time after the date of this Agreement by giving ten (10) days' notice as specified herein. Any such termination shall be without liability of any party to any other party except that the provisions of Section 8, Section 10, Section 11, Section 17 and Section 18 hereof shall remain in full force and effect notwithstanding such termination. The Agent shall have the right to terminate this Agreement as specified in Section 9.

(d) This Agreement shall remain in full force and effect unless terminated pursuant to Section 12(a), Section 12(b) or Section 12(c) above or otherwise by mutual agreement of the parties; *provided, however*, that any such termination by mutual agreement shall in all cases be deemed to provide that Section 8, Section 10, Section 11, Section 17 and Section 18 shall remain in full force and effect.

(e) Any termination of this Agreement shall be effective on the date specified in such notice of termination; *provided, however*, that such termination shall not be effective until the close of business on the date of receipt of such notice by the Agent or the Company, as the case may be. If such termination shall occur prior to the Settlement Date for any sale of Placement Shares, such Placement Shares shall settle in accordance with the provisions of this Agreement.

13. Notices. All notices or other communications required or permitted to be given by any party to any other party pursuant to the terms of this Agreement shall be in writing, unless otherwise specified, and if sent to the Agent, shall be delivered to:

Cantor Fitzgerald & Co.
499 Park Avenue
New York, NY 10022
Attention: Capital Markets/Jeffrey Lumby
Facsimile: (212) 307-3730

and:

Cantor Fitzgerald & Co.
499 Park Avenue
New York, NY 10022
Attention: General Counsel
Facsimile: (212) 829-4708

with a copy to:

Covington & Burling LLP
620 Eighth Avenue
New York, NY 10018
Attention: Donald J. Murray
Facsimile: (646) 441-9101

and if to the Company, shall be delivered to:

Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive, Suite 103
Norwood, MA 02062
Attention: Sean Moran
Facsimile: (617) 663-6085

with a copy to:

Lowenstein Sandler LLP
1251 Avenue of the Americas
New York, NY 10020
Attention: Steven M. Skolnick
Facsimile: (973) 597-2476

Each party to this Agreement may change such address for notices by sending to the parties to this Agreement written notice of a new address for such purpose. Each such notice or other communication shall be deemed given (i) when delivered personally or by verifiable facsimile transmission (with an original to follow) on or before 4:30 p.m., New York City time, on a Business Day or, if such day is not a Business Day, on the next succeeding Business Day, (ii) on the next Business Day after timely delivery to a nationally-recognized overnight courier and (iii) on the Business Day actually received if deposited in the U.S. mail (certified or registered mail, return receipt requested, postage prepaid). For purposes of this Agreement, “**Business Day**” shall mean any day on which the Exchange and commercial banks in the City of New York are open for business.

An electronic communication (“**Electronic Notice**”) shall be deemed written notice for purposes of this Section 13 if sent to the electronic mail address specified by the receiving party under separate cover. Electronic Notice shall be deemed received at the time the party sending Electronic Notice receives verification of receipt by the receiving party. Any party receiving Electronic Notice may request and shall be entitled to receive the notice on paper, in a nonelectronic form (“**Nonelectronic Notice**”) which shall be sent to the requesting party within ten (10) days of receipt of the written request for Nonelectronic Notice.

14. Successors and Assigns. This Agreement shall inure to the benefit of and be binding upon the Company and the Agent and their respective successors and the parties referred to in Section 10 hereof. References to any of the parties contained in this Agreement shall be deemed to include the successors and permitted assigns of such party. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assigns any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement. Neither party may assign its rights or obligations under this Agreement without the prior written consent of the other party; *provided, however*, that the Agent may assign its rights and obligations hereunder to an affiliate thereof without obtaining the Company’s consent.

15. Adjustments for Stock Splits. The parties acknowledge and agree that all share-related numbers contained in this Agreement shall be adjusted to take into account any stock split, stock dividend or similar event effected with respect to the Placement Shares.

16. Entire Agreement; Amendment; Severability; Waiver. This Agreement (including all schedules and exhibits attached hereto and Placement Notices issued pursuant hereto) constitutes the entire agreement and supersedes all other prior and contemporaneous agreements and undertakings, both written and oral, among the parties hereto with regard to the subject matter hereof. Neither this Agreement nor any term hereof may be amended except pursuant to a written instrument executed by the Company and the Agent. In the event that any one or more of the provisions contained herein, or the application thereof in any circumstance, is held invalid, illegal or unenforceable as written by a court of competent jurisdiction, then such provision shall be given full force and effect to the fullest possible extent that it is valid, legal and enforceable, and the remainder of the terms and provisions herein shall be construed as if such invalid, illegal or unenforceable term or provision was not contained herein, but only to the extent that giving effect to such provision and the remainder of the terms and provisions hereof shall be in accordance with the intent of the parties as reflected in this Agreement. No implied waiver by a party shall arise in the absence of a waiver in writing signed by such party. No failure or delay in exercising any right, power, or privilege hereunder 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.

17. **GOVERNING LAW AND TIME; WAIVER OF JURY TRIAL.** THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK WITHOUT REGARD TO THE PRINCIPLES OF CONFLICTS OF LAWS. SPECIFIED TIMES OF DAY REFER TO NEW YORK CITY TIME. EACH PARTY HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY.

18. **CONSENT TO JURISDICTION.** EACH PARTY HEREBY IRREVOCABLY SUBMITS TO THE EXCLUSIVE JURISDICTION OF THE STATE AND FEDERAL COURTS SITTING IN THE CITY OF NEW YORK, BOROUGH OF MANHATTAN, FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION WITH ANY TRANSACTION CONTEMPLATED HEREBY, AND HEREBY IRREVOCABLY WAIVES, AND AGREES NOT TO ASSERT IN ANY SUIT, ACTION OR PROCEEDING, ANY CLAIM THAT IT IS NOT PERSONALLY SUBJECT TO THE JURISDICTION OF ANY SUCH COURT, THAT SUCH SUIT, ACTION OR PROCEEDING IS BROUGHT IN AN INCONVENIENT FORUM OR THAT THE VENUE OF SUCH SUIT, ACTION OR PROCEEDING IS IMPROPER. EACH PARTY HEREBY IRREVOCABLY WAIVES PERSONAL SERVICE OF PROCESS AND CONSENTS TO PROCESS BEING SERVED IN ANY SUCH SUIT, ACTION OR PROCEEDING BY MAILING A COPY THEREOF (CERTIFIED OR REGISTERED MAIL, RETURN RECEIPT REQUESTED) TO SUCH PARTY AT THE ADDRESS IN EFFECT FOR NOTICES TO IT UNDER THIS AGREEMENT AND AGREES THAT SUCH SERVICE SHALL CONSTITUTE GOOD AND SUFFICIENT SERVICE OF PROCESS AND NOTICE THEREOF. NOTHING CONTAINED HEREIN SHALL BE DEEMED TO LIMIT IN ANY WAY ANY RIGHT TO SERVE PROCESS IN ANY MANNER PERMITTED BY LAW.

19. **Counterparts.** This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Delivery of an executed Agreement by one party to the other may be made by facsimile or electronic transmission.

20. **Construction.** The section and exhibit headings herein are for convenience only and shall not affect the construction hereof. References herein to any law, statute, ordinance, code, regulation, rule or other requirement of any Governmental Authority shall be deemed to refer to such law, statute, ordinance, code, regulation, rule or other requirement of any Governmental Authority as amended, reenacted, supplemented or superseded in whole or in part and in effect from time to time and also to all rules and regulations promulgated thereunder.

21. Absence of Fiduciary Relationship. The Company acknowledges and agrees that:

(a) the Agent is acting solely as agent in connection with the public offering of the Placement Shares and in connection with each transaction contemplated by this Agreement and the process leading to such transactions, and no fiduciary or advisory relationship between the Company or any of its respective affiliates, stockholders (or other equity holders), creditors or employees or any other party, on the one hand, and the Agent, on the other hand, has been or will be created in respect of any of the transactions contemplated by this Agreement, irrespective of whether or not the Agent has advised or is advising the Company on other matters, and the Agent has no obligation to the Company with respect to the transactions contemplated by this Agreement except the obligations expressly set forth in this Agreement;

(b) it is capable of evaluating and understanding, and understands and accepts, the terms, risks and conditions of the transactions contemplated by this Agreement;

(c) neither the Agent nor its affiliates have provided any legal, accounting, regulatory or tax advice with respect to the transactions contemplated by this Agreement and it has consulted its own legal, accounting, regulatory and tax advisors to the extent it has deemed appropriate;

(d) it is aware that the Agent and its affiliates are engaged in a broad range of transactions which may involve interests that differ from those of the Company and the Agent and its affiliates have no obligation to disclose such interests and transactions to the Company by virtue of any fiduciary, advisory or agency relationship or otherwise; and

(e) it waives, to the fullest extent permitted by law, any claims it may have against the Agent or its affiliates for breach of fiduciary duty or alleged breach of fiduciary duty in connection with the sale of Placement Shares under this Agreement and agrees that the Agent and its affiliates shall not have any liability (whether direct or indirect, in contract, tort or otherwise) to it in respect of such a fiduciary duty claim or to any person asserting a fiduciary duty claim on its behalf or in right of it or the Company, employees or creditors of Company.

22. Definitions. As used in this Agreement, the following terms have the respective meanings set forth below:

“**Applicable Time**” means (i) each Representation Date, (ii) the time of each sale of any Placement Shares pursuant to this Agreement and (iii) each Settlement Date.

“**Governmental Authority**” means (i) any federal, provincial, state, local, municipal, national or international government or governmental authority, regulatory or administrative agency, governmental commission, department, board, bureau, agency or instrumentality, court, tribunal, arbitrator or arbitral body (public or private); (ii) any self-regulatory organization; or (iii) any political subdivision of any of the foregoing.

“**Rule 164**,” “**Rule 172**,” “**Rule 405**,” “**Rule 415**,” “**Rule 424**,” “**Rule 424(b)**,” “**Rule 430B**,” and “**Rule 433**” refer to such rules under the Securities Act Regulations.

All references in this Agreement to financial statements and schedules and other information that is “contained,” “included” or “stated” in the Registration Statement or the Prospectus (and all other references of like import) shall be deemed to mean and include all such financial statements and schedules and other information that is incorporated by reference in the Registration Statement or the Prospectus, as the case may be.

All references in this Agreement to the Registration Statement, the Prospectus or any amendment or supplement to any of the foregoing shall be deemed to include the copy filed with the Commission pursuant to EDGAR, and all references in this Agreement to “supplements” to the Prospectus shall include, without limitation, any supplements, “wrappers” or similar materials prepared in connection with any offering, sale or private placement of any Placement Shares by the Agent outside of the United States.

[*Signature Page Follows*]

If the foregoing correctly sets forth the understanding between the Company and the Agent, please so indicate in the space provided below for that purpose, whereupon this letter shall constitute a binding agreement between the Company and the Agent.

Very truly yours,

CORBUS PHARMACEUTICALS HOLDINGS, INC.

By: /s/ Yuval Cohen

Name: Yuval Cohen, PhD

Title: Chief Executive Officer

ACCEPTED as of the date first-above written:

CANTOR FITZGERALD & CO.

By: /s/ Jeffrey Lumby

Name: Jeffrey Lumby

Title: Senior Managing Director

SCHEDULE 1

Form of Placement Notice

From: Corbus Pharmaceuticals Holdings, Inc.

To: Cantor Fitzgerald & Co.
Attention: [●]

Subject: Placement Notice

Date: [●], 201[●]

Ladies and Gentlemen:

Pursuant to the terms and subject to the conditions contained in the Sales Agreement between Corbus Pharmaceuticals Holdings, Inc., a Delaware corporation (the "Company"), and Cantor Fitzgerald & Co. ("Agent"), dated [●], the Company hereby requests that the Agent sell up to [●] of the Company's common stock, par value \$0.0001 per share, at a minimum market price of \$[●] per share, during the time period beginning [month, day, time] and ending [month, day, time].

SCHEDULE 2

Compensation

The Company shall pay to the Agent in cash, upon each sale of Placement Shares pursuant to this Agreement, an amount equal to 3.0% of the aggregate gross proceeds from each sale of Placement Shares.

SCHEDULE 3

Notice Parties

The Company

Sean Moran (smoran@corbuspharma.com)

Yuval Cohen, PhD (ycohen@corbuspharma.com)

The Agent

Jeffrey Lumby (jlumby@cantor.com)

Joshua Feldman (jfeldman@cantor.com)

Sameer Vasudev (svasudev@cantor.com)

With copies to:

CFCControlledEquityOffering@cantor.com

CORBUS PHARMACEUTICALS HOLDINGS, INC., as Issuer

and

●, as Trustee

INDENTURE

Dated as of ●

Senior Debt Securities

CROSS REFERENCE SHEET¹

Between

Provisions of the Trust Indenture Act of 1939 and the Indenture to be dated as of _____, 20__ between CORBUS PHARMACEUTICALS HOLDINGS, INC. and _____, as Trustee:

Section of the Act	Section of Indenture
310(a)(1) and (2)	5.08
310(a)(3) and (4)	Inapplicable
310(b)	5.09(a), (b) and (d)
310(c)	Inapplicable
311(a)	Inapplicable
311(b)	Inapplicable
311(c)	Inapplicable
312(a)	3.05
312(b)	3.05
312(c)	4.02(c)
313(a)	5.12
313(b)(1)	5.12
313(b)(2)	5.12
313(c)	5.12
313(d)	5.12
314(a)	3.06
314(b)	Inapplicable
314(c)(1) and (2)	10.05
314(c)(3)	Inapplicable
314(d)	Inapplicable
314(e)	10.05
314(f)	Inapplicable
315(a), (c) and (d)	5.01
315(b)	4.11
315(e)	4.12
316(a)(1)	4.09
316(a)(2)	Not required
316(a) (last sentence)	6.04
316(b)	4.07
317(a)	4.02
317(b)	3.03(a) and (b)
318(a)	10.07

¹ This Cross Reference Sheet is not part of the Indenture.

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THIS INDENTURE, dated as of _____, between CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (the “**Issuer**”) and _____, a _____ corporation, as trustee (the “**Trustee**”).

WITNESSETH:

WHEREAS, the Issuer has duly authorized the issue from time to time of its senior debentures, notes or other evidences of indebtedness to be issued in one or more series (the “**Securities**”) up to such principal amount or amounts as may from time to time be authorized in accordance with the terms of this Indenture and to provide, among other things, for the authentication, delivery and administration thereof, the Issuer has duly authorized the execution and delivery of this Indenture; and

WHEREAS, all things necessary to make this Indenture a valid indenture and agreement according to its terms have been done;

NOW, THEREFORE:

In consideration of the premises and the purchases of the Securities by the Holders thereof, the Issuer and the Trustee mutually covenant and agree for the equal and proportionate benefit of the respective Holders from time to time of the Securities as follows:

ARTICLE 1
DEFINITIONS

Section 1.01 *Certain Terms Defined*. The following terms (except as otherwise expressly provided or unless the context otherwise clearly requires) for all purposes of this Indenture and of any indenture supplemental hereto shall have the respective meanings specified in this Section. All other terms used in this Indenture that are defined in the Trust Indenture Act of 1939 or the definitions of which in the Securities Act of 1933 are referred to in the Trust Indenture Act of 1939, as amended, including terms defined therein by reference to the Securities Act of 1933, as amended, (except as herein otherwise expressly provided or unless the context otherwise clearly requires), shall have the meanings assigned to such terms in said Trust Indenture Act and in said Securities Act as in force at the date of this Indenture. All accounting terms used herein and not expressly defined shall have the meanings assigned to such terms in accordance with GAAP. The words “herein”, “hereof” and “hereunder” and other words of similar import refer to this Indenture as a whole and not to any particular Article, Section or other subdivision. The terms defined in this Article have the meanings assigned to them in this Article and include the plural as well as the singular.

“**Affiliate**” of any specified Person means any other Person directly or indirectly controlling or controlled by or under direct or indirect common control with such specified Person. For the purposes of this definition, “control” when used with respect to any specified Person means the power to direct the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise; and the terms “controlling” and “controlled” have meanings correlative to the foregoing.

“**Authorized Newspaper**” means a newspaper in the English language or in an official language of the country of publication, customarily printed on each Business Day, whether or not published on Saturdays, Sundays or holidays, and of general circulation in the place in connection with which the term is used or in the financial community of such place. If, because of temporary suspension of publication or general circulation of any newspaper or for any other reason, it is impossible or impracticable to make any publication of any notice required by this Indenture in the manner herein provided, such publication or other notice in lieu thereof which is made at the written direction of the Issuer by the Trustee shall constitute a sufficient publication of such notice.

“**Board of Directors**” means either the Board of Directors of the Issuer or any committee of such Board duly authorized to act hereunder.

“**Business Day**” means, with respect to any Security, a day that in the city (or in all of the cities, if more than one) in which amounts are payable, as specified in the form of such Security, is not a day on which banking institutions are authorized by law or regulation to close.

“**Capitalized Lease**” means, as applied to any Person, any lease of any property (whether real, personal, or mixed) of which the discounted present value of the rental obligations of such Person as lessee, in conformity with GAAP, is required to be capitalized on the balance sheet of such Person; and “**Capitalized Lease Obligation**” is defined to mean the rental obligations, as aforesaid, under such lease.

“**Capital Stock**” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s capital stock or other ownership interests, whether now outstanding or issued after the date of this Indenture, including, without limitation, all Common Stock and Preferred Stock.

“**Closing Price**” on any day when used with respect to any class of Capital Stock means the closing sale price per share (or if no closing sale price is reported, the average of the bid and ask prices or, if more than one in either case, the average of the average bid and the average ask prices) on that date as reported by The Nasdaq Global Select Market or, if such Capital Stock is not listed on The Nasdaq Global Select Market, then on the principal U.S. national or regional securities exchange on which such Capital Stock is then listed. If such Capital Stock is not listed on either The Nasdaq Global Select Market or on any U.S. national or regional securities exchange on the relevant date, the Closing Price will be the last quoted bid price for the Company’s Common Stock in the over-the-counter market on the relevant date as reported by the OTC Markets Group Inc. or similar organization. In the event that no such quotation is available for any day, the Board of Directors shall be entitled to determine in good faith the current market price on the basis of such quotations as it considers appropriate.

“**Commission**” means the Securities and Exchange Commission, as from time to time constituted, created under the Securities Exchange Act of 1934, or if at any time after the execution and delivery of this Indenture such Commission is not existing and performing the duties now assigned to it under the Trust Indenture Act, then the body performing such duties on such date.

“**Common Stock**” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s common stock, par value \$0.001 per share, whether now outstanding or issued after the date of the Indenture, including, without limitation, all series and classes of such common stock.

“**Corporate Trust Office**” means the office of the Trustee at which the corporate trust business of the Trustee shall, at any particular time, be principally administered, which office is, at the date as of which this Indenture is dated, located at ●.

“**Currency Agreement**” means any foreign exchange contract, currency swap agreement, or other similar agreement or arrangement designed to protect against the fluctuation in currency values.

“**Default**” means any Event of Default as defined in Section 4.01 and any event that is, or after notice or passage of time or both would be, an Event of Default.

“**Depository**” means, with respect to the Securities of any series issuable or issued in the form of one or more Registered Global Securities, the Person designated as Depository by the Issuer pursuant to Section 2.03 until a successor Depository shall have become such pursuant to the applicable provisions of this Indenture, and thereafter “Depository” shall mean or include each Person who is then a Depository hereunder, and if at any time there is more than one such Person, “Depository” as used with respect to the Securities of any such series shall mean the Depository with respect to the Registered Global Securities of that series.

“**Determination Date**” has the meaning specified in Section 12.05.

“**Event of Default**” has the meaning specified in Section 4.01.

“**GAAP**” means generally accepted accounting principles in the United States of America as in effect as of the date of determination, including, without limitation, those set forth in the opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other entity as approved by a significant segment of the accounting profession. All ratios and computations contained in this Indenture shall be computed in conformity with GAAP applied on a consistent basis.

“**Guarantee**” means any obligation, contingent or otherwise, of any Person directly or indirectly guaranteeing any Indebtedness or other obligation of any other Person and, without limiting the generality of the foregoing, any obligation, direct or indirect, contingent or otherwise, of such Person:

(i) to purchase or pay (or advance or supply funds for the purchase or payment of) such Indebtedness or other obligation of such other Person (whether arising by virtue of partnership arrangements, or by agreement to keep-well, to purchase assets, goods, securities, or services, to take-or-pay, or to maintain financial statement conditions or otherwise); or

(ii) entered into for purposes of assuring in any other manner the obligee of such Indebtedness or other obligation of the payment thereof or to protect such obligee against loss in respect thereof (in whole or in part);

provided, that the term “**Guarantee**” shall not include endorsements for collection or deposit in the ordinary course of business. The term “**Guarantee**” used as a verb has a corresponding meaning.

“**Holder**”, “**Securityholder**” or other similar terms mean the registered holder of any Security.

“**Indebtedness**” means, with respect to any Person at any date of determination (without duplication):

(i) all indebtedness of such Person for borrowed money;

(ii) all obligations of such Person evidenced by bonds, debentures, notes, or other similar instruments, in each case, for value received or settlement of claims;

(iii) all obligations of such Person in respect of letters of credit or other similar instruments (including reimbursement obligations with respect thereto);

(iv) all obligations of such Person to pay the deferred and unpaid purchase price of property or services (but excluding trade accounts payable or accrued liabilities arising in the ordinary course of business);

(v) all obligations of such Person as lessee under Capitalized Leases;

(vi) all Indebtedness of other Persons secured by a Lien on any asset of such Person, whether or not such Indebtedness is assumed by such Person; *provided* that the amount of such Indebtedness shall be the lesser of:

(1) the fair market value of such asset at such date of determination; and

(2) the amount of such Indebtedness;

(vii) all Indebtedness of other Persons to the extent Guaranteed by such Person; and

(viii) to the extent not otherwise included in this definition, obligations under Currency Agreements and Interest Rate Agreements.

Notwithstanding the foregoing, in no event shall the term “Indebtedness” be deemed to include letters of credit or bonds that secure performance or surety bonds or similar instruments that are issued in the ordinary course of business.

The amount of Indebtedness of any Person at any date shall be the outstanding balance at such date of all unconditional obligations as described above and, with respect to contingent obligations, the maximum liability upon the occurrence of the contingency giving rise to the obligation; *provided* that:

(x) the amount outstanding at any time of any Indebtedness issued with original issue discount is the face amount of such Indebtedness less the remaining unamortized portion of the original issue discount of such Indebtedness at such time as determined in conformity with GAAP; and

(y) Indebtedness shall not include any liability for federal, state, local, or other taxes.

“Indenture” means this instrument as originally executed and delivered or, if amended or supplemented as herein provided, as so amended or supplemented or both, and shall include the forms and terms of particular series of Securities established as contemplated hereunder.

“Interest” means, when used with respect to non-interest bearing Securities, interest payable after maturity. **“Interest Rate Agreement”** means any obligation of any Person pursuant to any interest rate swap, cap, collar or similar arrangement providing protection against fluctuations in interest rates. For purposes of the Indenture, the amount of such obligation shall be the amount determined in respect thereof as of the end of the then most recently ended fiscal quarter of such Person, based on the assumption that such obligation had terminated at the end of such fiscal quarter, and in making such determination, if any agreement relating to such obligation provides for the netting of amounts payable by and to such Person thereunder or if any such agreement provides for the simultaneous payment of amounts by and to such Person, then in each such case, the amount of such obligation shall be the net amount so determined, plus any premium due upon default by such Person.

“Issuer” means the Person identified as “Issuer” in the first paragraph hereof and, subject to Article 8, its successors and assigns.

“Lien” means, with respect to any asset, any mortgage, lien, pledge, charge, security interest or encumbrance of any kind, or any other type of preferential arrangement that has the practical effect of creating a security interest, in respect of such asset. For the purposes of this Indenture, the Issuer shall be deemed to own subject to a Lien any asset that it has acquired or holds subject to the interest of a vendor or lessor under any conditional sale agreement, capital lease or other title retention agreement relating to such asset.

“Officers’ Certificate” means a certificate signed by the chairman of the Issuer’s Board of Directors, its president or any vice president, and by its treasurer, any assistant treasurer, its secretary or any assistant secretary of the Issuer, and delivered to the Trustee. Each such certificate shall comply with Section 314 of the Trust Indenture Act of 1939 and include the statements provided for in Section 10.05.

“Opinion of Counsel” means an opinion in writing signed by legal counsel who may be an employee of or counsel to the Issuer and who shall be satisfactory to the Trustee. Each such opinion shall comply with Section 314 of the Trust Indenture Act of 1939 and include the statements provided for in Section 10.05, if and to the extent required hereby.

“Original Issue Date” of any Security (or portion thereof) means the earlier of (i) the date of such Security or (ii) the date of any Security (or portion thereof) for which such Security was issued (directly or indirectly) on registration of transfer, exchange or substitution.

“Original Issue Discount Security” means any Security that provides for an amount less than the Principal amount thereof to be due and payable upon a declaration of acceleration of the maturity thereof pursuant to Section 4.01.

“Outstanding”, when used with reference to Securities, shall, subject to the provisions of Section 6.04, mean, as of any particular time, all Securities authenticated and delivered by the Trustee under this Indenture, except:

(i) Securities theretofore canceled by the Trustee or delivered to the Trustee for cancellation;

(ii) Securities, or portions thereof, for the payment or redemption of which monies in the necessary amount shall have been deposited in trust with the Trustee or with any paying agent (other than the Issuer) or shall have been set aside, segregated and held in trust by the Issuer for the Holders of such Securities (if the Issuer shall act as its own paying agent), provided that if such Securities, or portions thereof, are to be redeemed prior to the maturity thereof, notice of such redemption shall have been given as herein provided, or provision satisfactory to the Trustee shall have been made for giving such notice; and

(iii) Securities in substitution for which other Securities shall have been authenticated and delivered, or which shall have been paid, pursuant to the terms of Section 2.09 (except with respect to any such Security as to which proof satisfactory to the Trustee is presented that such Security is held by a person in whose hands such Security is a legal, valid and binding obligation of the Issuer).

In determining whether the Holders of the requisite Principal amount of Outstanding Securities of any or all series have given any request, demand, authorization, direction, notice, consent or waiver hereunder, the Principal amount of an Original Issue Discount Security that shall be deemed to be Outstanding for such purposes shall be the amount of the Principal thereof that would be due and payable as of the date of such determination upon a declaration of acceleration of the maturity thereof pursuant to Section 4.01.

“Person” means any individual, corporation, partnership, limited liability company, joint venture, association, joint stock company, trust, unincorporated organization or government or any agency or political subdivision thereof or any other entity.

“Preferred Stock” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s preferred stock, par value \$0.001 per share, whether now outstanding or issued after the date of the Indenture, including, without limitation, all series and classes of such preferred stock.

“Principal” means, with respect to the Securities or any Security or any portion thereof, the principal amount of such Securities, Security or portion thereof, and shall be deemed to include “and premium, if any”.

“**record date**” as used with respect to any interest payment date (except a date for payment of defaulted interest), has the meaning specified in Section 2.07.

“**Registered Global Security**” means a Security evidencing all or a part of a series of Registered Securities, issued to the Depository for such series in accordance with Section 2.04, and bearing the legend prescribed in Section 2.04.

“**Registered Security**” means any Security registered on the register maintained by the Issuer pursuant to Section 2.08.

“**Responsible Officer**” when used with respect to the Trustee means any officer within the corporate trust department of the Trustee, including any vice president, assistant vice president, assistant secretary, assistant treasurer, trust officer or any other officer of the Trustee who customarily performs functions similar to those performed by the Persons who at the time shall be such officers, respectively, or to whom any corporate trust matter is referred because of such person’s knowledge of and familiarity with the particular subject and who shall have direct responsibility for the administration of this Indenture.

“**Security**” or “**Securities**” has the meaning stated in the first recital of this Indenture, or, as the case may be, Securities that have been authenticated and delivered under this Indenture.

“**Subsidiary**” means, with respect to any Person, any corporation, association or other business entity of which more than 50% of all votes represented by all classes of outstanding Voting Stock is owned, directly or indirectly, by such Person and one or more other Subsidiaries of such Person.

“**Trustee**” means the Person identified as “**Trustee**” in the first paragraph hereof and, subject to the provisions of Article 5, shall also include any successor trustee.

“**Trust Indenture Act of 1939**” (except as otherwise provided in Section 7.01 and 7.02) means the Trust Indenture Act of 1939 as in force at the date as of which this Indenture was originally executed.

“**UCC**” means the Uniform Commercial Code, as in effect in each applicable jurisdiction.

“**Unregistered Security**” means any Security other than a Registered Security.

“**U.S. Government Obligations**” means securities that are (i) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (ii) obligations of an agency of instrumentality of the United States of America the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government Obligation or a specific payment of interest on or principal of any such U.S. Government Obligation held by such custodian for the account of the holder of a depository receipt; provided that (except as required by law) such custodian is not authorized to make any deduction from the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government Obligation or the specific payment of interest on or principal of the U.S. Government Obligation evidenced by such depository receipt.

“**Voting Stock**” means, with respect to any Person, capital stock of any class or kind ordinarily having the power to vote for the election of directors, managers or other voting members of the governing body of such Person.

“**vice president**” when used with respect to the Issuer or the Trustee, means any vice president, whether or not designated by a number or a word or words added before or after the title of “**vice president**”.

“**Wholly-Owned**” is defined to mean, with respect to any Subsidiary of any Person, such Subsidiary if all of the outstanding common stock or other similar equity ownership interests (but not including preferred stock) in such Subsidiary (other than any director’s qualifying shares or investments by foreign nationals mandated by applicable law) is owned directly or indirectly by such Person.

“**Yield to Maturity**” means the yield to maturity on a series of securities, calculated at the time of issuance of such series, or, if applicable, at the most recent redetermination of interest on such series, and calculated in accordance with accepted financial practice.

ARTICLE 2
SECURITIES

Section 2.01 *Forms Generally*. The Securities of each series shall be substantially in such form (not inconsistent with this Indenture) as shall be established by or pursuant to a resolution of the Board of Directors or in one or more indentures supplemental hereto, in each case with such appropriate insertions, omissions, substitutions and other variations as are required or permitted by this Indenture and may have imprinted or otherwise reproduced thereon such legend or legends, not inconsistent with the provisions of this Indenture, as may be required to comply with any law or with any rules or regulations pursuant thereto, or with any rules of any securities exchange or to conform to general usage, all as may be determined by the officers executing such Securities, as evidenced by their execution of the Securities. The Issuer shall furnish any such legends to the Trustee in writing.

The definitive Securities shall be printed, lithographed or engraved on steel engraved borders or may be produced in any other manner, all as determined by the officers executing such Securities, as evidenced by their execution of such Securities.

Section 2.02 *Form of Trustee’s Certification of Authentication*. The Trustee’s certificate of authentication on all Securities shall be in substantially the following form:

This is one of the Securities of the series designated herein and referred to in the within-mentioned Indenture.

●,
as Trustee

By: _____
Authorized Signatory:

Section 2.03 *Amount Unlimited; Issuable in Series*. The aggregate Principal amount of Securities which may be authenticated and delivered under this Indenture is unlimited.

The Securities may be issued in one or more series. There shall be established in or pursuant to a resolution of the Board of Directors and set forth in an Officers' Certificate, or established in one or more indentures supplemental hereto, prior to the issuance of Securities of any series:

(a) the title of the Securities of the series (which shall distinguish the Securities of the series from all other Securities);

(b) any limit upon the aggregate Principal amount of the Securities of the series that may be authenticated and delivered under this Indenture (except for Securities authenticated and delivered upon registration of transfer of, or in exchange for, or in lieu of, other Securities of the series pursuant to Section 2.08, 2.09, 2.11 or Section 12.03);

(c) the date or dates on which the Principal of the Securities of the series is payable;

(d) the rate or rates at which the Securities of the series shall bear interest, if any, or the method by which such rate shall be determined, the date or dates from which such interest shall accrue, the interest payment dates on which such interest shall be payable and the record dates for the determination of Holders to whom interest is payable;

(e) the place or places where the Principal of and any interest on Securities of the series shall be payable (if other than as provided in Section 3.02);

(f) the price or prices at which, the period or periods within which and the terms and conditions upon which Securities of the series may be redeemed, in whole or in part, at the option of the Issuer;

(g) the obligation, if any, of the Issuer to redeem, purchase or repay Securities of the series at the option of a Holder thereof and the price or prices at which, the period or periods within which and the terms and conditions upon which Securities of the series shall be redeemed, purchased or repaid, in whole or in part, pursuant to such obligation;

(h) the obligation, if any, of the Issuer to permit the conversion of the Securities of such series into Capital Stock, and the terms and conditions upon which such conversion shall be effected (including, without limitation, the initial conversion price or rate, the conversion period and any other provision in addition to or in lieu of those set forth in this Indenture relative to such obligation);

(i) if other than denominations of \$1,000 and any multiple thereof, the denominations in which Securities of the series shall be issuable;

(j) if other than the Principal amount thereof, the portion of the Principal amount of Securities of the series which shall be payable upon declaration of acceleration of the maturity thereof pursuant to Section 4.01 or provable in bankruptcy pursuant to Section 4.02;

(k) if the Securities of the series are issuable in whole or in part as one or more Registered Global Securities, the identity of the Depository for such Registered Global Security or Securities;

(l) any other terms of the series (which terms shall not be inconsistent with the provisions of this Indenture); and

(m) any trustees, authenticating or paying agents, transfer agents or registrar or any other agents with respect to the Securities of such series.

All Securities of any one series shall be substantially identical except as to denomination and except as may otherwise be provided in or pursuant to such resolution of the Board of Directors or in any such indenture supplemental hereto.

Section 2.04 *Authentication and Delivery of Securities*. At any time and from time to time after the execution and delivery of this Indenture, the Issuer may deliver Securities of any series executed by the Issuer to the Trustee for authentication, and the Trustee shall thereupon authenticate and deliver such Securities to or upon the written order of the Issuer, such order to be signed by both (a) the chairman of its Board of Directors, its president or any vice president and by its treasurer, any assistant treasurer, its secretary or any assistant secretary, without any further action by the Issuer. In authenticating such Securities and accepting the additional responsibilities under this Indenture in relation to such Securities the Trustee shall receive, and (subject to Section 5.01) shall be fully protected in relying upon:

(a) a certified copy of any resolution or resolutions of the Board of Directors authorizing the action taken pursuant to the resolution or resolutions delivered under clause (b) below;

(b) a copy of any resolution or resolutions of the Board of Directors relating to such series, in each case certified by the secretary or an assistant secretary of the Issuer;

(c) an executed supplemental indenture, if any, and the documentation required to be delivered pursuant to Section 7.04;

(d) an Officers' Certificate setting forth the form and terms of the Securities as required pursuant to Section 2.01 and 2.03, respectively and prepared in accordance with Section 10.05;

(e) an Opinion of Counsel, prepared in accordance with Section 10.05, to the effect:

(i) that the form or forms and terms of such Securities have been established by or pursuant to a resolution of the Board of Directors or by a supplemental indenture as permitted by Section 2.01 and 2.03 in conformity with the provisions of this Indenture; and

(ii) that such Securities, when authenticated and delivered by the Trustee and issued by the Issuer in the manner and subject to any conditions specified in such Opinion of Counsel, will constitute valid and binding obligations of the Issuer enforceable against the Issuer in accordance with their terms, except to the extent that enforcement thereof may be limited by bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance or similar laws now or hereafter in effect relating to creditors' rights generally, and general principles of equity (regardless of whether enforceability is considered in a proceeding in equity or at law).

The Trustee shall have the right to decline to authenticate and deliver any Securities under this section if the Trustee, being advised by counsel, determines that such action may not lawfully be taken by the Issuer or if the Trustee in good faith by its board of directors or board of trustees, executive committee, or a trust committee of directors or trustees or Responsible Officers shall determine that such action would expose the Trustee to personal liability.

If the Issuer shall establish pursuant to Section 2.03 that the Securities of a series or a portion thereof are to be issued in the form of one or more Registered Global Securities, then the Issuer shall execute (in accordance with Section 2.05) and the Trustee shall authenticate and make available for delivery one or more Registered Global Securities that (i) shall represent and shall be denominated in an amount equal to the aggregate Principal amount of all of the Securities of such series issued in such form and not yet canceled, (ii) shall be registered in the name of the Depository for such Registered Global Security or Securities or the nominee of such Depository, (iii) shall be delivered by the Trustee to such Depository or its custodian or pursuant to such Depository's instructions and (iv) shall bear a legend substantially to the following effect: "Unless and until it is exchanged in whole or in part for Securities in definitive registered form, this Security may not be transferred except as a whole by the Depository to a nominee of the Depository or by a nominee of the Depository to the Depository or another nominee of the Depository or by the Depository or any such nominee to a successor Depository or a nominee of such successor Depository."

Section 2.05 *Execution of Securities*. The Securities shall be signed on behalf of the Issuer by the chairman of its Board of Directors, its president, any vice president, its treasurer or any assistant treasurer, under its corporate seal and attested by its secretary or any assistant secretary. Such signatures may be the manual or facsimile signatures of the present or any future such officers. The seal of the Issuer may be in the form of a facsimile thereof and may be impressed, affixed, imprinted or otherwise reproduced on the Securities. Typographical and other minor errors or defects in any such reproduction of the seal or any such signature shall not affect the validity or enforceability of any Security that has been duly authenticated and delivered by the Trustee.

In case any officer of the Issuer who shall have signed any of the Securities shall cease to be such officer before the Security so signed shall be authenticated and delivered by the Trustee or disposed of by the Issuer, such Security nevertheless may be authenticated and delivered or disposed of as though the person who signed such Security had not ceased to be such officer of the Issuer; and any Security may be signed on behalf of the Issuer by such persons as, at the actual date of the execution of such Security, shall be the proper officers of the Issuer, although at the date of the execution and delivery of this Indenture any such person was not such an officer.

Section 2.06 *Certificate of Authentication*. Only such Securities as shall bear thereon a certificate of authentication substantially in the form hereinbefore recited, executed by the Trustee by the manual signature of one of its authorized signatories, shall be entitled to the benefits of this Indenture or be valid or obligatory for any purpose. Such certificate by the Trustee upon any Security executed by the Issuer shall be conclusive evidence that the Security so authenticated has been duly authenticated and delivered hereunder and that the Holder is entitled to the benefits of this Indenture.

Section 2.07 *Denomination and Date of Securities; Payments of Interest*. The Securities shall be issuable as registered securities without coupons and in denominations as shall be specified as contemplated by Section 2.03. In the absence of any such specification with respect to the Securities of any series, the Securities of such series shall be issuable in denominations of \$1,000 and any multiple thereof. The Securities shall be numbered, lettered, or otherwise distinguished in such manner or in accordance with such plan as the officers of the Issuer executing the same may determine as evidenced by the execution and authentication thereof.

Each Security shall be dated the date of its authentication, shall bear interest, if any, from the date and shall be payable on the dates, in each case, which shall be specified as contemplated by Section 2.03.

The person in whose name any Security of any series is registered at the close of business on any record date applicable to a particular series with respect to any interest payment date for such series shall be entitled to receive the interest, if any, payable on such interest payment date notwithstanding any transfer or exchange of such Security subsequent to the record date and prior to such interest payment date, except if and to the extent the Issuer shall default in the payment of the interest due on such interest payment date for such series, in which case such defaulted interest shall be paid to the persons in whose names Outstanding Securities for such series are registered at the close of business on a subsequent record date (which shall be not less than five Business Days prior to the date of payment of such defaulted interest) established by notice given by mail by or on behalf of the Issuer to the Holders of Securities not less than 15 days preceding such subsequent record date. The term “**record date**” as used with respect to any interest payment date (except a date for payment of defaulted interest) shall mean the date specified as such in the terms of the Securities of any particular series, or, if no such date is so specified, if such interest payment date is the first day of a calendar month, the fifteenth day of the next preceding calendar month or, if such interest payment date is the fifteenth day of a calendar month, the first day of such calendar month, whether or not such record date is a Business Day.

Section 2.08 *Registration, Transfer and Exchange*. The Issuer will keep or cause to be kept at each office or agency to be maintained for the purpose as provided in Section 3.02 a register or registers in which, subject to such reasonable regulations as it may prescribe, it will register, and will register the transfer of, Securities as in this Article provided. Such register shall be in written form in the English language or in any other form capable of being converted into such form within a reasonable time. At all reasonable times such register or registers shall be open for inspection by the Trustee.

At the option of the Holder thereof, Registered Securities of any series (other than a Registered Global Security, except as set forth below) may be exchanged for a Registered Security or Registered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Registered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. If the Securities of any series are issued in both registered and unregistered form, except as otherwise established pursuant to Section 2.03, at the option of the Holder thereof, Unregistered Securities of any series may be exchanged for Registered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Unregistered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. At the option of the Holder thereof, if Unregistered Securities of any series, maturity date, interest rate and Original Issue Date are issued in more than one authorized denomination, except as otherwise established pursuant to Section 2.03, such Unregistered Securities may be exchanged for Unregistered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Unregistered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. Registered Securities of any series may not be exchanged for Unregistered Securities of such series. Whenever any Securities are so surrendered for exchange, the Issuer shall execute, and the Trustee shall authenticate and make available for delivery, the Securities which the Holder making the exchange is entitled to receive.

All Registered Securities presented for registration of transfer, exchange, redemption, conversion or payment shall be duly endorsed by, or be accompanied by a written instrument or instruments of transfer in form satisfactory to the Issuer and the Trustee duly executed by, the Holder or his attorney duly authorized in writing.

The Issuer may require payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in connection with any exchange or registration of transfer of Securities. No service charge shall be made for any such transaction.

Notwithstanding any other provision of this Section 2.08, unless and until it is exchanged in whole or in part for Securities in definitive registered form, a Registered Global Security representing all or a portion of the Securities of a series may not be transferred except as a whole by the Depository for such series to a nominee of such Depository or by a nominee of such Depository to such Depository or another nominee of such Depository or by such Depository or any such nominee to a successor Depository for such series or a nominee of such successor Depository.

If at any time the Depository for any Registered Global Securities of any series notifies the Issuer that it is unwilling or unable to continue as Depository for such Registered Global Securities or if at any time the Depository for such Registered Global Securities shall no longer be eligible under applicable law, the Issuer shall appoint a successor Depository eligible under applicable law with respect to such Registered Global Securities. If a successor Depository eligible under applicable law for such Registered Global Securities is not appointed by the Issuer within 90 days after the Issuer receives such notice or becomes aware of such ineligibility, the Issuer will execute, and the Trustee, upon receipt of the Issuer's order for the authentication and delivery of definitive Registered Securities of such series and tenor, will authenticate and make available for delivery Registered Securities of such series and tenor, in any authorized denominations, in an aggregate Principal amount equal to the Principal amount of such Registered Global Securities, in exchange for such Registered Global Securities.

The Issuer may at any time and in its sole discretion determine that any Registered Global Securities of any series shall no longer be maintained in global form. In such event, or in the event that there shall have occurred and be continuing an Event of Default with respect to a series of Securities, the Issuer will, upon the request of any Holder, execute, and the Trustee, upon receipt of the Issuer's order for the authentication and delivery of definitive Registered Securities of such series and tenor, will authenticate and make available for delivery, Registered Securities of such series and tenor in any authorized denominations, in an aggregate Principal amount equal to the Principal amount of such Registered Global Securities, in exchange for such Registered Global Securities.

Any time the Registered Securities of any series are not in the form of Registered Global Securities pursuant to the preceding two paragraphs, the Issuer agrees to supply the Trustee with a reasonable supply of certificated Registered Securities without the legend required by Section 2.04 and the Trustee agrees to hold such Registered Securities in safekeeping until authenticated and delivered pursuant to the terms of this Indenture.

If established by the Issuer pursuant to Section 2.03 with respect to any Registered Global Security, the Depositary for such Registered Global Security may surrender such Registered Global Security in exchange in whole or in part for Registered Securities of the same series and tenor in definitive registered form on such terms as are acceptable to the Issuer and such Depositary. Thereupon, the Issuer shall execute, and the Trustee shall authenticate and make available for delivery, without service charge,

(i) to the Person specified by such Depositary new Registered Securities of the same series and tenor, of any authorized denominations as requested by such Person, in an aggregate Principal amount equal to and in exchange for such Person's beneficial interest in the Registered Global Security; and

(ii) to such Depositary a new Registered Global Security in a denomination equal to the difference, if any, between the Principal amount of the surrendered Registered Global Security and the aggregate Principal amount of Registered Securities authenticated and delivered pursuant to clause (i) above.

Registered Securities issued in exchange for a Registered Global Security pursuant to this Section 2.08 shall be registered in such names and in such authorized denominations as the Depositary for such Registered Global Security, pursuant to instructions from its direct or indirect participants or otherwise, shall instruct the Trustee or an agent of the Issuer or the Trustee. The Trustee or such agent shall deliver such Securities to or as directed by the Persons in whose names such Securities are so registered.

All Securities issued upon any transfer or exchange of Securities shall be valid obligations of the Issuer, evidencing the same debt, and entitled to the same benefits under this Indenture, as the Securities surrendered upon such transfer or exchange.

Notwithstanding anything herein or in the forms or terms of any Securities to the contrary, none of the Issuer, the Trustee or any agent of the Issuer or the Trustee shall be required to exchange any Unregistered Security for a Registered Security if such exchange would result in adverse Federal income tax consequences to the Issuer (such as, for example, the inability of the Issuer to deduct from its income, as computed for Federal income tax purposes, the interest payable on the Unregistered Securities) under then applicable United States Federal income tax laws. The Trustee and any such agent shall be entitled to rely on an Officers' Certificate or an Opinion of Counsel in determining such result.

Neither the Registrar nor the Issuer shall be required (i) to issue, authenticate, register the transfer of or exchange Securities of any series for a period of 15 days before the mailing of a notice of redemption of such Securities to be redeemed or (ii) to register the transfer of or exchange any Security selected for redemption in whole or in part.

Section 2.09 *Mutilated, Defaced, Destroyed, Lost and Stolen Securities*. In case any temporary or definitive Security shall become mutilated or defaced and shall be surrendered to the Trustee, the Issuer shall execute, and the Trustee shall authenticate and deliver, a new Security of the same series, bearing a number not contemporaneously outstanding, in exchange and substitution for the mutilated or defaced Security. If the Holder of any Security claims that the Security has been lost, destroyed or wrongfully taken, the Issuer shall execute, and the Trustee shall authenticate and deliver, a new Security of the same series, bearing a number not contemporaneously outstanding, in exchange and substitution for the lost, destroyed or wrongfully taken Security, if the applicant so requests before the Issuer has notice that the Security has been acquired by a protected purchaser, and the applicant furnishes to the Issuer and to the Trustee and any agent of the Issuer or the Trustee such security or indemnity as may be required by them to indemnify and defend and to save each of them harmless and the applicant satisfies other reasonable requirements imposed by the Issuer.

Upon the issuance of any substitute Security, the Issuer may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Trustee and its counsel) connected therewith. In case any Security which has matured or is about to mature or has been called for redemption in full shall become mutilated or defaced or be destroyed, lost or stolen, the Issuer may instead of issuing a substitute Security, pay or authorize the payment of the same (without surrender thereof except in the case of a mutilated or defaced Security), if the applicant for such payment shall furnish to the Issuer and to the Trustee and any agent of the Issuer or the Trustee such security or taking, the applicant shall also furnish to the Issuer and the Trustee and any agent of the Issuer or the Trustee evidence to their satisfaction of the destruction, loss or wrongful taking of such Security and of the ownership thereof.

Every substitute Security of any series issued pursuant to the provisions of this section by virtue of the fact that any such Security is destroyed, lost or stolen shall constitute an additional contractual obligation of the Issuer, whether or not the destroyed, lost or wrongfully taken Security shall be at any time enforceable by anyone and shall be entitled to all the benefits of (but shall be subject to all the limitations of rights set forth in) this Indenture equally and proportionately with any and all other Securities of such series duly authenticated and delivered hereunder. All Securities shall be held and owned upon the express condition that, to the extent permitted by law, the foregoing provisions are exclusive with respect to the replacement or payment of mutilated, defaced or destroyed, lost or wrongfully taken Securities and shall preclude any and all other rights or remedies.

Section 2.10 *Cancellation of Securities; Destruction Thereof.* All Securities surrendered for payment, redemption, repurchase, conversion, registration of transfer or exchange, if surrendered to the Issuer or any agent of the Issuer or the Trustee, shall be delivered to the Trustee for cancellation or, if surrendered to the Trustee, shall be canceled by it; and no Securities shall be issued in lieu thereof except as expressly permitted by any of the provisions of this Indenture. The Trustee shall dispose of canceled Securities held by it in accordance with the record retention policies of the Trustee in effect from time to time and, if such canceled certificates are destroyed, shall deliver a certificate of destruction to the Issuer. If the Issuer shall acquire any of the Securities, such acquisition shall not operate as a redemption or satisfaction of the indebtedness represented by such Securities unless and until the same are delivered to the Trustee for cancellation.

Section 2.11 *Temporary Securities.* Pending the preparation of definitive Securities for any series, the Issuer may execute and the Trustee shall authenticate and deliver temporary Securities for such series (printed, lithographed, typewritten or otherwise reproduced, in each case in form satisfactory to the Trustee). Temporary Securities of any series shall be issuable as registered Securities without coupons, of any authorized denomination, and substantially in the form of the definitive Securities of such series but with such omissions, insertions and variations as may be appropriate for temporary Securities, all as may be determined by the Issuer with the concurrence of the Trustee. Temporary Securities may contain such reference to any provisions of this Indenture as may be appropriate. Every temporary Security shall be executed by the Issuer and be authenticated by the Trustee upon the same conditions and in substantially the same manner, and with like effect, as the definitive Securities. Without unreasonable delay the Issuer shall execute and shall furnish definitive Securities of such series and thereupon temporary Securities of such series may be surrendered in exchange therefor without charge at each office or agency to be maintained by the Issuer for that purpose pursuant to Section 3.02, and the Trustee shall authenticate and deliver in exchange for such temporary Securities of such series a like aggregate Principal amount of definitive Securities of the same series of authorized denominations. Until so exchanged, the temporary Securities of any series shall be entitled to the same benefits under this Indenture as definitive Securities of such series.

Section 2.12 *Computation of Interest.* Except as otherwise specified in the Securities of a series, interest shall be computed on the basis of a 360-day year of twelve 30-day months.

Section 2.13 *CUSIP Numbers*. The Issuer in issuing the Securities may use “CUSIP” numbers (if then generally in use), and, if so, the Trustee shall use “CUSIP” numbers in notices of redemption as a convenience to Holders; provided that any such notice may state that no representation is made as to the correctness of such numbers either as printed on the Securities or as contained in any notice of a redemption and that reliance may be placed only on the other identification numbers printed on the Securities, and any such redemption shall not be affected by any defect in or omission of such numbers. The Issuer will notify the Trustee of any change in the “CUSIP” numbers.

ARTICLE 3
COVENANTS OF THE ISSUER AND THE TRUSTEE

Section 3.01 *Payment of Principal and Interest*. The Issuer covenants and agrees for the benefit of each series of Securities that it will duly and punctually pay or cause to be paid the Principal of, and interest on, each of the Securities of such series at the place or places, at the respective times and in the manner provided in such Securities. Each installment of interest on the Securities of any series may be paid by mailing checks for such interest payable to or upon the written order of the Holders of Securities entitled thereto as they shall appear on the registry books of the Issuer.

Notwithstanding any provisions of this Indenture and the Securities of any series to the contrary, if the Issuer and a Holder of any Registered Security so agree or if expressly provided pursuant to Section 2.03, payments of interest on, and any portion of the Principal of, such Holder’s Registered Security shall be made by the paying agent, upon receipt from the Issuer of immediately available funds by 11:00 a.m., New York City time (or such other time as may be agreed to between the Issuer and the paying agent) or the Issuer, directly to the Holder of such Security (by wire transfer of Federal funds or immediately available funds or otherwise) if the Holder has delivered written instructions to the Trustee 15 days prior to such payment date requesting that such payment will be so made and designating the bank account to which such payments shall be so made and, in the case of payments of Principal, surrenders the same to the Trustee. The Trustee shall be entitled to rely on the last instruction delivered by the Holder pursuant to this Section 3.01 unless a new instruction is delivered 15 days prior to a payment date. The Issuer will indemnify and hold each of the Trustee and any paying agent harmless against any loss, liability or expense (including attorneys’ fees and expenses) resulting from any act or omission to act on the part of the Issuer or any such Holder in connection with any such agreement or from making any payment in accordance with any such agreement.

Section 3.02 *Offices for Payments, etc.* So long as any of the Securities remain outstanding, the Issuer will maintain in the Borough of Manhattan, The City of New York an office or agency (n) where the Securities may be presented for payment, (o) where the Securities may be presented for registration of transfer and for exchange as in this Indenture provided, (p) where notices and demands to or upon the Issuer in respect of the Securities or of this Indenture may be served and (q) for Securities of each series that is convertible, where such Securities may be presented for conversion. The Issuer will give to the Trustee written notice of the location of any such office or agency and of any change of location thereof. Unless otherwise specified in accordance with Section 2.03, the Issuer hereby initially designates the Corporate Trust Office of Trustee as the office to be maintained by it for each such purpose. In case the Issuer shall fail to so designate or maintain any such office or agency or shall fail to give such notice of the location or of any change in the location thereof, presentations and demands may be made and notices may be served at the Corporate Trust Office.

Section 3.03 *Paying Agents*. Whenever the Issuer shall appoint a paying agent other than the Trustee with respect to the Securities of any series, it will cause such paying agent to execute and deliver to the Trustee an instrument in which such agent shall agree with the Trustee, subject to the provisions of this Section:

(a) that it will hold all sums received by it as such agent for the payment of the Principal of or interest on the Securities of such series (whether such sums have been paid to it by the Issuer or by any other obligor on the Securities of such series) in trust for the benefit of the Holders of the Securities of such series or of the Trustee;

(b) that it will give the Trustee notice of any failure by the Issuer (or by any other obligor on the Securities of such series) to make any payment of the Principal of or interest on the Securities of such series when the same shall be due and payable; and during the continuance of the failure referred to in clause Section 3.03(b) above.

The Issuer will, on or prior to each due date of the Principal of or interest on the Securities of such series, deposit with the paying agent a sum sufficient to pay such Principal or interest so becoming due, and (unless such paying agent is the Trustee) the Issuer will promptly notify the Trustee of any failure to take such action.

If the Issuer shall act as its own paying agent with respect to the Securities of any Series, it will, on or before each due date of the Principal of or interest on the Securities of such series, set aside, segregate and hold in trust for the benefit of the Holders of the Securities of such series a sum sufficient to pay such Principal or interest so becoming due. The Issuer will promptly notify the Trustee of any failure to take such action.

Whenever the Issuer shall have one or more paying agents for any series of Securities, it will, on or before each due date of the Principal of or interest on any Securities of such series, deposit with the paying agent or agents for the Securities of such series a sum, by 11:00 a.m. New York City time in immediately available funds on the payment date, sufficient to pay the Principal or interest so becoming due with respect to the Securities of such series, and (unless such paying agent is the Trustee) the Issuer will promptly notify the Trustee in writing of any failure so to act.

Anything in this section to the contrary notwithstanding, the Issuer may at any time, for the purpose of obtaining a satisfaction and discharge with respect to one or more or all series of Securities hereunder, or for any other reason, pay or cause to be paid to the Trustee all sums held in trust for any such series by the Issuer or any paying agent hereunder, as required by this Section, such sums to be held by the Trustee upon the trusts herein contained.

Anything in this Section 3.03 to the contrary notwithstanding, the agreement to hold sums in trust as provided in this Section 3.03 is subject to the provisions of Section 9.05.

Section 3.04 *Certificate of the Issuer*. Within 120 days after the close of the fiscal year ended ●, and within 120 days after the close of each fiscal year thereafter, the Issuer will furnish to the Trustee a brief certificate (which need not comply with Section 10.05) from the principal executive, financial or accounting officer of the Issuer as to his or her knowledge of the Issuer's compliance with all conditions and covenants under the Indenture (such compliance to be determined without regard to any period of grace or requirement of notice provided under the Indenture).

At the time such certificate is filed, the Issuer will also file with the Trustee a letter or statement of the independent accountants who shall have certified the financial statements of the Issuer for its preceding fiscal year to the effect that, in making the examination necessary for certification of such financial statements, they have obtained no knowledge of any default by the Issuer in the performance or fulfillment of any covenant, agreement or condition contained in this Indenture, which default remains uncured at the date of such letter or statement, or, if they shall have obtained knowledge of any such uncured default, specifying in such letter or statement such default or defaults and the nature and status thereof, it being understood that such accountants shall not be liable directly or indirectly for failure to obtain knowledge of any such default or defaults, and that nothing contained in this Section 3.04 shall be construed to require such accountants to make any investigation beyond the scope required in connection with such examination.

Section 3.05 *List of Securityholders*. If and so long as the Trustee shall not be the Security registrar for the Securities of any series, the Issuer will furnish or cause to be furnished to the Trustee a list in such form as the Trustee may reasonably require of the names and addresses of the Holders of the Securities of such series pursuant to Section 312 of the Trust Indenture Act of 1939 (a) semi-annually not more than 10 days after each record date for the payment of interest on such Securities, as hereinabove specified, as of such record date and on dates to be determined pursuant to Section 2.03 for non-interest bearing Securities in each year and (b) at such other times as the Trustee may request in writing, within 30 days after receipt by the Issuer of any such request as of a date not more than 10 days prior to the time such information is furnished.

Section 3.06 *Reports by the Issuer*. The Issuer covenants to:

(a) file, whether or not required to do so under applicable law, with the Trustee, within 15 days after the Issuer files the same with the Commission:

(i) copies of the annual reports and of the information, documents, and other reports which the Issuer files with the Commission pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934; and

(ii) such additional information, documents and reports with respect to compliance by the Issuer with the conditions and covenants provided for in this Indenture as the Issuer may from time to time file with the Commission; and

(b) transmit to the Securityholders, in the manner and to the extent provided in Section 10.04, such summaries of any information, documents and reports required to be filed with the Trustee pursuant to the provisions of subdivision (a) of this Section 3.06 as may be required by the rules and regulations of the Commission.

Delivery of such reports, information and documents to the Trustee is for informational purposes only and the Trustee's receipt of such shall not constitute constructive notice of any information contained therein or determinable from information contained therein, including the Issuer's compliance with any of its covenants hereunder (as to which the Trustee is entitled to rely exclusively on Officers' Certificates).

Section 3.07 *Corporate Existence*. So long as any of the Securities remain unpaid, the Issuer will at all times (except as otherwise provided or permitted elsewhere in this Indenture) do or cause to be done all things necessary to preserve and keep in full force and effect its corporate existence.

Section 3.08 *Restrictions on Mergers, Sales and Consolidations*. So long as any of the Securities remain unpaid, the Issuer will not consolidate or merge with or sell, convey or lease all or substantially all of its property to any other corporation except as permitted in Article 8 hereof.

Section 3.09 *Further Assurances*. From time to time whenever requested by the Trustee, the Issuer will execute and deliver such further instruments and assurances and do such further acts as may be reasonably necessary or proper to carry out more effectually the purposes of this Indenture or to secure the rights and remedies hereunder of the Holders of the Securities of any series.

ARTICLE 4 REMEDIES OF THE TRUSTEE AND SECURITYHOLDERS ON EVENT OF DEFAULT

Section 4.01 *Event of Default Defined; Acceleration of Maturity; Waiver of Default*. "**Event of Default**" with respect to Securities of any series wherever used herein, means any one of the following events which shall have occurred and be continuing (whatever the reason for such Event of Default and whether it shall be voluntary or involuntary or be effected by operation of law or pursuant to any judgment, decree or order of any court or any order, rule or regulation of any administrative or governmental body):

(a) default by the Issuer in the payment of any installment of interest upon any of the Securities of such series as and when the same shall become due and payable, and continuance of such default for a period of 30 days;

(b) default by the Issuer in the payment of all or any part of the Principal on any of the Securities of such series as and when the same shall become due and payable either at maturity, upon redemption, by declaration or otherwise, and continuance of such default for a period of five days;

(c) default by the Issuer in the performance, or breach by the Issuer, of any of its covenants or agreements in respect of the Securities of such series (other than a covenant or agreement in respect of the Securities of such series a default in whose performance or whose breach is elsewhere in this section specifically dealt with), and continuance of such default or breach for a period of 30 consecutive days after there has been given, by registered or certified mail, to the Issuer by the Trustee or to the Issuer and the Trustee by the Holders of at least 25% in Principal amount of the Outstanding Securities of all series affected thereby, a written notice specifying such default or breach and requiring it to be remedied and stating that such notice is a notice of default hereunder;

(d) the entry by a court having jurisdiction in the premises of a decree or order for relief in respect of the Issuer in an involuntary case under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect, or the appointment of a receiver, liquidator, assignee, custodian, trustee or sequestrator (or similar official) of the Issuer or for any substantial part of the Issuer's property and assets or the ordering of the winding up or liquidation of the Issuer's affairs, and the continuance of any such decree or order unstayed and in effect for a period of 90 consecutive days;

(e) the commencement by the Issuer of a voluntary case under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect, or the consent by the Issuer to the entry of an order for relief in an involuntary case under any such law, or the consent by the Issuer to the appointment of or taking possession by a receiver, liquidator, assignee, custodian, trustee or sequestrator (or similar official) of the Issuer or for any substantial part of the Issuer's property, or the making of any general assignment by the Issuer for the benefit of creditors; or

(f) any other Event of Default provided in the supplemental indenture or resolution of the Board of Directors under which such series of Securities is issued or in the form of Security for such series.

If an Event of Default described in clauses 4.01(a), 4.01(b), 4.01(c) or 4.01(f) occurs and is continuing, then, and in each and every such case, unless the Principal of all of the Securities of such series shall have already become due and payable, either the Trustee or the Holders of not less than 25% in aggregate Principal amount of the Securities of any affected series then Outstanding hereunder (each such series voting as a separate class) by notice in writing to the Issuer (and to the Trustee if given by Securityholders), may declare the entire Principal (or, if the Securities of such series are Original Issue Discount Securities, such portion of the Principal amount as may be specified in the terms of such series) of all Securities of such series and the interest accrued thereon, if any, to be due and payable immediately, and upon any such declaration the same shall become immediately due and payable. If an Event of Default described in clauses Section 4.01(d) or Section 4.01(e) occurs and is continuing, then the Principal amount of all the Securities then Outstanding and interest accrued thereon, if any, shall be and become immediately due and payable, without any notice or other action by any Holder or the Trustee, to the full extent permitted by applicable law.

The foregoing provisions, however, are subject to the condition that if, at any time after the Principal (or, if the Securities are Original Issue Discount Securities, such portion of the Principal as may be specified in the terms thereof) of the Securities of any series (or of all the Securities, as the case may be) shall have been so declared due and payable, and before any judgment or decree for the payment of the monies due shall have been obtained or entered as hereinafter provided, the Issuer shall pay or shall deposit with the Trustee a sum sufficient to pay all matured installments of interest upon all the Securities of such series (or of all the Securities, as the case may be) and the Principal of any and all Securities of such series (or of all the Securities, as the case may be) which shall have become due otherwise than by acceleration (with interest upon such Principal and, to the extent that payment of such interest is enforceable under applicable law, on overdue installments of interest, at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series (or at the respective rates of interest or Yields to Maturity of all the Securities, as the case may be) to the date of such payment or deposit) and such amount as shall be sufficient to cover reasonable compensation to the Trustee, its agents, attorneys and counsel, and all other expenses and liabilities incurred, and all advances made, by the Trustee except as a result of negligence or bad faith, and if any and all Events of Default under the Indenture, other than the non-payment of the Principal of Securities which shall have become due by acceleration, shall have been cured, waived or otherwise remedied as provided herein, then and in every such case the Holders of a majority in aggregate Principal amount of all the then Outstanding Securities of all such series that have been accelerated, each such series voting as a separate class, by written notice to the Issuer and to the Trustee, may waive all defaults with respect to such series (or with respect to all the Securities, as the case may be) and rescind and annul such declaration and its consequences, but no such waiver or rescission and annulment shall extend to or shall affect any subsequent default or shall impair any right consequent thereon.

For all purposes under this Indenture, if a portion of the Principal of any Original Issue Discount Securities shall have been accelerated and declared due and payable pursuant to the provisions hereof, then, from and after such declaration, unless such declaration has been rescinded and annulled, the Principal amount of such Original Issue Discount Securities shall be deemed, for all purposes hereunder, to be such Portion of the Principal thereof as shall be due and payable as a result of such acceleration, and payment of such portion of the Principal thereof as shall be due and payable as a result of such acceleration, together with interest, if any, thereon and all other amounts owing thereunder, shall constitute payment in full of such Original Issue Discount Securities.

Section 4.02 *Collection of Indebtedness by Trustee; Trustee May Prove Debt*. The Issuer covenants that (h) in case default shall be made in the payment of any installment of interest on any of the Securities of any series when such interest shall have become due and payable, and such default shall have continued for a period of 30 days or (i) in case default shall be made in the payment of all or any part of the Principal of any of the Securities of any series when the same shall have become due and payable, whether upon maturity of the Securities of such series or upon any redemption or by declaration or otherwise, then in each case upon demand of the Trustee, the Issuer will pay to the Trustee for the benefit of the Holders of the Securities of such series (x) the whole amount that then shall have become due and payable on all Securities of such series for Principal or interest, as the case may be (with interest to the date of such payment upon the overdue Principal and, to the extent that payment of such interest is enforceable under applicable law, on overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series) and (y) in addition thereto, such further amount as shall be sufficient to cover the costs and expenses of collection, including reasonable compensation to the Trustee and each predecessor Trustee, their respective agents and counsel, and any expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of its negligence or bad faith.

Until such demand is made by the Trustee, the Issuer may pay the Principal of and interest on the Securities of any series to the registered Holders, whether or not the Principal of and interest on the Securities of such series be overdue.

In case the Issuer shall fail forthwith to pay such amounts upon such demand, the Trustee, in its own name and as trustee of an express trust, shall be entitled and empowered to institute any action or proceedings at law or in equity for the collection of the sums so due and unpaid, and may prosecute any such action or proceedings to judgment or final decree, and may enforce any such judgment or final decree against the Issuer or other obligor upon such Securities and collect in the manner provided by law out of the property of the Issuer or other obligor upon such Securities, wherever situated, the monies adjudged or decreed to be payable.

In case there shall be pending proceedings relative to the Issuer or any other obligor upon the Securities under Title 11 of the United States Code or any other applicable Federal or state bankruptcy, insolvency or other similar law, or in case a receiver, assignee or trustee in bankruptcy or reorganization, liquidator, sequestrator or similar official shall have been appointed for or taken possession of the Issuer or its property or such other obligor, or in case of any other comparable judicial proceedings relative to the Issuer or other obligor upon the Securities of any series, or to the creditors or property of the Issuer or such other obligor, the Trustee, irrespective of whether the Principal of any Securities shall then be due and payable as therein expressed or by declaration or otherwise and irrespective of whether the Trustee shall have made any demand pursuant to the provisions of this Section, shall be entitled and empowered, by intervention in such proceedings or otherwise:

(a) to file and prove a claim or claims for the whole amount of Principal and interest (or, if the Securities of any series are Original Issue Discount Securities, such portion of the Principal amount as may be specified in the terms of such series) owing and unpaid in respect of the Securities of any series, and to file such other papers or documents as may be necessary or advisable in order to have the claims of the Trustee (including any claim for reasonable compensation to the Trustee and each predecessor Trustee, and their respective agents, attorneys and counsel, and for reimbursement of all expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee, except as a result of negligence or bad faith) and of the Securityholders allowed in any judicial proceedings relative to the Issuer or other obligor upon the Securities of any series, or to the creditors or property of the Issuer or such other obligor;

(b) unless prohibited by applicable law and regulations, to vote on behalf of the Holders of the Securities of any series in any election of a trustee or a standby trustee in arrangement, reorganization, liquidation or other bankruptcy or insolvency proceedings or person performing similar functions in comparable proceedings; and

(c) to collect and receive any monies or other property payable or deliverable on any such claims, and to distribute all amounts received with respect to the claims of the Securityholders and of the Trustee on their behalf; and any trustee, receiver, or liquidator, custodian or other similar official is hereby authorized by each of the Securityholders to make payments to the Trustee, and, in the event that the Trustee shall consent to the making of payments directly to the Securityholders, to pay to the Trustee such amounts as shall be sufficient to cover reasonable compensation to the Trustee, each predecessor Trustee and their respective agents, attorneys and counsel, and all other expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of negligence or bad faith and all other amounts due to the Trustee or any predecessor Trustee pursuant to Section 5.06.

Nothing herein contained shall be deemed to authorize the Trustee to authorize or consent to or vote for or accept or adopt on behalf of any Securityholder any plan of reorganization, arrangement, adjustment or composition affecting the Securities of any series or the rights of any Holder thereof, or to authorize the Trustee to vote in respect of the claim of any Securityholder in any such proceeding except, as aforesaid, to vote for the election of a trustee in bankruptcy or similar person.

All rights of action and of asserting claims under this Indenture, or under any of the Securities, may be enforced by the Trustee without the possession of any of the Securities or the production thereof on any trial or other proceedings relative thereto, and any such action or proceedings instituted by the Trustee shall be brought in its own name as trustee of an express trust, and any recovery of judgment, subject to the payment of the expenses, disbursements and compensation of the Trustee, each predecessor Trustee and their respective agents and attorneys, shall be for the ratable benefit of the Holders of the Securities in respect of which such action was taken.

In any proceedings brought by the Trustee (and also any proceedings involving the interpretation of any provision of this Indenture to which the Trustee shall be a party) the Trustee shall be held to represent all the Holders of the Securities in respect to which such action was taken, and it shall not be necessary to make any Holders of such Securities parties to any such proceedings.

Section 4.03 *Application of Proceeds*. Any monies collected by the Trustee pursuant to this Article in respect of any series shall be applied in the following order at the date or dates fixed by the Trustee and, in case of the distribution of such monies on account of Principal or interest, upon presentation of the several Securities in respect of which monies have been collected and stamping (or otherwise noting) thereon the payment, or issuing Securities of such series in reduced Principal amounts in exchange for the presented Securities of like series if only partially paid, or upon surrender thereof if fully paid:

FIRST: To the payment of costs and expenses applicable to such series in respect of which monies have been collected, including reasonable compensation to the Trustee and each predecessor Trustee and their respective agents and attorneys and of all expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of negligence or bad faith, and all other amounts due to the Trustee or any predecessor Trustee pursuant to Section 5.06;

SECOND: In case the Principal of the Securities of such series in respect of which monies have been collected shall not have become and be then due and payable, to the payment of interest on the Securities of such series in default in the order of the maturity of the installments of such interest, with interest (to the extent that such interest has been collected by the Trustee) upon the overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in such Securities, such payments to be made ratably to the persons entitled thereto, without discrimination or preference;

THIRD: In case the Principal of the Securities of such series in respect of which monies have been collected shall have become and shall be then due and payable, to the payment of the whole amount then owing and unpaid upon all the Securities of such series for Principal and interest, with interest upon the overdue Principal, and (to the extent that such interest has been collected by the Trustee) upon overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series; and in case such monies shall be insufficient to pay in full the whole amount so due and unpaid upon the Securities of such series, then to the payment of such Principal and interest or yield to maturity, without preference or priority of Principal over interest or yield to maturity, or of interest or yield to maturity over Principal, or of any installment of interest over any other installment of interest, or of any Security of such series over any other Security of such series, ratably to the aggregate of such Principal and accrued and unpaid interest or yield to maturity; and

FOURTH: To the payment of the remainder, if any, to the Issuer or any other person lawfully entitled thereto.

Section 4.04 *Suits for Enforcement*. In case an Event of Default has occurred, has not been waived and is continuing, the Trustee may proceed to protect and enforce the rights vested in it by this Indenture, either at law or in equity or in bankruptcy or otherwise, whether for the specific enforcement of any covenant or agreement contained in this Indenture or in aid of the exercise of any power granted in this Indenture or to enforce any other legal or equitable right vested in the Trustee by this Indenture or by law.

Section 4.05 *Restoration of Rights on Abandonment of Proceedings*. In case the Trustee shall have proceeded to enforce any right under this Indenture and such proceedings shall have been discontinued or abandoned for any reason, or shall have been determined adversely to the Trustee, then and in every such case the Issuer and the Trustee shall be restored respectively to their former positions and rights hereunder, and all rights, remedies and powers of the Issuer, the Trustee and the Securityholders shall continue as though no such proceedings had been taken.

Section 4.06 *Limitations on Suits by Securityholder*. No Holder of any Security of any series shall have any right by virtue or by availing of any provision of this Indenture to institute any action or proceeding at law or in equity or in bankruptcy or otherwise upon or under or with respect to this Indenture, or for the appointment of a trustee, receiver, liquidator, custodian or other similar official or for any other remedy hereunder, unless such Holder previously shall have given to the Trustee written notice of an Event of Default and of the continuance thereof, as hereinbefore provided, and unless also the Holders of not less than 25% in aggregate Principal amount of the Securities of such series then outstanding shall have made written request upon the Trustee to institute such action or proceedings in respect of such Event of Default in its own name as trustee hereunder and shall have offered to the Trustee indemnity satisfactory to the Trustee against the costs, expenses and liabilities to be incurred therein or thereby and the Trustee for 60 days after its receipt of such notice, request and offer of indemnity shall have failed to institute any such action or proceeding and no direction inconsistent with such written request shall have been given to the Trustee pursuant to Section 4.09; it being understood and intended, and being expressly covenanted by the Holder of every Security with every other Holder and the Trustee, that no one or more Holders of Securities of any series shall have any right in any manner whatever by virtue or by availing of any provision of this Indenture to affect, disturb or prejudice the rights of any other such Holder of Securities, or to obtain or seek to obtain priority over or preference to any other such Holder or to enforce any right under this Indenture, except in the manner herein provided and for the equal, ratable and common benefit of all Holders of Securities of the applicable series. For the protection and enforcement of the provisions of this Section, each and every Securityholder and the Trustee shall be entitled to such relief as can be given either at law or in equity.

Section 4.07 *Unconditional Right of Securityholders to Institute Certain Suits*. Notwithstanding any other provision in this Indenture and any provision of any Security, the right of any Holder of any Security to receive payment of the Principal of or interest on such Security on or after the respective due dates expressed in such Security, or to institute suit for the enforcement of any such payment on or after such respective dates, shall not be impaired or affected without the consent of such Holder.

Section 4.08 *Powers and Remedies Cumulative; Delay or Omission Not Waiver of Default*. Except as provided in Section 4.06, no right or remedy herein conferred upon or reserved to the Trustee or to the Securityholders is intended to be exclusive of any other right or remedy, and every right and remedy shall, to the extent permitted by law, be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other appropriate right or remedy.

No delay or omission of the Trustee or of any Securityholder to exercise any right or power accruing upon any Event of Default occurring and continuing as aforesaid shall impair any such right or power or shall be construed to be a waiver of any such Event of Default or an acquiescence therein; and, subject to Section 4.06, every power and remedy given by this Indenture or by law to the Trustee or to the Securityholders may be exercised from time to time, and as often as shall be deemed expedient, by the Trustee or by the Securityholders.

Section 4.09 *Control by Securityholders*. The Holders of a majority in aggregate Principal amount of the Securities of each series affected (with each series voting as a separate class) at the time outstanding shall have the right to direct the time, method, and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred on the Trustee with respect to the Securities of such series by this Indenture; provided that such direction shall not be otherwise than in accordance with law and the provisions of this Indenture and provided further that (subject to the provisions of Section 5.01) the Trustee shall have the right to decline to follow any such direction if the Trustee, being advised by counsel, shall determine that the action or proceeding so directed may not lawfully be taken or if the Trustee in good faith by its board of directors, the executive committee, or a trust committee of directors or Responsible Officers of the Trustee shall determine that the action or proceedings so directed would subject the Trustee to personal liability or if the Trustee in good faith shall so determine that the actions or forbearances specified in or pursuant to such direction would be unduly prejudicial to the interests of Holders of the Securities of all series so affected not joining in the giving of said direction.

Nothing in this Indenture shall impair the right of the Trustee to take any action which is not inconsistent with such direction or directions by Securityholders.

Section 4.10 *Waiver of Past Defaults*. Prior to a declaration of the acceleration of the maturity of the Securities of any series as provided in Section 4.01, the Holders of a majority in aggregate Principal amount of the Securities of such series at the time Outstanding (each such series voting as a separate class) may on behalf of the Holders of all the Securities of such series waive an existing default or Event of Default, except a default in the payment of Principal of or interest on any Security as specified in clauses (a) or (b) of Section 4.01 or in respect of a covenant or provision hereof which cannot be modified or amended without the consent of each Holder affected as provided in Section 7.02. In the case of any such waiver, the Issuer, the Trustee and the Holders of the Securities of each series affected shall be restored to their former positions and rights hereunder, respectively.

Upon any such waiver, such default shall cease to exist and be deemed to have been cured and not to have occurred, and any Event of Default arising therefrom shall be deemed to have been cured, and not to have occurred for every purpose of this Indenture; but no such waiver shall extend to any subsequent or other default or Event of Default or impair any right consequent thereon.

Section 4.11 *Trustee to Give Notice of Default, But May Withhold in Certain Circumstances*. The Trustee shall give to the Securityholders of any series, as the names and addresses of such Holders appear on the registry books, notice by mail of all defaults known to Responsible Officers of the Trustee which have occurred with respect to such series, such notice to be transmitted within 90 days after the occurrence thereof, unless such defaults shall have been cured before the giving of such notice (the term "default" or "defaults" for the purposes of this section being hereby defined to mean any event or condition which is, or with notice or lapse of time or both would become, an Event of Default); *provided* that, except in the case of default in the payment of the Principal of or interest on any of the Securities of such series, the Trustee shall be protected in withholding such notice if and so long as the board of directors, the executive committee, or a trust committee of directors or trustees and/or Responsible Officers of the Trustee in good faith determines that the withholding of such notice is in the interests of the Securityholders of such series.

Section 4.12 *Right of Court to Require Filing of Undertaking to Pay Costs*. All parties to this Indenture agree, and each Holder of any Security by his acceptance thereof shall be deemed to have agreed, that any court may in its discretion require, in any suit for the enforcement of any right or remedy under this Indenture or in any suit against the Trustee for any action taken, suffered or omitted by it as Trustee, the filing by any party litigant in such suit of an undertaking to pay the costs of such suit, and that such court may in its discretion assess reasonable costs, including reasonable attorneys' fees and expenses, against any party litigant in such suit, having due regard to the merits and good faith of the claims or defenses made by such party litigant; *provided* that the provisions of this Section 4.12 shall not apply to (i) any suit instituted by the Trustee, (ii) any suit instituted by any Securityholder or group of Securityholders of any series holding in the aggregate more than 10% in aggregate Principal amount of the Securities of such series or (iii) any suit instituted by a Holder pursuant to Section 4.07.

ARTICLE 5
CONCERNING THE TRUSTEE

Section 5.01 *Duties and Responsibilities of the Trustee*. With respect to the Holders of any series of Securities issued hereunder, the Trustee, prior to the occurrence of an Event of Default with respect to the Securities of a particular series and after the curing or waiving of all Events of Default which may have occurred with respect to such series, undertakes to perform such duties and only such duties as are specifically set forth in this Indenture. In case an Event of Default with respect to the Securities of a series has occurred (which has not been cured or waived) the Trustee shall exercise such of the rights and powers vested in it by this Indenture, and use the same degree of care and skill in their exercise, as a prudent person would exercise or use under the circumstances in the conduct of such person's own affairs.

(a) Prior to the occurrence of an Event of Default with respect to the Securities of any series and after the curing or waiving of all such Events of Default with respect to such series which may have occurred:

(i) the duties and obligations of the Trustee with respect to the Securities of any Series shall be determined solely by the express provisions of this Indenture, and the Trustee shall not be liable except for the performance of such duties and obligations as are specifically set forth in this Indenture, and no implied covenants or obligations shall be read into this Indenture against the Trustee; and

(ii) in the absence of bad faith on the part of the Trustee, the Trustee may conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon any statements, certificates or opinions furnished to the Trustee and conforming to the requirements of this Indenture; but in the case of any such statements, certificates or opinions which by any provision hereof are specifically required to be furnished to the Trustee, the Trustee shall be under a duty to examine the same to determine whether or not they conform to the requirements of this Indenture.

(b) No provision of this Indenture shall be construed to relieve the Trustee from liability for its own negligent action, its own negligent failure to act or its own willful misconduct, except that:

(i) this subsection (b) shall not be construed to limit the effect of subsection (a) of this Section 5.01;

(ii) the Trustee shall not be liable for any error of judgment made in good faith by a Responsible Officer or Responsible Officers of the Trustee, unless it shall be proved that the Trustee was negligent in ascertaining the pertinent facts; and

(iii) the Trustee shall not be liable with respect to any action taken, suffered or omitted to be taken by it in good faith in accordance with the direction of the Holders relating to the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred upon the Trustee, under this Indenture.

None of the provisions contained in this Indenture shall require the Trustee to expend or risk its own funds or otherwise incur personal financial liability in the performance of any of its duties or in the exercise of any of its rights or powers, if there shall be reasonable ground for believing that the repayment of such funds or adequate indemnity against such liability is not reasonably assured to it.

The provisions of this Section 5.01 are in furtherance of and subject to Sections 315 and 316 of the Trust Indenture Act of 1939.

Whether or not therein expressly provided, every provision of this Indenture relating to the conduct of, affecting the liability of or affording protection to the Trustee shall be subject to the provisions of this Section 5.01.

Section 5.02 *Certain Rights of the Trustee*. In furtherance of and subject to the Trust Indenture Act of 1939, and subject to Section 5.01:

(a) In the absence of bad faith on its part, the Trustee may conclusively rely and shall be protected in acting or refraining from acting upon any resolution, Officers' Certificate or any other certificate, statement, instrument, opinion, report, notice, request, direction, consent, order, bond, debenture, note, coupon, security or other paper or document believed by it to be genuine and to have been signed or presented by the proper party or parties;

(b) any request, direction, order or demand of the Issuer mentioned herein shall be sufficiently evidenced by an Officers' Certificate (unless other evidence in respect thereof be herein specifically prescribed); and any resolution of the Board of Directors may be evidenced to the Trustee by a copy thereof certified by the secretary or an assistant secretary of the Issuer;

(c) the Trustee may consult with counsel of its selection and any advice or Opinion of Counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted to be taken by it hereunder in good faith and in accordance with such advice or Opinion of Counsel;

(d) the Trustee shall be under no obligation to exercise any of the trusts or powers vested in it by this Indenture at the request, order or direction of any of the Securityholders pursuant to the provisions of this Indenture, unless such Securityholders shall have offered to the Trustee reasonable security or indemnity against the costs, expenses and liabilities which might be incurred by it in connection with such request, order or direction;

(e) the Trustee shall not be liable for any action taken or omitted by it in good faith and believed by it to be authorized or within the discretion, rights or powers conferred upon it by this Indenture;

(f) prior to the occurrence of an Event of Default hereunder and after the curing or waiving of all Events of Default, the Trustee shall not be bound to make any investigation into the facts or matters stated in any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, approval, appraisal, bond, debenture, note, coupon, security, or other paper or document unless requested in writing so to do by the Holders of not less than a majority in aggregate Principal amount of the Securities of all series affected then outstanding; provided that, if the payment within a reasonable time to the Trustee of the costs, expenses or liabilities likely to be incurred by it in the making of such investigation is, in the opinion of the Trustee, not reasonably assured to the Trustee by the security afforded to it by the terms of this Indenture, the Trustee may require indemnity satisfactory to it against such expenses or liabilities as a condition to proceeding, and the reasonable expenses of every such investigation shall be paid by the Issuer or, if paid by the Trustee or any predecessor trustee, shall be repaid by the Issuer upon demand;

(g) the Trustee may execute any of the trusts or powers hereunder or perform any duties hereunder either directly or by or through agents or attorneys not regularly in its employ and the Trustee shall not be responsible for any misconduct or negligence on the part of any such agent or attorney appointed with due care by it hereunder;

(h) the Trustee shall not be liable for any action taken, suffered or omitted in good faith and believed by it to be authorized or within the discretion, rights or powers conferred upon it by this Indenture;

(i) the Trustee shall not be deemed to have notice of any Default or Event of Default unless a Responsible Officer of the Trustee has actual knowledge thereof or unless written notice of any event which is in fact such a default is received by the Trustee at the Corporate Trust Office of the Trustee, and such notice references the Securities and this Indenture;

(j) the rights, privileges, protections, immunities and benefits given to the Trustee, including, without limitation, its right to be indemnified, are extended to, and shall be enforceable by, the Trustee in each of its capacities hereunder, and each agent, custodian and other Person employed to act hereunder; and

(k) the Trustee may request that the Issuer deliver an Officers' Certificate setting forth the names of individuals and/or titles of officers authorized at such time to take specified actions pursuant to this Indenture, which Officers' Certificate may be signed by any person authorized to sign an Officers' Certificate, including any person specified as so authorized in any such certificate previously delivered and not superseded.

Section 5.03 *Trustee Not Responsible for Recitals, Disposition of Securities or Application of Proceeds Thereof*. The recitals contained herein and in the Securities, except the Trustee's certificates of authentication, shall be taken as the statements of the Issuer, and the Trustee assumes no responsibility for the correctness of the same. The Trustee makes no representation as to the validity or sufficiency of this Indenture or the Securities. The Trustee shall not be accountable for the use or application by the Issuer of any of the Securities or of the proceeds thereof.

Section 5.04 *Trustee and Agents May Hold Securities; Collections, etc.* The Trustee or any agent of the Issuer or the Trustee, in its individual or any other capacity, may become the owner or pledgee of Securities with the same rights it would have if it were not the Trustee or such agent and may otherwise deal with the Issuer and receive, collect, hold and retain collections from the Issuer with the same rights it would have if it were not the Trustee or such agent.

Section 5.05 *Monies Held by Trustee.* All monies received by the Trustee in trust hereunder need not be segregated from other funds except to the extent required by mandatory provisions of law. Neither the Trustee nor any agent of the Issuer or the Trustee shall be under any liability for interest on any monies received by it hereunder.

Section 5.06 *Compensation and Indemnification of Trustee and Its Prior Claim.* The Issuer covenants and agrees to pay to the Trustee from time to time, and the Trustee shall be entitled to, such compensation as shall be agreed in writing from time to time by the Issuer and the Trustee (which shall not be limited by any provision of law in regard to the compensation of a trustee of an express trust) and the Issuer covenants and agrees to pay or reimburse the Trustee and each predecessor Trustee upon its request for all reasonable expenses, disbursements and advances incurred or made by or on behalf of it in accordance with any of the provisions of this Indenture (including the reasonable compensation and the expenses and disbursements of its counsel and of all agents and other persons not regularly in its employ) except to the extent any such expense, disbursement or advance may arise from its negligence or bad faith. The Issuer also covenants and agrees to indemnify the Trustee and each predecessor Trustee for, and to hold it harmless against, any loss, liability or expense arising out of or in connection with the acceptance or administration of this Indenture or the trusts hereunder and the performance of its duties hereunder, including the costs and expenses of defending itself against or investigating any claim of liability (whether asserted by the Issuer, a Holder or any other Person) in the premises, except to the extent such loss, liability or expense is due to the negligence or bad faith of the Trustee or such predecessor Trustee. The obligations of the Issuer under this section to compensate and indemnify the Trustee and each predecessor Trustee and to pay or reimburse the Trustee and each predecessor Trustee for expenses, disbursements and advances shall constitute additional indebtedness hereunder and shall survive the satisfaction and discharge of this Indenture or the resignation or removal of the Trustee. Such additional indebtedness shall be a senior claim and lien to that of the Securities upon all property and funds held or collected by the Trustee as such, except funds held in trust for the benefit of the Holders of particular Securities, and the Securities are hereby subordinated to such senior claim. The parties agree that if the Trustee renders services following an Event of Default under Section 4.01(d) or 4.01(e), compensation for such services is intended to constitute administrative expense under any bankruptcy law.

Section 5.07 *Right of Trustee to Rely on Officers' Certificate, etc.* Subject to Section 5.01 and 5.02, whenever in the administration of the trusts of this Indenture the Trustee shall deem it necessary or desirable that a matter be proved or established prior to taking or suffering or omitting any action hereunder, such matter (unless other evidence in respect thereof be herein specifically prescribed) may, in the absence of negligence or bad faith on the part of the Trustee, be deemed to be conclusively proved and established by an Officers' Certificate delivered to the Trustee, and such certificate, in the absence of negligence or bad faith on the part of the Trustee, shall be full warrant to the Trustee for any action taken, suffered or omitted by it under the provisions of this Indenture upon the faith thereof.

Section 5.08 *Persons Eligible for Appointment as Trustee.* The Trustee for each series of Securities hereunder shall at all times be a corporation which is eligible in accordance with the provisions of Section 310(a) of the Trust Indenture Act of 1939 and which has (or which is a Wholly-Owned Subsidiary, directly or indirectly, of a bank holding company which has) a combined capital and surplus of \$50,000,000. If such corporation or holding company publishes reports of condition at least annually, pursuant to law or to the requirements of a Federal, State or District of Columbia supervising or examining authority, then for the purposes of this Section, the combined capital and surplus of such corporation or holding company shall be deemed to be its combined capital and surplus as set forth in its most recent report of condition so published.

Section 5.09 *Resignation and Removal; Appointment of Successor Trustee.* (a) The Trustee, or any trustee or trustees hereafter appointed, may at any time resign with respect to one or more or all series of Securities by giving written notice of resignation to the Issuer. Upon receiving such notice of resignation, the Issuer shall promptly appoint a successor trustee or trustees with respect to the applicable series by written instrument in duplicate, executed by authority of the Board of Directors, one copy of which instrument shall be delivered to the resigning Trustee and one copy to the successor trustee or trustees. If no successor Trustee shall have been so appointed with respect to any series and have accepted appointment within 30 days after the mailing of such notice of resignation, the resigning Trustee may petition, at the expense of the Issuer, any court of competent jurisdiction for the appointment of a successor Trustee, or any Securityholder who has been a bona fide Holder of a Security or Securities of the applicable series for at least six months may, subject to the provisions of Section 4.12, on behalf of himself and all others similarly situated, petition any such court for the appointment of a successor Trustee. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, appoint a successor Trustee.

(b) In case at any time any of the following shall occur:

(i) the Trustee shall fail to comply with the provisions of Section 310(b) of the Trust Indenture Act of 1939 with respect to any series of Securities after written request therefor by the Issuer or by any Securityholder who has been a bona fide Holder of a Security or Securities of such series for at least six months;

(ii) the Trustee shall cease to be eligible in accordance with the provisions of Section 310(a) of the Trust Indenture Act of 1939 and shall fail to resign after written request therefor by the Issuer or by any Securityholder; or

(iii) the Trustee shall become incapable of acting with respect to any series of Securities, or shall be adjudged a bankrupt or insolvent, or a receiver or liquidator of the Trustee or of its property shall be appointed, or any public officer shall take charge or control of the Trustee or of its property or affairs for the purpose of rehabilitation, conservation or liquidation; then, in any such case, the Issuer may remove the Trustee with respect to the applicable series of Securities and appoint a successor trustee for such series by written instrument, in duplicate, executed by order of the Board of Directors of the Issuer, one copy of which instrument shall be delivered to the Trustee so removed and one copy to the successor Trustee, or, subject to Section 315(e) of the Trust Indenture Act of 1939, any Securityholder who has been a bona fide Holder of a Security or Securities of such series for at least six months may on behalf of himself and all others similarly situated, petition any court of competent jurisdiction for the removal of the Trustee and the appointment of a successor trustee with respect to such series. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, remove the Trustee and appoint a successor trustee.

(c) The Holders of a majority in aggregate Principal amount of the Securities of each series at the time outstanding may at any time remove the Trustee with respect to Securities of such series and appoint a successor Trustee with respect to the Securities of such series by delivering to the Trustee so removed, to the successor Trustee so appointed and to the Issuer the evidence provided in Section 6.01 of the action in that regard taken by the Securityholders.

(d) Any resignation or removal of the Trustee with respect to any series and any appointment of a successor trustee with respect to such series pursuant to any of the provisions of this Section 5.09 shall become effective upon acceptance of appointment by the successor trustee as provided in Section 5.10.

Section 5.10 Acceptance of Appointment by Successor. Any successor Trustee appointed as provided in Section 5.09 shall execute and deliver to the Issuer and to its predecessor Trustee an instrument accepting such appointment hereunder, and thereupon the resignation or removal of the predecessor Trustee with respect to all or any applicable series shall become effective and such successor Trustee, without any further act, deed or conveyance, shall become vested with all rights, powers, duties and obligations with respect to such series of its predecessor hereunder, with like effect as if originally named as Trustee for such series hereunder. On the written request of the Issuer or of the successor Trustee, upon payment of its charges then unpaid, the Trustee ceasing to act shall, subject to Section 5.06, pay over to the successor Trustee all monies at the time held by it hereunder and shall execute and deliver an instrument transferring to such successor Trustee all such rights, powers, duties and obligations. Upon request of any such successor Trustee, the Issuer shall execute any and all instruments in writing for more fully and certainly vesting in and confirming to such successor Trustee all such rights and powers. Any Trustee ceasing to act shall, nevertheless, retain a prior claim upon all property or funds held or collected by such Trustee to secure any amounts then due it pursuant to the provisions of Section 5.06.

If a successor Trustee is appointed with respect to the Securities of one or more (but not all) series, the Issuer, the predecessor Trustee and each successor Trustee with respect to the Securities of any applicable series shall execute and deliver an indenture supplemental hereto which shall contain such provisions as shall be deemed necessary or desirable to confirm that all the rights, powers, trusts and duties of the predecessor Trustee with respect to the Securities of any series as to which the predecessor Trustee is not retiring shall continue to be vested in the predecessor Trustee, and shall add to or change any of the provisions of this Indenture as shall be necessary to provide for or facilitate the administration of the trusts hereunder by more than one Trustee, it being understood that nothing herein or in such supplemental indenture shall constitute such Trustees co-trustees of the same trust and that each such Trustee shall be Trustee of a trust or trusts under separate indentures.

Upon acceptance of appointment by any successor Trustee as provided in this Section 5.10, the Issuer shall mail notice thereof by first-class mail to the Holders of Securities of any series for which such successor Trustee is acting as Trustee at their last addresses as they shall appear in the Security register. If the acceptance of appointment is substantially contemporaneous with the resignation, then the notice called for by the preceding sentence may be combined with the notice called for by Section 5.09. If the Issuer fails to mail such notice within 10 days after acceptance of appointment by the successor Trustee, the successor Trustee shall cause such notice to be mailed at the expense of the Issuer.

Section 5.11 *Merger, Conversion, Consolidation or Succession to Business of Trustee*. Any corporation into which the Trustee may be merged or converted or with which it may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Trustee shall be a party, or any corporation succeeding to all or substantially all the corporate trust business of the Trustee, shall be the successor of the Trustee hereunder, provided that such corporation shall be eligible under the provisions of Section 5.08, without the execution or filing of any paper or any further act on the part of any of the parties hereto, anything herein to the contrary notwithstanding.

In case at the time such successor to the Trustee shall succeed to the trusts created by this Indenture any of the Securities of any series shall have been authenticated but not delivered, any such successor to the Trustee may adopt the certificate of authentication of any predecessor Trustee and deliver such Securities so authenticated; and, in case at that time any of the Securities of any series shall not have been authenticated, any successor to the Trustee may authenticate such Securities either in the name of any predecessor hereunder or in the name of the successor Trustee; and in all such cases such certificate shall have the full force which it is anywhere in the Securities of such series or in this Indenture provided that the certificate of the Trustee shall have; provided, that the right to adopt the certificate of authentication of any predecessor Trustee or to authenticate Securities of any series in the name of any predecessor Trustee shall apply only to its successor or successors by merger, conversion or consolidation.

Section 5.12 *Reports to the Trustee*. The Trustee shall transmit to Holders such reports concerning the Trustee and its actions under this Indenture as may be required pursuant to the Trust Indenture Act at the times and in the manner provided pursuant thereto. If required by Section 313(a) of the Trust Indenture Act, the Trustee shall, within sixty days after each May 15 following the date of the initial issuance of Securities under this Indenture deliver to Holders a brief report, dated as of such May 15, which complies with the provisions of such Section 313(a).

A copy of each such report shall, at the time of such transmission to Holders, be filed by the Trustee with each stock exchange, if any, upon which the Securities are listed, with the Commission and with the Issuer. The Issuer will promptly notify the Trustee when the Securities are listed on any stock exchange and of any delisting thereof.

ARTICLE 6
CONCERNING THE SECURITYHOLDERS

Section 6.01 *Evidence of Action Taken by Securityholders.* Any request, demand, authorization, direction, notice, consent, waiver or other action provided by this Indenture to be given or taken by a specified percentage in Principal amount of the Securityholders of any or all series may be embodied in and evidenced by one or more instruments of substantially similar tenor signed by such specified percentage of Securityholders in person or by agent duly appointed in writing; and, except as herein otherwise expressly provided, such action shall become effective when such instrument or instruments are delivered to the Trustee. Proof of execution of any instrument or of a writing appointing any such agent shall be sufficient for any purpose of this Indenture and (subject to Section 5.01 and 5.02) conclusive in favor of the Trustee and the Issuer, if made in the manner provided in this Article.

Section 6.02 *Proof of Execution of Instruments and of Holding of Securities; Record Date.* Subject to Section 5.01 and 5.02, the execution of any instrument by a Securityholder or his agent or proxy may be proved by the certificate of any notary public or other officer authorized to take acknowledgment of deeds, that the Person executing such instrument acknowledged to such notary public or other such officer the execution thereof, or by an affidavit of a witness to such execution sworn to before any such notary public or other officer. Where such execution is by an officer of a corporation or association or a member of a partnership on behalf of such corporation, association or partnership, as the case may be, or by any other Person acting in a representative capacity, such certificate or affidavit shall also constitute sufficient proof of such Person's authority. The holding of Securities shall be proved by the Security register or by a certificate of the registrar thereof. The Issuer may set a record date for purposes of determining the identity of Holders of Securities of any series entitled to vote or consent to any action referred to in Section 6.01, which record date may be set at any time or from time to time by notice to the Trustee, for any date or dates (in the case of any adjournment or reconsideration) not more than 60 days nor less than five days prior to the proposed date of such vote or consent, and thereafter, notwithstanding any other provisions hereof, only Holders of Securities of such series of record on such record date shall be entitled to so vote or give such consent or revoke such vote or consent.

Section 6.03 *Holders to be Treated as Owners.* Prior to due presentment of a Security for registration of transfer, the Issuer, the Trustee and any agent of the Issuer or the Trustee may deem and treat the person in whose name any Security shall be registered upon the Security register for such series as the absolute owner of such Security (whether or not such Security shall be overdue and notwithstanding any notation of ownership or other writing thereon) for the purpose of receiving payment of or on account of the Principal of and, subject to the provisions of this Indenture, interest on such Security and for all other purposes, and neither the Issuer nor the Trustee nor any agent of the Issuer or the Trustee shall be affected by any notice to the contrary. All such payments so made to any such person, or upon his order, shall be valid, and, to the extent of the sum or sums so paid, effectual to satisfy and discharge the liability for monies payable upon any such Security.

Section 6.04 *Securities Owned by Issuer Deemed Not Outstanding*. In determining whether the Holders of the requisite aggregate Principal amount of Outstanding Securities of any or all series have concurred in any direction, consent or waiver under this Indenture, Securities which are owned by the Issuer or any other obligor on the Securities with respect to which such determination is being made or by any person directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer or any other obligor on the Securities with respect to which such determination is being made shall be disregarded and deemed not to be Outstanding for the purpose of any such determination, except that for the purpose of determining whether the Trustee shall be protected in relying on any such direction, consent or waiver only Securities as to which the Trustee has received written notice are so owned shall be so disregarded. Securities so owned which have been pledged in good faith may be regarded as Outstanding if the pledgee establishes to the satisfaction of the Trustee the pledgee's right so to act with respect to such Securities and that the pledgee is not the Issuer or any other obligor upon the Securities or any person directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer or any other obligor on the Securities. In case of a dispute as to such right, the advice of counsel shall be full protection in respect of any decision made by the Trustee in accordance with such advice. Upon request of the Trustee, the Issuer shall furnish to the Trustee promptly an Officers' Certificate listing and identifying all Securities, if any, known by the Issuer to be owned or held by or for the account of any of the above-described persons; and, subject to Section 5.01 and 5.02, the Trustee shall be entitled to accept such Officers' Certificate as conclusive evidence of the facts therein set forth and of the fact that all Securities not listed therein are Outstanding for the purpose of any such determination.

Section 6.05 *Right of Revocation of Action Taken*. At any time prior to (but not after) the evidencing to the Trustee, as provided in Section 6.01, of the taking of any action by the Holders of the percentage in aggregate Principal amount of the Securities of any or all series, as the case may be, specified in this Indenture in connection with such action, any Holder of a Security the serial number of which is shown by the evidence to be included among the serial numbers of the Securities the Holders of which have consented to such action may, by filing written notice at the Corporate Trust Office and upon proof of holding as provided in this Article, revoke such action so far as concerns such Security. Except as aforesaid any such action taken by the Holder of any Security shall be conclusive and binding upon such Holder and upon all future Holders and owners of such Security and of any Securities issued in exchange or substitution therefor, irrespective of whether or not any notation in regard thereto is made upon any such Security. Any action taken by the Holders of the percentage in aggregate Principal amount of the Securities of any or all series, as the case may be, specified in this Indenture in connection with such action shall be conclusively binding upon the Issuer, the Trustee and the Holders of all the Securities affected by such action.

ARTICLE 7 SUPPLEMENTAL INDENTURES

Section 7.01 *Supplemental Indentures Without Consent of Securityholders*. The Issuer, when authorized by a resolution of its Board of Directors certified to the Trustee, and the Trustee may from time to time and at any time enter into an indenture or indentures supplemental hereto for one or more of the following purposes:

(a) to evidence the succession of another corporation to the Issuer, or successive successions, and the assumption by the successor corporation of the covenants, agreements and obligations of the Issuer pursuant to Article 8;

(b) (i) to cure any ambiguity or to correct or supplement any provision contained herein or in any supplemental indenture which may be defective or inconsistent with any other provision contained herein or in any supplemental indenture, (ii) to conform the terms of Securities to the description thereof in the prospectus and prospectus supplement (or similar offering document) offering such Securities or (iii) to make such other provisions in regard to matters or questions arising under this Indenture or under any supplemental indenture as the Board of Directors may deem necessary or desirable and which shall not adversely affect the interests of the Holders of the Securities in any material respect;

(c) to establish the form or terms of Securities of any series as permitted by Section 2.01 and 2.03;

(d) to evidence and provide for the acceptance of appointment hereunder by a successor trustee with respect to the Securities of one or more series and to add to or change any of the provisions of this Indenture as shall be necessary to provide for or facilitate the administration of the trusts hereunder by more than one trustee, pursuant to the requirements of Section 5.10;

(e) to comply with any requirements of the Commission in connection with the qualification of this Indenture under the Trust Indenture Act of 1939;

(f) to provide for uncertificated or Unregistered Securities and to make all appropriate changes for such purpose;

(g) to make any change that would not reasonably be expected to adversely affect the rights of any Holder in any material respect;

(h) to add to the covenants of the Issuer such new covenants, restrictions, conditions or provisions as its Board of Directors shall consider to be for the protection of the Holders of Securities, and with respect to which the Trustee has received an Opinion of Counsel to a similar effect, and to make the occurrence, or the occurrence and continuance, of a default in any such additional covenants, restrictions, conditions or provisions an Event of Default; provided, that in respect of any such additional covenant, restriction, condition or provision such supplemental indenture may provide for a particular period of grace after default (which period may be shorter or longer than that allowed in the case of other defaults) or may provide for an immediate enforcement upon such an Event of Default or may limit the remedies available to the Trustee upon such an Event of Default or may limit the right of the Holders of a majority in aggregate Principal amount of the Securities of such series to waive such an Event of Default; or

(i) to make any change so long as no Securities are Outstanding.

The Trustee is hereby authorized to join with the Issuer in the execution of any such supplemental indenture, to make any further appropriate agreements and stipulations which may be therein contained and to accept the conveyance, transfer, assignment, mortgage or pledge of any property thereunder, but the Trustee shall not be obligated to enter into any such supplemental indenture which affects the Trustee's own rights, duties or immunities under this Indenture or otherwise.

Any supplemental indenture authorized by the provisions of this section may be executed without the consent of the Holders of any of the Securities at the time outstanding, notwithstanding any of the provisions of Section 7.02.

Section 7.02 *Supplemental Indentures With Consent of Securityholders*. With the consent (evidenced as provided in Article 6) of the Holders of not less than a majority in aggregate Principal amount of the Securities at the time Outstanding of all series affected by such supplemental indenture (voting as one class), the Issuer, when authorized by a resolution of its Board of Directors, and the Trustee may, from time to time and at any time, enter into an indenture or indentures supplemental hereto for the purpose of adding any provisions to or changing in any manner or eliminating any of the provisions of this Indenture or of any supplemental indenture or of modifying in any manner the rights of the Holders of the Securities of each such series; provided, that no such supplemental indenture shall without the consent of each Holder affected thereby:

- (a) change the stated maturity of the Principal of, or the time of payment of any installment of interest on, such Holder's Security;
- (b) reduce the Principal thereof or the rate of interest thereon, or any premium payable with respect thereto;
- (c) change any place of payment where, or the currency in which, any Security or any premium or the interest thereon is payable;
- (d) change the provisions for calculating any redemption or repurchase price, including the definitions relating thereto;
- (e) make any change to Section 4.07 or Section 4.10 (except to include other provisions subject to Section 4.10);
- (f) reduce the percentage in Principal amount of outstanding Securities of the relevant series the consent of whose Holders is required for any such supplemental indenture, for any waiver of compliance with any provisions of this Indenture or any defaults and their consequences provided for in this Indenture;
- (g) alter or impair the right to convert any Security at the rate and upon the terms provided in Article 12;
- (h) waive a default in the payment of Principal of or interest on any Security of such Holder (except pursuant to a rescission of acceleration pursuant to Section 4.01);
- (i) adversely affect the rights of such Holder under any mandatory redemption or repurchase provision or any right of redemption or repurchase at the option of such Holder;

(j) modify any of the provisions of this Section 7.02, except to increase any such percentage or to provide that certain other provisions of this Indenture cannot be modified or waived without the consent of the Holder of each outstanding Security affected thereby; or

(k) change or waive any provision that, pursuant to a board resolution or indenture supplemental hereto establishing the terms of one or more series of Securities, is prohibited to be so changed or waived.

Upon the written request of the Issuer, accompanied by a copy of a resolution of the Board of Directors certified by the secretary or an assistant secretary of the Issuer authorizing the execution of any such supplemental indenture, and upon the filing with the Trustee of evidence of the consent of Securityholders as aforesaid and other documents, if any, required by Section 6.01, the Trustee shall join with the Issuer in the execution of such supplemental indenture unless such supplemental indenture affects the Trustee's own rights, duties or immunities under this Indenture or otherwise, in which case the Trustee may in its discretion, but shall not be obligated to, enter into such supplemental indenture.

It shall not be necessary for the consent of the Securityholders under this section to approve the particular form of any proposed supplemental indenture, but it shall be sufficient if such consent shall approve the substance thereof.

Promptly after the execution by the Issuer and the Trustee of any supplemental indenture pursuant to the provisions of this Section, the Issuer shall mail a notice thereof by first class mail to the Holders of Securities of each series affected thereby at their addresses as they shall appear on the registry books of the Issuer, setting forth in general terms the substance of such supplemental indenture. Any failure of the Issuer to mail such notice, or any defect therein, shall not, however, in any way impair or affect the validity of any such supplemental indenture.

Section 7.03 *Effect of Supplemental Indenture*. Upon the execution of any supplemental indenture pursuant to the provisions hereof, this Indenture shall be and be deemed to be modified and amended in accordance therewith and the respective rights, limitations of rights, obligations, duties and immunities under this Indenture of the Trustee, the Issuer and the Holders of Securities of each series affected thereby shall thereafter be determined, exercised and enforced hereunder subject in all respects to such modifications and amendments, and all the terms and conditions of any such supplemental indenture shall be and be deemed to be part of the terms and conditions of this Indenture for any and all purposes.

Section 7.04 *Documents to Be Given to Trustee*. The Trustee, subject to the provisions of Section 5.01 and 5.02, may receive an Officers' Certificate and an Opinion of Counsel as conclusive evidence that any supplemental indenture executed pursuant to this Article 7 complies with the applicable provisions of this Indenture.

Section 7.05 *Notation on Securities in Respect of Supplemental Indentures*. Securities of any series authenticated and delivered after the execution of any supplemental indenture pursuant to the provisions of this Article may bear a notation in form approved by the Trustee for such series as to any matter provided for by such supplemental indenture or as to any action taken at any such meeting. If the Issuer or the Trustee shall so determine, new Securities of any series so modified as to conform, in the opinion of the Trustee and the Board of Directors, to any modification of this Indenture contained in any such supplemental indenture may be prepared by the Issuer, authenticated by the Trustee and delivered in exchange for the Securities of such series then outstanding.

ARTICLE 8
CONSOLIDATION, MERGER, SALE OR CONVEYANCE

Section 8.01 *Issuer May Consolidate, etc., on Certain Terms*. The Issuer covenants that it will not merge or consolidate with any other Person or sell, convey, transfer, lease or otherwise dispose of all or substantially all of its property and assets to any Person (other than a consolidation with or merger with or into or a sale, conveyance, transfer, lease or other disposition to a Wholly-Owned Subsidiary with a positive net worth; *provided* that, in connection with any such merger of the Issuer with a Wholly-Owned Subsidiary, no consideration (other than common stock) in the surviving person or the Issuer shall be issued or distributed to the stockholders of the Issuer), unless (xiv) either (x) the Issuer shall be the continuing corporation, or the successor corporation or (y) the Person formed by such consolidation or into which the Issuer is merged or that acquires by sale or conveyance substantially all the assets of the Issuer (if other than the Issuer) shall be a corporation or limited liability company organized and validly existing under the laws of the United States of America or any jurisdiction thereof and shall expressly assume the due and punctual payment of the Principal of and interest on all the Securities, according to their tenor, and the due and punctual performance and observance of all of the covenants and conditions of this Indenture to be performed or observed by the Issuer, by supplemental indenture satisfactory to the Trustee, executed and delivered to the Trustee by such Person, (xv) immediately after giving effect to such transaction, no default or Event of Default shall have occurred and be continuing and (xvi) the Issuer delivers to the Trustee an Officers' Certificate and Opinion of Counsel, in each case stating that such consolidation, merger or transfer and such supplemental indenture complies with this Section 8.01 and that all conditions precedent provided for herein relating to such transaction have been complied with; *provided, however*, that the foregoing limitations shall not apply if, in the good faith determination of the Board of Directors, whose determination shall be evidenced by a board resolution certified to the Trustee, the principal purpose of such transaction is to change the state of incorporation of the Issuer; and *provided further* that any such transaction shall not have as one of its purposes the evasion of the foregoing limitations.

Section 8.02 *Successor Corporation Substituted*. In case of any such consolidation, merger, sale, conveyance, transfer, lease or other disposition, and following such an assumption by the successor Person, such successor Person shall succeed to and be substituted for the Issuer, with the same effect as if it had been named herein. Such successor Person may cause to be signed, and may issue either in its own name or in the name of the Issuer prior to such succession any or all of the Securities issuable hereunder which theretofore shall not have been signed by the Issuer and delivered to the Trustee; and, upon the order of such successor Person instead of the Issuer and subject to all the terms, conditions and limitations in this Indenture prescribed, the Trustee, pursuant to the terms hereof, shall authenticate and shall deliver any Securities which previously shall have been signed and delivered by the officers of the Issuer to the Trustee for authentication, and any Securities which such successor Person thereafter shall cause to be signed and delivered to the Trustee for that purpose. All of the Securities so issued shall in all respects have the same legal rank and benefit under this Indenture as the Securities theretofore or thereafter issued in accordance with the terms of this Indenture as though all of such Securities had been issued at the date of the execution hereof.

In case of any such consolidation, merger, sale, conveyance, transfer, lease or other disposition, such changes in phraseology and form (but not in substance) may be made in the Securities thereafter to be issued as may be appropriate.

Upon the assumption by the successor Person in the manner described in this Article, the Issuer shall be discharged from all obligations and covenants under this Indenture and the Securities.

ARTICLE 9 DISCHARGE OF INDENTURE

Section 9.01 *Defeasance Within One Year of Payment*. Except as otherwise provided in this Section 9.01, the Issuer may terminate its obligations under the Securities of any series and this Indenture with respect to Securities of such series if:

(a) all Securities of such series previously authenticated and delivered (other than destroyed, lost or wrongfully taken Securities of such series that have been replaced or Securities of such series for whose payment money or securities have theretofore been held in trust and thereafter repaid to the Issuer, as provided in Section 9.05) have been delivered to the Trustee for cancellation and the Issuer has paid all sums payable by it hereunder; or

(b) (xviii) (A) the Securities of such series mature within one year or all of them are to be called for redemption within one year under arrangements satisfactory to the Trustee for giving the notice of redemption, (B) the Issuer irrevocably deposits in trust with the Trustee, as trust funds solely for the benefit of the Holders of such Securities for that purpose, money or U.S. Government Obligations or a combination thereof sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee), without consideration of any reinvestment and after payment of all Federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay Principal of and interest on the Securities of such series to maturity or redemption, as the case may be, and to pay all other sums payable by it hereunder and (C) the Issuer delivers to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the satisfaction and discharge of this Indenture with respect to the Securities of such series have been complied with.

With respect to the foregoing clause (i), only the Issuer's obligations under Sections 5.06 and 9.05 in respect of the Securities of such series shall survive. With respect to the foregoing clause (ii), only the Issuer's obligations in Section 2.03 through 2.11, 3.02, 5.06, 5.09 and 9.05 in respect of the Securities of such series shall survive until such Securities of such series are no longer outstanding. Thereafter, only the Issuer's obligations in Section 5.06 and 9.05 in respect of the Securities of such series shall survive. After any such irrevocable deposit, the Trustee shall acknowledge in writing the discharge of the Issuer's obligations under the Securities of such series and this Indenture with respect to the Securities of such series except for those surviving obligations specified above.

Section 9.02 *Defeasance*. Except as provided below, the Issuer will be deemed to have paid and will be discharged from any and all obligations in respect of the Securities of any series and the provisions of this Indenture will no longer be in effect with respect to the Securities of such series (and the Trustee, at the expense of the Issuer, shall execute instruments in form and substance satisfactory to the Issuer and the Trustee acknowledging the same) if the following conditions shall have been satisfied:

(a) the Issuer has irrevocably deposited in trust with the Trustee as trust funds specifically pledged as security for, and dedicated solely to, Holders of the Securities of such series, for payment of the Principal of and interest on the Securities of such series, money or U.S. Government Obligations or a combination thereof sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee) without consideration of any reinvestment and after payment of all federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay and discharge the Principal of and accrued interest on the outstanding Securities of such series to maturity or earlier redemption (irrevocably provided for under arrangements satisfactory to the Trustee), as the case may be;

(b) such deposit will not result in a breach or violation of, or constitute a default under, this Indenture or any other material agreement or instrument to which the Issuer is a party or by which it is bound;

(c) no default or Event of Default with respect to the Securities of such series shall have occurred and be continuing on the date of such deposit;

(d) the Issuer shall have delivered to the Trustee (1) either (x) a ruling directed to the Trustee received from the Internal Revenue Service to the effect that the Holders of the Securities of such series will not recognize income, gain or loss for Federal income tax purposes as a result of the Issuer's exercise of its option under this Section 9.02 and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case if such deposit and defeasance had not occurred or (y) an Opinion of Counsel to the same effect as the ruling described in clause (x) above and based upon a change in law and (2) an Opinion of Counsel to the effect that the Holders of the Securities of such series have a valid security interest in the trust funds subject to no prior liens under the UCC; and

(e) the Issuer has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the defeasance contemplated by this Section 9.02 of the Securities of such series have been complied with.

The Issuer's obligations in Section 2.03 through 2.11, 3.02, 5.06, 5.09 and 9.05 with respect to the Securities of such series shall survive until such Securities are no longer outstanding. Thereafter, only the Issuer's obligations in Section 5.06 and 9.05 shall survive.

Section 9.03 *Covenant Defeasance*. The Issuer may omit to comply with any term, provision or condition set forth in Section 3.04, 3.06 or 3.08 (or any other specific covenant relating to the Securities of any series provided for in a Board Resolution or supplemental indenture pursuant to Section 2.03 which may by its terms be defeased pursuant to this Section 9.03), and such omission shall be deemed not to be an Event of Default under clause (c) of Section 4.01, with respect to the outstanding Securities of such series if:

(a) the Issuer has irrevocably deposited in trust with the Trustee as trust funds solely for the benefit of the Holders of the Securities of such series, for payment of the Principal of and interest, if any, on the Securities of such series, money or U.S. Government Obligations or a combination thereof in an amount sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee) without consideration of any reinvestment and after payment of all Federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay and discharge the Principal of and interest on the outstanding Securities of such series to maturity or earlier redemption (irrevocably provided for under arrangements satisfactory to the Trustee), as the case may be;

(b) such deposit will not result in a breach or violation of, or constitute a default under, this Indenture or any other material agreement or instrument to which the Issuer is a party or by which it is bound;

(c) no default or Event of Default with respect to the Securities of such series shall have occurred and be continuing on the date of such deposit;

(d) the Issuer has delivered to the Trustee an Opinion of Counsel to the effect that (A) the Holders of the Securities of such series have a valid security interest in the trust funds subject to no prior liens under the UCC and (B) such Holders will not recognize income, gain or loss for Federal income tax purposes as a result of such deposit and covenant defeasance and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case if such deposit and defeasance had not occurred; and

(e) the Issuer has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the covenant defeasance contemplated by this Section 9.03 of the Securities of such series have been complied with.

Section 9.04 *Application of Trust Money*. Subject to Section 9.05, the Trustee or Paying Agent shall hold in trust money or U.S. Government Obligations deposited with it pursuant to 9.01, 9.02, or 9.03, as the case may be, in respect of the Securities of any series and shall apply the deposited money and the proceeds from deposited U.S. Government Obligations in accordance with the Securities of such series and this Indenture to the payment of Principal of and interest on the Securities of such series; provided that such money need not be segregated from other funds except to the extent required by law. The Issuer shall pay and indemnify the Trustee against any tax, fee or other charge imposed on or assessed against the U.S. Government Obligations deposited pursuant to 9.01, 9.02, or 9.03, as the case may be, or the Principal and interest received in respect thereof, other than any such tax, fee or other charge that by law is for the account of the Holders.

Section 9.05 *Repayment to Issuer*. Subject to Section 5.06, 9.01, the Trustee and the Paying Agent shall promptly pay to the Issuer upon request set forth in an Officers' Certificate any money held by them at any time and not required to make payments hereunder and thereupon shall be relieved from all liability with respect to such money. Subject to applicable escheat or abandoned property laws, the Trustee and the Paying Agent shall pay to the Issuer upon written request any money held by them and required to make payments hereunder under this Indenture that remains unclaimed for two years; *provided* that the Trustee or such Paying Agent before being required to make any payment shall cause to be published at the expense of the Issuer once in an Authorized Newspaper or mail to each Holder entitled to such money at such Holder's address (as set forth in the register) notice that such money remains unclaimed and that after a date specified therein (which shall be at least 30 days from the date of such publication or mailing) any unclaimed balance of such money then remaining will be repaid to the Issuer. After payment to the Issuer, Holders entitled to such money must look to the Issuer for payment as general creditors unless an abandoned property law designates another Person, and all liability of the Trustee and such Paying Agent with respect to such money shall cease.

ARTICLE 10 MISCELLANEOUS PROVISIONS

Section 10.01 *Incorporators, Stockholders, Officers and Directors Exempt from Individual Liability*. No recourse under or upon any obligation, covenant or agreement contained in this Indenture or in any Security, or because of any indebtedness evidenced thereby, shall be had against any incorporator, as such, or against any past, present or future stockholder, officer, director or employee, as such, of the Issuer or of any successor Person thereof, either directly or through the Issuer or any successor Person thereof, under any rule of law, statute or constitutional provision or by the enforcement of any assessment or by any legal or equitable proceeding or otherwise, all such liability being expressly waived and released by the acceptance of the Securities by the Holders thereof and as part of the consideration for the issue of the Securities.

Section 10.02 *Provisions of Indenture for the Sole Benefit of Parties and Securityholders*. Nothing in this Indenture or in the Securities, expressed or implied, shall give or be construed to give to any person, firm or corporation, other than the parties hereto and their successors and the Holders of the Securities, any legal or equitable right, remedy or claim under this Indenture or under any covenant or provision herein contained, all such covenants and provisions being for the sole benefit of the parties hereto and their successors and of the Holders of the Securities.

Section 10.03 *Successors and Assigns of Issuer Bound by Indenture*. All the covenants, stipulations, promises and agreements contained in this Indenture by or on behalf of the Issuer shall bind its successors and assigns, whether so expressed or not.

Section 10.04 *Notices and Demands on Issuer, Trustee and Securityholders*. Any notice or demand which by any provision of this Indenture is required or permitted to be given or served by the Trustee or by the Holders of Securities to or on the Issuer may be given or served by being deposited postage prepaid, first-class mail (except as otherwise specifically provided herein) addressed (until another address of the Issuer is filed by the Issuer with the Trustee) to Corbus Pharmaceuticals Holdings, Inc. at 100 River Ridge Drive, Norwood MA, 02062, Attention: Chief Financial Officer. Any notice, direction, request or demand by the Issuer or any Securityholder to or upon the Trustee shall be deemed to have been sufficiently given or made, for all purposes, if given or made at the Corporate Trust Office.

Where this Indenture provides for notice to Holders, such notice shall be sufficiently given (unless otherwise herein expressly provided) if in writing and mailed, first-class postage prepaid, to each Holder entitled thereto, at such Holder's last address as it appears in the Security register. In any case where notice to Holders is given by mail, neither the failure to mail such notice, nor any defect in any notice so mailed, to any particular Holder shall affect the sufficiency of such notice with respect to other Holders. Where this Indenture provides for notice in any manner, such notice may be waived in writing by the person entitled to receive such notice, either before or after the event, and such waiver shall be the equivalent of such notice. Waivers of notice by Holders shall be filed with the Trustee, but such filing shall not be a condition precedent to the validity of any action taken in reliance upon such waiver.

In case, by reason of the suspension of or irregularities in regular mail service, it shall be impracticable to mail notice to the Issuer and Securityholders when such notice is required to be given pursuant to any provision of this Indenture, then any manner of giving such notice as shall be satisfactory to the Trustee shall be deemed to be a sufficient giving of such notice.

Section 10.05 *Officers' Certificates and Opinions of Counsel; Statements to be Contained Therein*. Upon any application or demand by the Issuer to the Trustee to take any action under any of the provisions of this Indenture, the Issuer shall furnish to the Trustee an Officers' Certificate stating that all conditions precedent provided for in this Indenture relating to the proposed action have been complied with and an Opinion of Counsel stating that in the opinion of such counsel all such conditions precedent have been complied with, except that in the case of any such application or demand as to which the furnishing of such documents is specifically required by any provision of this Indenture relating to such particular application or demand, no additional certificate or opinion need be furnished.

Each certificate or opinion provided for in this Indenture and delivered to the Trustee with respect to compliance with a condition or covenant provided for in this Indenture shall include (a) a statement that the person making such certificate or opinion has read such covenant or condition, (b) a brief statement as to the nature and scope of the examination or investigation upon which the statements or opinions contained in such certificate or opinion are based, (c) a statement that, in the opinion of such person, he has made such examination or investigation as is necessary to enable him to express an informed opinion as to whether or not such covenant or condition has been complied with and (d) a statement as to whether or not, in the opinion of such person, such condition or covenant has been complied with.

Any certificate, statement or opinion of an officer of the Issuer may be based, insofar as it relates to legal matters, upon a certificate or opinion of or representations by counsel, unless such officer knows that the certificate or opinion or representations with respect to the matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous. Any certificate, statement or opinion of counsel may be based, insofar as it relates to factual matters, information with respect to which is in the possession of the Issuer, upon the certificate, statement or opinion of or representations by an officer or officers of the Issuer, unless such counsel knows that the certificate, statement or opinion or representations with respect to the matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous.

Any certificate, statement or opinion of an officer of the Issuer or of counsel may be based, insofar as it relates to accounting matters, upon a certificate or opinion of or representations by an accountant or firm of accountants in the employ of the Issuer, unless such officer or counsel, as the case may be, knows that the certificate or opinion or representations with respect to the accounting matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous.

Any certificate or opinion of any independent firm of public accountants filed with the Trustee shall contain a statement that such firm is independent.

Section 10.06 *Payments Due on Saturdays, Sundays and Holidays*. If the date of maturity of interest on or Principal of the Securities of any series or the date fixed for redemption or repayment of any such Security shall not be a Business Day, then payment of interest or Principal need not be made on such date, but may be made on the next succeeding Business Day with the same force and effect as if made on the date of maturity or the date fixed for redemption, and no interest shall accrue for the period after such date.

Section 10.07 *Conflict of Any Provision of Indenture with Trust Indenture Act of 1939*. If and to the extent that any provision of this Indenture limits, qualifies or conflicts with another provision incorporated in this Indenture by operation of Sections 310 to 317, inclusive, of the Trust Indenture Act of 1939, such incorporated provision shall control.

Section 10.08 *New York Law to Govern*. This Indenture and each Security shall be deemed to be a contract under the laws of the State of New York, and for all purposes shall be construed in accordance with the laws of such State.

Section 10.09 *Counterparts*. This Indenture may be executed in any number of counterparts, each of which shall be an original; but such counterparts shall together constitute but one and the same instrument.

Section 10.10 *Effect of Headings*. The Article and Section headings herein and the Table of Contents are for convenience only and shall not affect the construction hereof.

ARTICLE 11
REDEMPTION OF SECURITIES

Section 11.01 *Applicability of Article*. The provisions of this Article shall be applicable to the Securities of any series which are redeemable before their maturity except as otherwise specified as contemplated by Section 2.03 for Securities of such series.

Section 11.02 *Notice of Redemption; Partial Redemptions*. Notice of redemption to the Holders of Securities of any series to be redeemed as a whole or in part at the option of the Issuer shall be given by mailing notice of such redemption by first class mail, postage prepaid, at least 30 days and not more than 60 days prior to the date fixed for redemption to such Holders of Securities of such series at their last addresses as they shall appear upon the registry books. Any notice which is mailed in the manner herein provided shall be conclusively presumed to have been duly given, whether or not the Holder receives the notice. Failure to give notice by mail, or any defect in the notice to the Holder of any Security of a series designated for redemption as a whole or in part shall not affect the validity of the proceedings for the redemption of any other Security of such series.

The notice of redemption to each such Holder shall specify the CUSIP numbers of such Securities to be redeemed, the Principal amount of each Security of such series held by such Holder to be redeemed, the date fixed for redemption, the redemption price, the place or places of payment, that payment will be made upon presentation and surrender of such Securities, that interest accrued to the date fixed for redemption will be paid as specified in such notice and that on and after said date interest thereon or on the portions thereof to be redeemed will cease to accrue. In case any Security of a series is to be redeemed in part only the notice of redemption shall state the portion of the Principal amount thereof to be redeemed, the method the Trustee shall use to determine such Securities to be redeemed as specified in the last paragraph of this Section 11.02, if applicable, and shall state that on and after the date fixed for redemption, upon surrender of such Security, a new Security or Securities of such series in Principal amount equal to the unredeemed portion thereof will be issued.

The notice of redemption of Securities of any series to be redeemed at the option of the Issuer shall be given by the Issuer or, at the Issuer's written request, by the Trustee in the name and at the expense of the Issuer.

By 11:00 a.m. (New York City time) on the redemption date specified in the notice of redemption given as provided in this Section, the Issuer will deposit with the Trustee or with one or more paying agents (or, if the Issuer is acting as its own paying agent, set aside, segregate and hold in trust as provided in Section 3.03) an amount of money sufficient to redeem on the redemption date all the Securities of such series so called for redemption at the appropriate redemption price, together with accrued interest to the date fixed for redemption. If less than all the outstanding Securities of a series are to be redeemed, the Issuer will deliver to the Trustee at least 70 days (unless a shorter period shall be satisfactory to the Trustee) prior to the date fixed for redemption an Officers' Certificate stating the aggregate Principal amount of Securities to be redeemed.

In the case of the redemption of all of the Securities of a series outstanding, the Issuer shall notify the Trustee in writing of the redemption date 45 days (unless a shorter period shall be satisfactory to the Trustee) prior to the redemption date.

If less than all the Securities of a series are to be redeemed, the Trustee shall select, pro rata or by lot or in such manner as it shall deem appropriate and fair, Securities of such series to be redeemed in whole or in part. Securities of a series may be redeemed in part in multiples equal to the minimum authorized denomination for Securities of such series or any multiple thereof. The Trustee shall promptly notify the Issuer in writing of the Securities of such series selected for redemption and, in the case of any Securities of such series selected for partial redemption, the Principal amount thereof to be redeemed. For all purposes of this Indenture, unless the context otherwise requires, all provisions relating to the redemption of Securities of any series shall relate, in the case of any Security redeemed or to be redeemed only in part, to the portion of the Principal amount of such Security which has been or is to be redeemed.

Section 11.03 *Payment of Securities Called for Redemption*. If notice of redemption has been given as above provided, the Securities or portions of Securities specified in such notice shall become due and payable on the date and at the place stated in such notice at the applicable redemption price, together with interest accrued to the date fixed for redemption, and on and after said date (unless the Issuer shall default in the payment of such Securities at the redemption price, together with interest accrued to said date) interest on the Securities or portions of Securities so called for redemption shall cease to accrue and, except as provided in Section 5.05 and 9.04, such Securities shall cease from and after the date fixed for redemption to be entitled to any benefit or security under this Indenture, and the Holders thereof shall have no right in respect of such Securities except the right to receive the redemption price thereof and unpaid interest to the date fixed for redemption. On presentation and surrender of such Securities at a place of payment specified in said notice, said Securities or the specified portions thereof shall be paid and redeemed by the Issuer at the applicable redemption price, together with interest accrued thereon to the date fixed for redemption; provided that any semiannual payment of interest becoming due on the date fixed for redemption shall be payable to the Holders of such Securities registered as such on the relevant record date subject to the terms and provisions of Section 2.07 hereof.

If any Security called for redemption shall not be so paid upon surrender thereof for redemption, the Principal shall, until paid or duly provided for, bear interest from the date fixed for redemption at the rate of interest or Yield to Maturity (in the case of an Original Issue Discount Security) borne by the Security.

Upon presentation of any Security redeemed in part only, the Issuer shall execute and the Trustee shall authenticate and deliver to or on the order of the Holder thereof, at the expense of the Issuer, a new Security or Securities of such series, of authorized denominations, in Principal amount equal to the unredeemed portion of the Security so presented, pursuant to Section 2.04, 2.05 and 2.06.

Section 11.04 *Exclusion of Certain Securities from Eligibility for Selection for Redemption.* Securities shall be excluded from eligibility for selection for redemption if they are identified by registration and certificate number in a written statement signed by an authorized officer of the Issuer and delivered to the Trustee at least 40 days prior to the last date on which notice of redemption may be given as being owned of record and beneficially by, and not pledged or hypothecated by either (a) the Issuer or (b) an entity specifically identified in such written statement directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer.

Section 11.05 *Conversion Arrangement On Call For Redemption.* In connection with any redemption of Securities, the Issuer shall deposit the amount due in connection with such redemption as required by Section 11.02 or it may arrange for the purchase and conversion of any Securities called for redemption by an agreement with one or more investment bankers or other purchasers to purchase such Securities and to make the deposit required of it by Section 11.02 on its behalf by paying to the Trustee or the Paying Agent in trust for the Securityholders, on or before 10:00 a.m. New York time on the redemption date, an amount no less than the redemption price, together with interest, if any, accrued to the redemption date of such Securities, in immediately available funds. Notwithstanding anything to the contrary contained in this Article 11, the obligation of the Issuer to pay the redemption price of such Securities, including all accrued interest, if any, shall be deemed to be satisfied and discharged to the extent such amount is so paid by such purchasers. If such an agreement is entered into, any Securities not duly surrendered for conversion by the Holders thereof may, at the option of the Issuer, be deemed, to the fullest extent permitted by law, acquired by such purchasers from such Holders and (notwithstanding anything to the contrary contained in Article 12) surrendered by such purchasers for conversion, all as of immediately prior to the close of business on the last day on which Securities of such series called for redemption may be converted in accordance with this Indenture and the terms of such Securities, subject to payment of the above amount aforesaid. The Trustee or the Paying Agent shall hold and pay to the Securityholders whose Securities are selected for redemption any such amount paid to it in the same manner as it would monies deposited with it by the Issuer for the redemption of Securities. Without the Trustee's and the Paying Agent's prior written consent, no arrangement between the Issuer and such purchasers for the purchase and conversion of any Securities shall increase or otherwise affect any of the powers, duties, responsibilities or obligations of the Trustee as set forth in this Indenture, and the Issuer agrees to indemnify the Trustee from, and hold it harmless against, any loss, liability or expense arising out of or in connection with any such arrangement for the purchase and conversion of any Securities between the Issuer and such purchasers, including the costs and expenses incurred by the Trustee and the Paying Agent in the defense of any claim or liability arising out of or in connection with the exercise or performance of any of its powers, duties, responsibilities or obligations under this Indenture.

ARTICLE 12 CONVERSION OF SECURITIES

Section 12.01 *Applicability of Article.* Securities of any series which are convertible into Capital Stock at the option of the Securityholder shall be convertible in accordance with their terms and (unless otherwise specified as contemplated by Section 2.03 for Securities of any series) in accordance with this Article. Each reference in this Article 12 to "a Security" or "the Securities" refers to the Securities of the particular series that is convertible into Capital Stock. Each reference in this Article to "Capital Stock" into which Securities of any series are convertible refers to the class of Capital Stock into which the Securities of such series are convertible in accordance with their terms (as specified as contemplated by Section 2.03). If more than one series of Securities with conversion privileges are outstanding at any time, the provisions of this Article 12 shall be applied separately to each such series.

Section 12.02 *Right of Securityholders to Convert Securities*. Subject to and upon compliance with the terms of the Securities and the provisions of Section 11.05 and this Article 12, at the option of the Holder thereof, any Security of any series of any authorized denomination, or any portion of the Principal amount thereof which is \$1,000 or any integral multiple of \$1,000, may, at any time during the period specified in the Securities of such series, or in case such Security or portion thereof shall have been called for redemption, then in respect of such Security or portion thereof until and including, but not after (unless the Issuer shall default in payment due upon the redemption thereof) the close of business on the Business Day prior to the date fixed for redemption except that in the case of redemption at the option of the Securityholder, if specified in the terms of such Securities, such right shall terminate upon receipt of written notice of the exercise of such option, be converted into duly authorized, validly issued, fully paid and nonassessable shares of Capital Stock, as specified in such Security, at the conversion rate for each \$1,000 Principal amount of Securities (such initial conversion rate reflecting an initial conversion price specified in such Security) in effect on the conversion date, or, in case an adjustment in the conversion rate has taken place pursuant to the provisions of Section 12.05, then at the applicable conversion rate as so adjusted, upon surrender of the Security or Securities, the Principal amount of which is so to be converted, to the Issuer at any time during usual business hours at the office or agency to be maintained by it in accordance with the provisions of Section 3.02, accompanied by a written notice of election to convert as provided in Section 12.03 and, if so required by the Issuer and the Trustee, by a written instrument or instruments of transfer in form satisfactory to the Issuer and the Trustee duly executed by the registered Holder or his attorney duly authorized in writing. All Securities surrendered for conversion shall, if surrendered to the Issuer or any conversion agent, be delivered to the Trustee for cancellation and cancelled by it, or shall, if surrendered to the Trustee, be cancelled by it, as provided in Section 2.10.

The initial conversion price or conversion rate in respect of a series of Securities shall be as specified in the Securities of such series. The conversion price or conversion rate will be subject to adjustment on the terms set forth in Section 12.05 or such other or different terms, if any, as may be specified by Section 2.03 for Securities of such series. Provisions of this Indenture that apply to conversion of all of a Security also apply to conversion of a portion of it.

Section 12.03 *Issuance of Shares of Capital Stock on Conversion*. As promptly as practicable after the surrender, as herein provided, of any Security or Securities for conversion, the Issuer shall deliver or cause to be delivered at its said office or agency to or upon the written order of the Holder of the Security or Securities so surrendered a certificate or certificates representing the number of duly authorized, validly issued, fully paid and nonassessable shares of Capital Stock into which such Security or Securities may be converted in accordance with the terms thereof and the provisions of this Article 12. Prior to delivery of such certificate or certificates, the Issuer shall require a written notice at its said office or agency from the Holder of the Security or Securities so surrendered stating that the Holder irrevocably elects to convert such Security or Securities, or, if less than the entire Principal amount thereof is to be converted, stating the portion thereof to be converted. Such notice shall also state the name or names (with address and social security or other taxpayer identification number) in which said certificate or certificates are to be issued. Such conversion shall be deemed to have been made at the time that such Security or Securities shall have been surrendered for conversion and such notice shall have been received by the Issuer or the Trustee, the rights of the Holder of such Security or Securities as a Securityholder shall cease at such time, the person or persons entitled to receive the shares of Capital Stock upon conversion of such Security or Securities shall be treated for all purposes as having become the record holder or holders of such shares of Capital Stock at such time and such conversion shall be at the conversion rate in effect at such time. In the case of any Security of any series which is converted in part only, upon such conversion, the Issuer shall execute and the Trustee shall authenticate and deliver to the Holder thereof, as requested by such Holder, a new Security or Securities of such series of authorized denominations in aggregate Principal amount equal to the unconverted portion of such Security.

If the last day on which a Security may be converted is not a Business Day in a place where a conversion agent is located, the Security may be surrendered to that conversion agent on the next succeeding day that is a Business Day.

The Issuer will not be required to deliver certificates for shares of Capital Stock upon conversion while its stock transfer books are closed for a meeting of shareholders or for the payment of dividends or for any other purpose, but certificates for shares of Capital Stock shall be delivered as soon as the stock transfer books shall again be opened.

Section 12.04 *No Payment or Adjustment for Interest or Dividends*. Unless otherwise specified as contemplated by Section 2.03 for Securities of such series, Securities surrendered for conversion during the period from the close of business on any regular record date (or special record date for payment of defaulted interest) next preceding any interest payment date to the opening of business on such interest payment date (except Securities called for redemption on a redemption date within such period) when surrendered for conversion must be accompanied by payment of an amount equal to the interest thereon which the registered Holder is to receive on such interest payment date. Payment of interest shall be made, as of such interest payment date or such date, as the case may be, to the Holder of record of the Securities as of such regular, or special record date, as applicable. Except where Securities surrendered for conversion must be accompanied by payment as described above, no interest on converted Securities will be payable by the Issuer on any interest payment date subsequent to the date of conversion. No other payment or adjustment for interest or dividends is to be made upon conversion. Notwithstanding the foregoing, upon conversion of any Original Issue Discount Security, the fixed number of shares of Capital Stock into which such Security is convertible delivered by the Issuer to the Holder thereof shall be applied, first, to pay the accrued original issue discount attributable to the period from the date of issuance to the date of conversion of such Security, and, second, to pay the balance of the Principal amount of such Security.

Section 12.05 *Adjustment of Conversion Rate*. Unless otherwise specified as contemplated by Section 2.03 for Securities of such series, the conversion rate for Securities in effect at any time shall be subject to adjustment as follows:

(a) In case the Issuer shall (i) declare a dividend or make a distribution on the class of Capital Stock into which Securities of such series are convertible in shares of its Capital Stock, (ii) subdivide the outstanding shares of the class of Capital Stock into which Securities of such series are convertible into a greater number of shares, (iii) combine the outstanding shares of the class of Capital Stock into which Securities of such series are convertible into a smaller number of shares or (iv) issue by reclassification of the shares of the class of Capital Stock into which Securities of such series are convertible (including any such reclassification in connection with a consolidation or merger in which the Issuer is the continuing corporation) any shares, the conversion rate for the Securities of such series in effect at the time of the record subdivision, combination or reclassification, shall be proportionately adjusted so that the Holder of any Security of such series surrendered for conversion after such time shall be entitled to receive the number and kind of shares which he would have owned or have been entitled to receive had such Security been converted immediately prior to such time. Similar adjustments shall be made whenever any event listed above shall occur.

(b) In case the Issuer shall fix a record date for the issuance of rights or warrants to all holders of the class of Capital Stock into which Securities of such series are convertible entitling them (for a period expiring within 45 days after such record date) to subscribe for or purchase shares of such class of Capital Stock (or securities convertible into shares of such class of Capital Stock) at a price per share (or, in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, having a conversion price per share, after adding thereto the exercise price, computed on the basis of the maximum number of shares of such class of Capital Stock issuable upon conversion of such convertible securities, per share of such class of Capital Stock, so issuable) less than the current market price per share of such class of Capital Stock (as defined in subsection (e) below) on the date on which such issuance was declared or otherwise announced by the Issuer (the "**Determination Date**"), the number of shares of such class of Capital Stock into which each \$1,000 Principal amount of Securities shall be convertible after such record date shall be determined by multiplying the number of shares of such class of Capital Stock into which such Principal amount of Securities was convertible immediately prior to such record date by a fraction, of which the numerator shall be the number of shares of such class of Capital Stock outstanding on the Determination Date plus the number of additional shares of such class of Capital Stock offered for subscription or purchase (or in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, the aggregate number of additional shares of such class of Capital Stock into which the convertible securities so offered are initially convertible), and of which the denominator shall be the number of shares of such class of Capital Stock outstanding on the Determination Date plus the number of shares of such class of Capital Stock obtained by dividing the aggregate offering price of the total number of shares so offered (or, in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, the aggregate initial conversion price of the convertible securities so offered, after adding thereto the aggregate exercise price of such rights or warrants computed on the basis of the maximum number of shares of such class of Capital Stock issuable upon conversion of such convertible securities) by such current market price. Shares of such class of Capital Stock of the Issuer owned by or held for the account of the Issuer shall not be deemed outstanding for the purpose of any such computation. Such adjustment shall be made successively whenever such a record date is fixed; and to the extent that shares of such class of Capital Stock are not delivered (or securities convertible into shares of such class of Capital Stock are not delivered) after the expiration of such rights or warrants (or, in the case of rights or warrants to purchase securities convertible into such class of Capital Stock once exercised, the expiration of the conversion right of such securities) the conversion rate shall be readjusted to the conversion rate which would then be in effect had the adjustments made upon the issuance of such rights or warrants (or securities convertible into shares) been made upon the basis of delivery of only the number of shares actually delivered. In the event that such rights or warrants are not so issued, the conversion rate shall again be adjusted to be the conversion rate which would then be in effect if such record date had not been fixed.

(c) In case the Issuer shall fix a record date for the making of a distribution to all holders of the class of Capital Stock into which Securities of such series are convertible (including any such distribution made in connection with a consolidation or merger in which the Issuer is the continuing corporation) of evidences of its indebtedness or assets (excluding any cash dividends paid from retained earnings and dividends payable in Capital Stock for which adjustment is made pursuant to subsection (a) above or (d) below) or subscription rights or warrants (excluding subscription rights or warrants to purchase the class of Capital Stock into which Securities of such series are convertible), the number of shares of such class of Capital Stock into which each \$1,000 Principal amount of Securities of such series shall be convertible after such record date shall be determined by multiplying the number of shares of such class of Capital Stock into which such Principal amount of Securities was convertible immediately prior to such record date by a fraction, of which the numerator shall be the fair market value of the assets of the Issuer, after deducting therefrom all liabilities of the Issuer and all preferences (including accrued but unpaid dividends) in respect of classes of Capital Stock having a preference with respect to the assets of the Issuer over such class of Capital Stock (all as determined by the Board of Directors, whose determination shall be conclusive, and described in a certificate signed by chairman of the Issuer's Board of Directors, its president, any vice president, its treasurer, any assistant treasurer, its secretary or any assistant secretary, filed with the Trustee and each conversion agent) on such record date, and of which the denominator shall be such fair market value after deducting therefrom such liabilities and preferences, less the fair market value (as determined by the Board of Directors, whose determination shall be conclusive, and described in a statement filed with the Trustee and each conversion agent) of the assets or evidences of indebtedness, so distributed or of such subscription rights or warrants applicable, so distributed. Such adjustment shall be made successively whenever such a record date is fixed; and in the event that such distribution is not so made, the conversion rate shall again be adjusted to the conversion rate which would then be in effect if such record date had not been fixed.

(d) In case the Issuer shall, by dividend or otherwise, distribute to all holders of its Capital Stock cash (excluding any dividend or distribution in connection with the liquidation, dissolution or winding up of the Issuer, whether voluntary or involuntary), then, in such case, unless the Issuer elects to reserve such cash for distribution to the Holders of the Securities upon the conversion of the Securities so that any such Holder converting Securities will receive upon such conversion, in addition to the shares of Capital Stock to which such Holder is entitled, the amount of cash which such Holder would have received if such Holder had, immediately prior to the record date for such distribution of cash, converted its Securities into Capital Stock, the conversion rate shall be adjusted so that the same shall equal the rate determined by multiplying the conversion rate in effect immediately prior to the record date by a fraction of which the denominator shall be the current market price of the Capital Stock (determined as provided in Section 12.05(e) on the record date less the amount of cash so distributed (and not excluded as provided above) applicable to one share of Capital Stock and the numerator shall be such current market price of the Capital Stock (determined as provided in Section 12.05(e)), such adjustment to be effective immediately prior to the opening of business on the day following the record date; provided, however, that in the event the portion of the cash so distributed applicable to one share of Capital Stock is equal to or greater than the current market price of the Capital Stock (determined as provided in Section 12.05(e)) on the record date, in lieu of the foregoing adjustment, adequate provision shall be made so that each Securityholder shall have the right to receive upon conversion the amount of cash such Holder would have received had such Holder converted each Security on the record date. If such dividend or distribution is not so paid or made, the conversion rate shall again be adjusted to be the conversion rate which would then be in effect if such dividend or distribution had not been declared.

(e) For the purpose of any computation under subsections (b) and (d) above and Section 12.06, the current market price per share of the Capital Stock on any date as of which such price is to be computed shall mean the average of the Closing Prices for the 30 consecutive Business Days commencing 45 Business Days before such date.

(f) No adjustment in the conversion rate shall be required unless such adjustment would require a cumulative increase or decrease of at least 1% in such rate; *provided, however*, that any adjustments which by reason of this subsection (f) are not required to be made shall be carried forward and taken into account in any subsequent adjustment; and *provided further*, that adjustments shall be required and made in accordance with the provisions of this Article 12 (other than this subsection (f)) not later than such time as may be required in order to preserve the tax-free nature of a States income tax purposes to the Holders of Securities or the class of Capital Stock into which such Securities are convertible. All calculations under this Article 12 shall be made to the nearest cent or to the nearest one-thousandth of a share, as the case may be. Anything in this Section 12.05 to the contrary notwithstanding, the Issuer shall be entitled to make such adjustments in the conversion rate, in addition to those required by this Section 12.05, as it in its discretion shall determine to be advisable in order that any stock dividend, subdivision of shares, distribution of rights to purchase stock or securities, or distribution of securities convertible into or exchangeable for stock hereafter made by the Issuer to its shareholders shall not be taxable for United States income tax purposes.

(g) Whenever the conversion rate is adjusted, as herein provided, the Issuer shall promptly file with the Trustee and with the office or agency maintained by the Issuer for the conversion of Securities of such series pursuant to Section 3.02, a certificate of a firm of independent public accountants of recognized national standing selected by the Board of Directors (who may be the regular accountants employed by the Issuer) setting forth the conversion rate after such adjustment and setting forth a brief statement of the facts requiring such adjustment and a computation thereof. Such certificate shall be conclusive evidence of the correctness of such adjustment. Neither the Trustee nor any conversion agent shall be under any duty or responsibility with respect to any such certificate or any facts or computations set forth therein, except to exhibit said certificate from time to time to any Securityholder of such series desiring to inspect the same. The Issuer shall promptly cause a notice setting forth the adjusted conversion rate to be mailed to the Holders of Securities of such series, as their names and addresses appear upon the register of the Issuer.

(h) In the event that at any time, as a result of shares of any other class of Capital Stock becoming issuable in exchange or substitution for or in lieu of shares of the class of Capital Stock into which such Securities are convertible or as a result of an adjustment made pursuant to subsection (a) above, the Holder of any Security of such series thereafter surrendered for conversion shall become entitled to receive any shares of the Issuer other than shares of the class of Capital Stock into which the Issuer of such series are convertible, thereafter the number of such other shares so receivable upon conversion of any Security shall be subject to adjustment from time to time in a manner and on terms as nearly equivalent as practicable to the provisions with respect to the class of Capital Stock into which the Securities of such series are convertible contained in subsections (a) to (f), inclusive, above, and the provisions of this Article 12 with respect to the class of Capital Stock into which the Securities of such series are convertible shall apply on like terms to any such other shares.

(i) The conversion rate with respect to any Original Issue Discount Security, the terms of which provide for convertibility, shall not be adjusted during the term of such Original Issue Discount Security for accrued original issue discount.

(j) In the event that the Securities of any series are convertible into more than one class of Capital Stock, the provisions of this Section 12.05 shall apply separately to events affecting each such class.

Section 12.06 *No Fractional Shares to Be Issued*. No fractional shares of Capital Stock shall be issued upon conversions of Securities. If more than one Security of any series shall be surrendered for conversion at one time by the same Holder, the number of full shares which shall be issuable upon conversion thereof shall be computed on the basis of the aggregate Principal amount of the Securities of such series (or specified portions thereof to the extent permitted hereby) so surrendered. Instead of a fraction of a share of Capital Stock which would otherwise be issuable upon conversion of any Security or Securities (or specified portions thereof), the Issuer shall pay a cash adjustment in respect of such fraction of a share in an amount equal to the same fractional interest of the current market price (as defined in Section 12.05) per share of Capital Stock on the Business Day next preceding the day of conversion.

Section 12.07 *Preservation of Conversion Rights Upon Consolidation, Merger, Sale or Conveyance*. In case of any consolidation of the Issuer with, or merger of the Issuer into, any other corporation (other than a consolidation or merger in which the Issuer is the continuing corporation), or in the case of any sale or transfer of all or substantially all of the assets of the Issuer, the corporation formed by such consolidation or the corporation into which the Issuer shall have been merged or the corporation which shall have acquired such assets, as the case may be, shall execute and deliver to the Trustee, a supplemental indenture, subject to the provisions of Article 7 and 8 as they relate to supplemental indentures, providing that the Holder of each Security then Outstanding of a series which was convertible into Capital Stock shall have the right thereafter to convert such Security into the kind and amount of shares of stock and other securities and property, including cash, receivable upon such consolidation, merger, sale or transfer by a holder of the number of shares of Capital Stock of the Issuer into which such Securities might have been converted immediately prior to such consolidation, merger, sale or transfer. Such supplemental indenture shall conform to the provisions of the Trust Indenture Act of 1939 as then in effect and shall provide for adjustments which shall be as nearly equivalent as may be practicable to the adjustments provided for in this Article 12. Neither the Trustee nor any conversion agent shall be under any responsibility to determine the correctness of any provision contained in any such supplemental indenture relating either to the kind or amount of shares of stock or other securities or property receivable by Securityholders upon the conversion of their Securities after any such consolidation, merger, sale or transfer, or to any adjustment to be made with respect there to and, subject to the provisions of Article 5, may accept as conclusive evidence of the correctness of any such provisions, and shall be protected in relying upon, an Opinion of Counsel with respect thereto. If in the case of any such consolidation, merger, sale or transfer, the stock or other securities and property receivable by a Holder of the Securities includes stock or other securities and property of a corporation other than the successor or purchasing corporation, then such supplemental indenture shall also be executed by such other corporation and shall contain such additional provisions to protect the interests of the Holders of the Securities as the Board of Directors shall reasonably consider necessary. The above provisions of this Section 12.07 shall similarly apply to successive consolidations, mergers, sales or transfers.

Section 12.08 *Notice to Security Holders of a Series Prior to Taking Certain Types of Action.* With respect to the Securities of any series, in case:

(a) the Issuer shall authorize the issuance to all holders of the class of Capital Stock into which Securities of such series are convertible of rights or warrants to subscribe for or purchase shares of its Capital Stock or of any other right;

(b) the Issuer shall authorize the distribution to all holders of the class of Capital Stock into which Securities of such series are convertible of evidences of its indebtedness or assets (except for the exclusions with respect to certain dividends set forth in Section 12.05(c));

(c) of any subdivision, combination or reclassification of the class of Capital Stock into which Securities of such series are convertible or of any consolidation or merger to which the Issuer is a party and for which approval by the shareholders of the Issuer is required, or of the sale or transfer of all or substantially all of the assets of the Issuer; or

(d) of the voluntary or involuntary dissolution, liquidation or winding up of the Issuer;

then the Issuer shall cause to be filed with the Trustee and at the office or agency maintained for the purpose of conversion of Securities of such series pursuant to Section 3.02, and shall cause to be mailed to the Holders of Securities of such series, at their last addresses as they shall appear upon the register of the Issuer, at least 10 days prior to the applicable record date hereinafter specified, a notice stating (i) the date as of which the holders of such class of Capital Stock to be entitled to receive any such rights, warrants or distribution are to be determined, or (ii) the date on which any such subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action is expected to become effective, and the date as of which it is expected that holders of record of such class of Capital Stock shall be entitled to exchange their Capital Stock of such class for securities or other property, if any, deliverable upon such subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action. The failure to give the notice required by this Section 12.08 or any defect therein shall not affect the legality or validity of any distribution, right, warrant, subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action, or the vote upon any of the foregoing. Such notice shall also be published by and at the expense of the Issuer not later than the aforesaid filing date at least once in an Authorized Newspaper.

Section 12.09 *Covenant to Reserve Shares for Issuance on Conversion of Securities*. The Issuer covenants that at all times it will reserve and keep available out of each class of its authorized Capital Stock, free from preemptive rights, solely for the purpose of issue upon conversion of Securities of any series as herein provided, such number of shares of Capital Stock of such class as shall then be issuable upon the conversion of all Outstanding Securities of such series. The Issuer covenants that an shares of Capital Stock which shall be so issuable shall, when issued or delivered, be duly and validly issued shares of the class of authorized Capital Stock into which Securities of such series are convertible, and shall be fully paid and nonassessable, free of all liens and charges and not subject to preemptive rights and that, upon conversion, the appropriate capital stock accounts of the Issuer will be duly credited.

Section 12.10 *Compliance with Governmental Requirements*. The Issuer covenants that if any shares of Capital Stock required to be reserved for purposes of conversion of Securities hereunder require registration or listing with or approval of any governmental authority under any Federal or State law, pursuant to the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, or any national or regional securities exchange on which such Capital Stock is listed at the time of delivery of any shares of such Capital Stock, before such shares may be issued upon conversion, the Issuer will use reasonable efforts to cause such shares to be duly registered, listed or approved, as the case may be.

Section 12.11 *Payment of Taxes Upon Certificates for Shares Issued Upon Conversion*. The issuance of certificates for shares of Capital Stock upon the conversion of Securities shall be made without charge to the converting Securityholders for any tax (including, without limitation, all documentary and stamp taxes) in respect of the issuance and delivery of such certificates, and such certificates shall be issued in the respective names of, or in such names as may be directed by, the Holders of the Securities converted; provided, however, that the Issuer shall not be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of any such certificate in a name other than that of the Holder of the Security converted, and the Issuer shall not be required to issue or deliver such certificates unless or until the person or persons requesting the issuance thereof shall have paid to the Issuer the amount of such tax or shall have established to the satisfaction of the Issuer that such tax has been paid.

Section 12.12 *Trustee's Duties with Respect to Conversion Provisions*. The Trustee and any conversion agent shall not at any time be under any duty or responsibility to any Securityholder to determine whether any facts exist which may require any adjustment of the conversion rate or conversion price, or with respect to the nature or extent of any such adjustment when made, or with respect to the method employed, or herein or in any supplemental indenture provided to be employed, in making the same. Neither the Trustee nor any conversion agent shall be accountable with respect to the registration under securities laws, listing, validity or value (or the kind or amount) of any shares of Capital Stock, or of any other securities or property, which may at any time be issued or delivered upon the conversion of any Security; and neither the Trustee nor any conversion agent makes any representation with respect thereto. Neither the Trustee nor any conversion agent shall be responsible for any failure of the Issuer to make any cash payment or to issue, transfer or deliver any shares of stock or stock certificates or other securities or property upon the surrender of any Security for the purpose of conversion; and the Trustee, subject to the provisions of Article 5, and any conversion agent shall not be responsible for any failure of the Issuer to comply with any of the covenants of the Issuer contained in this Article 12.

IN WITNESS WHEREOF, the parties hereto have caused this Indenture to be duly executed, as of the first date written above.

CORBUS PHARMACEUTICALS HOLDINGS, INC., as Issuer

By: _____
Name: _____
Title: _____

●, as Trustee

By: _____
Name: _____
Title: _____

FORM OF NOTE

UNLESS AND UNTIL IT IS EXCHANGED IN WHOLE OR IN PART FOR SECURITIES IN DEFINITIVE REGISTERED FORM, THIS SECURITY MAY NOT BE TRANSFERRED EXCEPT AS A WHOLE BY THE DEPOSITARY TO A NOMINEE OF THE DEPOSITARY OR BY A NOMINEE OF THE DEPOSITARY TO THE DEPOSITARY OR ANOTHER NOMINEE OF THE DEPOSITARY OR BY THE DEPOSITARY OR ANY SUCH NOMINEE TO A SUCCESSOR DEPOSITARY OR A NOMINEE OF SUCH SUCCESSOR DEPOSITARY. UNLESS THIS SECURITY IS PRESENTED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPOSITARY TRUST COMPANY, A NEW YORK CORPORATION (“**DTC**”), TO THE COMPANY OR ITS AGENT FOR REGISTRATION OF TRANSFER, EXCHANGE OR PAYMENT, AND ANY SECURITY ISSUED IS REGISTERED IN THE NAME OF CEDE & CO. OR IN SUCH OTHER NAME AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC (AND ANY PAYMENT IS MADE TO CEDE & CO. OR TO SUCH OTHER ENTITY AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC), ANY TRANSFER, PLEDGE OR OTHER USE HEREOF FOR VALUE OR OTHERWISE BY OR TO ANY PERSON IS WRONGFUL INASMUCH AS THE REGISTERED OWNER HEREOF, CEDE & CO., HAS AN INTEREST HEREIN.

CORBUS PHARMACEUTICALS HOLDINGS, INC.

• % Senior Note Due •

No. • CUSIP No.: •

\$ •

CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (“**Issuer**”, which term includes any successor corporation), for value received promises to pay to CEDE & CO. or its registered assigns, the principal sum of • on •.

Interest Payment Dates: • and • (each, an “**Interest Payment Date**”), commencing on •. Interest Record Dates: • and • (each, an “**Interest Record Date**”).

Reference is made to the further provisions of this Security contained herein, which will for all purposes have the same effect as if set forth at this place.

IN WITNESS WHEREOF, the Issuer has caused this Security to be signed manually or by facsimile by its duly authorized officer.

CORBUS PHARMACEUTICALS HOLDINGS, INC.

By: _____
Name: _____
Title: _____

This is one of the series designated herein and referred to in the within-mentioned Indenture.

- , as Trustee

By: _____
Authorized Signatory

(REVERSE OF SECURITY)
CORBUS PHARMACEUTICALS HOLDINGS, INC.

•% Senior Note Due •

1. Interest.

CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (the “Issuer”), promises to pay interest on the Principal amount of this Security at the rate per annum shown above. Cash interest on the Securities will accrue from the most recent date to which interest has been paid or, if no interest has been paid, from •. The Issuer will pay interest semi-annually in arrears on each Interest Payment Date, commencing •. Interest will be computed on the basis of a 360-day year of twelve 30-day months.

The Issuer shall pay interest on overdue Principal from time to time on demand at the rate borne by the Securities and on overdue installments of interest (without regard to any applicable grace periods) to the extent lawful.

2. Method of Payment.

The Issuer shall pay interest on the Securities (except defaulted interest) to the persons who are the registered Holders at the close of business on the Interest Record Date immediately preceding the Interest Payment Date notwithstanding any transfer or exchange of such Security subsequent to such Interest Record Date and prior to such Interest Payment Date. Holders must surrender Securities to the Trustee to collect Principal payments. The Issuer shall pay Principal and interest in money of the United States that at the time of payment is legal tender for payment of public and private debts (“**U.S. Legal Tender**”). However, the payments of interest, and any portion of the Principal (other than interest payable at maturity or on any redemption or repayment date or the final payment of Principal) shall be made by the Paying Agent, upon receipt from the Issuer of immediately available funds by 11:00 a.m., New York City time (or such other time as may be agreed to between the Issuer and the Paying Agent or the Issuer), directly to a Holder (by Federal funds wire transfer or otherwise) if the Holder has delivered written instructions to the Trustee 15 days prior to such payment date requesting that such payment will be so made and designating the bank account to which such payments shall be so made and in the case of payments of Principal surrenders the same to the Trustee in exchange for a Security or Securities aggregating the same principal amount as the unredeemed Principal amount of the Securities surrendered.

3. Paying Agent.

Initially, • (the “**Trustee**”) will act as Paying Agent. The Issuer may change any Paying Agent without notice to the Holders.

4. Indenture.

The Issuer issued the Securities under an Indenture, dated as of • (the “**Indenture**”), between the Issuer and the Trustee. Capitalized terms herein are used as defined in the Indenture unless otherwise defined herein. The terms of the Securities include those stated in the Indenture and those made part of the Indenture by reference to the Trust Indenture Act of 1939 (15 U.S.C. Sections 77aaa-77bbb) (the “**TIA**”), as in effect on the date of the Indenture until such time as the Indenture is qualified under the TIA, and thereafter as in effect on the date on which the Indenture is qualified under the TIA. Notwithstanding anything to the contrary herein, the Securities are subject to all such terms, and Holders of Securities are referred to the Indenture and the TIA for a statement of them. To the extent the terms of the Indenture and this Security are inconsistent, the terms of the Indenture shall govern.

5. Denominations; Transfer; Exchange.

The Securities are in registered form, without coupons, in denominations of \$1,000 and multiples of \$1,000. A Holder shall register the transfer of or exchange Securities in accordance with the Indenture. The Issuer may require a Holder, among other things, to furnish appropriate endorsements and transfer documents and to pay certain transfer taxes or similar governmental charges payable in connection therewith as permitted by the Indenture. The Issuer need not issue, authenticate, register the transfer of or exchange any Securities or portions thereof for a period of fifteen (15) days before such series is selected for redemption, nor need the Issuer register the transfer or exchange of any security selected for redemption in whole or in part.

6. Persons Deemed Owners.

The registered Holder of a Security shall be treated as the owner of it for all purposes.

7. Unclaimed Funds.

If funds for the payment of Principal or interest remain unclaimed for two years, the Trustee and the Paying Agent will repay the funds to the Issuer at its written request. After that, all liability of the Trustee and such Paying Agent with respect to such funds shall cease.

8. Legal Defeasance and Covenant Defeasance.

The Issuer may be discharged from its obligations under the Securities and under the Indenture with respect to the Securities except for certain provisions thereof, and may be discharged from obligations to comply with certain covenants contained in the Securities and in the Indenture with respect to the Securities, in each case upon satisfaction of certain conditions specified in the Indenture.

9. Amendment; Supplement; Waiver.

Subject to certain exceptions, the Securities and the provisions of the Indenture relating to the Securities may be amended or supplemented with the written consent of the Holders of at least a majority in aggregate Principal amount of the Securities then outstanding, and any existing Default or Event of Default or compliance with certain provisions may be waived with the consent of the Holders of a majority in aggregate Principal amount of the Securities then outstanding. Without notice to or consent of any Holder, the parties thereto may amend or supplement the Indenture and the Securities to, among other things, cure any ambiguity, defect or inconsistency, provide for uncertificated Securities in addition to or in place of certificated Securities or comply with any requirements of the Commission in connection with the qualification of the Indenture under the Trust Indenture Act, or make any other change that does not adversely affect the rights of any Holder of a Security.

10. Defaults and Remedies.

If an Event of Default (other than certain bankruptcy Events of Default with respect to the Issuer) occurs and is continuing, the Trustee or the Holders of at least 25% in aggregate Principal amount of Securities then outstanding may declare all of the Securities to be due and payable immediately in the manner and with the effect provided in the Indenture. If a bankruptcy Event of Default with respect to the Issuer occurs and is continuing, all the Securities shall be immediately due and payable immediately in the manner and with the effect provided in the Indenture without any notice or other action on the part of the Trustee or any Holder. Holders of Securities may not enforce the Indenture or the Securities except as provided in the Indenture. The Trustee is not obligated to enforce the Indenture or the Securities unless it has received indemnity satisfactory to it. The Indenture permits, subject to certain limitations therein provided, Holders of a majority in aggregate Principal amount of the Securities then outstanding to direct the Trustee in its exercise of any trust or power. The Trustee may withhold from Holders of Securities notice of certain continuing Defaults or Events of Default if it determines that withholding notice is in their interest.

11. Conversion.

Reference is made to the Indenture, including, without limitation, provisions giving the Holder of this Security the right to convert this Security into Capital Stock of the Issuer on the terms and subject to the limitations as more fully specified in the Indenture. The initial conversion rate for this Security is ●. This conversion rate is subject to modification as provided in the Indenture. Such further provisions shall for all purposes have the same effect as though fully set forth at this place.

12. Trustee Dealings with Issuer.

The Trustee under the Indenture, in its individual or any other capacity, may become the owner or pledgee of Securities and may otherwise deal with the Issuer as if it were not the Trustee.

13. No Recourse Against Others.

No stockholder, director, officer, employee or incorporator, as such, of the Issuer or any successor Person thereof shall have any liability for any obligation under the Securities or the Indenture or for any claim based on, in respect of or by reason of, such obligations or their creation. Each Holder of a Security by accepting a Security waives and releases all such liability. The waiver and release are part of the consideration for the issuance of the Securities.

14. Authentication.

This Security shall not be valid until the Trustee manually signs the certificate of authentication on this Security.

15. Abbreviations and Defined Terms.

Customary abbreviations may be used in the name of a Holder of a Security or an assignee, such as: TEN COM (= tenants in common), TEN ENT (= tenants by the entireties), JT TEN (= joint tenants with right of survivorship and not as tenants in common), CUST (= Custodian), and U/G/M/A (= Uniform Gifts to Minors Act).

16. CUSIP Numbers.

Pursuant to a recommendation promulgated by the Committee on Uniform Security Identification Procedures, the Issuer has caused CUSIP numbers to be printed on the Securities as a convenience to the Holders of the Securities. No representation is made as to the accuracy of such numbers as printed on the Securities and reliance may be placed only on the other identification numbers printed hereon.

17. Governing Law.

The laws of the State of New York shall govern the Indenture and this Security thereof.

ASSIGNMENT FORM

I or we assign and transfer this Security to

(Print or type name, address and zip code of assignee or transferee)

(Insert Social Security or other identifying number of assignee or transferee)

and irrevocably appoint _____ agent to transfer this Security on the books of the Issuer. The agent may substitute another to act for him.

Dated: _____

Signed: _____

(Signed exactly as name appears on the other side of this Security)

Signature Guarantee:

Participant in a recognized Signature Guarantee Medallion Program
(or other signature guarantor program reasonably acceptable to the Trustee)

CORBUS PHARMACEUTICALS HOLDINGS, INC., as Issuer

and

●, as Trustee

INDENTURE

Dated as of ●

Subordinated Debt Securities

CROSS REFERENCE SHEET¹

Between

Provisions of the Trust Indenture Act of 1939 and the Indenture to be dated as of _____, 20__ between CORBUS PHARMACEUTICALS HOLDINGS, INC. and _____, as Trustee:

Section of the Act	Section of Indenture
310(a)(1) and (2)	5.08
310(a)(3) and (4)	Inapplicable
310(b)	5.09(a), (b) and (d)
310(c)	Inapplicable
311(a)	Inapplicable
311(b)	Inapplicable
311(c)	Inapplicable
312(a)	3.05
312(b)	3.05
312(c)	4.02(c)
313(a)	5.12
313(b)(1)	5.12
313(b)(2)	5.12
313(c)	5.12
313(d)	5.12
314(a)	3.06
314(b)	Inapplicable
314(c)(1) and (2)	10.05
314(c)(3)	Inapplicable
314(d)	Inapplicable
314(e)	10.05
314(f)	Inapplicable
315(a), (c) and (d)	5.01
315(b)	4.11
315(e)	4.12
316(a)(1)	4.09
316(a)(2)	Not required
316(a) (last sentence)	6.04
316(b)	4.07
317(a)	4.02
317(b)	3.03(a) and (b)
318(a)	10.07

¹ This Cross Reference Sheet is not part of the Indenture.

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THIS INDENTURE, dated as of , between CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (the “**Issuer**”) and ●, a ● corporation, as trustee (the “**Trustee**”).

WITNESSETH:

WHEREAS, the Issuer has duly authorized the issue from time to time of its unsecured debentures, notes or other evidences of indebtedness to be issued in one or more series (the “**Securities**”) up to such principal amount or amounts as may from time to time be authorized in accordance with the terms of this Indenture and to provide, among other things, for the authentication, delivery and administration thereof, the Issuer has duly authorized the execution and delivery of this Indenture; and

WHEREAS, all things necessary to make this Indenture a valid indenture and agreement according to its terms have been done;

NOW, THEREFORE:

In consideration of the premises and the purchases of the Securities by the Holders thereof, the Issuer and the Trustee mutually covenant and agree for the equal and proportionate benefit of the respective Holders from time to time of the Securities as follows:

**ARTICLE 1
DEFINITIONS**

Section 1.01 *Certain Terms Defined*. The following terms (except as otherwise expressly provided or unless the context otherwise clearly requires) for all purposes of this Indenture and of any indenture supplemental hereto shall have the respective meanings specified in this Section. All other terms used in this Indenture that are defined in the Trust Indenture Act of 1939 or the definitions of which in the Securities Act of 1933 are referred to in the Trust Indenture Act of 1939, as amended, including terms defined therein by reference to the Securities Act of 1933, as amended, (except as herein otherwise expressly provided or unless the context otherwise clearly requires), shall have the meanings assigned to such terms in said Trust Indenture Act and in said Securities Act as in force at the date of this Indenture. All accounting terms used herein and not expressly defined shall have the meanings assigned to such terms in accordance with GAAP. The words “herein”, “hereof” and “hereunder” and other words of similar import refer to this Indenture as a whole and not to any particular Article, Section or other subdivision. The terms defined in this Article have the meanings assigned to them in this Article and include the plural as well as the singular.

“**Affiliate**” of any specified Person means any other Person directly or indirectly controlling or controlled by or under direct or indirect common control with such specified Person. For the purposes of this definition, “control” when used with respect to any specified Person means the power to direct the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise; and the terms “controlling” and “controlled” have meanings correlative to the foregoing.

“**Authorized Newspaper**” means a newspaper in the English language or in an official language of the country of publication, customarily printed on each Business Day, whether or not published on Saturdays, Sundays or holidays, and of general circulation in the place in connection with which the term is used or in the financial community of such place. If, because of temporary suspension of publication or general circulation of any newspaper or for any other reason, it is impossible or impracticable to make any publication of any notice required by this Indenture in the manner herein provided, such publication or other notice in lieu thereof which is made at the written direction of the Issuer by the Trustee shall constitute a sufficient publication of such notice.

“**Board of Directors**” means either the Board of Directors of the Issuer or any committee of such Board duly authorized to act hereunder.

“**Business Day**” means, with respect to any Security, a day that in the city (or in all of the cities, if more than one) in which amounts are payable, as specified in the form of such Security, is not a day on which banking institutions are authorized by law or regulation to close.

“**Capitalized Lease**” means, as applied to any Person, any lease of any property (whether real, personal, or mixed) of which the discounted present value of the rental obligations of such Person as lessee, in conformity with GAAP, is required to be capitalized on the balance sheet of such Person; and “**Capitalized Lease Obligation**” is defined to mean the rental obligations, as aforesaid, under such lease.

“**Capital Stock**” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s capital stock or other ownership interests, whether now outstanding or issued after the date of this Indenture, including, without limitation, all Common Stock and Preferred Stock.

“**Closing Price**” on any day when used with respect to any class of Capital Stock means the closing sale price per share (or if no closing sale price is reported, the average of the bid and ask prices or, if more than one in either case, the average of the average bid and the average ask prices) on that date as reported by The Nasdaq Global Select Market or, if such Capital Stock is not listed on The Nasdaq Global Select Market, then on the principal U.S. national or regional securities exchange on which such Capital Stock is then listed. If such Capital Stock is not listed on either The Nasdaq Global Select Market or on any U.S. national or regional securities exchange on the relevant date, the Closing Price will be the last quoted bid price for the Company’s Common Stock in the over-the-counter market on the relevant date as reported by the OTC Markets Group Inc. or similar organization. In the event that no such quotation is available for any day, the Board of Directors shall be entitled to determine in good faith the current market price on the basis of such quotations as it considers appropriate.

“**Commission**” means the Securities and Exchange Commission, as from time to time constituted, created under the Securities Exchange Act of 1934, or if at any time after the execution and delivery of this Indenture such Commission is not existing and performing the duties now assigned to it under the Trust Indenture Act, then the body performing such duties on such date.

“**Common Stock**” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s common stock, par value \$0.001 per share, whether now outstanding or issued after the date of the Indenture, including, without limitation, all series and classes of such common stock.

“**Corporate Trust Office**” means the office of the Trustee at which the corporate trust business of the Trustee shall, at any particular time, be principally administered, which office is, at the date as of which this Indenture is dated, located at ●.

“**Currency Agreement**” means any foreign exchange contract, currency swap agreement, or other similar agreement or arrangement designed to protect against the fluctuation in currency values.

“**Default**” means any Event of Default as defined in Section 4.01 and any event that is, or after notice or passage of time or both would be, an Event of Default.

“**Depository**” means, with respect to the Securities of any series issuable or issued in the form of one or more Registered Global Securities, the Person designated as Depository by the Issuer pursuant to Section 2.03 until a successor Depository shall have become such pursuant to the applicable provisions of this Indenture, and thereafter “**Depository**” shall mean or include each Person who is then a Depository hereunder, and if at any time there is more than one such Person, “**Depository**” as used with respect to the Securities of any such series shall mean the Depository with respect to the Registered Global Securities of that series.

“**Determination Date**” has the meaning specified in Section 12.05.

“**Event of Default**” has the meaning specified in Section 4.01.

“**GAAP**” means generally accepted accounting principles in the United States of America as in effect as of the date of determination, including, without limitation, those set forth in the opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other entity as approved by a significant segment of the accounting profession. All ratios and computations contained in this Indenture shall be computed in conformity with GAAP applied on a consistent basis.

“**Guarantee**” means any obligation, contingent or otherwise, of any Person directly or indirectly guaranteeing any Indebtedness or other obligation of any other Person and, without limiting the generality of the foregoing, any obligation, direct or indirect, contingent or otherwise, of such Person:

(i) to purchase or pay (or advance or supply funds for the purchase or payment of) such Indebtedness or other obligation of such other Person (whether arising by virtue of partnership arrangements, or by agreement to keep-well, to purchase assets, goods, securities, or services, to take-or-pay, or to maintain financial statement conditions or otherwise); or

(ii) entered into for purposes of assuring in any other manner the obligee of such Indebtedness or other obligation of the payment thereof or to protect such obligee against loss in respect thereof (in whole or in part);

provided, that the term “**Guarantee**” shall not include endorsements for collection or deposit in the ordinary course of business. The term “**Guarantee**” used as a verb has a corresponding meaning.

“**Holder**”, “**Securityholder**” or other similar terms mean the registered holder of any Security.

“**Indebtedness**” means, with respect to any Person at any date of determination (without duplication):

(i) all indebtedness of such Person for borrowed money;

(ii) all obligations of such Person evidenced by bonds, debentures, notes, or other similar instruments, in each case, for value received or settlement of claims;

(iii) all obligations of such Person in respect of letters of credit or other similar instruments (including reimbursement obligations with respect thereto);

(iv) all obligations of such Person to pay the deferred and unpaid purchase price of property or services (but excluding trade accounts payable or accrued liabilities arising in the ordinary course of business);

(v) all obligations of such Person as lessee under Capitalized Leases;

(vi) all Indebtedness of other Persons secured by a Lien on any asset of such Person, whether or not such Indebtedness is assumed by such Person; *provided* that the amount of such Indebtedness shall be the lesser of:

(1) the fair market value of such asset at such date of determination; and

(2) amount of such Indebtedness;

(vii) all Indebtedness of other Persons to the extent Guaranteed by such Person; and

(viii) to the extent not otherwise included in this definition, obligations under Currency Agreements and Interest Rate Agreements.

Notwithstanding the foregoing, in no event shall the term “Indebtedness” be deemed to include letters of credit or bonds that secure performance or surety bonds or similar instruments that are issued in the ordinary course of business.

The amount of Indebtedness of any Person at any date shall be the outstanding balance at such date of all unconditional obligations as described above and, with respect to contingent obligations, the maximum liability upon the occurrence of the contingency giving rise to the obligation; provided that:

(x) the amount outstanding at any time of any Indebtedness issued with original issue discount is the face amount of such Indebtedness less the remaining unamortized portion of the original issue discount of such Indebtedness at such time as determined in conformity with GAAP; and

(y) Indebtedness shall not include any liability for federal, state, local, or other taxes.

“Indenture” means this instrument as originally executed and delivered or, if amended or supplemented as herein provided, as so amended or supplemented or both, and shall include the forms and terms of particular series of Securities established as contemplated hereunder.

“Interest” means, when used with respect to non-interest bearing Securities, interest payable after maturity. **“Interest Rate Agreement”** means any obligation of any Person pursuant to any interest rate swap, cap, collar or similar arrangement providing protection against fluctuations in interest rates. For purposes of the Indenture, the amount of such obligation shall be the amount determined in respect thereof as of the end of the then most recently ended fiscal quarter of such Person, based on the assumption that such obligation had terminated at the end of such fiscal quarter, and in making such determination, if any agreement relating to such obligation provides for the netting of amounts payable by and to such Person thereunder or if any such agreement provides for the simultaneous payment of amounts by and to such Person, then in each such case, the amount of such obligation shall be the net amount so determined, plus any premium due upon default by such Person.

“Issuer” means the Person identified as “Issuer” in the first paragraph hereof and, subject to Article 8, its successors and assigns.

“Lien” means, with respect to any asset, any mortgage, lien, pledge, charge, security interest or encumbrance of any kind, or any other type of preferential arrangement that has the practical effect of creating a security interest, in respect of such asset. For the purposes of this Indenture, the Issuer shall be deemed to own subject to a Lien any asset that it has acquired or holds subject to the interest of a vendor or lessor under any conditional sale agreement, capital lease or other title retention agreement relating to such asset.

“Officers’ Certificate” means a certificate signed by the chairman of the Issuer’s Board of Directors, its president or any vice president, and by its treasurer, any assistant treasurer, its secretary or any assistant secretary of the Issuer, and delivered to the Trustee. Each such certificate shall comply with Section 314 of the Trust Indenture Act of 1939 and include the statements provided for in Section 10.05.

“Opinion of Counsel” means an opinion in writing signed by legal counsel who may be an employee of or counsel to the Issuer and who shall be satisfactory to the Trustee. Each such opinion shall comply with Section 314 of the Trust Indenture Act of 1939 and include the statements provided for in Section 10.05, if and to the extent required hereby.

“Original Issue Date” of any Security (or portion thereof) means the earlier of (i) the date of such Security or (ii) the date of any Security (or portion thereof) for which such Security was issued (directly or indirectly) on registration of transfer, exchange or substitution.

“Original Issue Discount Security” means any Security that provides for an amount less than the Principal amount thereof to be due and payable upon a declaration of acceleration of the maturity thereof pursuant to Section 4.01.

“Outstanding”, when used with reference to Securities, shall, subject to the provisions of Section 6.04, mean, as of any particular time, all Securities authenticated and delivered by the Trustee under this Indenture, except:

(i) Securities theretofore canceled by the Trustee or delivered to the Trustee for cancellation;

(ii) Securities, or portions thereof, for the payment or redemption of which monies in the necessary amount shall have been deposited in trust with the Trustee or with any paying agent (other than the Issuer) or shall have been set aside, segregated and held in trust by the Issuer for the Holders of such Securities (if the Issuer shall act as its own paying agent), provided that if such Securities, or portions thereof, are to be redeemed prior to the maturity thereof, notice of such redemption shall have been given as herein provided, or provision satisfactory to the Trustee shall have been made for giving such notice; and

(iii) Securities in substitution for which other Securities shall have been authenticated and delivered, or which shall have been paid, pursuant to the terms of Section 2.09 (except with respect to any such Security as to which proof satisfactory to the Trustee is presented that such Security is held by a person in whose hands such Security is a legal, valid and binding obligation of the Issuer).

In determining whether the Holders of the requisite Principal amount of Outstanding Securities of any or all series have given any request, demand, authorization, direction, notice, consent or waiver hereunder, the Principal amount of an Original Issue Discount Security that shall be deemed to be Outstanding for such purposes shall be the amount of the Principal thereof that would be due and payable as of the date of such determination upon a declaration of acceleration of the maturity thereof pursuant to Section 4.01.

“Person” means any individual, corporation, partnership, limited liability company, joint venture, association, joint stock company, trust, unincorporated organization or government or any agency or political subdivision thereof or any other entity.

“Preferred Stock” means any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) of the Issuer’s preferred stock, par value \$0.001 per share, whether now outstanding or issued after the date of the Indenture, including, without limitation, all series and classes of such preferred stock.

“Principal” means, with respect to the Securities or any Security or any portion thereof, the principal amount of such Securities, Security or portion thereof, and shall be deemed to include “and premium, if any”.

“**record date**” as used with respect to any interest payment date (except a date for payment of defaulted interest), has the meaning specified in Section 2.07.

“**Registered Global Security**” means a Security evidencing all or a part of a series of Registered Securities, issued to the Depository for such series in accordance with Section 2.04, and bearing the legend prescribed in Section 2.04.

“**Registered Security**” means any Security registered on the register maintained by the Issuer pursuant to Section 2.08.

“**Responsible Officer**” when used with respect to the Trustee means any officer within the corporate trust department of the Trustee, including any vice president, assistant vice president, assistant secretary, assistant treasurer, trust officer or any other officer of the Trustee who customarily performs functions similar to those performed by the Persons who at the time shall be such officers, respectively, or to whom any corporate trust matter is referred because of such person’s knowledge of and familiarity with the particular subject and who shall have direct responsibility for the administration of this Indenture.

“**Security**” or “**Securities**” has the meaning stated in the first recital of this Indenture, or, as the case may be, Securities that have been authenticated and delivered under this Indenture.

“**Senior Indebtedness**” of the Issuer means (a) all Indebtedness of the Issuer, whether currently outstanding or hereafter issued, unless, by the terms of the instrument creating or evidencing such Indebtedness, it is provided that such Indebtedness is not superior in right of payment to the Securities, and (b) any modifications, refunding, deferrals, renewals or extensions of any such Indebtedness or securities, notes or other evidence of Indebtedness issued in exchange for such Indebtedness; provided that in no event shall “Senior Indebtedness” include (i) Indebtedness of the Issuer owed or owing to any Subsidiary of the Issuer or any officer, director or employee of the Issuer or any Subsidiary of the Issuer, (ii) Indebtedness to trade creditors or (iii) any liability for taxes owned or owing by the Issuer.

“**Subsidiary**” means, with respect to any Person, any corporation, association or other business entity of which more than 50% of all votes represented by all classes of outstanding Voting Stock is owned, directly or indirectly, by such Person and one or more other Subsidiaries of such Person.

“**Trustee**” means the Person identified as “**Trustee**” in the first paragraph hereof and, subject to the provisions of Article 5, shall also include any successor trustee.

“**Trust Indenture Act of 1939**” (except as otherwise provided in Section 7.01 and Section 7.02) means the Trust Indenture Act of 1939 as in force at the date as of which this Indenture was originally executed.

“**UCC**” means the Uniform Commercial Code, as in effect in each applicable jurisdiction. “**Unregistered Security**” means any Security other than a Registered Security.

“**U.S. Government Obligations**” means securities that are (i) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (ii) obligations of an agency of instrumentality of the United States of America the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government Obligation or a specific payment of interest on or principal of any such U.S. Government Obligation held by such custodian for the account of the holder of a depository receipt; provided that (except as required by law) such custodian is not authorized to make any deduction from the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government Obligation or the specific payment of interest on or principal of the U.S. Government Obligation evidenced by such depository receipt.

“**Voting Stock**” means, with respect to any Person, capital stock of any class or kind ordinarily having the power to vote for the election of directors, managers or other voting members of the governing body of such Person.

“**vice president**” when used with respect to the Issuer or the Trustee, means any vice president, whether or not designated by a number or a word or words added before or after the title of “**vice president**”.

“**Wholly-Owned**” is defined to mean, with respect to any Subsidiary of any Person, such Subsidiary if all of the outstanding common stock or other similar equity ownership interests (but not including preferred stock) in such Subsidiary (other than any director’s qualifying shares or investments by foreign nationals mandated by applicable law) is owned directly or indirectly by such Person.

“**Yield to Maturity**” means the yield to maturity on a series of securities, calculated at the time of issuance of such series, or, if applicable, at the most recent redetermination of interest on such series, and calculated in accordance with accepted financial practice.

ARTICLE 2 SECURITIES

Section 2.01 *Forms Generally*. The Securities of each series shall be substantially in such form (not inconsistent with this Indenture) as shall be established by or pursuant to a resolution of the Board of Directors or in one or more indentures supplemental hereto, in each case with such appropriate insertions, omissions, substitutions and other variations as are required or permitted by this Indenture and may have imprinted or otherwise reproduced thereon such legend or legends, not inconsistent with the provisions of this Indenture, as may be required to comply with any law or with any rules or regulations pursuant thereto, or with any rules of any securities exchange or to conform to general usage, all as may be determined by the officers executing such Securities, as evidenced by their execution of the Securities. The Issuer shall furnish any such legends to the Trustee in writing.

The definitive Securities shall be printed, lithographed or engraved on steel engraved borders or may be produced in any other manner, all as determined by the officers executing such Securities, as evidenced by their execution of such Securities.

Section 2.02 *Form of Trustee's Certification of Authentication*. The Trustee's certificate of authentication on all Securities shall be in substantially the following form:

This is one of the Securities of the series designated herein and referred to in the within-mentioned Indenture.

•,
as Trustee

By: _____
Authorized Signatory:

Section 2.03 *Amount Unlimited; Issuable in Series*. The aggregate Principal amount of Securities which may be authenticated and delivered under this Indenture is unlimited.

The Securities may be issued in one or more series. There shall be established in or pursuant to a resolution of the Board of Directors and set forth in an Officers' Certificate, or established in one or more indentures supplemental hereto, prior to the issuance of Securities of any series:

(a) the title of the Securities of the series (which shall distinguish the Securities of the series from all other Securities);

(b) any limit upon the aggregate Principal amount of the Securities of the series that may be authenticated and delivered under this Indenture (except for Securities authenticated and delivered upon registration of transfer of, or in exchange for, or in lieu of, other Securities of the series pursuant to Section 2.08, Section 2.09, Section 2.11 or Section 12.03);

(c) the date or dates on which the Principal of the Securities of the series is payable;

(d) the rate or rates at which the Securities of the series shall bear interest, if any, or the method by which such rate shall be determined, the date or dates from which such interest shall accrue, the interest payment dates on which such interest shall be payable and the record dates for the determination of Holders to whom interest is payable;

(e) the place or places where the Principal of and any interest on Securities of the series shall be payable (if other than as provided in Section 3.02);

(f) the price or prices at which, the period or periods within which and the terms and conditions upon which Securities of the series may be redeemed, in whole or in part, at the option of the Issuer;

(g) the obligation, if any, of the Issuer to redeem, purchase or repay Securities of the series at the option of a Holder thereof and the price or prices at which, the period or periods within which and the terms and conditions upon which Securities of the series shall be redeemed, purchased or repaid, in whole or in part, pursuant to such obligation;

(h) the obligation, if any, of the Issuer to permit the conversion of the Securities of such series into Capital Stock, and the terms and conditions upon which such conversion shall be effected (including, without limitation, the initial conversion price or rate, the conversion period and any other provision in addition to or in lieu of those set forth in this Indenture relative to such obligation);

(i) if other than denominations of \$1,000 and any multiple thereof, the denominations in which Securities of the series shall be issuable;

(j) if other than the Principal amount thereof, the portion of the Principal amount of Securities of the series which shall be payable upon declaration of acceleration of the maturity thereof pursuant to Section 4.01 or provable in bankruptcy pursuant to Section 4.02;

(k) if the Securities of the series are issuable in whole or in part as one or more Registered Global Securities, the identity of the Depositary for such Registered Global Security or Securities;

(l) any other terms of the series (which terms shall not be inconsistent with the provisions of this Indenture);

(m) any trustees, authenticating or paying agents, transfer agents or registrar or any other agents with respect to the Securities of such series; and

(n) the extent to which payments on the Securities will be subordinated to the payment of Senior Indebtedness of the Issuer.

All Securities of any one series shall be substantially identical except as to denomination and except as may otherwise be provided in or pursuant to such resolution of the Board of Directors or in any such indenture supplemental hereto.

Section 2.04 *Authentication and Delivery of Securities*. At any time and from time to time after the execution and delivery of this Indenture, the Issuer may deliver Securities of any series executed by the Issuer to the Trustee for authentication, and the Trustee shall thereupon authenticate and deliver such Securities to or upon the written order of the Issuer, such order to be signed by both (a) the chairman of its Board of Directors, its president or any vice president and by its treasurer, any assistant treasurer, its secretary or any assistant secretary, without any further action by the Issuer. In authenticating such Securities and accepting the additional responsibilities under this Indenture in relation to such Securities the Trustee shall receive, and (subject to Section 5.01) shall be fully protected in relying upon:

(a) a certified copy of any resolution or resolutions of the Board of Directors authorizing the action taken pursuant to the resolution or resolutions delivered under clause (b) below;

(b) a copy of any resolution or resolutions of the Board of Directors relating to such series, in each case certified by the secretary or an assistant secretary of the Issuer;

(c) an executed supplemental indenture, if any, and the documentation required to be delivered pursuant to Section 7.04;

(d) an Officers' Certificate setting forth the form and terms of the Securities as required pursuant to Section 2.01 and Section 2.03, respectively and prepared in accordance with Section 10.05;

(e) an Opinion of Counsel, prepared in accordance with Section 10.05, to the effect:

(i) that the form or forms and terms of such Securities have been established by or pursuant to a resolution of the Board of Directors or by a supplemental indenture as permitted by Section 2.01 and Section 2.03 in conformity with the provisions of this Indenture; and

(ii) that such Securities, when authenticated and delivered by the Trustee and issued by the Issuer in the manner and subject to any conditions specified in such Opinion of Counsel, will constitute valid and binding obligations of the Issuer enforceable against the Issuer in accordance with their terms, except to the extent that enforcement thereof may be limited by bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance or similar laws now or hereafter in effect relating to creditors' rights generally, and general principles of equity (regardless of whether enforceability is considered in a proceeding in equity or at law).

The Trustee shall have the right to decline to authenticate and deliver any Securities under this section if the Trustee, being advised by counsel, determines that such action may not lawfully be taken by the Issuer or if the Trustee in good faith by its board of directors or board of trustees, executive committee, or a trust committee of directors or trustees or Responsible Officers shall determine that such action would expose the Trustee to personal liability.

If the Issuer shall establish pursuant to Section 2.03 that the Securities of a series or a portion thereof are to be issued in the form of one or more Registered Global Securities, then the Issuer shall execute (in accordance with Section 2.05) and the Trustee shall authenticate and make available for delivery one or more Registered Global Securities that (i) shall represent and shall be denominated in an amount equal to the aggregate Principal amount of all of the Securities of such series issued in such form and not yet canceled, (ii) shall be registered in the name of the Depository for such Registered Global Security or Securities or the nominee of such Depository, (iii) shall be delivered by the Trustee to such Depository or its custodian or pursuant to such Depository's instructions and (iv) shall bear a legend substantially to the following effect: "Unless and until it is exchanged in whole or in part for Securities in definitive registered form, this Security may not be transferred except as a whole by the Depository to a nominee of the Depository or by a nominee of the Depository to the Depository or another nominee of the Depository or by the Depository or any such nominee to a successor Depository or a nominee of such successor Depository."

Section 2.05 *Execution of Securities*. The Securities shall be signed on behalf of the Issuer by the chairman of its Board of Directors, its president, any vice president, its treasurer or any assistant treasurer, under its corporate seal and attested by its secretary or any assistant secretary. Such signatures may be the manual or facsimile signatures of the present or any future such officers. The seal of the Issuer may be in the form of a facsimile thereof and may be impressed, affixed, imprinted or otherwise reproduced on the Securities. Typographical and other minor errors or defects in any such reproduction of the seal or any such signature shall not affect the validity or enforceability of any Security that has been duly authenticated and delivered by the Trustee.

In case any officer of the Issuer who shall have signed any of the Securities shall cease to be such officer before the Security so signed shall be authenticated and delivered by the Trustee or disposed of by the Issuer, such Security nevertheless may be authenticated and delivered or disposed of as though the person who signed such Security had not ceased to be such officer of the Issuer; and any Security may be signed on behalf of the Issuer by such persons as, at the actual date of the execution of such Security, shall be the proper officers of the Issuer, although at the date of the execution and delivery of this Indenture any such person was not such an officer.

Section 2.06 *Certificate of Authentication*. Only such Securities as shall bear thereon a certificate of authentication substantially in the form hereinbefore recited, executed by the Trustee by the manual signature of one of its authorized signatories, shall be entitled to the benefits of this Indenture or be valid or obligatory for any purpose. Such certificate by the Trustee upon any Security executed by the Issuer shall be conclusive evidence that the Security so authenticated has been duly authenticated and delivered hereunder and that the Holder is entitled to the benefits of this Indenture.

Section 2.07 *Denomination and Date of Securities; Payments of Interest*. The Securities shall be issuable as registered securities without coupons and in denominations as shall be specified as contemplated by Section 2.03. In the absence of any such specification with respect to the Securities of any series, the Securities of such series shall be issuable in denominations of \$1,000 and any multiple thereof. The Securities shall be numbered, lettered, or otherwise distinguished in such manner or in accordance with such plan as the officers of the Issuer executing the same may determine as evidenced by the execution and authentication thereof.

Each Security shall be dated the date of its authentication, shall bear interest, if any, from the date and shall be payable on the dates, in each case, which shall be specified as contemplated by Section 2.03.

The person in whose name any Security of any series is registered at the close of business on any record date applicable to a particular series with respect to any interest payment date for such series shall be entitled to receive the interest, if any, payable on such interest payment date notwithstanding any transfer or exchange of such Security subsequent to the record date and prior to such interest payment date, except if and to the extent the Issuer shall default in the payment of the interest due on such interest payment date for such series, in which case such defaulted interest shall be paid to the persons in whose names Outstanding Securities for such series are registered at the close of business on a subsequent record date (which shall be not less than five Business Days prior to the date of payment of such defaulted interest) established by notice given by mail by or on behalf of the Issuer to the Holders of Securities not less than 15 days preceding such subsequent record date. The term “**record date**” as used with respect to any interest payment date (except a date for payment of defaulted interest) shall mean the date specified as such in the terms of the Securities of any particular series, or, if no such date is so specified, if such interest payment date is the first day of a calendar month, the fifteenth day of the next preceding calendar month or, if such interest payment date is the fifteenth day of a calendar month, the first day of such calendar month, whether or not such record date is a Business Day.

Section 2.08 *Registration, Transfer and Exchange*. The Issuer will keep or cause to be kept at each office or agency to be maintained for the purpose as provided in Section 3.02 a register or registers in which, subject to such reasonable regulations as it may prescribe, it will register, and will register the transfer of, Securities as in this Article provided. Such register shall be in written form in the English language or in any other form capable of being converted into such form within a reasonable time. At all reasonable times such register or registers shall be open for inspection by the Trustee.

At the option of the Holder thereof, Registered Securities of any series (other than a Registered Global Security, except as set forth below) may be exchanged for a Registered Security or Registered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Registered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. If the Securities of any series are issued in both registered and unregistered form, except as otherwise established pursuant to Section 2.03, at the option of the Holder thereof, Unregistered Securities of any series may be exchanged for Registered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Unregistered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. At the option of the Holder thereof, if Unregistered Securities of any series, maturity date, interest rate and Original Issue Date are issued in more than one authorized denomination, except as otherwise established pursuant to Section 2.03, such Unregistered Securities may be exchanged for Unregistered Securities of such series and tenor having authorized denominations and an equal aggregate Principal amount, upon surrender of such Unregistered Securities to be exchanged at the agency of the Issuer that shall be maintained for such purpose in accordance with Section 3.02 and upon payment, if the Issuer shall so require, of the charges hereinafter provided. Registered Securities of any series may not be exchanged for Unregistered Securities of such series. Whenever any Securities are so surrendered for exchange, the Issuer shall execute, and the Trustee shall authenticate and make available for delivery, the Securities which the Holder making the exchange is entitled to receive.

All Registered Securities presented for registration of transfer, exchange, redemption, conversion or payment shall be duly endorsed by, or be accompanied by a written instrument or instruments of transfer in form satisfactory to the Issuer and the Trustee duly executed by, the Holder or his attorney duly authorized in writing.

The Issuer may require payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in connection with any exchange or registration of transfer of Securities. No service charge shall be made for any such transaction.

Notwithstanding any other provision of this Section 2.08, unless and until it is exchanged in whole or in part for Securities in definitive registered form, a Registered Global Security representing all or a portion of the Securities of a series may not be transferred except as a whole by the Depositary for such series to a nominee of such Depositary or by a nominee of such Depositary to such Depositary or another nominee of such Depositary or by such Depositary or any such nominee to a successor Depositary for such series or a nominee of such successor Depositary.

If at any time the Depositary for any Registered Global Securities of any series notifies the Issuer that it is unwilling or unable to continue as Depositary for such Registered Global Securities or if at any time the Depositary for such Registered Global Securities shall no longer be eligible under applicable law, the Issuer shall appoint a successor Depositary eligible under applicable law with respect to such Registered Global Securities. If a successor Depositary eligible under applicable law for such Registered Global Securities is not appointed by the Issuer within 90 days after the Issuer receives such notice or becomes aware of such ineligibility, the Issuer will execute, and the Trustee, upon receipt of the Issuer's order for the authentication and delivery of definitive Registered Securities of such series and tenor, will authenticate and make available for delivery Registered Securities of such series and tenor, in any authorized denominations, in an aggregate Principal amount equal to the Principal amount of such Registered Global Securities, in exchange for such Registered Global Securities.

The Issuer may at any time and in its sole discretion determine that any Registered Global Securities of any series shall no longer be maintained in global form. In such event, or in the event that there shall have occurred and be continuing an Event of Default with respect to a series of Securities, the Issuer will, upon the request of any Holder, execute, and the Trustee, upon receipt of the Issuer's order for the authentication and delivery of definitive Registered Securities of such series and tenor, will authenticate and make available for delivery, Registered Securities of such series and tenor in any authorized denominations, in an aggregate Principal amount equal to the Principal amount of such Registered Global Securities, in exchange for such Registered Global Securities.

Any time the Registered Securities of any series are not in the form of Registered Global Securities pursuant to the preceding two paragraphs, the Issuer agrees to supply the Trustee with a reasonable supply of certificated Registered Securities without the legend required by Section 2.04 and the Trustee agrees to hold such Registered Securities in safekeeping until authenticated and delivered pursuant to the terms of this Indenture.

If established by the Issuer pursuant to Section 2.03 with respect to any Registered Global Security, the Depositary for such Registered Global Security may surrender such Registered Global Security in exchange in whole or in part for Registered Securities of the same series and tenor in definitive registered form on such terms as are acceptable to the Issuer and such Depositary. Thereupon, the Issuer shall execute, and the Trustee shall authenticate and make available for delivery, without service charge,

(i) to the Person specified by such Depositary new Registered Securities of the same series and tenor, of any authorized denominations as requested by such Person, in an aggregate Principal amount equal to and in exchange for such Person's beneficial interest in the Registered Global Security; and

(ii) to such Depositary a new Registered Global Security in a denomination equal to the difference, if any, between the Principal amount of the surrendered Registered Global Security and the aggregate Principal amount of Registered Securities authenticated and delivered pursuant to clause (i) above.

Registered Securities issued in exchange for a Registered Global Security pursuant to this Section 2.08 shall be registered in such names and in such authorized denominations as the Depositary for such Registered Global Security, pursuant to instructions from its direct or indirect participants or otherwise, shall instruct the Trustee or an agent of the Issuer or the Trustee. The Trustee or such agent shall deliver such Securities to or as directed by the Persons in whose names such Securities are so registered.

All Securities issued upon any transfer or exchange of Securities shall be valid obligations of the Issuer, evidencing the same debt, and entitled to the same benefits under this Indenture, as the Securities surrendered upon such transfer or exchange.

Notwithstanding anything herein or in the forms or terms of any Securities to the contrary, none of the Issuer, the Trustee or any agent of the Issuer or the Trustee shall be required to exchange any Unregistered Security for a Registered Security if such exchange would result in adverse Federal income tax consequences to the Issuer (such as, for example, the inability of the Issuer to deduct from its income, as computed for Federal income tax purposes, the interest payable on the Unregistered Securities) under then applicable United States Federal income tax laws. The Trustee and any such agent shall be entitled to rely on an Officers' Certificate or an Opinion of Counsel in determining such result.

Neither the Registrar nor the Issuer shall be required (i) to issue, authenticate, register the transfer of or exchange Securities of any series for a period of 15 days before the mailing of a notice of redemption of such Securities to be redeemed or (ii) to register the transfer of or exchange any Security selected for redemption in whole or in part.

Section 2.09 *Mutilated, Defaced, Destroyed, Lost and Stolen Securities*. In case any temporary or definitive Security shall become mutilated or defaced and shall be surrendered to the Trustee, the Issuer shall execute, and the Trustee shall authenticate and deliver, a new Security of the same series, bearing a number not contemporaneously outstanding, in exchange and substitution for the mutilated or defaced Security. If the Holder of any Security claims that the Security has been lost, destroyed or wrongfully taken, the Issuer shall execute, and the Trustee shall authenticate and deliver, a new Security of the same series, bearing a number not contemporaneously outstanding, in exchange and substitution for the lost, destroyed or wrongfully taken Security, if the applicant so requests before the Issuer has notice that the Security has been acquired by a protected purchaser, and the applicant furnishes to the Issuer and to the Trustee and any agent of the Issuer or the Trustee such security or indemnity as may be required by them to indemnify and defend and to save each of them harmless and the applicant satisfies other reasonable requirements imposed by the Issuer.

Upon the issuance of any substitute Security, the Issuer may require the payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto and any other expenses (including the fees and expenses of the Trustee and its counsel) connected therewith. In case any Security which has matured or is about to mature or has been called for redemption in full shall become mutilated or defaced or be destroyed, lost or stolen, the Issuer may instead of issuing a substitute Security, pay or authorize the payment of the same (without surrender thereof except in the case of a mutilated or defaced Security), if the applicant for such payment shall furnish to the Issuer and to the Trustee and any agent of the Issuer or the Trustee such security or taking, the applicant shall also furnish to the Issuer and the Trustee and any agent of the Issuer or the Trustee evidence to their satisfaction of the destruction, loss or wrongful taking of such Security and of the ownership thereof.

Every substitute Security of any series issued pursuant to the provisions of this section by virtue of the fact that any such Security is destroyed, lost or stolen shall constitute an additional contractual obligation of the Issuer, whether or not the destroyed, lost or wrongfully taken Security shall be at any time enforceable by anyone and shall be entitled to all the benefits of (but shall be subject to all the limitations of rights set forth in) this Indenture equally and proportionately with any and all other Securities of such series duly authenticated and delivered hereunder. All Securities shall be held and owned upon the express condition that, to the extent permitted by law, the foregoing provisions are exclusive with respect to the replacement or payment of mutilated, defaced or destroyed, lost or wrongfully taken Securities and shall preclude any and all other rights or remedies.

Section 2.10 *Cancellation of Securities; Destruction Thereof.* All Securities surrendered for payment, redemption, repurchase, conversion, registration of transfer or exchange, if surrendered to the Issuer or any agent of the Issuer or the Trustee, shall be delivered to the Trustee for cancellation or, if surrendered to the Trustee, shall be canceled by it; and no Securities shall be issued in lieu thereof except as expressly permitted by any of the provisions of this Indenture. The Trustee shall dispose of canceled Securities held by it in accordance with the record retention policies of the Trustee in effect from time to time and, if such canceled certificates are destroyed, shall deliver a certificate of destruction to the Issuer. If the Issuer shall acquire any of the Securities, such acquisition shall not operate as a redemption or satisfaction of the indebtedness represented by such Securities unless and until the same are delivered to the Trustee for cancellation.

Section 2.11 *Temporary Securities.* Pending the preparation of definitive Securities for any series, the Issuer may execute and the Trustee shall authenticate and deliver temporary Securities for such series (printed, lithographed, typewritten or otherwise reproduced, in each case in form satisfactory to the Trustee). Temporary Securities of any series shall be issuable as registered Securities without coupons, of any authorized denomination, and substantially in the form of the definitive Securities of such series but with such omissions, insertions and variations as may be appropriate for temporary Securities, all as may be determined by the Issuer with the concurrence of the Trustee. Temporary Securities may contain such reference to any provisions of this Indenture as may be appropriate. Every temporary Security shall be executed by the Issuer and be authenticated by the Trustee upon the same conditions and in substantially the same manner, and with like effect, as the definitive Securities. Without unreasonable delay the Issuer shall execute and shall furnish definitive Securities of such series and thereupon temporary Securities of such series may be surrendered in exchange therefor without charge at each office or agency to be maintained by the Issuer for that purpose pursuant to Section 3.02, and the Trustee shall authenticate and deliver in exchange for such temporary Securities of such series a like aggregate Principal amount of definitive Securities of the same series of authorized denominations. Until so exchanged, the temporary Securities of any series shall be entitled to the same benefits under this Indenture as definitive Securities of such series.

Section 2.12 *Computation of Interest*. Except as otherwise specified in the Securities of a series, interest shall be computed on the basis of a 360-day year of twelve 30-day months.

Section 2.13 *CUSIP Numbers*. The Issuer in issuing the Securities may use “CUSIP” numbers (if then generally in use), and, if so, the Trustee shall use “CUSIP” numbers in notices of redemption as a convenience to Holders; provided that any such notice may state that no representation is made as to the correctness of such numbers either as printed on the Securities or as contained in any notice of a redemption and that reliance may be placed only on the other identification numbers printed on the Securities, and any such redemption shall not be affected by any defect in or omission of such numbers. The Issuer will notify the Trustee of any change in the “CUSIP” numbers.

ARTICLE 3 COVENANTS OF THE ISSUER AND THE TRUSTEE

Section 3.01 *Payment of Principal and Interest*. The Issuer covenants and agrees for the benefit of each series of Securities that it will duly and punctually pay or cause to be paid the Principal of, and interest on, each of the Securities of such series at the place or places, at the respective times and in the manner provided in such Securities. Each installment of interest on the Securities of any series may be paid by mailing checks for such interest payable to or upon the written order of the Holders of Securities entitled thereto as they shall appear on the registry books of the Issuer.

Notwithstanding any provisions of this Indenture and the Securities of any series to the contrary, if the Issuer and a Holder of any Registered Security so agree or if expressly provided pursuant to Section 2.03, payments of interest on, and any portion of the Principal of, such Holder’s Registered Security shall be made by the paying agent, upon receipt from the Issuer of immediately available funds by 11:00 a.m., New York City time (or such other time as may be agreed to between the Issuer and the paying agent) or the Issuer, directly to the Holder of such Security (by wire transfer of Federal funds or immediately available funds or otherwise) if the Holder has delivered written instructions to the Trustee 15 days prior to such payment date requesting that such payment will be so made and designating the bank account to which such payments shall be so made and, in the case of payments of Principal, surrenders the same to the Trustee. The Trustee shall be entitled to rely on the last instruction delivered by the Holder pursuant to this Section 3.01 unless a new instruction is delivered 15 days prior to a payment date. The Issuer will indemnify and hold each of the Trustee and any paying agent harmless against any loss, liability or expense (including attorneys’ fees and expenses) resulting from any act or omission to act on the part of the Issuer or any such Holder in connection with any such agreement or from making any payment in accordance with any such agreement.

Section 3.02 *Offices for Payments, etc.* So long as any of the Securities remain outstanding, the Issuer will maintain in the Borough of Manhattan, The City of New York an office or agency (o) where the Securities may be presented for payment, (p) where the Securities may be presented for registration of transfer and for exchange as in this Indenture provided, (q) where notices and demands to or upon the Issuer in respect of the Securities or of this Indenture may be served and (r) for Securities of each series that is convertible, where such Securities may be presented for conversion. The Issuer will give to the Trustee written notice of the location of any such office or agency and of any change of location thereof. Unless otherwise specified in accordance with Section 2.03, the Issuer hereby initially designates the Corporate Trust Office of Trustee as the office to be maintained by it for each such purpose. In case the Issuer shall fail to so designate or maintain any such office or agency or shall fail to give such notice of the location or of any change in the location thereof, presentations and demands may be made and notices may be served at the Corporate Trust Office.

Section 3.03 *Paying Agents.* Whenever the Issuer shall appoint a paying agent other than the Trustee with respect to the Securities of any series, it will cause such paying agent to execute and deliver to the Trustee an instrument in which such agent shall agree with the Trustee, subject to the provisions of this Section:

(a) that it will hold all sums received by it as such agent for the payment of the Principal of or interest on the Securities of such series (whether such sums have been paid to it by the Issuer or by any other obligor on the Securities of such series) in trust for the benefit of the Holders of the Securities of such series or of the Trustee;

(b) that it will give the Trustee notice of any failure by the Issuer (or by any other obligor on the Securities of such series) to make any payment of the Principal of or interest on the Securities of such series when the same shall be due and payable; and during the continuance of the failure referred to in clause Section 3.03(b) above.

The Issuer will, on or prior to each due date of the Principal of or interest on the Securities of such series, deposit with the paying agent a sum sufficient to pay such Principal or interest so becoming due, and (unless such paying agent is the Trustee) the Issuer will promptly notify the Trustee of any failure to take such action.

If the Issuer shall act as its own paying agent with respect to the Securities of any Series, it will, on or before each due date of the Principal of or interest on the Securities of such series, set aside, segregate and hold in trust for the benefit of the Holders of the Securities of such series a sum sufficient to pay such Principal or interest so becoming due. The Issuer will promptly notify the Trustee of any failure to take such action.

Whenever the Issuer shall have one or more paying agents for any series of Securities, it will, on or before each due date of the Principal or interest on any Securities of such series, deposit with the paying agent or agents for the Securities of such series a sum, by 11:00 a.m. New York City time in immediately available funds on the payment date, sufficient to pay the Principal or interest so becoming due with respect to the Securities of such series, and (unless such paying agent is the Trustee) the Issuer will promptly notify the Trustee in writing of any failure so to act.

Anything in this section to the contrary notwithstanding, the Issuer may at any time, for the purpose of obtaining a satisfaction and discharge with respect to one or more or all series of Securities hereunder, or for any other reason, pay or cause to be paid to the Trustee all sums held in trust for any such series by the Issuer or any paying agent hereunder, as required by this Section, such sums to be held by the Trustee upon the trusts herein contained.

Anything in this Section 3.03 to the contrary notwithstanding, the agreement to hold sums in trust as provided in this Section 3.03 is subject to the provisions of Section 9.05.

Section 3.04 *Certificate of the Issuer*. Within 120 days after the close of the fiscal year ended ●, and within 120 days after the close of each fiscal year thereafter, the Issuer will furnish to the Trustee a brief certificate (which need not comply with Section 10.05) from the principal executive, financial or accounting officer of the Issuer as to his or her knowledge of the Issuer's compliance with all conditions and covenants under the Indenture (such compliance to be determined without regard to any period of grace or requirement of notice provided under the Indenture).

At the time such certificate is filed, the Issuer will also file with the Trustee a letter or statement of the independent accountants who shall have certified the financial statements of the Issuer for its preceding fiscal year to the effect that, in making the examination necessary for certification of such financial statements, they have obtained no knowledge of any default by the Issuer in the performance or fulfillment of any covenant, agreement or condition contained in this Indenture, which default remains uncured at the date of such letter or statement, or, if they shall have obtained knowledge of any such uncured default, specifying in such letter or statement such default or defaults and the nature and status thereof, it being understood that such accountants shall not be liable directly or indirectly for failure to obtain knowledge of any such default or defaults, and that nothing contained in this Section 3.04 shall be construed to require such accountants to make any investigation beyond the scope required in connection with such examination.

Section 3.05 *List of Securityholders*. If and so long as the Trustee shall not be the Security registrar for the Securities of any series, the Issuer will furnish or cause to be furnished to the Trustee a list in such form as the Trustee may reasonably require of the names and addresses of the Holders of the Securities of such series pursuant to Section 312 of the Trust Indenture Act of 1939 (a) semi-annually not more than 10 days after each record date for the payment of interest on such Securities, as hereinabove specified, as of such record date and on dates to be determined pursuant to Section 2.03 for non-interest bearing Securities in each year and (b) at such other times as the Trustee may request in writing, within 30 days after receipt by the Issuer of any such request as of a date not more than 10 days prior to the time such information is furnished.

Section 3.06 *Reports by the Issuer*. The Issuer covenants to:

(a) file, whether or not required to do so under applicable law, with the Trustee, within 15 days after the Issuer files the same with the Commission:

(i) copies of the annual reports and of the information, documents, and other reports which the Issuer files with the Commission pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934; and

(ii) such additional information, documents and reports with respect to compliance by the Issuer with the conditions and covenants provided for in this Indenture as the Issuer may from time to time file with the Commission; and

(b) transmit to the Securityholders, in the manner and to the extent provided in Section 10.04, such summaries of any information, documents and reports required to be filed with the Trustee pursuant to the provisions of subdivision (a) of this Section 3.06 as may be required by the rules and regulations of the Commission.

Delivery of such reports, information and documents to the Trustee is for informational purposes only and the Trustee's receipt of such shall not constitute constructive notice of any information contained therein or determinable from information contained therein, including the Issuer's compliance with any of its covenants hereunder (as to which the Trustee is entitled to rely exclusively on Officers' Certificates).

Section 3.07 *Corporate Existence*. So long as any of the Securities remain unpaid, the Issuer will at all times (except as otherwise provided or permitted elsewhere in this Indenture) do or cause to be done all things necessary to preserve and keep in full force and effect its corporate existence.

Section 3.08 *Restrictions on Mergers, Sales and Consolidations*. So long as any of the Securities remain unpaid, the Issuer will not consolidate or merge with or sell, convey or lease all or substantially all of its property to any other corporation except as permitted in Article 8 hereof.

Section 3.09 *Further Assurances*. From time to time whenever requested by the Trustee, the Issuer will execute and deliver such further instruments and assurances and do such further acts as may be reasonably necessary or proper to carry out more effectually the purposes of this Indenture or to secure the rights and remedies hereunder of the Holders of the Securities of any series.

ARTICLE 4
REMEDIES OF THE TRUSTEE AND SECURITYHOLDERS
ON EVENT OF DEFAULT

Section 4.01 *Event of Default Defined; Acceleration of Maturity; Waiver of Default*. “**Event of Default**” with respect to Securities of any series wherever used herein, means any one of the following events which shall have occurred and be continuing (whatever the reason for such Event of Default and whether it shall be voluntary or involuntary or be effected by operation of law or pursuant to any judgment, decree or order of any court or any order, rule or regulation of any administrative or governmental body):

(a) default by the Issuer in the payment of any installment of interest upon any of the Securities of such series as and when the same shall become due and payable, and continuance of such default for a period of 30 days;

(b) default by the Issuer in the payment of all or any part of the Principal on any of the Securities of such series as and when the same shall become due and payable either at maturity, upon redemption, by declaration or otherwise, and continuance of such default for a period of five days;

(c) default by the Issuer in the performance, or breach by the Issuer, of any of its covenants or agreements in respect of the Securities of such series (other than a covenant or agreement in respect of the Securities of such series a default in whose performance or whose breach is elsewhere in this section specifically dealt with), and continuance of such default or breach for a period of 30 consecutive days after there has been given, by registered or certified mail, to the Issuer by the Trustee or to the Issuer and the Trustee by the Holders of at least 25% in Principal amount of the Outstanding Securities of all series affected thereby, a written notice specifying such default or breach and requiring it to be remedied and stating that such notice is a notice of default hereunder;

(d) the entry by a court having jurisdiction in the premises of a decree or order for relief in respect of the Issuer in an involuntary case under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect, or the appointment of a receiver, liquidator, assignee, custodian, trustee or sequestrator (or similar official) of the Issuer or for any substantial part of the Issuer’s property and assets or the ordering of the winding up or liquidation of the Issuer’s affairs, and the continuance of any such decree or order unstayed and in effect for a period of 90 consecutive days;

(e) the commencement by the Issuer of a voluntary case under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect, or the consent by the Issuer to the entry of an order for relief in an involuntary case under any such law, or the consent by the Issuer to the appointment of or taking possession by a receiver, liquidator, assignee, custodian, trustee or sequestrator (or similar official) of the Issuer or for any substantial part of the Issuer’s property, or the making of any general assignment by the Issuer for the benefit of creditors; or

(f) any other Event of Default provided in the supplemental indenture or resolution of the Board of Directors under which such series of Securities is issued or in the form of Security for such series.

If an Event of Default described in clauses 4.01(a), 4.01(b), 4.01(c) or 4.01(f) occurs and is continuing, then, and in each and every such case, unless the Principal of all of the Securities of such series shall have already become due and payable, either the Trustee or the Holders of not less than 25% in aggregate Principal amount of the Securities of any affected series then Outstanding hereunder (each such series voting as a separate class) by notice in writing to the Issuer (and to the Trustee if given by Securityholders), may declare the entire Principal (or, if the Securities of such series are Original Issue Discount Securities, such portion of the Principal amount as may be specified in the terms of such series) of all Securities of such series and the interest accrued thereon, if any, to be due and payable immediately, and upon any such declaration the same shall become immediately due and payable. If an Event of Default described in clauses Section 4.01(d) or Section 4.01(e) occurs and is continuing, then the Principal amount of all the Securities then Outstanding and interest accrued thereon, if any, shall be and become immediately due and payable, without any notice or other action by any Holder or the Trustee, to the full extent permitted by applicable law.

The foregoing provisions, however, are subject to the condition that if, at any time after the Principal (or, if the Securities are Original Issue Discount Securities, such portion of the Principal as may be specified in the terms thereof) of the Securities of any series (or of all the Securities, as the case may be) shall have been so declared due and payable, and before any judgment or decree for the payment of the monies due shall have been obtained or entered as hereinafter provided, the Issuer shall pay or shall deposit with the Trustee a sum sufficient to pay all matured installments of interest upon all the Securities of such series (or of all the Securities, as the case may be) and the Principal of any and all Securities of such series (or of all the Securities, as the case may be) which shall have become due otherwise than by acceleration (with interest upon such Principal and, to the extent that payment of such interest is enforceable under applicable law, on overdue installments of interest, at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series (or at the respective rates of interest or Yields to Maturity of all the Securities, as the case may be) to the date of such payment or deposit) and such amount as shall be sufficient to cover reasonable compensation to the Trustee, its agents, attorneys and counsel, and all other expenses and liabilities incurred, and all advances made, by the Trustee except as a result of negligence or bad faith, and if any and all Events of Default under the Indenture, other than the non-payment of the Principal of Securities which shall have become due by acceleration, shall have been cured, waived or otherwise remedied as provided herein, then and in every such case the Holders of a majority in aggregate Principal amount of all the then Outstanding Securities of all such series that have been accelerated, each such series voting as a separate class, by written notice to the Issuer and to the Trustee, may waive all defaults with respect to such series (or with respect to all the Securities, as the case may be) and rescind and annul such declaration and its consequences, but no such waiver or rescission and annulment shall extend to or shall affect any subsequent default or shall impair any right consequent thereon.

For all purposes under this Indenture, if a portion of the Principal of any Original Issue Discount Securities shall have been accelerated and declared due and payable pursuant to the provisions hereof, then, from and after such declaration, unless such declaration has been rescinded and annulled, the Principal amount of such Original Issue Discount Securities shall be deemed, for all purposes hereunder, to be such Portion of the Principal thereof as shall be due and payable as a result of such acceleration, and payment of such portion of the Principal thereof as shall be due and payable as a result of such acceleration, together with interest, if any, thereon and all other amounts owing thereunder, shall constitute payment in full of such Original Issue Discount Securities.

Section 4.02 *Collection of Indebtedness by Trustee; Trustee May Prove Debt*. The Issuer covenants that (h) in case default shall be made in the payment of any installment of interest on any of the Securities of any series when such interest shall have become due and payable, and such default shall have continued for a period of 30 days or (i) in case default shall be made in the payment of all or any part of the Principal of any of the Securities of any series when the same shall have become due and payable, whether upon maturity of the Securities of such series or upon any redemption or by declaration or otherwise, then in each case upon demand of the Trustee, the Issuer will pay to the Trustee for the benefit of the Holders of the Securities of such series (x) the whole amount that then shall have become due and payable on all Securities of such series for Principal or interest, as the case may be (with interest to the date of such payment upon the overdue Principal and, to the extent that payment of such interest is enforceable under applicable law, on overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series) and (y) in addition thereto, such further amount as shall be sufficient to cover the costs and expenses of collection, including reasonable compensation to the Trustee and each predecessor Trustee, their respective agents and counsel, and any expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of its negligence or bad faith.

Until such demand is made by the Trustee, the Issuer may pay the Principal of and interest on the Securities of any series to the registered Holders, whether or not the Principal of and interest on the Securities of such series be overdue.

In case the Issuer shall fail forthwith to pay such amounts upon such demand, the Trustee, in its own name and as trustee of an express trust, shall be entitled and empowered to institute any action or proceedings at law or in equity for the collection of the sums so due and unpaid, and may prosecute any such action or proceedings to judgment or final decree, and may enforce any such judgment or final decree against the Issuer or other obligor upon such Securities and collect in the manner provided by law out of the property of the Issuer or other obligor upon such Securities, wherever situated, the monies adjudged or decreed to be payable.

In case there shall be pending proceedings relative to the Issuer or any other obligor upon the Securities under Title 11 of the United States Code or any other applicable Federal or state bankruptcy, insolvency or other similar law, or in case a receiver, assignee or trustee in bankruptcy or reorganization, liquidator, sequestrator or similar official shall have been appointed for or taken possession of the Issuer or its property or such other obligor, or in case of any other comparable judicial proceedings relative to the Issuer or other obligor upon the Securities of any series, or to the creditors or property of the Issuer or such other obligor, the Trustee, irrespective of whether the Principal of any Securities shall then be due and payable as therein expressed or by declaration or otherwise and irrespective of whether the Trustee shall have made any demand pursuant to the provisions of this Section, shall be entitled and empowered, by intervention in such proceedings or otherwise:

(a) to file and prove a claim or claims for the whole amount of Principal and interest (or, if the Securities of any series are Original Issue Discount Securities, such portion of the Principal amount as may be specified in the terms of such series) owing and unpaid in respect of the Securities of any series, and to file such other papers or documents as may be necessary or advisable in order to have the claims of the Trustee (including any claim for reasonable compensation to the Trustee and each predecessor Trustee, and their respective agents, attorneys and counsel, and for reimbursement of all expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee, except as a result of negligence or bad faith) and of the Securityholders allowed in any judicial proceedings relative to the Issuer or other obligor upon the Securities of any series, or to the creditors or property of the Issuer or such other obligor;

(b) unless prohibited by applicable law and regulations, to vote on behalf of the Holders of the Securities of any series in any election of a trustee or a standby trustee in arrangement, reorganization, liquidation or other bankruptcy or insolvency proceedings or person performing similar functions in comparable proceedings; and

(c) to collect and receive any monies or other property payable or deliverable on any such claims, and to distribute all amounts received with respect to the claims of the Securityholders and of the Trustee on their behalf; and any trustee, receiver, or liquidator, custodian or other similar official is hereby authorized by each of the Securityholders to make payments to the Trustee, and, in the event that the Trustee shall consent to the making of payments directly to the Securityholders, to pay to the Trustee such amounts as shall be sufficient to cover reasonable compensation to the Trustee, each predecessor Trustee and their respective agents, attorneys and counsel, and all other expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of negligence or bad faith and all other amounts due to the Trustee or any predecessor Trustee pursuant to Section 5.06.

Nothing herein contained shall be deemed to authorize the Trustee to authorize or consent to or vote for or accept or adopt on behalf of any Securityholder any plan of reorganization, arrangement, adjustment or composition affecting the Securities of any series or the rights of any Holder thereof, or to authorize the Trustee to vote in respect of the claim of any Securityholder in any such proceeding except, as aforesaid, to vote for the election of a trustee in bankruptcy or similar person.

All rights of action and of asserting claims under this Indenture, or under any of the Securities, may be enforced by the Trustee without the possession of any of the Securities or the production thereof on any trial or other proceedings relative thereto, and any such action or proceedings instituted by the Trustee shall be brought in its own name as trustee of an express trust, and any recovery of judgment, subject to the payment of the expenses, disbursements and compensation of the Trustee, each predecessor Trustee and their respective agents and attorneys, shall be for the ratable benefit of the Holders of the Securities in respect of which such action was taken.

In any proceedings brought by the Trustee (and also any proceedings involving the interpretation of any provision of this Indenture to which the Trustee shall be a party) the Trustee shall be held to represent all the Holders of the Securities in respect to which such action was taken, and it shall not be necessary to make any Holders of such Securities parties to any such proceedings.

Section 4.03 *Application of Proceeds*. Any monies collected by the Trustee pursuant to this Article in respect of any series shall be applied in the following order at the date or dates fixed by the Trustee and, in case of the distribution of such monies on account of Principal or interest, upon presentation of the several Securities in respect of which monies have been collected and stamping (or otherwise noting) thereon the payment, or issuing Securities of such series in reduced Principal amounts in exchange for the presented Securities of like series if only partially paid, or upon surrender thereof if fully paid:

FIRST: To the payment of costs and expenses applicable to such series in respect of which monies have been collected, including reasonable compensation to the Trustee and each predecessor Trustee and their respective agents and attorneys and of all expenses and liabilities incurred, and all advances made, by the Trustee and each predecessor Trustee except as a result of negligence or bad faith, and all other amounts due to the Trustee or any predecessor Trustee pursuant to Section 5.06;

SECOND: In case the Principal of the Securities of such series in respect of which monies have been collected shall not have become and be then due and payable, to the payment of interest on the Securities of such series in default in the order of the maturity of the installments of such interest, with interest (to the extent that such interest has been collected by the Trustee) upon the overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in such Securities, such payments to be made ratably to the persons entitled thereto, without discrimination or preference;

THIRD: In case the Principal of the Securities of such series in respect of which monies have been collected shall have become and shall be then due and payable, to the payment of the whole amount then owing and unpaid upon all the Securities of such series for Principal and interest, with interest upon the overdue Principal, and (to the extent that such interest has been collected by the Trustee) upon overdue installments of interest at the same rate as the rate of interest or Yield to Maturity (in the case of Original Issue Discount Securities) specified in the Securities of such series; and in case such monies shall be insufficient to pay in full the whole amount so due and unpaid upon the Securities of such series, then to the payment of such Principal and interest or yield to maturity, without preference or priority of Principal over interest or yield to maturity, or of interest or yield to maturity over Principal, or of any installment of interest over any other installment of interest, or of any Security of such series over any other Security of such series, ratably to the aggregate of such Principal and accrued and unpaid interest or yield to maturity; and

FOURTH: To the payment of the remainder, if any, to the Issuer or any other person lawfully entitled thereto.

Section 4.04 *Suits for Enforcement*. In case an Event of Default has occurred, has not been waived and is continuing, the Trustee may proceed to protect and enforce the rights vested in it by this Indenture, either at law or in equity or in bankruptcy or otherwise, whether for the specific enforcement of any covenant or agreement contained in this Indenture or in aid of the exercise of any power granted in this Indenture or to enforce any other legal or equitable right vested in the Trustee by this Indenture or by law.

Section 4.05 *Restoration of Rights on Abandonment of Proceedings*. In case the Trustee shall have proceeded to enforce any right under this Indenture and such proceedings shall have been discontinued or abandoned for any reason, or shall have been determined adversely to the Trustee, then and in every such case the Issuer and the Trustee shall be restored respectively to their former positions and rights hereunder, and all rights, remedies and powers of the Issuer, the Trustee and the Securityholders shall continue as though no such proceedings had been taken.

Section 4.06 *Limitations on Suits by Securityholder*. No Holder of any Security of any series shall have any right by virtue or by availing of any provision of this Indenture to institute any action or proceeding at law or in equity or in bankruptcy or otherwise upon or under or with respect to this Indenture, or for the appointment of a trustee, receiver, liquidator, custodian or other similar official or for any other remedy hereunder, unless such Holder previously shall have given to the Trustee written notice of an Event of Default and of the continuance thereof, as hereinbefore provided, and unless also the Holders of not less than 25% in aggregate Principal amount of the Securities of such series then outstanding shall have made written request upon the Trustee to institute such action or proceedings in respect of such Event of Default in its own name as trustee hereunder and shall have offered to the Trustee indemnity satisfactory to the Trustee against the costs, expenses and liabilities to be incurred therein or thereby and the Trustee for 60 days after its receipt of such notice, request and offer of indemnity shall have failed to institute any such action or proceeding and no direction inconsistent with such written request shall have been given to the Trustee pursuant to Section 4.09; it being understood and intended, and being expressly covenanted by the Holder of every Security with every other Holder and the Trustee, that no one or more Holders of Securities of any series shall have any right in any manner whatever by virtue or by availing of any provision of this Indenture to affect, disturb or prejudice the rights of any other such Holder of Securities, or to obtain or seek to obtain priority over or preference to any other such Holder or to enforce any right under this Indenture, except in the manner herein provided and for the equal, ratable and common benefit of all Holders of Securities of the applicable series. For the protection and enforcement of the provisions of this Section, each and every Securityholder and the Trustee shall be entitled to such relief as can be given either at law or in equity.

Section 4.07 *Unconditional Right of Securityholders to Institute Certain Suits*. Notwithstanding any other provision in this Indenture and any provision of any Security, the right of any Holder of any Security to receive payment of the Principal of or interest on such Security on or after the respective due dates expressed in such Security, or to institute suit for the enforcement of any such payment on or after such respective dates, shall not be impaired or affected without the consent of such Holder.

Section 4.08 *Powers and Remedies Cumulative; Delay or Omission Not Waiver of Default*. Except as provided in Section 4.06, no right or remedy herein conferred upon or reserved to the Trustee or to the Securityholders is intended to be exclusive of any other right or remedy, and every right and remedy shall, to the extent permitted by law, be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other appropriate right or remedy.

No delay or omission of the Trustee or of any Securityholder to exercise any right or power accruing upon any Event of Default occurring and continuing as aforesaid shall impair any such right or power or shall be construed to be a waiver of any such Event of Default or an acquiescence therein; and, subject to Section 4.06, every power and remedy given by this Indenture or by law to the Trustee or to the Securityholders may be exercised from time to time, and as often as shall be deemed expedient, by the Trustee or by the Securityholders.

Section 4.09 *Control by Securityholders*. The Holders of a majority in aggregate Principal amount of the Securities of each series affected (with each series voting as a separate class) at the time outstanding shall have the right to direct the time, method, and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred on the Trustee with respect to the Securities of such series by this Indenture; provided that such direction shall not be otherwise than in accordance with law and the provisions of this Indenture and provided further that (subject to the provisions of Section 5.01) the Trustee shall have the right to decline to follow any such direction if the Trustee, being advised by counsel, shall determine that the action or proceeding so directed may not lawfully be taken or if the Trustee in good faith by its board of directors, the executive committee, or a trust committee of directors or Responsible Officers of the Trustee shall determine that the action or proceedings so directed would subject the Trustee to personal liability or if the Trustee in good faith shall so determine that the actions or forbearances specified in or pursuant to such direction would be unduly prejudicial to the interests of Holders of the Securities of all series so affected not joining in the giving of said direction.

Nothing in this Indenture shall impair the right of the Trustee to take any action which is not inconsistent with such direction or directions by Securityholders.

Section 4.10 *Waiver of Past Defaults*. Prior to a declaration of the acceleration of the maturity of the Securities of any series as provided in Section 4.01, the Holders of a majority in aggregate Principal amount of the Securities of such series at the time Outstanding (each such series voting as a separate class) may on behalf of the Holders of all the Securities of such series waive an existing default or Event of Default, except a default in the payment of Principal of or interest on any Security as specified in clauses (a) or (b) of Section 4.01 or in respect of a covenant or provision hereof which cannot be modified or amended without the consent of each Holder affected as provided in Section 7.02. In the case of any such waiver, the Issuer, the Trustee and the Holders of the Securities of each series affected shall be restored to their former positions and rights hereunder, respectively.

Upon any such waiver, such default shall cease to exist and be deemed to have been cured and not to have occurred, and any Event of Default arising therefrom shall be deemed to have been cured, and not to have occurred for every purpose of this Indenture; but no such waiver shall extend to any subsequent or other default or Event of Default or impair any right consequent thereon.

Section 4.11 *Trustee to Give Notice of Default, But May Withhold in Certain Circumstances*. The Trustee shall give to the Securityholders of any series, as the names and addresses of such Holders appear on the registry books, notice by mail of all defaults known to Responsible Officers of the Trustee which have occurred with respect to such series, such notice to be transmitted within 90 days after the occurrence thereof, unless such defaults shall have been cured before the giving of such notice (the term "default" or "defaults" for the purposes of this section being hereby defined to mean any event or condition which is, or with notice or lapse of time or both would become, an Event of Default); provided that, except in the case of default in the payment of the Principal of or interest on any of the Securities of such series, the Trustee shall be protected in withholding such notice if and so long as the board of directors, the executive committee, or a trust committee of directors or trustees and/or Responsible Officers of the Trustee in good faith determines that the withholding of such notice is in the interests of the Securityholders of such series.

Section 4.12 *Right of Court to Require Filing of Undertaking to Pay Costs*. All parties to this Indenture agree, and each Holder of any Security by his acceptance thereof shall be deemed to have agreed, that any court may in its discretion require, in any suit for the enforcement of any right or remedy under this Indenture or in any suit against the Trustee for any action taken, suffered or omitted by it as Trustee, the filing by any party litigant in such suit of an undertaking to pay the costs of such suit, and that such court may in its discretion assess reasonable costs, including reasonable attorneys' fees and expenses, against any party litigant in such suit, having due regard to the merits and good faith of the claims or defenses made by such party litigant; *provided* that the provisions of this Section 4.12 shall not apply to (i) any suit instituted by the Trustee, (ii) any suit instituted by any Securityholder or group of Securityholders of any series holding in the aggregate more than 10% in aggregate Principal amount of the Securities of such series or (iii) any suit instituted by a Holder pursuant to Section 4.07.

**ARTICLE 5
CONCERNING THE TRUSTEE**

Section 5.01 *Duties and Responsibilities of the Trustee*. With respect to the Holders of any series of Securities issued hereunder, the Trustee, prior to the occurrence of an Event of Default with respect to the Securities of a particular series and after the curing or waiving of all Events of Default which may have occurred with respect to such series, undertakes to perform such duties and only such duties as are specifically set forth in this Indenture. In case an Event of Default with respect to the Securities of a series has occurred (which has not been cured or waived) the Trustee shall exercise such of the rights and powers vested in it by this Indenture, and use the same degree of care and skill in their exercise, as a prudent person would exercise or use under the circumstances in the conduct of such person's own affairs.

(a) Prior to the occurrence of an Event of Default with respect to the Securities of any series and after the curing or waiving of all such Events of Default with respect to such series which may have occurred:

(i) the duties and obligations of the Trustee with respect to the Securities of any Series shall be determined solely by the express provisions of this Indenture, and the Trustee shall not be liable except for the performance of such duties and obligations as are specifically set forth in this Indenture, and no implied covenants or obligations shall be read into this Indenture against the Trustee; and

(ii) in the absence of bad faith on the part of the Trustee, the Trustee may conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon any statements, certificates or opinions furnished to the Trustee and conforming to the requirements of this Indenture; but in the case of any such statements, certificates or opinions which by any provision hereof are specifically required to be furnished to the Trustee, the Trustee shall be under a duty to examine the same to determine whether or not they conform to the requirements of this Indenture.

(b) No provision of this Indenture shall be construed to relieve the Trustee from liability for its own negligent action, its own negligent failure to act or its own willful misconduct, except that:

(i) this subsection (b) shall not be construed to limit the effect of subsection (a) of this Section 5.01;

(ii) the Trustee shall not be liable for any error of judgment made in good faith by a Responsible Officer or Responsible Officers of the Trustee, unless it shall be proved that the Trustee was negligent in ascertaining the pertinent facts; and

(iii) the Trustee shall not be liable with respect to any action taken, suffered or omitted to be taken by it in good faith in accordance with the direction of the Holders relating to the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any trust or power conferred upon the Trustee, under this Indenture.

None of the provisions contained in this Indenture shall require the Trustee to expend or risk its own funds or otherwise incur personal financial liability in the performance of any of its duties or in the exercise of any of its rights or powers, if there shall be reasonable ground for believing that the repayment of such funds or adequate indemnity against such liability is not reasonably assured to it.

The provisions of this Section 5.01 are in furtherance of and subject to Sections 315 and 316 of the Trust Indenture Act of 1939.

Whether or not therein expressly provided, every provision of this Indenture relating to the conduct of, affecting the liability of or affording protection to the Trustee shall be subject to the provisions of this Section 5.01.

Section 5.02 *Certain Rights of the Trustee*. In furtherance of and subject to the Trust Indenture Act of 1939, and subject to Section 5.01:

(a) In the absence of bad faith on its part, the Trustee may conclusively rely and shall be protected in acting or refraining from acting upon any resolution, Officers' Certificate or any other certificate, statement, instrument, opinion, report, notice, request, direction, consent, order, bond, debenture, note, coupon, security or other paper or document believed by it to be genuine and to have been signed or presented by the proper party or parties;

(b) any request, direction, order or demand of the Issuer mentioned herein shall be sufficiently evidenced by an Officers' Certificate (unless other evidence in respect thereof be herein specifically prescribed); and any resolution of the Board of Directors may be evidenced to the Trustee by a copy thereof certified by the secretary or an assistant secretary of the Issuer;

(c) the Trustee may consult with counsel of its selection and any advice or Opinion of Counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted to be taken by it hereunder in good faith and in accordance with such advice or Opinion of Counsel;

(d) the Trustee shall be under no obligation to exercise any of the trusts or powers vested in it by this Indenture at the request, order or direction of any of the Securityholders pursuant to the provisions of this Indenture, unless such Securityholders shall have offered to the Trustee reasonable security or indemnity against the costs, expenses and liabilities which might be incurred by it in connection with such request, order or direction;

(e) the Trustee shall not be liable for any action taken or omitted by it in good faith and believed by it to be authorized or within the discretion, rights or powers conferred upon it by this Indenture;

(f) prior to the occurrence of an Event of Default hereunder and after the curing or waiving of all Events of Default, the Trustee shall not be bound to make any investigation into the facts or matters stated in any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, approval, appraisal, bond, debenture, note, coupon, security, or other paper or document unless requested in writing so to do by the Holders of not less than a majority in aggregate Principal amount of the Securities of all series affected then outstanding; provided that, if the payment within a reasonable time to the Trustee of the costs, expenses or liabilities likely to be incurred by it in the making of such investigation is, in the opinion of the Trustee, not reasonably assured to the Trustee by the security afforded to it by the terms of this Indenture, the Trustee may require indemnity satisfactory to it against such expenses or liabilities as a condition to proceeding, and the reasonable expenses of every such investigation shall be paid by the Issuer or, if paid by the Trustee or any predecessor trustee, shall be repaid by the Issuer upon demand;

(g) the Trustee may execute any of the trusts or powers hereunder or perform any duties hereunder either directly or by or through agents or attorneys not regularly in its employ and the Trustee shall not be responsible for any misconduct or negligence on the part of any such agent or attorney appointed with due care by it hereunder;

(h) the Trustee shall not be liable for any action taken, suffered or omitted in good faith and believed by it to be authorized or within the discretion, rights or powers conferred upon it by this Indenture;

(i) the Trustee shall not be deemed to have notice of any Default or Event of Default unless a Responsible Officer of the Trustee has actual knowledge thereof or unless written notice of any event which is in fact such a default is received by the Trustee at the Corporate Trust Office of the Trustee, and such notice references the Securities and this Indenture;

(j) the rights, privileges, protections, immunities and benefits given to the Trustee, including, without limitation, its right to be indemnified, are extended to, and shall be enforceable by, the Trustee in each of its capacities hereunder, and each agent, custodian and other Person employed to act hereunder; and

(k) the Trustee may request that the Issuer deliver an Officers' Certificate setting forth the names of individuals and/or titles of officers authorized at such time to take specified actions pursuant to this Indenture, which Officers' Certificate may be signed by any person authorized to sign an Officers' Certificate, including any person specified as so authorized in any such certificate previously delivered and not superseded.

Section 5.03 *Trustee Not Responsible for Recitals, Disposition of Securities or Application of Proceeds Thereof*. The recitals contained herein and in the Securities, except the Trustee's certificates of authentication, shall be taken as the statements of the Issuer, and the Trustee assumes no responsibility for the correctness of the same. The Trustee makes no representation as to the validity or sufficiency of this Indenture or the Securities. The Trustee shall not be accountable for the use or application by the Issuer of any of the Securities or of the proceeds thereof.

Section 5.04 *Trustee and Agents May Hold Securities; Collections, etc.* The Trustee or any agent of the Issuer or the Trustee, in its individual or any other capacity, may become the owner or pledgee of Securities with the same rights it would have if it were not the Trustee or such agent and may otherwise deal with the Issuer and receive, collect, hold and retain collections from the Issuer with the same rights it would have if it were not the Trustee or such agent.

Section 5.05 *Monies Held by Trustee*. All monies received by the Trustee in trust hereunder need not be segregated from other funds except to the extent required by mandatory provisions of law. Neither the Trustee nor any agent of the Issuer or the Trustee shall be under any liability for interest on any monies received by it hereunder.

Section 5.06 *Compensation and Indemnification of Trustee and Its Prior Claim*. The Issuer covenants and agrees to pay to the Trustee from time to time, and the Trustee shall be entitled to, such compensation as shall be agreed in writing from time to time by the Issuer and the Trustee (which shall not be limited by any provision of law in regard to the compensation of a trustee of an express trust) and the Issuer covenants and agrees to pay or reimburse the Trustee and each predecessor Trustee upon its request for all reasonable expenses, disbursements and advances incurred or made by or on behalf of it in accordance with any of the provisions of this Indenture (including the reasonable compensation and the expenses and disbursements of its counsel and of all agents and other persons not regularly in its employ) except to the extent any such expense, disbursement or advance may arise from its negligence or bad faith. The Issuer also covenants and agrees to indemnify the Trustee and each predecessor Trustee for, and to hold it harmless against, any loss, liability or expense arising out of or in connection with the acceptance or administration of this Indenture or the trusts hereunder and the performance of its duties hereunder, including the costs and expenses of defending itself against or investigating any claim of liability (whether asserted by the Issuer, a Holder or any other Person) in the premises, except to the extent such loss, liability or expense is due to the negligence or bad faith of the Trustee or such predecessor Trustee. The obligations of the Issuer under this section to compensate and indemnify the Trustee and each predecessor Trustee and to pay or reimburse the Trustee and each predecessor Trustee for expenses, disbursements and advances shall constitute additional indebtedness hereunder and shall survive the satisfaction and discharge of this Indenture or the resignation or removal of the Trustee. Such additional indebtedness shall be a senior claim and lien to that of the Securities upon all property and funds held or collected by the Trustee as such, except funds held in trust for the benefit of the Holders of particular Securities, and the Securities are hereby subordinated to such senior claim. The parties agree that if the Trustee renders services following an Event of Default under Section 4.01(d) or (e), compensation for such services is intended to constitute administrative expense under any bankruptcy law.

Section 5.07 *Right of Trustee to Rely on Officers' Certificate, etc.* Subject to Section 5.01 and Section 5.02, whenever in the administration of the trusts of this Indenture the Trustee shall deem it necessary or desirable that a matter be proved or established prior to taking or suffering or omitting any action hereunder, such matter (unless other evidence in respect thereof be herein specifically prescribed) may, in the absence of negligence or bad faith on the part of the Trustee, be deemed to be conclusively proved and established by an Officers' Certificate delivered to the Trustee, and such certificate, in the absence of negligence or bad faith on the part of the Trustee, shall be full warrant to the Trustee for any action taken, suffered or omitted by it under the provisions of this Indenture upon the faith thereof.

Section 5.08 *Persons Eligible for Appointment as Trustee*. The Trustee for each series of Securities hereunder shall at all times be a corporation which is eligible in accordance with the provisions of Section 310(a) of the Trust Indenture Act of 1939 and which has (or which is a Wholly-Owned Subsidiary, directly or indirectly, of a bank holding company which has) a combined capital and surplus of \$50,000,000. If such corporation or holding company publishes reports of condition at least annually, pursuant to law or to the requirements of a Federal, State or District of Columbia supervising or examining authority, then for the purposes of this Section, the combined capital and surplus of such corporation or holding company shall be deemed to be its combined capital and surplus as set forth in its most recent report of condition so published.

Section 5.09 *Resignation and Removal; Appointment of Successor Trustee*. (a) The Trustee, or any trustee or trustees hereafter appointed, may at any time resign with respect to one or more or all series of Securities by giving written notice of resignation to the Issuer. Upon receiving such notice of resignation, the Issuer shall promptly appoint a successor trustee or trustees with respect to the applicable series by written instrument in duplicate, executed by authority of the Board of Directors, one copy of which instrument shall be delivered to the resigning Trustee and one copy to the successor trustee or trustees. If no successor Trustee shall have been so appointed with respect to any series and have accepted appointment within 30 days after the mailing of such notice of resignation, the resigning Trustee may petition, at the expense of the Issuer, any court of competent jurisdiction for the appointment of a successor Trustee, or any Securityholder who has been a bona fide Holder of a Security or Securities of the applicable series for at least six months may, subject to the provisions of Section 4.12, on behalf of himself and all others similarly situated, petition any such court for the appointment of a successor Trustee. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, appoint a successor Trustee.

(b) In case at any time any of the following shall occur:

(i) the Trustee shall fail to comply with the provisions of Section 310(b) of the Trust Indenture Act of 1939 with respect to any series of Securities after written request therefor by the Issuer or by any Securityholder who has been a bona fide Holder of a Security or Securities of such series for at least six months;

(ii) the Trustee shall cease to be eligible in accordance with the provisions of Section 310(a) of the Trust Indenture Act of 1939 and shall fail to resign after written request therefor by the Issuer or by any Securityholder; or

(iii) the Trustee shall become incapable of acting with respect to any series of Securities, or shall be adjudged a bankrupt or insolvent, or a receiver or liquidator of the Trustee or of its property shall be appointed, or any public officer shall take charge or control of the Trustee or of its property or affairs for the purpose of rehabilitation, conservation or liquidation; then, in any such case, the Issuer may remove the Trustee with respect to the applicable series of Securities and appoint a successor trustee for such series by written instrument, in duplicate, executed by order of the Board of Directors of the Issuer, one copy of which instrument shall be delivered to the Trustee so removed and one copy to the successor Trustee, or, subject to Section 315(e) of the Trust Indenture Act of 1939, any Securityholder who has been a bona fide Holder of a Security or Securities of

such series for at least six months may on behalf of himself and all others similarly situated, petition any court of competent jurisdiction for the removal of the Trustee and the appointment of a successor trustee with respect to such series. Such court may thereupon, after such notice, if any, as it may deem proper and prescribe, remove the Trustee and appoint a successor trustee.

(c) The Holders of a majority in aggregate Principal amount of the Securities of each series at the time outstanding may at any time remove the Trustee with respect to Securities of such series and appoint a successor Trustee with respect to the Securities of such series by delivering to the Trustee so removed, to the successor Trustee so appointed and to the Issuer the evidence provided in Section 6.01 of the action in that regard taken by the Securityholders.

(d) Any resignation or removal of the Trustee with respect to any series and any appointment of a successor trustee with respect to such series pursuant to any of the provisions of this Section 5.09 shall become effective upon acceptance of appointment by the successor trustee as provided in Section 5.10.

Section 5.10 *Acceptance of Appointment by Successor.* Any successor Trustee appointed as provided in Section 5.09 shall execute and deliver to the Issuer and to its predecessor Trustee an instrument accepting such appointment hereunder, and thereupon the resignation or removal of the predecessor Trustee with respect to all or any applicable series shall become effective and such successor Trustee, without any further act, deed or conveyance, shall become vested with all rights, powers, duties and obligations with respect to such series of its predecessor hereunder, with like effect as if originally named as Trustee for such series hereunder. On the written request of the Issuer or of the successor Trustee, upon payment of its charges then unpaid, the Trustee ceasing to act shall, subject to Section 5.06, pay over to the successor Trustee all monies at the time held by it hereunder and shall execute and deliver an instrument transferring to such successor Trustee all such rights, powers, duties and obligations. Upon request of any such successor Trustee, the Issuer shall execute any and all instruments in writing for more fully and certainly vesting in and confirming to such successor Trustee all such rights and powers. Any Trustee ceasing to act shall, nevertheless, retain a prior claim upon all property or funds held or collected by such Trustee to secure any amounts then due it pursuant to the provisions of Section 5.06.

If a successor Trustee is appointed with respect to the Securities of one or more (but not all) series, the Issuer, the predecessor Trustee and each successor Trustee with respect to the Securities of any applicable series shall execute and deliver an indenture supplemental hereto which shall contain such provisions as shall be deemed necessary or desirable to confirm that all the rights, powers, trusts and duties of the predecessor Trustee with respect to the Securities of any series as to which the predecessor Trustee is not retiring shall continue to be vested in the predecessor Trustee, and shall add to or change any of the provisions of this Indenture as shall be necessary to provide for or facilitate the administration of the trusts hereunder by more than one Trustee, it being understood that nothing herein or in such supplemental indenture shall constitute such Trustees co-trustees of the same trust and that each such Trustee shall be Trustee of a trust or trusts under separate indentures.

Upon acceptance of appointment by any successor Trustee as provided in this Section 5.10, the Issuer shall mail notice thereof by first-class mail to the Holders of Securities of any series for which such successor Trustee is acting as Trustee at their last addresses as they shall appear in the Security register. If the acceptance of appointment is substantially contemporaneous with the resignation, then the notice called for by the preceding sentence may be combined with the notice called for by Section 5.09. If the Issuer fails to mail such notice within 10 days after acceptance of appointment by the successor Trustee, the successor Trustee shall cause such notice to be mailed at the expense of the Issuer.

Section 5.11 *Merger, Conversion, Consolidation or Succession to Business of Trustee*. Any corporation into which the Trustee may be merged or converted or with which it may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Trustee shall be a party, or any corporation succeeding to all or substantially all the corporate trust business of the Trustee, shall be the successor of the Trustee hereunder, provided that such corporation shall be eligible under the provisions of Section 5.08, without the execution or filing of any paper or any further act on the part of any of the parties hereto, anything herein to the contrary notwithstanding.

In case at the time such successor to the Trustee shall succeed to the trusts created by this Indenture any of the Securities of any series shall have been authenticated but not delivered, any such successor to the Trustee may adopt the certificate of authentication of any predecessor Trustee and deliver such Securities so authenticated; and, in case at that time any of the Securities of any series shall not have been authenticated, any successor to the Trustee may authenticate such Securities either in the name of any predecessor hereunder or in the name of the successor Trustee; and in all such cases such certificate shall have the full force which it is anywhere in the Securities of such series or in this Indenture provided that the certificate of the Trustee shall have; provided, that the right to adopt the certificate of authentication of any predecessor Trustee or to authenticate Securities of any series in the name of any predecessor Trustee shall apply only to its successor or successors by merger, conversion or consolidation.

Section 5.12 *Reports to the Trustee*. The Trustee shall transmit to Holders such reports concerning the Trustee and its actions under this Indenture as may be required pursuant to the Trust Indenture Act at the times and in the manner provided pursuant thereto. If required by Section 313(a) of the Trust Indenture Act, the Trustee shall, within sixty days after each May 15 following the date of the initial issuance of Securities under this Indenture deliver to Holders a brief report, dated as of such May 15, which complies with the provisions of such Section 313(a).

A copy of each such report shall, at the time of such transmission to Holders, be filed by the Trustee with each stock exchange, if any, upon which the Securities are listed, with the Commission and with the Issuer. The Issuer will promptly notify the Trustee when the Securities are listed on any stock exchange and of any delisting thereof.

ARTICLE 6
CONCERNING THE SECURITYHOLDERS

Section 6.01 *Evidence of Action Taken by Securityholders.* Any request, demand, authorization, direction, notice, consent, waiver or other action provided by this Indenture to be given or taken by a specified percentage in Principal amount of the Securityholders of any or all series may be embodied in and evidenced by one or more instruments of substantially similar tenor signed by such specified percentage of Securityholders in person or by agent duly appointed in writing; and, except as herein otherwise expressly provided, such action shall become effective when such instrument or instruments are delivered to the Trustee. Proof of execution of any instrument or of a writing appointing any such agent shall be sufficient for any purpose of this Indenture and (subject to Section 5.01 and Section 5.02) conclusive in favor of the Trustee and the Issuer, if made in the manner provided in this Article.

Section 6.02 *Proof of Execution of Instruments and of Holding of Securities; Record Date.* Subject to Section 5.01 and Section 5.02, the execution of any instrument by a Securityholder or his agent or proxy may be proved by the certificate of any notary public or other officer authorized to take acknowledgment of deeds, that the Person executing such instrument acknowledged to such notary public or other such officer the execution thereof, or by an affidavit of a witness to such execution sworn to before any such notary public or other officer. Where such execution is by an officer of a corporation or association or a member of a partnership on behalf of such corporation, association or partnership, as the case may be, or by any other Person acting in a representative capacity, such certificate or affidavit shall also constitute sufficient proof of such Person's authority. The holding of Securities shall be proved by the Security register or by a certificate of the registrar thereof. The Issuer may set a record date for purposes of determining the identity of Holders of Securities of any series entitled to vote or consent to any action referred to in Section 6.01, which record date may be set at any time or from time to time by notice to the Trustee, for any date or dates (in the case of any adjournment or reconsideration) not more than 60 days nor less than five days prior to the proposed date of such vote or consent, and thereafter, notwithstanding any other provisions hereof, only Holders of Securities of such series of record on such record date shall be entitled to so vote or give such consent or revoke such vote or consent.

Section 6.03 *Holders to be Treated as Owners.* Prior to due presentment of a Security for registration of transfer, the Issuer, the Trustee and any agent of the Issuer or the Trustee may deem and treat the person in whose name any Security shall be registered upon the Security register for such series as the absolute owner of such Security (whether or not such Security shall be overdue and notwithstanding any notation of ownership or other writing thereon) for the purpose of receiving payment of or on account of the Principal of and, subject to the provisions of this Indenture, interest on such Security and for all other purposes, and neither the Issuer nor the Trustee nor any agent of the Issuer or the Trustee shall be affected by any notice to the contrary. All such payments so made to any such person, or upon his order, shall be valid, and, to the extent of the sum or sums so paid, effectual to satisfy and discharge the liability for monies payable upon any such Security.

Section 6.04 *Securities Owned by Issuer Deemed Not Outstanding.* In determining whether the Holders of the requisite aggregate Principal amount of Outstanding Securities of any or all series have concurred in any direction, consent or waiver under this Indenture, Securities which are owned by the Issuer or any other obligor on the Securities with respect to which such determination is being made or by any person directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer or any other obligor on the Securities with respect to which such determination is being made shall be disregarded and deemed not to be Outstanding for the purpose of any such determination, except that for the purpose of determining whether the Trustee shall be protected in relying on any such direction, consent or waiver only Securities as to which the Trustee has received written notice are so owned shall be so disregarded. Securities so owned which have been pledged in good faith may be regarded as Outstanding if the pledgee establishes to the satisfaction of the Trustee the pledgee's right so to act with respect to such Securities and that the pledgee is not the Issuer or any other obligor upon the Securities or any person directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer or any other obligor on the Securities. In case of a dispute as to such right, the advice of counsel shall be full protection in respect of any decision made by the Trustee in accordance with such advice. Upon request of the Trustee, the Issuer shall furnish to the Trustee promptly an Officers' Certificate listing and identifying all Securities, if any, known by the Issuer to be owned or held by or for the account of any of the above-described persons; and, subject to Section 5.01 and Section 5.02, the Trustee shall be entitled to accept such Officers' Certificate as conclusive evidence of the facts therein set forth and of the fact that all Securities not listed therein are Outstanding for the purpose of any such determination.

Section 6.05 *Right of Revocation of Action Taken*. At any time prior to (but not after) the evidencing to the Trustee, as provided in Section 6.01, of the taking of any action by the Holders of the percentage in aggregate Principal amount of the Securities of any or all series, as the case may be, specified in this Indenture in connection with such action, any Holder of a Security the serial number of which is shown by the evidence to be included among the serial numbers of the Securities the Holders of which have consented to such action may, by filing written notice at the Corporate Trust Office and upon proof of holding as provided in this Article, revoke such action so far as concerns such Security. Except as aforesaid any such action taken by the Holder of any Security shall be conclusive and binding upon such Holder and upon all future Holders and owners of such Security and of any Securities issued in exchange or substitution therefor, irrespective of whether or not any notation in regard thereto is made upon any such Security. Any action taken by the Holders of the percentage in aggregate Principal amount of the Securities of any or all series, as the case may be, specified in this Indenture in connection with such action shall be conclusively binding upon the Issuer, the Trustee and the Holders of all the Securities affected by such action.

ARTICLE 7
SUPPLEMENTAL INDENTURES

Section 7.01 *Supplemental Indentures Without Consent of Securityholders*. The Issuer, when authorized by a resolution of its Board of Directors certified to the Trustee, and the Trustee may from time to time and at any time enter into an indenture or indentures supplemental hereto for one or more of the following purposes:

(a) to evidence the succession of another corporation to the Issuer, or successive successions, and the assumption by the successor corporation of the covenants, agreements and obligations of the Issuer pursuant to Article 8;

(b) (i) to cure any ambiguity or to correct or supplement any provision contained herein or in any supplemental indenture which may be defective or inconsistent with any other provision contained herein or in any supplemental indenture, (ii) to conform the terms of Securities to the description thereof in the prospectus and prospectus supplement (or similar offering document) offering such Securities or (iii) to make such other provisions in regard to matters or questions arising under this Indenture or under any supplemental indenture as the Board of Directors may deem necessary or desirable and which shall not adversely affect the interests of the Holders of the Securities in any material respect;

(c) to establish the form or terms of Securities of any series as permitted by Section 2.01 and Section 2.03;

(d) to evidence and provide for the acceptance of appointment hereunder by a successor trustee with respect to the Securities of one or more series and to add to or change any of the provisions of this Indenture as shall be necessary to provide for or facilitate the administration of the trusts hereunder by more than one trustee, pursuant to the requirements of Section 5.10;

(e) to comply with any requirements of the Commission in connection with the qualification of this Indenture under the Trust Indenture Act of 1939;

(f) to provide for uncertificated or Unregistered Securities and to make all appropriate changes for such purpose;

(g) to make any change that would not reasonably be expected to adversely affect the rights of any Holder in any material respect;

(h) to add to the covenants of the Issuer such new covenants, restrictions, conditions or provisions as its Board of Directors shall consider to be for the protection of the Holders of Securities, and with respect to which the Trustee has received an Opinion of Counsel to a similar effect, and to make the occurrence, or the occurrence and continuance, of a default in any such additional covenants, restrictions, conditions or provisions an Event of Default; provided, that in respect of any such additional covenant, restriction, condition or provision such supplemental indenture may provide for a particular period of grace after default (which period may be shorter or longer than that allowed in the case of other defaults) or may provide for an immediate enforcement upon such an Event of Default or may limit the remedies available to the Trustee upon such an Event of Default or may limit the right of the Holders of a majority in aggregate Principal amount of the Securities of such series to waive such an Event of Default; or

(i) to make any change so long as no Securities are Outstanding.

The Trustee is hereby authorized to join with the Issuer in the execution of any such supplemental indenture, to make any further appropriate agreements and stipulations which may be therein contained and to accept the conveyance, transfer, assignment, mortgage or pledge of any property thereunder, but the Trustee shall not be obligated to enter into any such supplemental indenture which affects the Trustee's own rights, duties or immunities under this Indenture or otherwise.

Any supplemental indenture authorized by the provisions of this section may be executed without the consent of the Holders of any of the Securities at the time outstanding, notwithstanding any of the provisions of Section 7.02.

Section 7.02 *Supplemental Indentures With Consent of Securityholders*. With the consent (evidenced as provided in Article 6) of the Holders of not less than a majority in aggregate Principal amount of the Securities at the time Outstanding of all series affected by such supplemental indenture (voting as one class), the Issuer, when authorized by a resolution of its Board of Directors, and the Trustee may, from time to time and at any time, enter into an indenture or indentures supplemental hereto for the purpose of adding any provisions to or changing in any manner or eliminating any of the provisions of this Indenture or of any supplemental indenture or of modifying in any manner the rights of the Holders of the Securities of each such series; provided, that no such supplemental indenture shall without the consent of each Holder affected thereby:

Security; (i) change the stated maturity of the Principal of, or the time of payment of any installment of interest on, such Holder's

(ii) reduce the Principal thereof or the rate of interest thereon, or any premium payable with respect thereto;

payable; (iii) change any place of payment where, or the currency in which, any Security or any premium or the interest thereon is

(iv) change the provisions for calculating any redemption or repurchase price, including the definitions relating thereto;

(v) make any change to Section 4.07 or Section 4.10 (except to include other provisions subject to Section 4.10);

(vi) reduce the percentage in Principal amount of outstanding Securities of the relevant series the consent of whose Holders is required for any such supplemental indenture, for any waiver of compliance with any provisions of this Indenture or any defaults and their consequences provided for in this Indenture;

(vii) alter or impair the right to convert any Security at the rate and upon the terms provided in Article 12;

(viii) waive a default in the payment of Principal of or interest on any Security of such Holder (except pursuant to a rescission of acceleration pursuant to Section 4.01);

(ix) adversely affect the rights of such Holder under any mandatory redemption or repurchase provision or any right of redemption or repurchase at the option of such Holder;

(x) modify any of the provisions of this Section 7.02, except to increase any such percentage or to provide that certain other provisions of this Indenture cannot be modified or waived without the consent of the Holder of each outstanding Security affected thereby;

(xi) modify Article 13 of this Indenture or the definition of "Senior Indebtedness" in Article 1 hereof in a manner adverse to Holders of any series of Securities; or

(xii) change or waive any provision that, pursuant to a board resolution or indenture supplemental hereto establishing the terms of one or more series of Securities, is prohibited to be so changed or waived.

Upon the written request of the Issuer, accompanied by a copy of a resolution of the Board of Directors certified by the secretary or an assistant secretary of the Issuer authorizing the execution of any such supplemental indenture, and upon the filing with the Trustee of evidence of the consent of Securityholders as aforesaid and other documents, if any, required by Section 6.01, the Trustee shall join with the Issuer in the execution of such supplemental indenture unless such supplemental indenture affects the Trustee's own rights, duties or immunities under this Indenture or otherwise, in which case the Trustee may in its discretion, but shall not be obligated to, enter into such supplemental indenture.

It shall not be necessary for the consent of the Securityholders under this section to approve the particular form of any proposed supplemental indenture, but it shall be sufficient if such consent shall approve the substance thereof.

Promptly after the execution by the Issuer and the Trustee of any supplemental indenture pursuant to the provisions of this Section, the Issuer shall mail a notice thereof by first class mail to the Holders of Securities of each series affected thereby at their addresses as they shall appear on the registry books of the Issuer, setting forth in general terms the substance of such supplemental indenture. Any failure of the Issuer to mail such notice, or any defect therein, shall not, however, in any way impair or affect the validity of any such supplemental indenture.

Section 7.03 Effect of Supplemental Indenture. Upon the execution of any supplemental indenture pursuant to the provisions hereof, this Indenture shall be and be deemed to be modified and amended in accordance therewith and the respective rights, limitations of rights, obligations, duties and immunities under this Indenture of the Trustee, the Issuer and the Holders of Securities of each series affected thereby shall thereafter be determined, exercised and enforced hereunder subject in all respects to such modifications and amendments, and all the terms and conditions of any such supplemental indenture shall be and be deemed to be part of the terms and conditions of this Indenture for any and all purposes.

Section 7.04 Documents to Be Given to Trustee. The Trustee, subject to the provisions of Section 5.01 and Section 5.02, may receive an Officers' Certificate and an Opinion of Counsel as conclusive evidence that any supplemental indenture executed pursuant to this Article 7 complies with the applicable provisions of this Indenture.

Section 7.05 *Notation on Securities in Respect of Supplemental Indentures*. Securities of any series authenticated and delivered after the execution of any supplemental indenture pursuant to the provisions of this Article may bear a notation in form approved by the Trustee for such series as to any matter provided for by such supplemental indenture or as to any action taken at any such meeting. If the Issuer or the Trustee shall so determine, new Securities of any series so modified as to conform, in the opinion of the Trustee and the Board of Directors, to any modification of this Indenture contained in any such supplemental indenture may be prepared by the Issuer, authenticated by the Trustee and delivered in exchange for the Securities of such series then outstanding.

ARTICLE 8 CONSOLIDATION, MERGER, SALE OR CONVEYANCE

Section 8.01 *Issuer May Consolidate, etc., on Certain Terms*. The Issuer covenants that it will not merge or consolidate with any other Person or sell, convey, transfer, lease or otherwise dispose of all or substantially all of its property and assets to any Person (other than a consolidation with or merger with or into or a sale, conveyance, transfer, lease or other disposition to a Wholly-Owned Subsidiary with a positive net worth; *provided* that, in connection with any such merger of the Issuer with a Wholly-Owned Subsidiary, no consideration (other than common stock) in the surviving person or the Issuer shall be issued or distributed to the stockholders of the Issuer), unless (xv) either (x) the Issuer shall be the continuing corporation, or the successor corporation or (y) the Person formed by such consolidation or into which the Issuer is merged or that acquires by sale or conveyance substantially all the assets of the Issuer (if other than the Issuer) shall be a corporation or limited liability company organized and validly existing under the laws of the United States of America or any jurisdiction thereof and shall expressly assume the due and punctual payment of the Principal of and interest on all the Securities, according to their tenor, and the due and punctual performance and observance of all of the covenants and conditions of this Indenture to be performed or observed by the Issuer, by supplemental indenture satisfactory to the Trustee, executed and delivered to the Trustee by such Person, (xvi) immediately after giving effect to such transaction, no default or Event of Default shall have occurred and be continuing and (xvii) the Issuer delivers to the Trustee an Officers' Certificate and Opinion of Counsel, in each case stating that such consolidation, merger or transfer and such supplemental indenture complies with this Section 8.01 and that all conditions precedent provided for herein relating to such transaction have been complied with; *provided*, however, that the foregoing limitations shall not apply if, in the good faith determination of the Board of Directors, whose determination shall be evidenced by a board resolution certified to the Trustee, the principal purpose of such transaction is to change the state of incorporation of the Issuer; and *provided further* that any such transaction shall not have as one of its purposes the evasion of the foregoing limitations.

Section 8.02 *Successor Corporation Substituted*. In case of any such consolidation, merger, sale, conveyance, transfer, lease or other disposition, and following such an assumption by the successor Person, such successor Person shall succeed to and be substituted for the Issuer, with the same effect as if it had been named herein. Such successor Person may cause to be signed, and may issue either in its own name or in the name of the Issuer prior to such succession any or all of the Securities issuable hereunder which theretofore shall not have been signed by the Issuer and delivered to the Trustee; and, upon the order of such successor Person instead of the Issuer and subject to all the terms, conditions and limitations in this Indenture prescribed, the Trustee, pursuant to the terms hereof, shall authenticate and shall deliver any Securities which previously shall have been signed and delivered by the officers of the Issuer to the Trustee for authentication, and any Securities which such successor Person thereafter shall cause to be signed and delivered to the Trustee for that purpose. All of the Securities so issued shall in all respects have the same legal rank and benefit under this Indenture as the Securities theretofore or thereafter issued in accordance with the terms of this Indenture as though all of such Securities had been issued at the date of the execution hereof.

In case of any such consolidation, merger, sale, conveyance, transfer, lease or other disposition, such changes in phraseology and form (but not in substance) may be made in the Securities thereafter to be issued as may be appropriate.

Upon the assumption by the successor Person in the manner described in this Article, the Issuer shall be discharged from all obligations and covenants under this Indenture and the Securities.

ARTICLE 9 DISCHARGE OF INDENTURE

Section 9.01 *Defeasance Within One Year of Payment*. Except as otherwise provided in this Section 9.01, the Issuer may terminate its obligations under the Securities of any series and this Indenture with respect to Securities of such series if:

(i) all Securities of such series previously authenticated and delivered (other than destroyed, lost or wrongfully taken Securities of such series that have been replaced or Securities of such series for whose payment money or securities have theretofore been held in trust and thereafter repaid to the Issuer, as provided in Section 9.05) have been delivered to the Trustee for cancellation and the Issuer has paid all sums payable by it hereunder; or

(ii) (A) the Securities of such series mature within one year or all of them are to be called for redemption within one year under arrangements satisfactory to the Trustee for giving the notice of redemption, (B) the Issuer irrevocably deposits in trust with the Trustee, as trust funds solely for the benefit of the Holders of such Securities for that purpose, money or U.S. Government Obligations or a combination thereof sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee), without consideration of any reinvestment and after payment of all Federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay Principal of and interest on the Securities of such series to maturity or redemption, as the case may be, and to pay all other sums payable by it hereunder and (C) the Issuer delivers to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the satisfaction and discharge of this Indenture with respect to the Securities of such series have been complied with.

With respect to the foregoing clause (i), only the Issuer's obligations under Sections 5.06 and 9.05 in respect of the Securities of such series shall survive. With respect to the foregoing clause (ii), only the Issuer's obligations in Sections 2.03 through 2.11, 3.02, 5.06, 5.09 and 9.05 in respect of the Securities of such series shall survive until such Securities of such series are no longer outstanding. Thereafter, only the Issuer's obligations in Sections 5.06 and 9.05 in respect of the Securities of such series shall survive. After any such irrevocable deposit, the Trustee shall acknowledge in writing the discharge of the Issuer's obligations under the Securities of such series and this Indenture with respect to the Securities of such series except for those surviving obligations specified above.

Section 9.02 *Defeasance*. Except as provided below, the Issuer will be deemed to have paid and will be discharged from any and all obligations in respect of the Securities of any series and the provisions of this Indenture will no longer be in effect with respect to the Securities of such series (and the Trustee, at the expense of the Issuer, shall execute instruments in form and substance satisfactory to the Issuer and the Trustee acknowledging the same) if the following conditions shall have been satisfied:

(i) the Issuer has irrevocably deposited in trust with the Trustee as trust funds specifically pledged as security for, and dedicated solely to, Holders of the Securities of such series, for payment of the Principal of and interest on the Securities of such series, money or U.S. Government Obligations or a combination thereof sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee) without consideration of any reinvestment and after payment of all federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay and discharge the Principal of and accrued interest on the outstanding Securities of such series to maturity or earlier redemption (irrevocably provided for under arrangements satisfactory to the Trustee), as the case may be;

(ii) such deposit will not result in a breach or violation of, or constitute a default under, this Indenture or any other material agreement or instrument to which the Issuer is a party or by which it is bound;

(iii) no default or Event of Default with respect to the Securities of such series shall have occurred and be continuing on the date of such deposit;

(iv) the Issuer shall have delivered to the Trustee (1) either (x) a ruling directed to the Trustee received from the Internal Revenue Service to the effect that the Holders of the Securities of such series will not recognize income, gain or loss for Federal income tax purposes as a result of the Issuer's exercise of its option under this Section 9.02 and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case if such deposit and defeasance had not occurred or (y) an Opinion of Counsel to the same effect as the ruling described in clause (x) above and based upon a change in law and (2) an Opinion of Counsel to the effect that the Holders of the Securities of such series have a valid security interest in the trust funds subject to no prior liens under the UCC; and

(v) the Issuer has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the defeasance contemplated by this Section 9.02 of the Securities of such series have been complied with.

The Issuer's obligations in Sections 2.03 through 2.11, 3.02, 5.06, 5.09 and 9.05 with respect to the Securities of such series shall survive until such Securities are no longer outstanding. Thereafter, only the Issuer's obligations in Sections 5.06 and 9.05 shall survive.

Section 9.03 *Covenant Defeasance*. The Issuer may omit to comply with any term, provision or condition set forth in Sections 3.04, 3.06 or 3.08 (or any other specific covenant relating to the Securities of any series provided for in a Board Resolution or supplemental indenture pursuant to Section 2.03 which may by its terms be defeased pursuant to this Section 9.03), and such omission shall be deemed not to be an Event of Default under clause (c) of Section 4.01, with respect to the outstanding Securities of such series if:

(i) the Issuer has irrevocably deposited in trust with the Trustee as trust funds solely for the benefit of the Holders of the Securities of such series, for payment of the Principal of and interest, if any, on the Securities of such series, money or U.S. Government Obligations or a combination thereof in an amount sufficient (unless such funds consist solely of money, in the opinion of a nationally recognized firm of independent public accountants expressed in a written certification thereof delivered to the Trustee) without consideration of any reinvestment and after payment of all Federal, state and local taxes or other charges and assessments in respect thereof payable by the Trustee, to pay and discharge the Principal of and interest on the outstanding Securities of such series to maturity or earlier redemption (irrevocably provided for under arrangements satisfactory to the Trustee), as the case may be;

(ii) such deposit will not result in a breach or violation of, or constitute a default under, this Indenture or any other material agreement or instrument to which the Issuer is a party or by which it is bound;

(iii) no default or Event of Default with respect to the Securities of such series shall have occurred and be continuing on the date of such deposit;

(iv) the Issuer has delivered to the Trustee an Opinion of Counsel to the effect that (A) the Holders of the Securities of such series have a valid security interest in the trust funds subject to no prior liens under the UCC and (B) such Holders will not recognize income, gain or loss for Federal income tax purposes as a result of such deposit and covenant defeasance and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case if such deposit and defeasance had not occurred; and

(v) the Issuer has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, in each case stating that all conditions precedent provided for herein relating to the covenant defeasance contemplated by this Section 9.03 of the Securities of such series have been complied with.

Section 9.04 *Application of Trust Money*. Subject to Section 9.05, the Trustee or Paying Agent shall hold in trust money or U.S. Government Obligations deposited with it pursuant to 9.01, 9.02, 9.03, as the case may be, in respect of the Securities of any series and shall apply the deposited money and the proceeds from deposited U.S. Government Obligations in accordance with the Securities of such series and this Indenture to the payment of Principal of and interest on the Securities of such series; provided that such money need not be segregated from other funds except to the extent required by law. The Issuer shall pay and indemnify the Trustee against any tax, fee or other charge imposed on or assessed against the U.S. Government Obligations deposited pursuant to 9.01, 9.02, 9.03, as the case may be, or the Principal and interest received in respect thereof, other than any such tax, fee or other charge that by law is for the account of the Holders.

Section 9.05 *Repayment to Issuer*. Subject to Sections 5.06 and 9.01, the Trustee and the Paying Agent shall promptly pay to the Issuer upon request set forth in an Officers' Certificate any money held by them at any time and not required to make payments hereunder and thereupon shall be relieved from all liability with respect to such money. Subject to applicable escheat or abandoned property laws, the Trustee and the Paying Agent shall pay to the Issuer upon written request any money held by them and required to make payments hereunder under this Indenture that remains unclaimed for two years; *provided* that the Trustee or such Paying Agent before being required to make any payment shall cause to be published at the expense of the Issuer once in an Authorized Newspaper or mail to each Holder entitled to such money at such Holder's address (as set forth in the register) notice that such money remains unclaimed and that after a date specified therein (which shall be at least 30 days from the date of such publication or mailing) any unclaimed balance of such money then remaining will be repaid to the Issuer. After payment to the Issuer, Holders entitled to such money must look to the Issuer for payment as unsecured general creditors unless an abandoned property law designates another Person, and all liability of the Trustee and such Paying Agent with respect to such money shall cease.

ARTICLE 10 MISCELLANEOUS PROVISIONS

Section 10.01 *Incorporators, Stockholders, Officers and Directors Exempt from Individual Liability*. No recourse under or upon any obligation, covenant or agreement contained in this Indenture or in any Security, or because of any indebtedness evidenced thereby, shall be had against any incorporator, as such, or against any past, present or future stockholder, officer, director or employee, as such, of the Issuer or of any successor Person thereof, either directly or through the Issuer or any successor Person thereof, under any rule of law, statute or constitutional provision or by the enforcement of any assessment or by any legal or equitable proceeding or otherwise, all such liability being expressly waived and released by the acceptance of the Securities by the Holders thereof and as part of the consideration for the issue of the Securities.

Section 10.02 *Provisions of Indenture for the Sole Benefit of Parties and Securityholders*. Nothing in this Indenture or in the Securities, expressed or implied, shall give or be construed to give to any person, firm or corporation, other than the parties hereto and their successors and the Holders of the Securities, any legal or equitable right, remedy or claim under this Indenture or under any covenant or provision herein contained, all such covenants and provisions being for the sole benefit of the parties hereto and their successors and of the Holders of the Securities.

Section 10.03 *Successors and Assigns of Issuer Bound by Indenture*. All the covenants, stipulations, promises and agreements contained in this Indenture by or on behalf of the Issuer shall bind its successors and assigns, whether so expressed or not.

Section 10.04 *Notices and Demands on Issuer, Trustee and Securityholders*. Any notice or demand which by any provision of this Indenture is required or permitted to be given or served by the Trustee or by the Holders of Securities to or on the Issuer may be given or served by being deposited postage prepaid, first-class mail (except as otherwise specifically provided herein) addressed (until another address of the Issuer is filed by the Issuer with the Trustee) to Corbus Pharmaceuticals Holdings, Inc. at 100 River Ridge Drive, Norwood MA, 02062, Attention: Chief Financial Officer. Any notice, direction, request or demand by the Issuer or any Securityholder to or upon the Trustee shall be deemed to have been sufficiently given or made, for all purposes, if given or made at the Corporate Trust Office.

Where this Indenture provides for notice to Holders, such notice shall be sufficiently given (unless otherwise herein expressly provided) if in writing and mailed, first-class postage prepaid, to each Holder entitled thereto, at such Holder's last address as it appears in the Security register. In any case where notice to Holders is given by mail, neither the failure to mail such notice, nor any defect in any notice so mailed, to any particular Holder shall affect the sufficiency of such notice with respect to other Holders. Where this Indenture provides for notice in any manner, such notice may be waived in writing by the person entitled to receive such notice, either before or after the event, and such waiver shall be the equivalent of such notice. Waivers of notice by Holders shall be filed with the Trustee, but such filing shall not be a condition precedent to the validity of any action taken in reliance upon such waiver.

In case, by reason of the suspension of or irregularities in regular mail service, it shall be impracticable to mail notice to the Issuer and Securityholders when such notice is required to be given pursuant to any provision of this Indenture, then any manner of giving such notice as shall be satisfactory to the Trustee shall be deemed to be a sufficient giving of such notice.

Section 10.05 *Officers' Certificates and Opinions of Counsel; Statements to be Contained Therein*. Upon any application or demand by the Issuer to the Trustee to take any action under any of the provisions of this Indenture, the Issuer shall furnish to the Trustee an Officers' Certificate stating that all conditions precedent provided for in this Indenture relating to the proposed action have been complied with and an Opinion of Counsel stating that in the opinion of such counsel all such conditions precedent have been complied with, except that in the case of any such application or demand as to which the furnishing of such documents is specifically required by any provision of this Indenture relating to such particular application or demand, no additional certificate or opinion need be furnished.

Each certificate or opinion provided for in this Indenture and delivered to the Trustee with respect to compliance with a condition or covenant provided for in this Indenture shall include (a) a statement that the person making such certificate or opinion has read such covenant or condition, (b) a brief statement as to the nature and scope of the examination or investigation upon which the statements or opinions contained in such certificate or opinion are based, (c) a statement that, in the opinion of such person, he has made such examination or investigation as is necessary to enable him to express an informed opinion as to whether or not such covenant or condition has been complied with and (d) a statement as to whether or not, in the opinion of such person, such condition or covenant has been complied with.

Any certificate, statement or opinion of an officer of the Issuer may be based, insofar as it relates to legal matters, upon a certificate or opinion of or representations by counsel, unless such officer knows that the certificate or opinion or representations with respect to the matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous. Any certificate, statement or opinion of counsel may be based, insofar as it relates to factual matters, information with respect to which is in the possession of the Issuer, upon the certificate, statement or opinion of or representations by an officer or officers of the Issuer, unless such counsel knows that the certificate, statement or opinion or representations with respect to the matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous.

Any certificate, statement or opinion of an officer of the Issuer or of counsel may be based, insofar as it relates to accounting matters, upon a certificate or opinion of or representations by an accountant or firm of accountants in the employ of the Issuer, unless such officer or counsel, as the case may be, knows that the certificate or opinion or representations with respect to the accounting matters upon which his certificate, statement or opinion may be based as aforesaid are erroneous, or in the exercise of reasonable care should know that the same are erroneous.

Any certificate or opinion of any independent firm of public accountants filed with the Trustee shall contain a statement that such firm is independent.

Section 10.06 *Payments Due on Saturdays, Sundays and Holidays*. If the date of maturity of interest on or Principal of the Securities of any series or the date fixed for redemption or repayment of any such Security shall not be a Business Day, then payment of interest or Principal need not be made on such date, but may be made on the next succeeding Business Day with the same force and effect as if made on the date of maturity or the date fixed for redemption, and no interest shall accrue for the period after such date.

Section 10.07 *Conflict of Any Provision of Indenture with Trust Indenture Act of 1939*. If and to the extent that any provision of this Indenture limits, qualifies or conflicts with another provision incorporated in this Indenture by operation of Sections 310 to 317, inclusive, of the Trust Indenture Act of 1939, such incorporated provision shall control.

Section 10.08 *New York Law to Govern*. This Indenture and each Security shall be deemed to be a contract under the laws of the State of New York, and for all purposes shall be construed in accordance with the laws of such State.

Section 10.09 *Counterparts*. This Indenture may be executed in any number of counterparts, each of which shall be an original; but such counterparts shall together constitute but one and the same instrument.

Section 10.10 *Effect of Headings*. The Article and Section headings herein and the Table of Contents are for convenience only and shall not affect the construction hereof.

ARTICLE 11
REDEMPTION OF SECURITIES

Section 11.01 *Applicability of Article*. The provisions of this Article shall be applicable to the Securities of any series which are redeemable before their maturity except as otherwise specified as contemplated by Section 2.03 for Securities of such series.

Section 11.02 *Notice of Redemption; Partial Redemptions*. Notice of redemption to the Holders of Securities of any series to be redeemed as a whole or in part at the option of the Issuer shall be given by mailing notice of such redemption by first class mail, postage prepaid, at least 30 days and not more than 60 days prior to the date fixed for redemption to such Holders of Securities of such series at their last addresses as they shall appear upon the registry books. Any notice which is mailed in the manner herein provided shall be conclusively presumed to have been duly given, whether or not the Holder receives the notice. Failure to give notice by mail, or any defect in the notice to the Holder of any Security of a series designated for redemption as a whole or in part shall not affect the validity of the proceedings for the redemption of any other Security of such series.

The notice of redemption to each such Holder shall specify the CUSIP numbers of such Securities to be redeemed, the Principal amount of each Security of such series held by such Holder to be redeemed, the date fixed for redemption, the redemption price, the place or places of payment, that payment will be made upon presentation and surrender of such Securities, that interest accrued to the date fixed for redemption will be paid as specified in such notice and that on and after said date interest thereon or on the portions thereof to be redeemed will cease to accrue. In case any Security of a series is to be redeemed in part only the notice of redemption shall state the portion of the Principal amount thereof to be redeemed, the method the Trustee shall use to determine such Securities to be redeemed as specified in the last paragraph of this Section 11.02, if applicable, and shall state that on and after the date fixed for redemption, upon surrender of such Security, a new Security or Securities of such series in Principal amount equal to the unredeemed portion thereof will be issued.

The notice of redemption of Securities of any series to be redeemed at the option of the Issuer shall be given by the Issuer or, at the Issuer's written request, by the Trustee in the name and at the expense of the Issuer.

By 11:00 a.m. (New York City time) on the redemption date specified in the notice of redemption given as provided in this Section, the Issuer will deposit with the Trustee or with one or more paying agents (or, if the Issuer is acting as its own paying agent, set aside, segregate and hold in trust as provided in Section 3.03) an amount of money sufficient to redeem on the redemption date all the Securities of such series so called for redemption at the appropriate redemption price, together with accrued interest to the date fixed for redemption. If less than all the outstanding Securities of a series are to be redeemed, the Issuer will deliver to the Trustee at least 70 days (unless a shorter period shall be satisfactory to the Trustee) prior to the date fixed for redemption an Officers' Certificate stating the aggregate Principal amount of Securities to be redeemed.

In the case of the redemption of all of the Securities of a series outstanding, the Issuer shall notify the Trustee in writing of the redemption date 45 days (unless a shorter period shall be satisfactory to the Trustee) prior to the redemption date.

If less than all the Securities of a series are to be redeemed, the Trustee shall select, pro rata or by lot or in such manner as it shall deem appropriate and fair, Securities of such series to be redeemed in whole or in part. Securities of a series may be redeemed in part in multiples equal to the minimum authorized denomination for Securities of such series or any multiple thereof. The Trustee shall promptly notify the Issuer in writing of the Securities of such series selected for redemption and, in the case of any Securities of such series selected for partial redemption, the Principal amount thereof to be redeemed. For all purposes of this Indenture, unless the context otherwise requires, all provisions relating to the redemption of Securities of any series shall relate, in the case of any Security redeemed or to be redeemed only in part, to the portion of the Principal amount of such Security which has been or is to be redeemed.

Section 11.03 *Payment of Securities Called for Redemption.* If notice of redemption has been given as above provided, the Securities or portions of Securities specified in such notice shall become due and payable on the date and at the place stated in such notice at the applicable redemption price, together with interest accrued to the date fixed for redemption, and on and after said date (unless the Issuer shall default in the payment of such Securities at the redemption price, together with interest accrued to said date) interest on the Securities or portions of Securities so called for redemption shall cease to accrue and, except as provided in Section 5.05 and Section 9.04, such Securities shall cease from and after the date fixed for redemption to be entitled to any benefit or security under this Indenture, and the Holders thereof shall have no right in respect of such Securities except the right to receive the redemption price thereof and unpaid interest to the date fixed for redemption. On presentation and surrender of such Securities at a place of payment specified in said notice, said Securities or the specified portions thereof shall be paid and redeemed by the Issuer at the applicable redemption price, together with interest accrued thereon to the date fixed for redemption; provided that any semiannual payment of interest becoming due on the date fixed for redemption shall be payable to the Holders of such Securities registered as such on the relevant record date subject to the terms and provisions of Section 2.07 hereof.

If any Security called for redemption shall not be so paid upon surrender thereof for redemption, the Principal shall, until paid or duly provided for, bear interest from the date fixed for redemption at the rate of interest or Yield to Maturity (in the case of an Original Issue Discount Security) borne by the Security.

Upon presentation of any Security redeemed in part only, the Issuer shall execute and the Trustee shall authenticate and deliver to or on the order of the Holder thereof, at the expense of the Issuer, a new Security or Securities of such series, of authorized denominations, in Principal amount equal to the unredeemed portion of the Security so presented, pursuant to Sections 2.04, 2.05 and 2.06.

Section 11.04 *Exclusion of Certain Securities from Eligibility for Selection for Redemption.* Securities shall be excluded from eligibility for selection for redemption if they are identified by registration and certificate number in a written statement signed by an authorized officer of the Issuer and delivered to the Trustee at least 40 days prior to the last date on which notice of redemption may be given as being owned of record and beneficially by, and not pledged or hypothecated by either (a) the Issuer or (b) an entity specifically identified in such written statement directly or indirectly controlling or controlled by or under direct or indirect common control with the Issuer.

Section 11.05 *Conversion Arrangement On Call For Redemption*. In connection with any redemption of Securities, the Issuer shall deposit the amount due in connection with such redemption as required by Section 11.02 or it may arrange for the purchase and conversion of any Securities called for redemption by an agreement with one or more investment bankers or other purchasers to purchase such Securities and to make the deposit required of it by Section 11.02 on its behalf by paying to the Trustee or the Paying Agent in trust for the Securityholders, on or before 10:00 a.m. New York time on the redemption date, an amount no less than the redemption price, together with interest, if any, accrued to the redemption date of such Securities, in immediately available funds. Notwithstanding anything to the contrary contained in this Article 11, the obligation of the Issuer to pay the redemption price of such Securities, including all accrued interest, if any, shall be deemed to be satisfied and discharged to the extent such amount is so paid by such purchasers. If such an agreement is entered into, any Securities not duly surrendered for conversion by the Holders thereof may, at the option of the Issuer, be deemed, to the fullest extent permitted by law, acquired by such purchasers from such Holders and (notwithstanding anything to the contrary contained in Article 12) surrendered by such purchasers for conversion, all as of immediately prior to the close of business on the last day on which Securities of such series called for redemption may be converted in accordance with this Indenture and the terms of such Securities, subject to payment of the above amount aforesaid. The Trustee or the Paying Agent shall hold and pay to the Securityholders whose Securities are selected for redemption any such amount paid to it in the same manner as it would monies deposited with it by the Issuer for the redemption of Securities. Without the Trustee's and the Paying Agent's prior written consent, no arrangement between the Issuer and such purchasers for the purchase and conversion of any Securities shall increase or otherwise affect any of the powers, duties, responsibilities or obligations of the Trustee as set forth in this Indenture, and the Issuer agrees to indemnify the Trustee from, and hold it harmless against, any loss, liability or expense arising out of or in connection with any such arrangement for the purchase and conversion of any Securities between the Issuer and such purchasers, including the costs and expenses incurred by the Trustee and the Paying Agent in the defense of any claim or liability arising out of or in connection with the exercise or performance of any of its powers, duties, responsibilities or obligations under this Indenture.

ARTICLE 12 CONVERSION OF SECURITIES

Section 12.01 *Applicability of Article*. Securities of any series which are convertible into Capital Stock at the option of the Securityholder shall be convertible in accordance with their terms and (unless otherwise specified as contemplated by Section 2.03 for Securities of any series) in accordance with this Article. Each reference in this Article 12 to "a Security" or "the Securities" refers to the Securities of the particular series that is convertible into Capital Stock. Each reference in this Article to "Capital Stock" into which Securities of any series are convertible refers to the class of Capital Stock into which the Securities of such series are convertible in accordance with their terms (as specified as contemplated by Section 2.03). If more than one series of Securities with conversion privileges are outstanding at any time, the provisions of this Article 12 shall be applied separately to each such series.

Section 12.02 *Right of Securityholders to Convert Securities*. Subject to and upon compliance with the terms of the Securities and the provisions of Section 11.05 and this Article 12, at the option of the Holder thereof, any Security of any series of any authorized denomination, or any portion of the Principal amount thereof which is \$1,000 or any integral multiple of \$1,000, may, at any time during the period specified in the Securities of such series, or in case such Security or portion thereof shall have been called for redemption, then in respect of such Security or portion thereof until and including, but not after (unless the Issuer shall default in payment due upon the redemption thereof) the close of business on the Business Day prior to the date fixed for redemption except that in the case of redemption at the option of the Securityholder, if specified in the terms of such Securities, such right shall terminate upon receipt of written notice of the exercise of such option, be converted into duly authorized, validly issued, fully paid and nonassessable shares of Capital Stock, as specified in such Security, at the conversion rate for each \$1,000 Principal amount of Securities (such initial conversion rate reflecting an initial conversion price specified in such Security) in effect on the conversion date, or, in case an adjustment in the conversion rate has taken place pursuant to the provisions of Section 12.05, then at the applicable conversion rate as so adjusted, upon surrender of the Security or Securities, the Principal amount of which is so to be converted, to the Issuer at any time during usual business hours at the office or agency to be maintained by it in accordance with the provisions of Section 3.02, accompanied by a written notice of election to convert as provided in Section 12.03 and, if so required by the Issuer and the Trustee, by a written instrument or instruments of transfer in form satisfactory to the Issuer and the Trustee duly executed by the registered Holder or his attorney duly authorized in writing. All Securities surrendered for conversion shall, if surrendered to the Issuer or any conversion agent, be delivered to the Trustee for cancellation and cancelled by it, or shall, if surrendered to the Trustee, be cancelled by it, as provided in Section 2.10.

The initial conversion price or conversion rate in respect of a series of Securities shall be as specified in the Securities of such series. The conversion price or conversion rate will be subject to adjustment on the terms set forth in Section 12.05 or such other or different terms, if any, as may be specified by Section 2.03 for Securities of such series. Provisions of this Indenture that apply to conversion of all of a Security also apply to conversion of a portion of it.

Section 12.03 *Issuance of Shares of Capital Stock on Conversion*. As promptly as practicable after the surrender, as herein provided, of any Security or Securities for conversion, the Issuer shall deliver or cause to be delivered at its said office or agency to or upon the written order of the Holder of the Security or Securities so surrendered a certificate or certificates representing the number of duly authorized, validly issued, fully paid and nonassessable shares of Capital Stock into which such Security or Securities may be converted in accordance with the terms thereof and the provisions of this Article 12. Prior to delivery of such certificate or certificates, the Issuer shall require a written notice at its said office or agency from the Holder of the Security or Securities so surrendered stating that the Holder irrevocably elects to convert such Security or Securities, or, if less than the entire Principal amount thereof is to be converted, stating the portion thereof to be converted. Such notice shall also state the name or names (with address and social security or other taxpayer identification number) in which said certificate or certificates are to be issued. Such conversion shall be deemed to have been made at the time that such Security or Securities shall have been surrendered for conversion and such notice shall have been received by the Issuer or the Trustee, the rights of the Holder of such Security or Securities as a Securityholder shall cease at such time, the person or persons entitled to receive the shares of Capital Stock upon conversion of such Security or Securities shall be treated for all purposes as having become the record holder or holders of such shares of Capital Stock at such time and such conversion shall be at the conversion rate in effect at such time. In the case of any Security of any series which is converted in part only, upon such conversion, the Issuer shall execute and the Trustee shall authenticate and deliver to the Holder thereof, as requested by such Holder, a new Security or Securities of such series of authorized denominations in aggregate Principal amount equal to the unconverted portion of such Security.

If the last day on which a Security may be converted is not a Business Day in a place where a conversion agent is located, the Security may be surrendered to that conversion agent on the next succeeding day that is a Business Day.

The Issuer will not be required to deliver certificates for shares of Capital Stock upon conversion while its stock transfer books are closed for a meeting of shareholders or for the payment of dividends or for any other purpose, but certificates for shares of Capital Stock shall be delivered as soon as the stock transfer books shall again be opened.

Section 12.04 *No Payment or Adjustment for Interest or Dividends*. Unless otherwise specified as contemplated by Section 2.03 for Securities of such series, Securities surrendered for conversion during the period from the close of business on any regular record date (or special record date for payment of defaulted interest) next preceding any interest payment date to the opening of business on such interest payment date (except Securities called for redemption on a redemption date within such period) when surrendered for conversion must be accompanied by payment of an amount equal to the interest thereon which the registered Holder is to receive on such interest payment date. Payment of interest shall be made, as of such interest payment date or such date, as the case may be, to the Holder of record of the Securities as of such regular, or special record date, as applicable. Except where Securities surrendered for conversion must be accompanied by payment as described above, no interest on converted Securities will be payable by the Issuer on any interest payment date subsequent to the date of conversion. No other payment or adjustment for interest or dividends is to be made upon conversion. Notwithstanding the foregoing, upon conversion of any Original Issue Discount Security, the fixed number of shares of Capital Stock into which such Security is convertible delivered by the Issuer to the Holder thereof shall be applied, first, to pay the accrued original issue discount attributable to the period from the date of issuance to the date of conversion of such Security, and, second, to pay the balance of the Principal amount of such Security.

Section 12.05 *Adjustment of Conversion Rate*. Unless otherwise specified as contemplated by Section 2.03 for Securities of such series, the conversion rate for Securities in effect at any time shall be subject to adjustment as follows:

(a) In case the Issuer shall (i) declare a dividend or make a distribution on the class of Capital Stock into which Securities of such series are convertible in shares of its Capital Stock, (ii) subdivide the outstanding shares of the class of Capital Stock into which Securities of such series are convertible into a greater number of shares, (iii) combine the outstanding shares of the class of Capital Stock into which Securities of such series are convertible into a smaller number of shares or (iv) issue by reclassification of the shares of the class of Capital Stock into which Securities of such series are convertible (including any such reclassification in connection with a consolidation or merger in which the Issuer is the continuing corporation) any shares, the conversion rate for the Securities of such series in effect at the time of the record subdivision, combination or reclassification, shall be proportionately adjusted so that the Holder of any Security of such series surrendered for conversion after such time shall be entitled to receive the number and kind of shares which he would have owned or have been entitled to receive had such Security been converted immediately prior to such time. Similar adjustments shall be made whenever any event listed above shall occur.

(b) In case the Issuer shall fix a record date for the issuance of rights or warrants to all holders of the class of Capital Stock into which Securities of such series are convertible entitling them (for a period expiring within 45 days after such record date) to subscribe for or purchase shares of such class of Capital Stock (or securities convertible into shares of such class of Capital Stock) at a price per share (or, in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, having a conversion price per share, after adding thereto the exercise price, computed on the basis of the maximum number of shares of such class of Capital Stock issuable upon conversion of such convertible securities, per share of such class of Capital Stock, so issuable) less than the current market price per share of such class of Capital Stock (as defined in subsection (e) below) on the date on which such issuance was declared or otherwise announced by the Issuer (the “**Determination Date**”), the number of shares of such class of Capital Stock into which each \$1,000 Principal amount of Securities shall be convertible after such record date shall be determined by multiplying the number of shares of such class of Capital Stock into which such Principal amount of Securities was convertible immediately prior to such record date by a fraction, of which the numerator shall be the number of shares of such class of Capital Stock outstanding on the Determination Date plus the number of additional shares of such class of Capital Stock offered for subscription or purchase (or in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, the aggregate number of additional shares of such class of Capital Stock into which the convertible securities so offered are initially convertible), and of which the denominator shall be the number of shares of such class of Capital Stock outstanding on the Determination Date plus the number of shares of such class of Capital Stock obtained by dividing the aggregate offering price of the total number of shares so offered (or, in the case of a right or warrant to purchase securities convertible into such class of Capital Stock, the aggregate initial conversion price of the convertible securities so offered, after adding thereto the aggregate exercise price of such rights or warrants computed on the basis of the maximum number of shares of such class of Capital Stock issuable upon conversion of such convertible securities) by such current market price. Shares of such class of Capital Stock of the Issuer owned by or held for the account of the Issuer shall not be deemed outstanding for the purpose of any such computation. Such adjustment shall be made successively whenever such a record date is fixed; and to the extent that shares of such class of Capital Stock are not delivered (or securities convertible into shares of such class of Capital Stock are not delivered) after the expiration of such rights or warrants (or, in the case of rights or warrants to purchase securities convertible into such class of Capital Stock once exercised, the expiration of the conversion right of such securities) the conversion rate shall be readjusted to the conversion rate which would then be in effect had the adjustments made upon the issuance of such rights or warrants (or securities convertible into shares) been made upon the basis of delivery of only the number of shares actually delivered. In the event that such rights or warrants are not so issued, the conversion rate shall again be adjusted to be the conversion rate which would then be in effect if such record date had not been fixed.

(c) In case the Issuer shall fix a record date for the making of a distribution to all holders of the class of Capital Stock into which Securities of such series are convertible (including any such distribution made in connection with a consolidation or merger in which the Issuer is the continuing corporation) of evidences of its indebtedness or assets (excluding any cash dividends paid from retained earnings and dividends payable in Capital Stock for which adjustment is made pursuant to subsection (a) above or (d) below) or subscription rights or warrants (excluding subscription rights or warrants to purchase the class of Capital Stock into which Securities of such series are convertible), the number of shares of such class of Capital Stock into which each \$1,000 Principal amount of Securities of such series shall be convertible after such record date shall be determined by multiplying the number of shares of such class of Capital Stock into which such Principal amount of Securities was convertible immediately prior to such record date by a fraction, of which the numerator shall be the fair market value of the assets of the Issuer, after deducting therefrom all liabilities of the Issuer and all preferences (including accrued but unpaid dividends) in respect of classes of Capital Stock having a preference with respect to the assets of the Issuer over such class of Capital Stock (all as determined by the Board of Directors, whose determination shall be conclusive, and described in a certificate signed by chairman of the Issuer's Board of Directors, its president, any vice president, its treasurer, any assistant treasurer, its secretary or any assistant secretary, filed with the Trustee and each conversion agent) on such record date, and of which the denominator shall be such fair market value after deducting therefrom such liabilities and preferences, less the fair market value (as determined by the Board of Directors, whose determination shall be conclusive, and described in a statement filed with the Trustee and each conversion agent) of the assets or evidences of indebtedness, so distributed or of such subscription rights or warrants applicable, so distributed. Such adjustment shall be made successively whenever such a record date is fixed; and in the event that such distribution is not so made, the conversion rate shall again be adjusted to the conversion rate which would then be in effect if such record date had not been fixed.

(d) In case the Issuer shall, by dividend or otherwise, distribute to all holders of its Capital Stock cash (excluding any dividend or distribution in connection with the liquidation, dissolution or winding up of the Issuer, whether voluntary or involuntary), then, in such case, unless the Issuer elects to reserve such cash for distribution to the Holders of the Securities upon the conversion of the Securities so that any such Holder converting Securities will receive upon such conversion, in addition to the shares of Capital Stock to which such Holder is entitled, the amount of cash which such Holder would have received if such Holder had, immediately prior to the record date for such distribution of cash, converted its Securities into Capital Stock, the conversion rate shall be adjusted so that the same shall equal the rate determined by multiplying the conversion rate in effect immediately prior to the record date by a fraction of which the denominator shall be the current market price of the Capital Stock (determined as provided in Section 12.05(e) on the record date less the amount of cash so distributed (and not excluded as provided above) applicable to one share of Capital Stock and the numerator shall be such current market price of the Capital Stock (determined as provided in Section 12.05(e)), such adjustment to be effective immediately prior to the opening of business on the day following the record date; provided, however, that in the event the portion of the cash so distributed applicable to one share of Capital Stock is equal to or greater than the current market price of the Capital Stock (determined as provided in (e)Section 12.05(e)) on the record date, in lieu of the foregoing adjustment, adequate provision shall be made so that each Securityholder shall have the right to receive upon conversion the amount of cash such Holder would have received had such Holder converted each Security on the record date. If such dividend or distribution is not so paid or made, the conversion rate shall again be adjusted to be the conversion rate which would then be in effect if such dividend or distribution had not been declared.

(e) For the purpose of any computation under subsections (b) and (d) above and Section 12.06, the current market price per share of the Capital Stock on any date as of which such price is to be computed shall mean the average of the Closing Prices for the 30 consecutive Business Days commencing 45 Business Days before such date.

(f) No adjustment in the conversion rate shall be required unless such adjustment would require a cumulative increase or decrease of at least 1% in such rate; provided, however, that any adjustments which by reason of this subsection (f) are not required to be made shall be carried forward and taken into account in any subsequent adjustment; and *provided further*, that adjustments shall be required and made in accordance with the provisions of this Article 12 (other than this subsection (f)) not later than such time as may be required in order to preserve the tax-free nature of a States income tax purposes to the Holders of Securities or the class of Capital Stock into which such Securities are convertible. All calculations under this Article 12 shall be made to the nearest cent or to the nearest one-thousandth of a share, as the case may be. Anything in this Section 12.05 to the contrary notwithstanding, the Issuer shall be entitled to make such adjustments in the conversion rate, in addition to those required by this Section 12.05, as it in its discretion shall determine to be advisable in order that any stock dividend, subdivision of shares, distribution of rights to purchase stock or securities, or distribution of securities convertible into or exchangeable for stock hereafter made by the Issuer to its shareholders shall not be taxable for United States income tax purposes.

(g) Whenever the conversion rate is adjusted, as herein provided, the Issuer shall promptly file with the Trustee and with the office or agency maintained by the Issuer for the conversion of Securities of such series pursuant to Section 3.02, a certificate of a firm of independent public accountants of recognized national standing selected by the Board of Directors (who may be the regular accountants employed by the Issuer) setting forth the conversion rate after such adjustment and setting forth a brief statement of the facts requiring such adjustment and a computation thereof. Such certificate shall be conclusive evidence of the correctness of such adjustment. Neither the Trustee nor any conversion agent shall be under any duty or responsibility with respect to any such certificate or any facts or computations set forth therein, except to exhibit said certificate from time to time to any Securityholder of such series desiring to inspect the same. The Issuer shall promptly cause a notice setting forth the adjusted conversion rate to be mailed to the Holders of Securities of such series, as their names and addresses appear upon the register of the Issuer.

(h) In the event that at any time, as a result of shares of any other class of Capital Stock becoming issuable in exchange or substitution for or in lieu of shares of the class of Capital Stock into which such Securities are convertible or as a result of an adjustment made pursuant to subsection (a) above, the Holder of any Security of such series thereafter surrendered for conversion shall become entitled to receive any shares of the Issuer other than shares of the class of Capital Stock into which the Issuer of such series are convertible, thereafter the number of such other shares so receivable upon conversion of any Security shall be subject to adjustment from time to time in a manner and on terms as nearly equivalent as practicable to the provisions with respect to the class of Capital Stock into which the Securities of such series are convertible contained in subsections (a) to (f), inclusive, above, and the provisions of this Article 12 with respect to the class of Capital Stock into which the Securities of such series are convertible shall apply on like terms to any such other shares.

(i) The conversion rate with respect to any Original Issue Discount Security, the terms of which provide for convertibility, shall not be adjusted during the term of such Original Issue Discount Security for accrued original issue discount.

(j) In the event that the Securities of any series are convertible into more than one class of Capital Stock, the provisions of this Section 12.05 shall apply separately to events affecting each such class.

Section 12.06 *No Fractional Shares to Be Issued*. No fractional shares of Capital Stock shall be issued upon conversions of Securities. If more than one Security of any series shall be surrendered for conversion at one time by the same Holder, the number of full shares which shall be issuable upon conversion thereof shall be computed on the basis of the aggregate Principal amount of the Securities of such series (or specified portions thereof to the extent permitted hereby) so surrendered. Instead of a fraction of a share of Capital Stock which would otherwise be issuable upon conversion of any Security or Securities (or specified portions thereof), the Issuer shall pay a cash adjustment in respect of such fraction of a share in an amount equal to the same fractional interest of the current market price (as defined in Section 12.05) per share of Capital Stock on the Business Day next preceding the day of conversion.

Section 12.07 *Preservation of Conversion Rights Upon Consolidation, Merger, Sale or Conveyance*. In case of any consolidation of the Issuer with, or merger of the Issuer into, any other corporation (other than a consolidation or merger in which the Issuer is the continuing corporation), or in the case of any sale or transfer of all or substantially all of the assets of the Issuer, the corporation formed by such consolidation or the corporation into which the Issuer shall have been merged or the corporation which shall have acquired such assets, as the case may be, shall execute and deliver to the Trustee, a supplemental indenture, subject to the provisions of Article 12 and ARTICLE 8 as they relate to supplemental indentures, providing that the Holder of each Security then Outstanding of a series which was convertible into Capital Stock shall have the right thereafter to convert such Security into the kind and amount of shares of stock and other securities and property, including cash, receivable upon such consolidation, merger, sale or transfer by a holder of the number of shares of Capital Stock of the Issuer into which such Securities might have been converted immediately prior to such consolidation, merger, sale or transfer. Such supplemental indenture shall conform to the provisions of the Trust Indenture Act of 1939 as then in effect and shall provide for adjustments which shall be as nearly equivalent as may be practicable to the adjustments provided for in this Article 12. Neither the Trustee nor any conversion agent shall be under any responsibility to determine the correctness of any provision contained in any such supplemental indenture relating either to the kind or amount of shares of stock or other securities or property receivable by Securityholders upon the conversion of their Securities after any such consolidation, merger, sale or transfer, or to any adjustment to be made with respect there to and, subject to the provisions of Article 5, may accept as conclusive evidence of the correctness of any such provisions, and shall be protected in relying upon, an Opinion of Counsel with respect thereto. If in the case of any such consolidation, merger, sale or transfer, the stock or other securities and property receivable by a Holder of the Securities includes stock or other securities and property of a corporation other than the successor or purchasing corporation, then such supplemental indenture shall also be executed by such other corporation and shall contain such additional provisions to protect the interests of the Holders of the Securities as the Board of Directors shall reasonably consider necessary. The above provisions of this Section 12.07 shall similarly apply to successive consolidations, mergers, sales or transfers.

Section 12.08 Notice to Security Holders of a Series Prior to Taking Certain Types of Action. With respect to the Securities of any series, in case:

(a) the Issuer shall authorize the issuance to all holders of the class of Capital Stock into which Securities of such series are convertible of rights or warrants to subscribe for or purchase shares of its Capital Stock or of any other right;

(b) the Issuer shall authorize the distribution to all holders of the class of Capital Stock into which Securities of such series are convertible of evidences of its indebtedness or assets (except for the exclusions with respect to certain dividends set forth in Section 12.05(c));

(c) of any subdivision, combination or reclassification of the class of Capital Stock into which Securities of such series are convertible or of any consolidation or merger to which the Issuer is a party and for which approval by the shareholders of the Issuer is required, or of the sale or transfer of all or substantially all of the assets of the Issuer; or

(d) of the voluntary or involuntary dissolution, liquidation or winding up of the Issuer;

then the Issuer shall cause to be filed with the Trustee and at the office or agency maintained for the purpose of conversion of Securities of such series pursuant to Section 3.02, and shall cause to be mailed to the Holders of Securities of such series, at their last addresses as they shall appear upon the register of the Issuer, at least 10 days prior to the applicable record date hereinafter specified, a notice stating (i) the date as of which the holders of such class of Capital Stock to be entitled to receive any such rights, warrants or distribution are to be determined, or (ii) the date on which any such subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action is expected to become effective, and the date as of which it is expected that holders of record of such class of Capital Stock shall be entitled to exchange their Capital Stock of such class for securities or other property, if any, deliverable upon such subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action. The failure to give the notice required by this Section 12.08 or any defect therein shall not affect the legality or validity of any distribution, right, warrant, subdivision, combination, reclassification, consolidation, merger, sale, transfer, dissolution, liquidation, winding up or other action, or the vote upon any of the foregoing. Such notice shall also be published by and at the expense of the Issuer not later than the aforesaid filing date at least once in an Authorized Newspaper.

Section 12.09 *Covenant to Reserve Shares for Issuance on Conversion of Securities*. The Issuer covenants that at all times it will reserve and keep available out of each class of its authorized Capital Stock, free from preemptive rights, solely for the purpose of issue upon conversion of Securities of any series as herein provided, such number of shares of Capital Stock of such class as shall then be issuable upon the conversion of all Outstanding Securities of such series. The Issuer covenants that an shares of Capital Stock which shall be so issuable shall, when issued or delivered, be duly and validly issued shares of the class of authorized Capital Stock into which Securities of such series are convertible, and shall be fully paid and nonassessable, free of all liens and charges and not subject to preemptive rights and that, upon conversion, the appropriate capital stock accounts of the Issuer will be duly credited.

Section 12.10 *Compliance with Governmental Requirements*. The Issuer covenants that if any shares of Capital Stock required to be reserved for purposes of conversion of Securities hereunder require registration or listing with or approval of any governmental authority under any Federal or State law, pursuant to the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, or any national or regional securities exchange on which such Capital Stock is listed at the time of delivery of any shares of such Capital Stock, before such shares may be issued upon conversion, the Issuer will use reasonable efforts to cause such shares to be duly registered, listed or approved, as the case may be.

Section 12.11 *Payment of Taxes Upon Certificates for Shares Issued Upon Conversion*. The issuance of certificates for shares of Capital Stock upon the conversion of Securities shall be made without charge to the converting Securityholders for any tax (including, without limitation, all documentary and stamp taxes) in respect of the issuance and delivery of such certificates, and such certificates shall be issued in the respective names of, or in such names as may be directed by, the Holders of the Securities converted; provided, however, that the Issuer shall not be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of any such certificate in a name other than that of the Holder of the Security converted, and the Issuer shall not be required to issue or deliver such certificates unless or until the person or persons requesting the issuance thereof shall have paid to the Issuer the amount of such tax or shall have established to the satisfaction of the Issuer that such tax has been paid.

Section 12.12 *Trustee's Duties with Respect to Conversion Provisions*. The Trustee and any conversion agent shall not at any time be under any duty or responsibility to any Securityholder to determine whether any facts exist which may require any adjustment of the conversion rate or conversion price, or with respect to the nature or extent of any such adjustment when made, or with respect to the method employed, or herein or in any supplemental indenture provided to be employed, in making the same. Neither the Trustee nor any conversion agent shall be accountable with respect to the registration under securities laws, listing, validity or value (or the kind or amount) of any shares of Capital Stock, or of any other securities or property, which may at any time be issued or delivered upon the conversion of any Security; and neither the Trustee nor any conversion agent makes any representation with respect thereto. Neither the Trustee nor any conversion agent shall be responsible for any failure of the Issuer to make any cash payment or to issue, transfer or deliver any shares of stock or stock certificates or other securities or property upon the surrender of any Security for the purpose of conversion; and the Trustee, subject to the provisions of Article 5, and any conversion agent shall not be responsible for any failure of the Issuer to comply with any of the covenants of the Issuer contained in this Article 12.

ARTICLE 13
SUBORDINATION OF SECURITIES

Section 13.01 *Agreement Of Subordination*. The Issuer covenants and agrees, and each Holder of Securities issued hereunder by his acceptance thereof likewise covenants and agrees, that all Securities shall be issued subject to the provisions of this ARTICLE 13; and each Holder, whether upon original issue or upon transfer or assignment thereof, accepts and agrees to be bound by such provisions.

The payment of the principal of, premium, if any, and interest on all Securities issued hereunder shall, to the extent and in the manner hereinafter set forth, be subordinated and subject in right of payment to the prior payment in full of all Senior Indebtedness, whether outstanding at the date of this Indenture or thereafter incurred.

The provisions of this ARTICLE 13 define the subordination of the Securities, as obligations of the Issuer, with respect to Senior Indebtedness of the Issuer, as defined for the Issuer.

No provision of this ARTICLE 13 shall prevent the occurrence of any default or Event of Default hereunder.

Section 13.02 *Payments to Holders*. In the event and during the continuation of any default in the payment of principal, premium, interest or any other payment due on any Senior Indebtedness of the Issuer continuing beyond the period of grace, if any, specified in the instrument or lease evidencing such Senior Indebtedness of the Issuer, then, unless and until such default shall have been cured or waived or shall have ceased to exist, no payment shall be made by the Issuer with respect to the principal of, or premium, if any, or interest on the Securities, except payments made pursuant to Article 9 hereof from amounts deposited with the Trustee pursuant thereto prior to the happening of such default.

Upon any payment by the Issuer, or distribution of assets of the Issuer of any kind or character, whether in cash, property or securities, to creditors upon any dissolution or winding-up or liquidation or reorganization of the Issuer, whether voluntary or involuntary or in bankruptcy, insolvency, receivership or other proceedings, all amounts due or to become due upon all Senior Indebtedness of the Issuer shall first be paid in full, or payment thereof provided for in money in accordance with its terms, before any payment is made on account of principal (including, if applicable, any cash due upon conversion the Securities), premium, if any, or interest on the Securities (except payments made pursuant to ARTICLE 9 hereof from amounts deposited with the Trustee pursuant thereto prior to the happening of such dissolution, winding-up, liquidation or reorganization); and upon any such dissolution or winding-up or liquidation or reorganization any payment by the Issuer, or distribution of assets of the Issuer of any kind or character, whether in cash, property or securities, to which the holders of the Securities or the Trustee would be entitled, except for the provisions of this ARTICLE 13, shall (except as aforesaid) be paid by the Issuer or by any receiver, trustee in bankruptcy, liquidating trustee, agent or other Person making such payment or distribution, or by the holders of the Securities or by the Trustee under this Indenture if received by them or it, directly to the holders of Senior Indebtedness of the Issuer (pro rata to such holders on the basis of the respective amounts of Senior Indebtedness of the Issuer held by such holders, as calculated by the Issuer) or their representative or representatives, or to the trustee or trustees under any indenture pursuant to which any instruments evidencing any Senior Indebtedness of the Issuer may have been issued, as their respective interests may appear, to the extent necessary to pay all Senior Indebtedness of the Issuer in full, in money or money's worth, after giving effect to any concurrent payment or distribution to or for the holders of Senior Indebtedness of the Issuer, before any payment or distribution is made to the holders of the Securities or to the Trustee.

In the event that, notwithstanding the foregoing, any payment or distribution of assets of the Issuer of any kind or character, whether in cash, property or securities, prohibited by the foregoing, shall be received by the Trustee or the holders of the Securities before all Senior Indebtedness of the Issuer is paid in full, or provision is made for such payment in money in accordance with its terms, such payment or distribution shall be held in trust for the benefit of and shall be paid over or delivered to the holders of Senior Indebtedness of the Issuer or their representative or representatives, or to the trustee or trustees under any indenture pursuant to which any instruments evidencing any Senior Indebtedness of the Issuer may have been issued, as their respective interests may appear, as calculated by the Issuer, for application to the payment of all Senior Indebtedness of the Issuer remaining unpaid to the extent necessary to pay all Senior Indebtedness of the Issuer in full in money in accordance with its terms, after giving effect to any concurrent payment or distribution to or for the holders of such Senior Indebtedness.

For purposes of this ARTICLE 13, the words, "cash, property or securities" shall not be deemed to include shares of stock of the Issuer as reorganized or readjusted, or securities of the Issuer or any other corporation provided for by a plan of reorganization or readjustment, the payment of which is subordinated at least to the extent provided in this ARTICLE 13 with respect to the Securities to the payment of all Senior Indebtedness of the Issuer which may at the time be outstanding; provided that (i) the Senior Indebtedness of the Issuer is assumed by the new corporation, if any, resulting from any such reorganization or readjustment, and (ii) the rights of the holders of the Senior Indebtedness of the Issuer (other than leases) and of leases which are assumed are not, without the consent of such holders, altered by such reorganization or readjustment. The consolidation of the Issuer with, or the merger of the Issuer into, another corporation or the liquidation or dissolution of the Issuer following the conveyance or transfer of its property as an entirety, or substantially as an entirety, to another corporation upon the terms and conditions provided for in ARTICLE 8 hereof shall not be deemed a dissolution, winding-up, liquidation or reorganization for the purposes of this Section 13.02 if such other corporation shall, as a part of such consolidation, merger, conveyance or transfer, comply with the conditions stated in ARTICLE 8 hereof. Nothing in this Section 13.02 shall apply to claims of, or payments to, the Trustee under or pursuant to Section 5.06.

Section 13.03 *Subrogation Of Securities*. Subject to the payment in full of all Senior Indebtedness of the Issuer, the rights of the holders of the Securities shall be subrogated to the rights of the holders of Senior Indebtedness of the Issuer to receive payments or distributions of cash, property or securities of the Issuer applicable to the Senior Indebtedness of the Issuer until principal (including, if applicable, any cash due upon conversion the Securities), premium, if any, and interest on the Securities on the Securities shall be paid in full; and, for the purposes of such subrogation, no payments or distributions to the holders of the Senior Indebtedness of the Issuer of any cash, property or securities to which the holders of the Securities or the Trustee would be entitled except for the provisions of this ARTICLE 13 to or for the benefit of the holders of Senior Indebtedness of the Issuer by holders of the Securities or the Trustee, shall, as between the Issuer, its creditors other than holders of Senior Indebtedness of the Issuer, and the holders of the Securities, be deemed to be a payment by the Issuer to or on account of the Senior Indebtedness of the Issuer. It is understood that the provisions of this ARTICLE 13 are and are intended solely for the purpose of defining the relative rights of the holders of the Securities, on the one hand, and the holders of the Senior Indebtedness of the Issuer, on the other hand.

Nothing contained in this ARTICLE 13 or elsewhere in this Indenture or in the Securities is intended to or shall impair, as between the Issuer, its creditors other than the holders of its Senior Indebtedness, and the holders of the Securities, the obligation of the Issuer, which is absolute and unconditional, to pay to the holders of the Securities the principal (including, if applicable, any cash due upon conversion the Securities), premium, if any, and interest on the Securities as and when the same shall become due and payable in accordance with their terms, or is intended to or shall affect the relative rights of the holders of the Securities and creditors of the Issuer other than the holders of its Senior Indebtedness, nor shall anything herein or therein prevent the Trustee or the holder of any Security from exercising all remedies otherwise permitted by applicable law upon default under this Indenture, subject to the rights, if any, under this ARTICLE 13 of the holders of Senior Indebtedness of the Issuer in respect of cash, property or securities of the Issuer received upon the exercise of any such remedy.

Upon any payment or distribution of assets of the Issuer referred to in this ARTICLE 13, the Trustee, subject to the provisions of Section 5.01, and the holders of the Securities shall be entitled to rely upon any order or decree made by any court of competent jurisdiction in which such dissolution, winding-up, liquidation or reorganization proceedings are pending, or a certificate of the receiver, trustee in bankruptcy, liquidating trustee, agent or other Person making such payment or distribution, delivered to the Trustee or to the holders of the Securities, for the purpose of ascertaining the Persons entitled to participate in such distribution, the holders of the Senior Indebtedness and other indebtedness of the Issuer, the amount thereof or payable thereon, the amount or amounts paid or distributed thereon and all other facts pertinent thereto or to this ARTICLE 13.

Section 13.04 *Authorization By Holders*. Each holder of a Security by his or her acceptance thereof authorizes and directs the Trustee on his or her behalf to take such action as may be necessary or appropriate to effectuate the subordination provided in this ARTICLE 13 appoints the Trustee his attorney-in-fact for any and all such purposes.

Section 13.05 *Notice to Trustee*. The Issuer shall give promptly written notice to a Responsible Officer of the Trustee of any fact known to the Issuer which would prohibit the making of any payment of monies to or by the Trustee in respect of the Securities pursuant to the provisions of this ARTICLE 13. Notwithstanding the provisions of this ARTICLE 13 or any other provision of this Indenture, the Trustee shall not be charged with knowledge of the existence of any facts which would prohibit the making of any payment of amounts to or by the Trustee in respect of the Securities pursuant to the provisions of this ARTICLE 13, unless and until a Responsible Officer of the Trustee shall have received written notice thereof at the Corporate Trust Office of the Trustee from the Issuer or a holder or holders of Senior Indebtedness or from any trustee therefor; and before the receipt of any such written notice, the Trustee, subject to the provisions of Section 5.01, shall be entitled in all respects to assume that no such facts exist; *provided* that if on a date not fewer than three Business Days prior to the date upon which by the terms hereof any such amounts may become payable for any purpose (including, without limitation, the payment of principal (including, if applicable, any cash due upon conversion of the Securities), premium, if any, and interest on any Security) the Trustee shall not have received, with respect to such monies, the notice provided for in this Section 13.05, then, anything herein contained to the contrary notwithstanding, the Trustee shall have full power and authority to receive such amounts and to apply the same to the purpose for which they were received, and shall not be affected by any notice to the contrary which may be received by it on or after such prior date. Notwithstanding anything to the contrary hereinbefore set forth, nothing shall prevent any payment or delivery by the Issuer or the Trustee to the Holders of amounts in connection with a redemption of Securities if (i) notice of such redemption has been given pursuant to ARTICLE 11 or Section 9.01 hereof prior to the receipt by the Trustee of written notice as aforesaid, and (ii) such notice of redemption is given not earlier than 60 days before the redemption date.

The Trustee conclusively shall be entitled to rely on the delivery to it of a written notice by a Person representing himself to be a holder of Senior Indebtedness of the Issuer (or a trustee on behalf of such holder) to establish that such notice has been given by a holder of Senior Indebtedness of the Issuer or a trustee on behalf of any such holder or holders. In the event that the Trustee determines in good faith that further evidence is required with respect to the right of any Person as a holder of Senior Indebtedness of the Issuer to participate in any payment or distribution pursuant to this ARTICLE 13, the Trustee may request such Person to furnish evidence to the reasonable satisfaction of the Trustee as to the amount of Senior Indebtedness of the Issuer held by such Person, the extent to which such Person is entitled to participate in such payment or distribution and any other facts pertinent to the rights of such Person under this ARTICLE 13, and if such evidence is not furnished the Trustee may defer any payment to such Person pending judicial determination as to the right of such Person to receive such payment.

Section 13.06 *Trustee's Relation to Senior Indebtedness*. The Trustee in its individual capacity shall be entitled to all the rights set forth in this ARTICLE 13 in respect of any Senior Indebtedness of the Issuer at any time held by it, to the same extent as any other holder of Senior Indebtedness of the Issuer and nothing elsewhere in this Indenture shall deprive the Trustee of any of its rights as such holder.

With respect to the holders of Senior Indebtedness of the Issuer, the Trustee undertakes to perform or to observe only such of its covenants and obligations as are specifically set forth in this ARTICLE 13, and no implied covenants or obligations with respect to the holders of Senior Indebtedness of the Issuer shall be read into this Indenture against the Trustee. The Trustee shall not be deemed to owe any fiduciary duty to the holders of Senior Indebtedness of the Issuer and the Trustee shall not be liable to any holder of Senior Indebtedness of the Issuer if it shall pay over or deliver to holders of Securities, the Issuer or any other Person money or assets to which any holder of Senior Indebtedness of the Issuer shall be entitled by virtue of this ARTICLE 13 or otherwise.

Section 13.07 *No Impairment Of Subordination*. No right of any present or future holder of any Senior Indebtedness to enforce subordination as herein provided shall at any time in any way be prejudiced or impaired by any act or failure to act on the part of the Issuer or by any act or failure to act, in good faith, by any such holder, or by any noncompliance by the Issuer with the terms, provisions and covenants of this Indenture, regardless of any knowledge thereof which any such holder may have or otherwise be charged with.

Section 13.08 *Rights Of Trustee*. Nothing in this ARTICLE 13 shall apply to claims of or payments to, the Trustee pursuant to Section 5.06.

IN WITNESS WHEREOF, the parties hereto have caused this Indenture to be duly executed, as of the first date written above.

CORBUS PHARMACEUTICALS HOLDINGS, INC., as Issuer

By: _____
Name: _____
Title: _____

●, as Trustee

By: _____
Name: _____
Title: _____

FORM OF NOTE

UNLESS AND UNTIL IT IS EXCHANGED IN WHOLE OR IN PART FOR SECURITIES IN DEFINITIVE REGISTERED FORM, THIS SECURITY MAY NOT BE TRANSFERRED EXCEPT AS A WHOLE BY THE DEPOSITARY TO A NOMINEE OF THE DEPOSITARY OR BY A NOMINEE OF THE DEPOSITARY TO THE DEPOSITARY OR ANOTHER NOMINEE OF THE DEPOSITARY OR BY THE DEPOSITARY OR ANY SUCH NOMINEE TO A SUCCESSOR DEPOSITARY OR A NOMINEE OF SUCH SUCCESSOR DEPOSITARY. UNLESS THIS SECURITY IS PRESENTED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPOSITARY TRUST COMPANY, A NEW YORK CORPORATION (“**DTC**”), TO THE COMPANY OR ITS AGENT FOR REGISTRATION OF TRANSFER, EXCHANGE OR PAYMENT, AND ANY SECURITY ISSUED IS REGISTERED IN THE NAME OF CEDE & CO. OR IN SUCH OTHER NAME AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC (AND ANY PAYMENT IS MADE TO CEDE & CO. OR TO SUCH OTHER ENTITY AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC), ANY TRANSFER, PLEDGE OR OTHER USE HEREOF FOR VALUE OR OTHERWISE BY OR TO ANY PERSON IS WRONGFUL INASMUCH AS THE REGISTERED OWNER HEREOF, CEDE & CO., HAS AN INTEREST HEREIN.

CORBUS PHARMACEUTICALS HOLDINGS, INC.

• % Subordinated Note Due •

No. • CUSIP No.: •

\$ •

CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (“**Issuer**”, which term includes any successor corporation), for value received promises to pay to CEDE & CO. or its registered assigns, the principal sum of • on •.

Interest Payment Dates: • and • (each, an “**Interest Payment Date**”), commencing on •. Interest Record Dates: • and • (each, an “**Interest Record Date**”).

Reference is made to the further provisions of this Security contained herein, which will for all purposes have the same effect as if set forth at this place.

IN WITNESS WHEREOF, the Issuer has caused this Security to be signed manually or by facsimile by its duly authorized officer.

CORBUS PHARMACEUTICALS HOLDINGS, INC.

By: _____
Name:
Title:

This is one of the series designated herein and referred to in the within-mentioned Indenture.

●, as Trustee

By: _____
Authorized Signatory

(REVERSE OF SECURITY)
CORBUS PHARMACEUTICALS HOLDINGS, INC.
●% Subordinated Note Due ●

1. Interest.

CORBUS PHARMACEUTICALS HOLDINGS, INC., a Delaware corporation (the “**Issuer**”), promises to pay interest on the Principal amount of this Security at the rate per annum shown above. Cash interest on the Securities will accrue from the most recent date to which interest has been paid or, if no interest has been paid, from ●. The Issuer will pay interest semi-annually in arrears on each Interest Payment Date, commencing ●. Interest will be computed on the basis of a 360-day year of twelve 30-day months.

The Issuer shall pay interest on overdue Principal from time to time on demand at the rate borne by the Securities and on overdue installments of interest (without regard to any applicable grace periods) to the extent lawful.

2. Method of Payment.

The Issuer shall pay interest on the Securities (except defaulted interest) to the persons who are the registered Holders at the close of business on the Interest Record Date immediately preceding the Interest Payment Date notwithstanding any transfer or exchange of such Security subsequent to such Interest Record Date and prior to such Interest Payment Date. Holders must surrender Securities to the Trustee to collect Principal payments. The Issuer shall pay Principal and interest in money of the United States that at the time of payment is legal tender for payment of public and private debts (“**U.S. Legal Tender**”). However, the payments of interest, and any portion of the Principal (other than interest payable at maturity or on any redemption or repayment date or the final payment of Principal) shall be made by the Paying Agent, upon receipt from the Issuer of immediately available funds by 11:00 a.m., New York City time (or such other time as may be agreed to between the Issuer and the Paying Agent or the Issuer), directly to a Holder (by Federal funds wire transfer or otherwise) if the Holder has delivered written instructions to the Trustee 15 days prior to such payment date requesting that such payment will be so made and designating the bank account to which such payments shall be so made and in the case of payments of Principal surrenders the same to the Trustee in exchange for a Security or Securities aggregating the same principal amount as the unredeemed Principal amount of the Securities surrendered.

3. Paying Agent.

Initially, ● (the “**Trustee**”) will act as Paying Agent. The Issuer may change any Paying Agent without notice to the Holders.

4. Indenture.

The Issuer issued the Securities under an Indenture, dated as of ● (the “**Indenture**”), between the Issuer and the Trustee. Capitalized terms herein are used as defined in the Indenture unless otherwise defined herein. The terms of the Securities include those stated in the Indenture and those made part of the Indenture by reference to the Trust Indenture Act of 1939 (15 U.S.C. Sections 77aaa-77bbb) (the “**TIA**”), as in effect on the date of the Indenture until such time as the Indenture is qualified under the TIA, and thereafter as in effect on the date on which the Indenture is qualified under the TIA. Notwithstanding anything to the contrary herein, the Securities are subject to all such terms, and Holders of Securities are referred to the Indenture and the TIA for a statement of them. To the extent the terms of the Indenture and this Security are inconsistent, the terms of the Indenture shall govern.

5. Subordination.

The indebtedness of the Issuer evidenced by this Security, including the Principal hereof and interest hereon, is, to the extent and in the manner set forth in the Indenture, subordinate and junior in right of payment to the Company's obligations to holders of Senior Indebtedness of the Issuer and each Holder of this Security, by acceptance hereof, agrees to and shall be bound by such provisions of the Indenture and all other provisions of the Indenture.

6. Denominations; Transfer; Exchange.

The Securities are in registered form, without coupons, in denominations of \$1,000 and multiples of \$1,000. A Holder shall register the transfer of or exchange Securities in accordance with the Indenture. The Issuer may require a Holder, among other things, to furnish appropriate endorsements and transfer documents and to pay certain transfer taxes or similar governmental charges payable in connection therewith as permitted by the Indenture. The Issuer need not issue, authenticate, register the transfer of or exchange any Securities or portions thereof for a period of fifteen (15) days before such series is selected for redemption, nor need the Issuer register the transfer or exchange of any security selected for redemption in whole or in part.

7. Persons Deemed Owners.

The registered Holder of a Security shall be treated as the owner of it for all purposes.

8. Unclaimed Funds.

If funds for the payment of Principal or interest remain unclaimed for two years, the Trustee and the Paying Agent will repay the funds to the Issuer at its written request. After that, all liability of the Trustee and such Paying Agent with respect to such funds shall cease.

9. Legal Defeasance and Covenant Defeasance.

The Issuer may be discharged from its obligations under the Securities and under the Indenture with respect to the Securities except for certain provisions thereof, and may be discharged from obligations to comply with certain covenants contained in the Securities and in the Indenture with respect to the Securities, in each case upon satisfaction of certain conditions specified in the Indenture.

10. Amendment; Supplement; Waiver.

Subject to certain exceptions, the Securities and the provisions of the Indenture relating to the Securities may be amended or supplemented with the written consent of the Holders of at least a majority in aggregate Principal amount of the Securities then outstanding, and any existing Default or Event of Default or compliance with certain provisions may be waived with the consent of the Holders of a majority in aggregate Principal amount of the Securities then outstanding. Without notice to or consent of any Holder, the parties thereto may amend or supplement the Indenture and the Securities to, among other things, cure any ambiguity, defect or inconsistency, provide for uncertificated Securities in addition to or in place of certificated Securities or comply with any requirements of the Commission in connection with the qualification of the Indenture under the Trust Indenture Act, or make any other change that does not adversely affect the rights of any Holder of a Security.

11. Defaults and Remedies.

If an Event of Default (other than certain bankruptcy Events of Default with respect to the Issuer) occurs and is continuing, the Trustee or the Holders of at least 25% in aggregate Principal amount of Securities then outstanding may declare all of the Securities to be due and payable immediately in the manner and with the effect provided in the Indenture. If a bankruptcy Event of Default with respect to the Issuer occurs and is continuing, all the Securities shall be immediately due and payable immediately in the manner and with the effect provided in the Indenture without any notice or other action on the part of the Trustee or any Holder. Holders of Securities may not enforce the Indenture or the Securities except as provided in the Indenture. The Trustee is not obligated to enforce the Indenture or the Securities unless it has received indemnity satisfactory to it. The Indenture permits, subject to certain limitations therein provided, Holders of a majority in aggregate Principal amount of the Securities then outstanding to direct the Trustee in its exercise of any trust or power. The Trustee may withhold from Holders of Securities notice of certain continuing Defaults or Events of Default if it determines that withholding notice is in their interest.

12. Conversion.

Reference is made to the Indenture, including, without limitation, provisions giving the Holder of this Security the right to convert this Security into Capital Stock of the Issuer on the terms and subject to the limitations as more fully specified in the Indenture. The initial conversion rate for this Security is •. This conversion rate is subject to modification as provided in the Indenture. Such further provisions shall for all purposes have the same effect as though fully set forth at this place.

13. Trustee Dealings with Issuer.

The Trustee under the Indenture, in its individual or any other capacity, may become the owner or pledgee of Securities and may otherwise deal with the Issuer as if it were not the Trustee.

14. No Recourse Against Others.

No stockholder, director, officer, employee or incorporator, as such, of the Issuer or any successor Person thereof shall have any liability for any obligation under the Securities or the Indenture or for any claim based on, in respect of or by reason of, such obligations or their creation. Each Holder of a Security by accepting a Security waives and releases all such liability. The waiver and release are part of the consideration for the issuance of the Securities.

15. Authentication.

This Security shall not be valid until the Trustee manually signs the certificate of authentication on this Security.

16. Abbreviations and Defined Terms.

Customary abbreviations may be used in the name of a Holder of a Security or an assignee, such as: TEN COM (= tenants in common), TEN ENT (= tenants by the entireties), JT TEN (= joint tenants with right of survivorship and not as tenants in common), CUST (= Custodian), and U/G/M/A (= Uniform Gifts to Minors Act).

17. CUSIP Numbers.

Pursuant to a recommendation promulgated by the Committee on Uniform Security Identification Procedures, the Issuer has caused CUSIP numbers to be printed on the Securities as a convenience to the Holders of the Securities. No representation is made as to the accuracy of such numbers as printed on the Securities and reliance may be placed only on the other identification numbers printed hereon.

18. Governing Law.

The laws of the State of New York shall govern the Indenture and this Security thereof.

ASSIGNMENT FORM

I or we assign and transfer this Security to

(Print or type name, address and zip code of assignee or transferee)

(Insert Social Security or other identifying number of assignee or transferee)

and irrevocably appoint _____ agent to transfer this Security on the books of the Issuer. The agent may substitute another to act for him.

Dated: _____

Signed: (Signed exactly as name appears on the other side of this Security)

Signature Guarantee:

Participant in a recognized Signature Guarantee Medallion Program (or other signature guarantor program reasonably acceptable to the Trustee)

January 5, 2018

Corbus Pharmaceuticals Holdings, Inc.
100 River Ridge Drive, Suite 103
Norwood, MA 02062

Re: Shelf Registration Statement on Form S-3

Ladies and Gentlemen:

This opinion is being furnished to you in connection with the Registration Statement on Form S-3 (the "Registration Statement"), including the base prospectus that is part of the Registration Statement (the "Prospectus") and the sales agreement prospectus that is part of the Registration Statement (the "ATM Prospectus"), filed by Corbus Pharmaceuticals Holdings, Inc., a Delaware corporation (the "Company"), with the Securities and Exchange Commission (the "Commission") on January 5, 2018 under the Securities Act of 1933, as amended (the "Securities Act").

The Prospectus provides that it will be supplemented in the future by one or more prospectus supplements (each, a "Prospectus Supplement"). The Prospectus, as supplemented by the various Prospectus Supplements, will provide for the issuance and sale by the Company from time to time of up to \$200,000,000 aggregate offering price of (i) shares of the Company's common stock, par value \$0.0001 per share (the "Common Stock"), (ii) shares of the Company's preferred stock, par value \$0.0001 per share (the "Preferred Stock"), in one or more series or classes, (iii) warrants to purchase shares of Common Stock or Preferred Stock (the "Warrants"), (iv) the Company's senior debt securities and subordinated debt securities (collectively, the "Debt Securities"), which may be issued pursuant to a senior debt indenture (the "Senior Debt Indenture") between the Company and the trustee to be named therein (the "Senior Debt Trustee") and a subordinated debt indenture (the "Subordinated Debt Indenture," and together with the Senior Debt Indenture, the "Indentures") between the Company and the trustee to be named therein (the "Subordinated Debt Trustee" and, together with the Senior Debt Trustee, the "Trustees"), (v) subscription rights to purchase Common Stock or Debt Securities (the "Subscription Rights") or (vi) units composed of any of the foregoing (the "Units"). The Common Stock, Preferred Stock, Warrants, Debt Securities, Subscription Rights and Units are collectively referred to herein as the "Securities." The Warrants may be issued pursuant to a warrant agreement (the "Warrant Agreement") between the Company and a bank or trust company as warrant agent. Any Preferred Stock may be exchangeable for and/or convertible into shares of Common Stock or another series of Preferred Stock. Any Debt Securities may be exchangeable and/or convertible into shares of Common Stock or Preferred Stock. The Units may be issued pursuant to a Unit Agreement (the "Unit Agreement") between the Company and a bank or trust company as unit agent. The Securities are being registered for offering and sale from time to time pursuant to Rule 415 under the Securities Act.

The ATM Prospectus relates to the sale by the Company of shares of common stock having an aggregate offering price of up to \$50,000,000 (the "ATM Shares") under a sales agreement dated as of January 5, 2018, (the "Sales Agreement") between the Company and Cantor Fitzgerald & Co.

In rendering our opinions set forth below, we have reviewed the Registration Statement and the exhibits thereto. We have also reviewed such corporate documents and records of the Company, such certificates of public officials and officers of the Company and such other matters as we have deemed necessary or appropriate for purposes of this opinion. In our examination, we have assumed: (i) the authenticity of original documents and the genuineness of all signatures; (ii) the conformity to the originals of all documents submitted to us as copies; (iii) the truth, accuracy and completeness of the information, representations and warranties contained in the instruments, documents, certificates and records we have reviewed; and (iv) the legal capacity for all purposes relevant hereto of all natural persons and, with respect to all parties to agreements or instruments relevant hereto other than the Company, that such parties had the requisite power and authority (corporate or otherwise) to execute, deliver and perform such agreements or instruments, that such agreements or instruments have been duly authorized by all requisite action (corporate or otherwise), executed and delivered by such parties and that such agreements or instruments are the valid, binding and enforceable obligations of such parties. As to any facts material to the opinions expressed herein that were not independently established or verified, we have relied upon oral or written statements and representations of officers and other representatives of the Company.

Based on the foregoing, and subject to the assumptions, limitations and qualifications set forth herein, we are of the opinion that:

1. With respect to shares of Common Stock (other than the ATM Shares), when (a) the issuance and the terms of the sale of the shares of Common Stock have been duly authorized by the Board of Directors of the Company in conformity with the Company's certificate of incorporation and bylaws; (b) such shares have been issued and delivered against payment of the purchase price therefor in an amount in excess of the par value thereof, in accordance with the applicable definitive purchase, underwriting or similar agreement, and as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement; and (c) to the extent such shares of Common Stock are to be issued upon the conversion, exchange or exercise of any Preferred Stock, Warrants or Debt Securities, when such shares have been duly issued and delivered as contemplated by the terms of the applicable Preferred Stock, the Warrant Agreement relating to such Warrants or the Indenture relating to such Debt Securities, respectively, the shares of Common Stock will be validly issued, fully paid and nonassessable.

2. With respect to the ATM Shares, (a) when the Registration Statement has become effective under the Securities Act, and (b) when the ATM Shares have been issued and sold in accordance with the Sales Agreement, and as described in the Registration Statement and ATM Prospectus, the ATM Shares will be validly issued, fully paid and nonassessable.

2. With respect to any particular series of shares of Preferred Stock, when (a) the issuance and the terms of the sale of the shares of Preferred Stock have been duly authorized by the Board of Directors of the Company in conformity with the Company's certificate of incorporation and bylaws; (b) an appropriate certificate of designation relating to a series of the Preferred Stock to be sold under the Registration Statement has been duly authorized and adopted and filed with the Secretary of State of Delaware; (c) the terms of issuance and sale of shares of such series of Preferred Stock have been duly established in conformity with the Company's certificate of incorporation and bylaws so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company and comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company or any of its property; (d) such shares have been issued and delivered against payment of the purchase price therefor in an amount in excess of the par value thereof, in accordance with the applicable definitive purchase, underwriting or similar agreement, and as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement; and (e) to the extent such shares of Preferred Stock are to be issued upon the conversion, exchange or exercise of any Preferred Stock, Warrants or Debt Securities, when such shares have been duly issued and delivered as contemplated by the terms of the applicable Preferred Stock, the Warrant Agreement relating to such Warrants or the Indenture relating to such Debt Securities, respectively, the shares of Preferred Stock will be validly issued, fully paid and nonassessable.

3. With respect to Warrants, when (a) the issuance and the terms of the sale of the Warrants have been duly authorized by the Board of Directors of the Company; (b) the terms of the Warrants and of their issuance and sale have been duly established so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company and comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company or any of its property; (c) the Warrants and the applicable Warrant Agreement relating to the Warrants, if any, have been duly executed and countersigned and the Warrants have been issued and sold in accordance with the applicable definitive purchase, underwriting or similar agreement, as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement; and (d) the Company has received the applicable consideration for the Warrants as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement(s), the Warrants will constitute valid and binding obligations of the Company.

4. With respect to Debt Securities, when (a) the issuance and the terms of the sale of the Debt Securities have been duly authorized by the Board of Directors of the Company; (b) the terms of the Debt Securities and of their issuance and sale have been duly established so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company and comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company or any of its property; (c) the Debt Securities and the applicable Indenture relating to the Debt Securities have been duly executed and countersigned and in the case of the Indenture, duly authenticated by the Trustee, and the Debt Securities have been issued and sold as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement; and (d) the Company has received the applicable consideration for the Debt Securities as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement(s), the Debt Securities will constitute valid and binding obligations of the Company.

5. With respect to the Subscription Rights, when both: (a) the issuance and the terms of the sale of the Subscription Rights have been duly authorized by the Board of Directors of the Company; (b) the terms of the Subscription Rights and of their issuance and sale have been duly established so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company and comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company or any of its property; and (c) the agreement(s) relating to the Subscription Rights have been duly authorized and validly executed and delivered by the Company, then the Subscription Rights will be valid and binding obligations of the Company, enforceable against the Company in accordance with their terms.

5. With respect to Units, when (a) the issuance and the terms of the sale of the Units have been duly authorized by the Board of Directors of the Company; (b) the terms of the Units and of their issuance and sale have been duly established so as not to violate any applicable law or result in a default under or breach of any agreement or instrument binding upon the Company and comply with any requirement or restriction imposed by any court or governmental body having jurisdiction over the Company or any of its property; (c) the Unit Agreement and the Units have been duly executed and countersigned and the Units have been issued and sold in accordance with the applicable Unit Agreement, as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement; and (d) the Company has received the applicable consideration for the Units as contemplated by the Registration Statement, the Prospectus and the related Prospectus Supplement(s), the Units will constitute valid and binding obligations of the Company.

In rendering the opinions set forth above, we have assumed that (i) the Registration Statement (and any applicable post-effective amendment thereto) will have become effective under the Securities Act, a Prospectus Supplement will have been prepared and filed with the Commission describing the Securities offered thereby and such Securities will have been issued and sold in accordance with the terms of such Prospectus Supplement and in compliance with all applicable laws; and (ii) a definitive purchase, underwriting or similar agreement with respect to such Securities (if applicable) will have been duly authorized, executed and delivered by the Company and the other parties thereto; (iii) the Securities will be duly authorized by all necessary corporate action by the Company and any agreement pursuant to which such Securities may be issued will be duly authorized, executed and delivered by the Company and the other parties thereto; (iv) the Company is and will remain duly organized, validly existing and in good standing under applicable state law; and (v) the Company has reserved a sufficient number of shares of its duly authorized, but unissued, Common Stock and Preferred Stock as is necessary to provide for the issuance of the shares of Common Stock and Preferred Stock pursuant to the Registration Statement.

The opinions set forth above are subject to the following exceptions, limitations and qualifications: (i) the effect of bankruptcy, insolvency, reorganization, fraudulent conveyance, moratorium or other similar laws now or hereafter in effect relating to or affecting the rights and remedies of creditors; (ii) the effect of general principles of equity, including without limitation, concepts of materiality, reasonableness, good faith and fair dealing and the possible unavailability of specific performance or injunctive relief, regardless of whether enforcement is considered in a proceeding in equity or at law, and the discretion of the court before which any proceeding therefor may be brought; and (iii) the unenforceability under certain circumstances under law or court decisions of provisions providing for the indemnification of, or contribution to, a party with respect to liability where such indemnification or contribution is contrary to public policy. We express no opinion concerning the enforceability of any waiver of rights or defenses with respect to stay, extension or usury laws. Our opinion expressed herein is also subject to the qualification that no term or provision shall be included in any certificate of designation relating to any series of the Preferred Stock, Warrant Agreement, Indenture, Unit Agreement or any other agreement or instrument pursuant to which any of the Securities are to be issued that would affect the validity of such opinion.

Our opinion is limited to the federal laws of the United States, the General Corporation Law of the State of Delaware (including reported judicial decisions interpreting the General Corporation Law of the State of Delaware) and the State of New York. We express no opinion as to the effect of the law of any other jurisdiction. Our opinion is rendered as of the date hereof, and we assume no obligation to advise you of changes in law or fact (or the effect thereof on the opinions expressed herein) that hereafter may come to our attention.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the Registration Statement and to the references to our firm therein and in the Prospectus and in any Prospectus Supplement under the caption "Legal Matters." In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ Lowenstein Sandler LLP

LOWENSTEIN SANDLER LLP

Computation of Ratio of Earnings to Combined Fixed Charges

	Nine Months Ended September 30,		Year Ended December 31,			
	2017	2016	2015	2014	2013	2012
Earnings:						
Loss from Operations before income taxes	\$ (21,727,922)	\$(19,998,675)	\$ (8,850,739)	\$ (2,540,485)	\$ (602,350)	\$ (0)
Add:						
Interest portion of rental expense (1)	18,872	\$ 20,673	\$ 4,995	\$ 3,200	\$ 0	\$ 0
Interest expensed and capitalized	11,164	5,705	2,440	24,021	45,114	0
Amortized premiums related to indebtedness	0	0	0	0	0	0
Amortization of capitalized interest	0	0	0	0	0	0
Less:						
Interest Capitalized	0	0	0	0	0	0
Total Earnings	<u>\$ (21,697,886)</u>	<u>\$(19,972,297)</u>	<u>\$ (8,843,304)</u>	<u>\$ (2,513,264)</u>	<u>\$ (557,236)</u>	<u>\$ (0)</u>
Fixed Charges and Preference Dividends:						
Interest portion of rental expense (1)	18,872	\$ 20,673	\$ 4,995	\$ 3,200	\$ 0	\$ 0
Interest expensed and capitalized	11,164	5,705	2,440	24,021	45,114	0
Amortized premiums related to indebtedness	0	0	0	0	0	0
Total Fixed Charges	\$ 30,036	\$ 26,378	\$ 7,435	\$ 27,221	\$ 45,114	\$ 0
Ratio of earnings to fixed charges and preference dividends	(2)	(2)	(2)	(2)	(2)	(2)
Coverage deficiency (3)	<u>\$ (21,727,922)</u>	<u>\$(19,998,675)</u>	<u>\$ (8,850,739)</u>	<u>\$ (2,540,485)</u>	<u>\$ (602,350)</u>	<u>\$ (0)</u>

(1) Computation of interest factor of rent expense

Operating rental expense	\$ 209,687	\$ 229,705	\$ 55,496	\$ 35,550	\$ 0	\$ 0
Interest factor (*)	9%	9%	9%	9%	9%	9%
Total	<u>\$ 18,872</u>	<u>\$ 20,673</u>	<u>\$ 4,995</u>	<u>\$ 3,200</u>	<u>\$ 0</u>	<u>\$ 0</u>

* Calculated as 9% of rent expense, which management believes is a reasonable approximation of the interest factor.

(2) Due to our losses from continuing operations for the nine months ended September 30, 2017 and for the years ended December 31, 2016, 2015, 2014, 2013 and 2012, earnings were insufficient to cover fixed charges by \$21.7 million, \$20.0 million, \$8.9 million, \$2.5 million, \$0.6 million, and \$0.0 million, respectively. For this reason, no ratios are provided.

(3) In each of the years presented, we incurred losses from operations and as a result our earnings were insufficient to cover over fixed charges.

The amount shown represents the amount of the coverage deficiency in each such period

We consent to the incorporation by reference in this Registration Statement of Corbus Pharmaceuticals Holdings, Inc. and Subsidiary on Form S-3 to be filed on or about January 5, 2018 of our report dated March 8, 2017, on our audit of the consolidated financial statements as of December 31, 2016 and 2015 and for each of the years then ended, which report was included in the Annual Report on Form 10-K filed March 8, 2017. We also consent to the reference to our firm under the caption “Experts” in the Registration Statement on Form S-3.

/s/ EISNERAMPER LLP

Iselin, New Jersey
January 5, 2018
