

Fibrocell Science, Inc.
Form 424B5
August 08, 2016

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Filed Pursuant to Rule 424(b)(5)
Registration No. 333-209077

This preliminary prospectus supplement relates to an effective registration statement under the Securities Act of 1933, but the information in this preliminary prospectus supplement is not complete and may be changed. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell and are not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED AUGUST 8, 2016

**Preliminary Prospectus Supplement
(To Prospectus dated February 9, 2016)**

Shares of Common Stock

Warrants to Purchase up to Shares of Common Stock

We are offering shares of our common stock, par value \$0.001 per share, and warrants to purchase up to shares of our common stock, in each case, pursuant to this prospectus supplement and the accompanying prospectus. The common stock and warrants will be sold in combination, with one warrant to purchase of a share of common stock accompanying each share of our common stock sold. The combined purchase price for each share of our common stock and accompanying warrant is \$.

Each warrant will have an exercise price of \$ per share, will be exercisable upon issuance and will expire five years from the date of issuance. The shares of our common stock and the warrants are immediately separable and will be issued separately, but must be purchased together in this offering.

Our common stock is listed on The NASDAQ Capital Market ("NASDAQ") under the symbol "FCSC." On August 5, 2016, the last reported sale price of our common stock on NASDAQ was \$1.01 per share. There is no established trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to list the warrants on NASDAQ, any other national securities exchange or any other nationally recognized trading system.

Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page S-7 of this prospectus supplement and in the other documents that are incorporated by reference in this prospectus supplement and the accompanying prospectus.

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

	Per Common Share and Accompanying Warrant(1)	Total
Public offering price	\$	\$
Underwriting discounts and commissions	\$	\$
Proceeds, before expenses, to us	\$	\$

(1) We have agreed to reimburse the underwriters for certain expenses in connection with the offering. See "Underwriting" on page S-25 of this prospectus supplement.

The underwriters may also purchase up to an additional _____ shares of our common stock and warrants to purchase up to _____ shares of common stock at the public offering price, less underwriting discounts and commissions, within 30 days of the date of this prospectus supplement. If the underwriters exercise this option in full, the total underwriting discounts and commissions will be \$ _____, and our total proceeds before expenses will be \$ _____.

Intrexon Corporation (NYSE:XON) ("Intrexon"), a corporation affiliated with Randal J. Kirk, our largest stockholder who beneficially owns approximately 37.9% of our common stock, and our collaboration partner on our development programs, has indicated an interest in purchasing 37.9% of the shares of our common stock and accompanying warrants being offered in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no securities in this offering to Intrexon and Intrexon may determine to purchase more, fewer or no securities in this offering.

The underwriters expect to deliver the shares of our common stock and warrants to the investors on or about _____, 2016.

Cantor Fitzgerald & Co.

Roth Capital Partners

Griffin Securities

The date of this prospectus supplement is _____, 2016.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus are part of a "shelf" registration statement on Form S-3 (File No. 333-209077) that we initially filed with the Securities and Exchange Commission (the "SEC") on January 21, 2016, and that was declared effective by the SEC on February 9, 2016. This document is in two parts. The first part is this prospectus supplement which describes the terms of this offering of shares of our common stock and warrants and adds to and updates the information contained in the accompanying prospectus. The second part, the accompanying prospectus, provides more general information, some of which may not apply to this offering. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement and the information contained in the accompanying prospectus or in any document incorporated by reference into this prospectus supplement that was filed with the SEC before the date of this prospectus supplement, you should rely on the information in this prospectus supplement.

This prospectus supplement and the accompanying prospectus relate to the offering of shares of our common stock and warrants. Before buying any of the shares of common stock and warrants offered hereby, we urge you to read carefully this prospectus supplement and the accompanying prospectus, together with the information incorporated herein and therein by reference as described below under the section entitled "Incorporation of Certain Information by Reference" on page S-31 of this prospectus supplement.

You should rely only on the information contained in, or incorporated by reference into, this prospectus supplement and the accompanying prospectus. We have not, and the underwriters have not, authorized anyone to provide you with different or additional information.

We are not making offers to sell or solicitations to buy our securities in any jurisdiction in which an offer or solicitation is not authorized or in which the person making that offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make an offer or solicitation. Persons outside the United States who come into possession of this prospectus supplement and accompanying prospectus must inform themselves about, and observe any restrictions relating to, the offering of our securities and the distribution of this prospectus supplement and accompanying prospectus outside the United States. You should assume that the information in this prospectus supplement and the accompanying prospectus is accurate only as of the date on the front of the respective document and that any information that we have incorporated by reference is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus supplement or the accompanying prospectus or the time of any sale of a security.

This prospectus supplement and the accompanying prospectus contain summaries of certain provisions contained in some of the documents described herein and therein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein and therein have been filed, will be filed or will be incorporated herein by reference as exhibits to the registration statement, and you may obtain copies of those documents as described below under the section entitled "Where You Can Find More Information" on page S-30 of this prospectus supplement.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

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This prospectus supplement and the accompanying prospectus contain and incorporate by reference market data and industry statistics and forecasts that are based on independent industry publications and other publicly-available information. Although we believe these sources are reliable, we do not guarantee the accuracy or completeness of this information and we have not independently verified this information. Although we are not aware of any misstatements regarding the market data and industry statistics and forecasts presented in this prospectus supplement, accompanying prospectus or the documents incorporated herein and therein by reference, these estimates involve risks and uncertainties and are subject to change based on various factors. Accordingly, investors should not place undue reliance on this information.

Unless the context otherwise requires, in this prospectus supplement the "Company," "Fibrocell," "we," "us," "our" and similar names refer to Fibrocell Science, Inc. and its subsidiaries.

This prospectus supplement and the accompanying prospectus and the information incorporated herein and therein by reference include trademarks, service marks and trade names owned by us or other companies. We have registered or filed applications to register certain trademarks in the United States and abroad, including Fibrocell®, Fibrocell Science® and LAVIV®. All other trademarks or trade names referred to in this prospectus supplement and the accompanying prospectus are the property of their respective owners.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights selected information about us and this offering and does not contain all of the information that you should consider in making your investment decision. You should carefully read this entire prospectus supplement and the accompanying prospectus, including the risks and uncertainties discussed under the heading "Risk Factors" beginning on page S-7 of this prospectus supplement, and the information incorporated by reference in this prospectus supplement, including our financial statements, before making an investment decision. If you invest in our securities, you are assuming a high degree of risk.

Company Overview

We are an autologous cell and gene-therapy company focused on translating personalized biologics into medical breakthroughs for diseases affecting the skin and connective tissue. Our approach to personalized biologics is distinctive and the foundation of our personalized biologics platform is our proprietary autologous fibroblast technology. Fibroblasts are the most common cell in skin and connective tissue and are responsible for synthesizing extracellular matrix proteins, including collagen and other growth factors, that provide structure and support. Because fibroblasts naturally reside in the localized environment of the skin and connective tissue, they represent an ideal therapeutic agent for the treatment of diseases affecting the skin and connective tissue. We target the underlying cause of disease by using fibroblast cells from a patient's skin to create localized therapies with genetic modification that are compatible with the unique biology of the patient (i.e., autologous).

We are focused on discovering and developing localized therapies for diseases affecting the skin and connective tissue, where there are high unmet needs, to improve the lives of patients and their families. In that regard, we commit significant resources to our research and development programs. Currently, all of our research and development operations and focus are on gaining regulatory approvals to commercialize our product candidates in the United States; however, we may seek to expand into international markets in the future.

Our current pipeline consists of the following product candidates which we are developing in collaboration with Intrexon:

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Development Programs

FCX-007 for Recessive Dystrophic Epidermolysis Bullosa

Recessive dystrophic epidermolysis bullosa ("RDEB") is the most severe form of dystrophic epidermolysis bullosa, a congenital, progressive, devastatingly painful and debilitating genetic disorder that often leads to death. RDEB is caused by a mutation of the COL7A1 gene, the gene which encodes for type VII collagen ("COL7"), a protein that forms anchoring fibrils. Anchoring fibrils hold together the layers of skin, and without them, skin layers separate causing severe blistering, open wounds and scarring in response to friction, including normal daily activities like rubbing or scratching. Children who inherit this condition are often called "butterfly children" because their skin can be as fragile as a butterfly's wings. We estimate that there are approximately 1,100 - 2,500 RDEB patients in the U.S. Currently, treatments for RDEB address only the sequelae, including daily bandaging (which can cost a patient in excess of \$10,000 per month), hydrogel dressings, antibiotics, feeding tubes and surgeries.

Our lead orphan gene-therapy product candidate, FCX-007, is in clinical development for the treatment of RDEB. In addition to having orphan drug designation from the U.S. Food and Drug Administration's ("FDA") Office of Orphan Products Development ("OOPD"), FCX-007 also was granted pediatric rare disease designation. FCX-007 is a genetically-modified autologous fibroblast that encodes the gene for COL7 for localized treatment of RDEB. By genetically modifying autologous fibroblasts, ex vivo, to produce COL7, culturing them and then treating blisters and wounds locally via injection, FCX-007 offers the potential to address the underlying cause of the disease by providing high levels of COL7 directly to the affected areas, thereby avoiding systemic treatment. In addition, based on third party academic research, we believe that the persistence of COL7 in RDEB skin tissue will be long lasting.

Phase I/II Trial of FCX-007 for RDEB

The primary objective of this open label trial is to evaluate the safety of FCX-007 in RDEB subjects. Additionally, the trial will assess (i) the mechanism of action of FCX-007 through the evaluation of type VII collagen expression and the presence of anchoring fibrils and (ii) the efficacy of FCX-007 through intra-subject paired analysis of target wound area by comparing FCX-007 treated wounds to untreated wounds in Phase I and to wounds administered sterile saline in Phase II. Six adult subjects are expected to be treated with FCX-007 in the Phase I portion of the trial and six pediatric subjects in the Phase II portion of the trial. Prior to enrolling pediatric subjects, we are required to obtain allowance from the FDA and submit evidence of FCX-007 activity in adult subjects and final data from an ongoing toxicology study.

We are actively recruiting adult subjects for the Phase I portion of this trial and currently have 2 subjects enrolled. We expect to dose our first subject at the end of 2016. Additional adult subjects will be dosed after a required 90-day waiting period following the dosing of the first subject. This required waiting period is to provide time to assess the safety of the first dose of the new gene-therapy. We expect to have three-month post-treatment data for safety, mechanism of action and efficacy for the adult subjects in the Phase I portion of the trial in the second half of 2017, as well as 6-month data for a cohort of this group.

FCX-013 for Linear Scleroderma

Linear scleroderma, a form of localized scleroderma, is a chronic autoimmune skin disorder that manifests as excess production of extracellular matrix, specifically type I collagen and type III collagen, resulting in thickening of the skin and connective tissue. The localized areas of skin thickening may extend to underlying tissue and muscle in children which can impair growth and development. Lesions appearing across joints can be painful, impair motion and may be permanent. Current treatments for linear scleroderma, which include systemic or topical corticosteroids, UVA light therapy and physical

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therapy, only address the symptoms of the disorder. We estimate the U.S. population of patients who have linear scleroderma over a major joint and exhibit severe joint pain to be approximately 40,000 individuals.

Our second gene-therapy product candidate, FCX-013, is in pre-clinical development for the treatment of linear scleroderma. FCX-013 incorporates Intrexon's proprietary RTS® switch, a biologic switch activated by an orally administered compound to control future protein expression once the initial fibrosis has been resolved. FCX-013 is designed to be injected under the skin at the location of the fibrosis where the genetically-modified fibroblast cells will produce a protein to break down excess collagen accumulation. The patient takes an oral compound to facilitate protein expression. Once the fibrosis is resolved, the patient will stop taking the oral compound which will stop further production of the subject protein by FCX-013.

We have successfully completed a proof-of-concept study for FCX-013 in which the primary objective was to determine whether FCX-013 had the potential to reduce dermal thickness in fibrotic tissue. In this study, FCX-013 was evaluated in a bleomycin-induced scleroderma model utilizing severe combined immunodeficiency ("SCID") mice. Data from the study demonstrated that FCX-013 reduced dermal thickness of fibrotic tissue to levels similar to that of the non-treated control and further reduced the thickness of the sub-dermal muscle layer. Based upon this data and the FDA's feedback to our pre-Investigational New Drug ("IND") application briefing package, we are advancing FCX-013 into pre-clinical dose-ranging and toxicology/biodistribution studies. In April 2016, we received orphan drug designation from the OOPD for FCX-013 for the treatment of localized scleroderma. We expect to submit an IND application for FCX-013 to the FDA in 2017.

Gene-Therapy Research Program for Arthritis and Related Conditions

Arthritis is a broad term that covers a group of more than 100 different types of diseases that affect the joints, as well as connective tissues and organs, including the skin. According to the Centers for Disease Control and Prevention, arthritis characterized by joint inflammation, pain and decreased range of motion is the United States' most common cause of disability affecting more than 52 million adults as well as 300,000 children at a cost exceeding \$120 billion.

Our third gene-therapy program is focused on the treatment of arthritis and related conditions. Our goal is to deliver a protein therapy locally to the joint to provide sustained efficacy while avoiding key side effects typically associated with systemic therapy.

Intrexon Collaborations

We collaborate with Intrexon, a related party, through two distinct exclusive channel collaboration agreements consisting of the Exclusive Channel Collaboration Agreement entered into in October 2012 and amended in June 2013 and January 2014 (as amended, the "2012 ECC") and the Exclusive Channel Collaboration Agreement entered into in December 2015 (the "2015 ECC"). Pursuant to these agreements, we engage Intrexon for support services for the research and development of product candidates covered under the respective agreements and reimburse Intrexon for its cost for time and materials for such work. We are developing FCX-007 and FCX-013 under the 2012 ECC and we are in the research phase for a gene-therapy treatment for arthritis and related conditions under the 2015 ECC.

Recent Developments

Wind-down of azficel-T Operations

In June 2016, we reported that the primary efficacy endpoints were not met in our Phase II clinical trial of azficel-T for the treatment of vocal cord scarring resulting in chronic or severe

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dysphonia. As a result, we determined to wind-down azficel-T (including LAVIV) operations at our Exton, PA facility in order to focus our efforts and resources on our gene-therapy portfolio of product candidates. In connection with this wind-down, we eliminated 25 positions, primarily in the areas of manufacturing and quality operations, representing approximately 50% of our employee base. We have incurred one-time termination costs in connection with the reduction in workforce, which includes severance, benefits and related costs, of approximately \$0.3 million for the quarter ended June 30, 2016 and expect to incur an additional \$0.1 million for the quarter ended September 30, 2016. We have incurred approximately \$0.3 million and less than \$0.1 million, respectively, for non-cash impairment charges against the carrying values of inventory (including reserves) and equipment used in our azficel-T operations for the quarter ended June 30, 2016. Additionally, we expect to incur other cash expenditures to decommission our azficel-T manufacturing facility and to terminate and wind-down our contractual and other obligations relating to our azficel-T operations, as well as potential non-cash charges related to future impairments of the carrying values of inventory and equipment used in our azficel-T operations, but cannot estimate them at this time.

Corporate Information

Our corporate headquarters is located at 405 Eagleview Boulevard, Exton, Pennsylvania 19341. Our phone number is (484) 713-6000. Our corporate website is www.fibrocell.com. We make available free of charge on our website our annual, quarterly and current reports, including amendments to such reports, as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the SEC. Information contained on our website is not incorporated by reference into this prospectus supplement or the accompanying prospectus, and you should not consider information contained on our website as part of this prospectus supplement or the accompanying prospectus.

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The Offering

Common stock offered by us pursuant to this prospectus supplement	shares, plus shares of our common stock underlying the warrants offered in this offering.
Warrants offered by us pursuant to this prospectus supplement	Warrants to purchase up to shares of our common stock. Each warrant will have an exercise price of \$ per share, will be exercisable upon issuance and will expire five years from the date of issuance. This prospectus supplement also relates to the offering of the shares of common stock issuable upon exercise of the warrants. The exercise price of the warrants is subject to adjustment in certain circumstances.
Option to purchase additional securities	We have granted the underwriters an option for a period of up to 30 days from the date of this prospectus supplement to purchase up to an additional shares of our common stock and warrants to purchase up to shares of our common stock at the public offering price less the underwriting discounts and commissions to cover over-allotments, if any.
Common stock to be outstanding immediately after this offering	shares (assuming none of the warrants issued in this offering are exercised) (shares assuming the underwriters exercise in full their over-allotment option and none of the warrants issued in this offering are exercised).
Use of Proceeds	We currently intend to use the net proceeds from this offering for the continued pre-clinical and clinical development of our product candidates, including for the research of potential product candidates under the 2015 ECC, and for other general corporate purposes, which may include working capital, research and development expenditures, the funding of in-licensing agreements for product candidates, additional technologies or other forms of intellectual property, expenditures relating to manufacturing infrastructure and other capital expenditures and general and administrative expenses. As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses of the proceeds from this offering. As a result, our management will retain broad discretion in the allocation and use of the net proceeds from this offering. See "Use of Proceeds" on page S-12 of this prospectus supplement.

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Risk Factors	An investment in our securities involves a high degree of risk. See the information contained in or incorporated by reference under "Risk Factors" on page S-7 of this prospectus supplement, page 19 of our Annual Report on Form 10-K for the year ended December 31, 2015 (the "2015 Annual Report"), page 26 of our Quarterly Report on Form 10-Q for the period ended June 30, 2016 and under similar headings in the other documents that are incorporated by reference herein and therein, as well as the other information included in or incorporated by reference in this prospectus supplement and the accompanying prospectus.
Listing	Our common stock is quoted and traded on NASDAQ under the symbol "FCSC." There is no established public trading market for the warrants, and a market may never develop. The warrants are not and will not be listed for trading on NASDAQ, any other national securities exchange or other nationally recognized trading system.
Transfer agent and warrant agent	American Stock Transfer & Trust Company, LLC

The number of shares of our common stock to be outstanding immediately after this offering is based on 43,898,785 shares of common stock outstanding as of June 30, 2016. Unless specifically stated otherwise, the information in this prospectus supplement is as of June 30, 2016 and excludes:

4,195,650 shares of our common stock issuable upon the exercise of stock options outstanding as of June 30, 2016, at a weighted average exercise price of \$5.15 per share, of which options to purchase 1,954,190 shares of our common stock were then exercisable;

5,340,877 shares of our common stock issuable upon the exercise of warrants (excluding the warrants offered hereby) at a weighted average exercise price of \$7.18 per share; and

an aggregate of 3,365,103 shares of our common stock reserved for future grants of stock options (or other similar equity instruments) under the Fibrocell Science, Inc. 2009 Equity Incentive Plan, as amended (the "Equity Incentive Plan").

Additionally, one of our outstanding warrants, which is currently exercisable for 60,000 shares of our common stock at an exercise price per share of \$2.50, contains so-called full-ratchet anti-dilution provisions which may be triggered by the issuance of the shares of our common stock and accompanying warrants being offered hereby or upon any future issuance by us of shares of our common stock or common stock equivalents at a per share price below the then-exercise price of the warrant, subject to some exceptions. See "Dilution" on page S-13 of this prospectus supplement for more information about these possible anti-dilution adjustments.

Except as otherwise indicated, all information in this prospectus supplement assumes no exercise (a) of the outstanding options and warrants described above or the warrants offered hereby and (b) by the underwriters of their option to purchase additional shares of our common stock and additional warrants to purchase shares of our common stock.

Intrexon, a corporation affiliated with Randal J. Kirk, our largest stockholder who beneficially owns approximately 37.9% of our common stock, and our collaboration partner on our development programs, has indicated an interest in purchasing 37.9% of the shares of our common stock and accompanying warrants being offered in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no securities in this offering to Intrexon and Intrexon may determine to purchase more, fewer or no securities in this offering.

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RISK FACTORS

Investing in our securities involves a high degree of risk. Before investing in our securities, you should carefully consider the risks described below, together with all of the other information contained in this prospectus supplement and the accompanying prospectus and incorporated by reference herein and therein, including from our 2015 Annual Report. Some of these factors relate principally to our business and the industry in which we operate. Other factors relate principally to your investment in our securities. The risks and uncertainties described therein and below are not the only risks facing us. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also materially and adversely affect our business and operations.

If any of the matters included in the following risks were to occur, our business, financial condition, results of operations, cash flows or prospects could be materially and adversely affected. In such case, you may lose all or part of your investment.

Risks Related to this Offering

The exercise of options and warrants and other issuances of shares of common stock or securities convertible into or exercisable for shares of common stock following this offering will dilute your ownership interests and may adversely affect the future market price of our common stock.

Sales of our common stock in the public market, either by us or by our current stockholders, or the perception that these sales could occur, could cause a decline in the market price of our securities. All of the shares of our common stock held by those of our current stockholders who have not entered into lock-up agreements with the underwriters may be immediately eligible for resale in the open market either in compliance with an exemption under Rule 144 promulgated under the Securities Act of 1933, as amended (the "Securities Act"), or pursuant to an effective resale registration statement that we have previously filed with the SEC. Such sales, along with any other market transactions, could adversely affect the market price of our common stock.

In addition, as of June 30, 2016, there were outstanding options to purchase an aggregate of 4,195,650 shares of our common stock at a weighted average exercise price of \$5.15 per share, of which options to purchase 1,954,190 shares of our common stock were then exercisable. As of June 30, 2016, there were warrants outstanding to purchase 5,340,877 shares of our common stock at a weighted average exercise price of \$7.18 per share. One of these outstanding warrants, which is currently exercisable for 60,000 shares of our common stock at an exercise price per share of \$2.50, contains so-called full-ratchet anti-dilution provisions which may be triggered by the issuance of the shares of our common stock and accompanying warrants being offered hereby or upon any future issuance by us of shares of our common stock or common stock equivalents at a per share price below the then-exercise price of the warrant, subject to some exceptions. The shares of our common stock issuable upon exercise of outstanding options and warrants (including the warrants to be issued in this offering) held by persons who have not entered into lock up agreements with the underwriters may be immediately eligible for resale in the open market, either in compliance with an exemption from registration under the Securities Act, or pursuant to an effective resale registration statement that we have previously filed with the SEC. Such sales, along with any other market transactions, could adversely affect the market price of our common stock. Additional dilution may result from the issuance of shares of our common stock in connection with collaborations or manufacturing arrangements or in connection with other financing efforts.

Moreover, if we issue options or warrants to purchase our common stock in the future and those options or warrants are exercised, you may experience further dilution. Holders of shares of our common stock have no preemptive rights that entitle them to purchase their pro rata share of any offering of shares of any class or series.

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You will suffer immediate and substantial dilution in the securities you purchase. You may experience further dilution upon exercise of warrants.

The public offering price of \$ _____ per share of our common stock and accompanying warrant in this offering is substantially higher than the net tangible book value per share of our outstanding shares of common stock immediately after this offering. As a result, investors purchasing securities in this offering will incur immediate and substantial dilution of approximately \$ _____ per share of our common stock, representing the difference between the public offering price per share of common stock and accompanying warrant, assuming no value is attributable to the warrants, and our net tangible book value as of June 30, 2016, without giving effect to the potential exercises of the warrants offered by this prospectus supplement. Accordingly, existing stockholders will benefit disproportionately from this offering. If we raise additional capital through the sale of equity, including convertible securities, your percentage of ownership will be diluted. You may also experience additional dilution if stock options or warrants to purchase our shares are exercised at less than the public offering price. As of June 30, 2016, we had reserved 4,195,650 shares of our common stock for issuance upon the exercise of outstanding stock options, 3,365,103 shares of our common stock for future issuance under the Equity Incentive Plan and 5,340,877 shares of our common stock for issuance upon exercise of outstanding warrants.

We have broad discretion in the use of the net proceeds of this offering and, despite our efforts, we may use the net proceeds in a manner that does not increase the value of your investment.

We currently intend to use the net proceeds from this offering for the continued pre-clinical and clinical development of our product candidates, including for the research of potential product candidates under the 2015 ECC, and for other general corporate purposes, which may include working capital, research and development expenditures, the funding of in-licensing agreements for product candidates, additional technologies or other forms of intellectual property, expenditures relating to manufacturing infrastructure and other capital expenditures and general and administrative expenses. However, we have not determined the specific allocation of the net proceeds among these potential uses. Our management will have broad discretion over the use and investment of the net proceeds of this offering, and, accordingly, investors in this offering will need to rely upon the judgment of our management with respect to the use of proceeds, with only limited information concerning our specific intentions. These proceeds could be applied in ways that do not improve our operating results or increase the value of your investment. Please see the section entitled "Use of Proceeds" on page S-12 of this prospectus supplement for further information.

There is no public market for the warrants to purchase shares of our common stock being offered in this offering.

There is no established public trading market for the warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the warrants on any national securities exchange, including NASDAQ, or other nationally recognized trading system. Without an active market, the liquidity of the warrants will be limited.

Investors will have no rights as a common stockholder with respect to their warrants until they exercise their warrants and acquire our common stock.

Until you acquire shares of our common stock upon exercise of your warrants, you will have no rights with respect to the shares of our common stock underlying such warrants. Upon exercise of your warrants, you will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

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Anti-dilution provisions of the warrants you purchase in this offering could result in dilution of the common stock you purchase in this offering.

The exercise price of the warrants issued in this offering is subject to certain anti-dilution provisions. Under the provisions, if we issue future issuances of our common stock or equivalents thereof, subject to specified customary exceptions, at a price below the exercise price of the warrants, such exercise price will be reduced, and will potentially cause additional common stock to be issued upon exercise of the warrants. As a result, you may experience immediate dilution of the common stock you purchase in this offering.

We have identified the following changes to the risk factors previously disclosed in our 2015 Annual Report. The risk factors listed below should be read in conjunction with the risk factors set forth in our 2015 Annual Report.

Risks Related to our Financial Position and Need for Additional Capital

We recently announced the wind-down of our azficel-T (including LAVIV) operations at our Exton, PA facility and related workforce reduction that are expected to result in significant cost savings as we focus our efforts and resources on our gene-therapy portfolio of product candidates. If we are unable to realize the anticipated cost-saving benefits of these measures or we incur additional costs as we progress through the wind-down process, our operating results and financial condition could be adversely affected.

In June 2016, we announced that we are focusing our efforts and resources on our gene-therapy portfolio of product candidates and, as a result, determined to wind-down azficel-T (including LAVIV) operations at our Exton, PA facility and reduce the workforce that supports such operations. In connection with this reduction in workforce, 25 positions were eliminated, primarily in the areas of manufacturing and quality operations, representing approximately 50% of our employee base. We have incurred one-time termination costs in connection with the reduction in workforce, which includes severance, benefits and related costs, of approximately \$0.3 million for the quarter ended June 30, 2016 and expect to incur an additional \$0.1 million for the quarter ended September 30, 2016. We have incurred approximately \$0.3 million and less than \$0.1 million, respectively, for non-cash impairment charges against the carrying values of inventory (including reserves) and equipment used in our azficel-T operations for the quarter ended June 30, 2016. Additionally, we expect to incur other cash expenditures to decommission our azficel-T manufacturing facility and to terminate and wind-down our contractual and other obligations relating to our azficel-T operations, as well as potential non-cash charges related to future impairments of the carrying values of inventory and equipment used in our azficel-T operations, but cannot estimate them at this time.

If we are unable to realize the expected cost savings from the workforce reduction and wind-down activities, our operating results and financial condition would be adversely affected. In addition, as we progress through the wind-down activities, we may incur additional costs and expenses, including costs to decommission our azficel-T manufacturing facility and to terminate and wind-down our contractual and other obligations relating to our azficel-T operations. The wind-down process may also be difficult to manage and may increase the likelihood of turnover of other key employees, all of which may have an adverse impact on our business, as well as on our operating results and financial condition.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein and therein contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, included in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein and therein regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. The words "aim," "anticipate," "believe," "estimate," "expect," "potential," "intend," "may," "plan," "predict," "project," "will," "should," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein and therein include, among other things, statements about:

our expectations related to the use of proceeds from this offering;

our expectation that the net proceeds from this offering, together with our existing cash resources, will be sufficient to enable us to fund our operations into the first quarter of 2018;

our expectation to dose the first subject in the Phase I portion of our Phase I/II clinical trial of FCX-007 at the end of 2016 and to have three-month data for the adult subjects in the Phase I portion of the trial in the second half of 2017, as well as 6-month data for a cohort of this group;

the anticipated submission of an IND for FCX-013 to the FDA in 2017;

expected costs associated with the wind-down of azficel-T (including LAVIV) operations at our Exton, PA facility including future cash expenditures to decommission our azficel-T manufacturing facility and to terminate and wind-down our contractual and other obligations relating to our azficel-T operations, as well as potential non-cash charges related to the impairment of the carrying values of inventory and equipment used in our azficel-T operations;

future expenses and capital expenditures and our plans to address our future capital requirements;

our product development goals under our 2015 ECC with Intrexon;

the potential benefits of orphan drug and pediatric rare disease designations; and

the potential advantage of our product candidates and technologies.

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 supplement, particularly under "Risk Factors" on page S-7 of this prospectus supplement, the accompanying prospectus and the documents incorporated herein and therein that we believe 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, collaborations or investments we may make.

You should read this prospectus supplement, the accompanying prospectus and the documents that we incorporate by reference herein and therein completely and with the understanding that our actual future results may be materially different from what we expect.

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Except as required by law, we undertake no obligation to update or revise any forward-looking statements to reflect new information or future events or developments. You should not assume that our silence over time means that actual events are bearing out as expressed or implied in such forward-looking statements. Before deciding to purchase our securities, you should carefully consider the risk factors discussed and incorporated by reference in this prospectus supplement and the accompanying prospectus and in the registration statement of which this prospectus supplement and the accompanying prospectus form a part.

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USE OF PROCEEDS

We expect to receive net proceeds of approximately \$ _____ from the sale of _____ shares of our common stock and warrants to purchase up to _____ shares of our common in this offering, or \$ _____ if the underwriters exercise in full their option to purchase additional shares of common stock and accompanying warrants, based on a public offering price of \$ _____ per share of our common stock and accompanying warrant, after deducting the estimated expenses related to this offering and the underwriting discounts and commissions payable by us. This amount does not give effect to the exercise of the warrants being offered and issued in this offering.

We currently intend to use the net proceeds from this offering for the continued pre-clinical and clinical development of our product candidates, including for the research of potential product candidates under the 2015 ECC, and for other general corporate purposes, which may include, without limitation:

working capital;

research and development expenditures;

the funding of in-licensing agreements for product candidates, additional technologies or other forms of intellectual property;

expenditures relating to manufacturing infrastructure and other capital expenditures; and

general and administrative expenses.

The amounts and timing of our use of the net proceeds from this offering will depend on a number of factors, such as the timing and progress of our research and development efforts, the timing and progress of any partnering efforts, technological advances and the competitive environment for our product candidates. As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses for the net proceeds to us from the sale of the securities offered by us hereunder. Accordingly, our management will have broad discretion in the timing and application of these proceeds. Pending application of the net proceeds as described above, we intend to temporarily invest the proceeds in short-term, interest-bearing instruments.

Although it is difficult to predict future liquidity requirements, we believe that the net proceeds from this offering, together with our existing cash resources, will be sufficient to enable us to fund our operations into the first quarter of 2018. We have based this estimate on assumptions that may prove to be incorrect, and we could use our available capital resources sooner than we currently expect.

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Purchasers of securities in this offering will experience immediate dilution to the extent of the difference between the public offering price per share of common stock and accompanying warrant, assuming no value is attributable to the warrants, and the net tangible book value per share of our common stock immediately after this offering.

Our net tangible book value as of June 30, 2016 was approximately \$7.2 million, or \$0.16 per share of common stock. Net tangible book value per share is determined by dividing total tangible assets less total tangible liabilities, excluding items such as intangibles and non-cash generally accepted accounting principles adjustments, by the aggregate number of shares of common stock outstanding as of June 30, 2016. After giving effect to the sale by us of _____ shares of our common stock and accompanying warrants at the public offering price of \$ _____ per share of common stock and accompanying warrant and after deducting the underwriting discount and commissions and estimated offering expenses, our net tangible book value as of June 30, 2016 would have been approximately \$ _____ million, or \$ _____ per share of common stock. This represents an immediate increase in net tangible book value of \$ _____ per share to our existing stockholders and an immediate dilution of \$ _____ per share of common stock issued to the new investors purchasing securities in this offering.

The following table illustrates this per share dilution:

Public offering price per share of common stock and accompanying warrant	\$
Net tangible book value per share as of June 30, 2016	\$ 0.16
Increase per share attributable to new investors	\$
Net tangible book value per share after this offering	\$
Dilution per share to new investors	\$

If the underwriters exercise their option in full to purchase _____ additional shares of common stock and accompanying warrants in this offering at the public offering price of \$ _____ per share, the net tangible book value per share after the offering would be \$ _____ per share, the increase in the net tangible book value per share to existing stockholders would be \$ _____ per share and the dilution to new investors purchasing securities in this offering would be \$ _____ per share.

The number of shares of our common stock to be outstanding immediately after this offering is based on 43,898,785 shares of common stock outstanding as of June 30, 2016. Unless specifically stated otherwise, the information in this prospectus supplement is as of June 30, 2016 and excludes:

4,195,650 shares of our common stock issuable upon the exercise of stock options outstanding as of June 30, 2016, at a weighted average exercise price of \$5.15 per share, of which options to purchase 1,954,190 shares of our common stock were then exercisable;

5,340,877 shares of our common stock issuable upon the exercise of warrants (excluding the warrants offered hereby) at a weighted average exercise price of \$7.18 per share; and

an aggregate of 3,365,103 shares of our common stock reserved for future grants of stock options (or other similar equity instruments) under the Equity Incentive Plan.

Additionally, one of our outstanding warrants, which is currently exercisable for 60,000 shares of our common stock at an exercise price per share of \$2.50, contains so-called full-ratchet anti-dilution provisions which may be triggered by the issuance of the shares of our common stock and accompanying warrants being offered hereby or upon any future issuance by us of shares of our common stock or common stock equivalents at a per share price below the then-exercise price of the warrant, subject to some exceptions. Upon consummation of the offering, we anticipate that the

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exercise price of this outstanding warrant will be adjusted downward to the public offering price in this offering and the number of shares underlying this warrant will be increased to .

To the extent that options or warrants are exercised, new options are issued under the Equity Incentive Plan, or we issue additional equity or convertible debt securities in the future, there may be further dilution to investors participating in this offering. The above illustration of dilution per share to investors participating in this offering assumes no exercise of outstanding options or outstanding warrants to purchase shares of our common stock (including the potential exercise of the warrants offered by this prospectus supplement). 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.

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DESCRIPTION OF THE SECURITIES WE ARE OFFERING

In this offering, we are offering _____ shares of our common stock and warrants to purchase up to _____ shares of our common stock. Each warrant will have an exercise price of \$ _____ per share. No fractional warrants will be issued. The shares of our common stock and the warrants are immediately separable and will be issued separately.

Our authorized capital stock consists of 150,000,000 shares of common stock, par value \$0.001 per share, and 5,000,000 shares of preferred stock, par value \$0.001 per share. As of June 30, 2016, we had 43,898,785 shares of our common stock outstanding and zero shares of preferred stock outstanding. In addition, we had outstanding options to purchase an aggregate of 4,195,650 shares of our common stock at a weighted average exercise price of \$5.15 per share, of which options to purchase 1,954,190 shares of our common stock were then exercisable. As of June 30, 2016, there were warrants outstanding to purchase 5,340,877 shares of our common stock at a weighted average exercise price of \$7.18 per share. Additionally, one of our outstanding warrants, which is currently exercisable for 60,000 shares of our common stock at an exercise price per share of \$2.50, contains so-called full-ratchet anti-dilution provisions which may be triggered by the issuance of the shares of our common stock and accompanying warrants being offered hereby or upon any future issuance by us of shares of our common stock or common stock equivalents at a per share price below the then-exercise price of the warrant, subject to some exceptions. See "Dilution" on page S-13 of this prospectus supplement for more information about these possible anti-dilution adjustments.

Common Stock

The material terms and provisions of our common stock and each other class of our securities that qualifies or limits our common stock are described under the caption "Description of Capital Stock" starting on page 8 of the accompanying prospectus.

Warrants

The following is a brief summary of certain terms and conditions of the warrants we are offering and is subject in all respects to the provisions contained in the warrants. Certain provisions of the warrants are set forth herein but are only a summary and are qualified in their entirety by the relevant provisions of the warrant certificate and warrant agreement, the form of such warrant certificate and warrant agreement will be filed as exhibits to the registration statement of which this prospectus forms a part.

Form. The warrants will be issued pursuant to a warrant certificate and under a warrant agreement to be entered into between us and American Stock Transfer & Trust Company, LLC (the "Warrant Agent").

Exercisability. The warrants will be exercisable upon issuance and will expire on the five-year anniversary of issuance. The warrants will be exercisable, at the option of each holder, in whole or in part by delivering to us and the Warrant Agent a duly executed exercise notice and payment in full of the exercise price within two trading days in available funds for the number of shares of common stock purchased upon such exercise. If a registration statement registering the resale of the shares of common stock underlying the warrants under the Securities Act is not available, the holder may, in its sole discretion, elect to exercise the warrant through a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the warrant certificate. No fractional shares of common stock will be issued in connection with the exercise of a warrant. In lieu of fractional shares, we will issue a number of shares of our common stock rounded up to the nearest whole number.

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Failure to Timely Deliver Shares. If we fail to cause the Warrant Agent to deliver to the holder a certificate representing shares issuable upon exercise of a warrant or to credit the holder's balance account with Depository Trust Company for such number of shares of common stock to which the holder is entitled upon the holder's exercise of the warrant, in each case, by the delivery date set forth in the warrant, and if on or after such date the holder purchases the shares of our common stock to deliver in satisfaction of a sale by the holder of the underlying warrant shares that the holder anticipated receiving from us, then, within three business days of receipt of the holder's request, we, at the holder's discretion, will either (i) pay cash to the holder in an amount equal to the holder's total purchase price (including brokerage commissions, if any) for the shares of common stock purchased (the "buy-in price") at which point our obligation to deliver the underlying common stock will terminate, or (ii) promptly honor our obligation to deliver to the holder a certificate or certificates representing the underlying common stock or credit the holder's balance account with Depository Trust Company and pay cash to the holder in an amount equal to the excess (if any) of the buy-in price over the product of (A) the number of shares of common stock, times (B) the closing bid price on the date of exercise.

Exercise Limitation. In general, a holder will not have the right to exercise any portion of the warrant if the holder (together with its affiliates) would beneficially own in excess of 4.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the warrant certificate. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99% upon notice to us, provided that any increase in this limitation will not be effective until 61 days after such notice from the holder to us and such increase or decrease will apply only to the holder providing such notice.

Exercise Price; Anti-Dilution. Each warrant will be exercisable for the purchase of a share of common stock at an exercise price of \$ _____ per share, payable in U.S. dollars. The exercise price is subject to so called full-ratchet anti-dilution adjustment in the event of certain sales of our common stock at a price per share less than the exercise price then in effect (or securities convertible or exercisable into common stock, in general, at a conversion or exercise price less than the exercise price then in effect). In addition, the exercise price and the number of shares issuable upon exercise are subject to adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock, and also upon any distributions of assets, including cash, stock or other property to our stockholders.

Transferability. Subject to applicable laws, the warrants may be offered for sale, sold, transferred or assigned. There is currently no trading market for the warrants and a trading market is not expected to develop.

Exchange Listing. There is no established public trading market for the warrants, and we do not intend to apply to list the warrants on any securities exchange, including NASDAQ, or automated quotation system.

Fundamental Transactions. If a fundamental transaction (as defined below) occurs, then the successor entity will succeed to, and be substituted for us, and may exercise every right and power that we may exercise and will assume all of our obligations under the warrants with the same effect as if such successor entity had been named in the warrant itself. Additionally, upon consummation of a fundamental transaction pursuant to which holders of shares of our common stock are entitled to receive securities or other assets with respect to or in exchange for shares of our common stock, we will make appropriate provision to insure that the holder will thereafter have the right to receive upon an exercise of the warrant at any time after the consummation of the fundamental transaction but prior to the expiration date of the warrant, in lieu of shares of our common stock (or other securities, cash, assets or other property) purchasable upon the exercise of the warrant prior to such fundamental

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transaction, such shares of stock, securities, cash, assets or any other property whatsoever (including warrants or other purchase or subscription rights) which the holder would have been entitled to receive upon the happening of such fundamental transaction had the warrant been exercised immediately prior to such fundamental transaction. If holders of our common stock are given a choice as to the securities, cash or property to be received in a fundamental transaction, then the holder shall be given the same choice as to the consideration it receives upon any exercise of the warrant following such fundamental transaction. These provisions apply similarly and equally to successive fundamental transactions and other corporate events described in the warrant certificate and will be applied without regard to any limitations on the exercise of the warrant. In the event of certain fundamental transactions, at the request of the holder delivered before the 90th day after such fundamental transaction, we or the successor entity shall purchase the unexercised portion of the warrant from the holder by paying to the holder, within five business days after such request (or, if later, on the effective date of the fundamental transaction), cash in an amount equal to the Black-Scholes Value (as defined below) of the remaining unexercised portion of the warrant on the date of such fundamental transaction.

Rights as a Stockholder. Except as otherwise provided in the warrant certificate or by virtue of such holder's ownership of shares of our common stock, the holder of a warrant does not have the rights or privileges of a holder of our common stock, including any voting rights, until the holder exercises the warrant.

Definitions

The following terms have the meaning set forth below as used in this description:

"Black-Scholes Value" means the value of the warrant based on the Black-Scholes Option Pricing Model obtained from the "OV" function on Bloomberg Financial Market using (i) a price per share of common stock equal to the weighted average price of the common stock for the trading day immediately preceding the date of consummation of the applicable fundamental transaction, (ii) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the remaining term of the warrant as of the date of consummation of the applicable fundamental transaction and (iii) an expected volatility equal to the 30-day volatility obtained from the HVT function on Bloomberg determined as of the trading day following the public announcement of the applicable fundamental transaction.

"fundamental transaction" means that we shall, directly or indirectly, in one or more related transactions, (i) consolidate or merge with or into (whether or not we are the surviving corporation) another person, or (ii) sell, assign, transfer, convey or otherwise dispose of all or substantially all of our properties or assets to another person, or (iii) allow another person to make a purchase, tender or exchange offer that is accepted by the holders of more than the 50% of the outstanding shares of our common stock (not including any shares of our common stock held by the person or persons making or party to, or associated or affiliated with the persons making or party to, such purchase, tender or exchange offer), or (iv) consummate a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another person whereby such other person acquires more than the 50% of the outstanding shares of our common stock (not including any shares of our common stock held by the other person or other persons making or party to, or associated or affiliated with the other persons making or party to, such stock purchase agreement or other business combination), or (v) reorganize, recapitalize or reclassify our common stock, or (vi) any "person" or "group" (as these terms are used for purposes of Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") is or shall become the "beneficial owner" (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of 50% of the aggregate ordinary voting power represented by issued and outstanding common stock.

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MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES

The following discussion is a summary of the material U.S. federal income tax consequences of the purchase, ownership and disposition of the shares of our common stock and accompanying warrants or components thereof, which we refer to collectively as the Securities, issued pursuant to this offering, but does not purport to be a complete analysis of all potential tax effects. The effects of other U.S. federal tax laws, such as estate and gift tax laws, and any applicable state, local or foreign tax laws are not discussed. This discussion is based on the Internal Revenue Code of 1986, as amended (the "Code"), Treasury Regulations promulgated thereunder, judicial decisions, and published rulings and administrative pronouncements of the U.S. Internal Revenue Service (the "IRS"), in effect as of the date of this offering. These authorities may change or be subject to differing interpretations. Any such change or differing interpretation may be applied retroactively in a manner that could adversely affect a holder of the Securities. We have not sought and will not seek any rulings from the IRS regarding the matters discussed below. There can be no assurance the IRS or a court will not take a contrary position regarding the tax consequences of the purchase, ownership and disposition of the Securities.

This discussion is limited to holders that hold the Securities as a "capital asset" within the meaning of Section 1221 of the Code (property held for investment). This discussion does not address all U.S. federal income tax consequences relevant to a holder's particular circumstances, including the impact of the alternative minimum tax or the unearned income Medicare contribution tax. In addition, it does not address consequences relevant to holders subject to particular rules, including, without limitation:

U.S. expatriates and certain former citizens or long-term residents of the United States;

persons holding the Securities as part of a hedge, straddle or other risk reduction strategy or as part of a conversion transaction or other integrated investment;

banks, insurance companies, and other financial institutions;

brokers, dealers or traders in securities;

controlled foreign corporations, "passive foreign investment companies," and corporations that accumulate earnings to avoid U.S. federal income tax;

partnerships or other entities or arrangements treated as partnerships for U.S. federal income tax purposes (and investors therein);

tax-exempt organizations or governmental organizations;

persons deemed to sell the Securities under the constructive sale provisions of the Code;

persons for whom our stock constitutes "qualified small business stock" within the meaning of Section 1202 of the Code;

persons who hold or receive the Securities pursuant to the exercise of any employee stock option or otherwise as compensation; and

tax-qualified retirement plans.

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If a partnership (or other entity treated as a partnership for U.S. federal income tax purposes) holds the Securities, the tax treatment of a partner in the partnership will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. Accordingly, partnerships holding the Securities and the partners in such partnerships should consult their tax advisors regarding the U.S. federal income tax consequences to them.

THIS DISCUSSION IS FOR INFORMATION PURPOSES ONLY AND IS NOT INTENDED AS TAX ADVICE. INVESTORS SHOULD CONSULT THEIR TAX ADVISORS WITH RESPECT TO THE APPLICATION OF THE U.S. FEDERAL INCOME TAX LAWS TO THEIR PARTICULAR

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SITUATIONS AS WELL AS ANY TAX CONSEQUENCES OF THE PURCHASE, OWNERSHIP AND DISPOSITION OF THE SECURITIES ARISING UNDER THE U.S. FEDERAL ESTATE OR GIFT TAX LAWS OR UNDER THE LAWS OF ANY STATE, LOCAL OR NON-U.S. TAXING JURISDICTION OR UNDER ANY APPLICABLE INCOME TAX TREATY.

Each share of our common stock and accompanying warrant will be treated for U.S. federal income tax purposes as an investment unit consisting of one share of our common stock and a warrant to purchase _____ of a share of our common stock. In determining their tax basis for the common stock and warrant constituting a unit, holders of Securities should allocate their purchase price for the unit between the common stock and the warrant on the basis of their relative fair market values at the time of issuance. We do not intend to advise holders of the Securities with respect to this determination, and holders of the Securities are advised to consult their tax and financial advisors with respect to the relative fair market values of the common stock and the warrants for U.S. federal income tax purposes.

Tax Considerations Applicable to U.S. Holders

Definition of a U.S. Holder

For purposes of this discussion, a "U.S. holder" is any beneficial owner of the Securities that, for U.S. federal income tax purposes, is:

an individual who is a citizen or resident of the United States;

a corporation (or other entity treated as a corporation for U.S. federal income tax purposes) created or organized under the laws of the United States, any state thereof, or the District of Columbia;

an estate, the income of which is subject to U.S. federal income tax regardless of its source; or

a trust that (1) is subject to the primary supervision of a U.S. court and the control of one or more United States persons (within the meaning of Section 7701(a)(30) of the Code), or (2) has made a valid election under applicable Treasury Regulations to continue to be treated as a United States person.

Distributions

We do not anticipate declaring or paying dividends to holders of our common stock in the foreseeable future. However, if we do make distributions on our common stock, such distributions of cash or property on our common stock will constitute dividends to the extent paid out of our current or accumulated earnings and profits, as determined for U.S. federal income tax purposes. Dividends received by a corporate U.S. holder may be eligible for a dividends received deduction, subject to applicable limitations. Dividends received by certain non-corporate U.S. holders, including individuals, are generally taxed at the lower applicable capital gains rate provided certain holding period and other requirements are satisfied. Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital and first be applied against and reduce a U.S. holder's adjusted tax basis in its common stock, but not below zero. Any excess will be treated as capital gain and will be treated as described below in the section relating to the sale or disposition of our common stock.

Sale or Other Taxable Disposition of Common Stock

Upon the sale, exchange or other taxable disposition of the common stock, a U.S. holder generally will recognize capital gain or loss equal to the difference between (i) the amount of cash and the fair market value of any property received upon the sale, exchange or other taxable disposition and (ii) such U.S. holder's adjusted tax basis in the common stock. Such capital gain or loss will be

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long-term capital gain or loss if the U.S. holder's holding period in such common stock is more than one year at the time of the sale, exchange or other taxable disposition. Long-term capital gains recognized by certain non-corporate U.S. holders, including individuals, generally will be subject to reduced rates of U.S. federal income tax. The deductibility of capital losses is subject to certain limitations.

Sale or Other Disposition, Exercise or Expiration of Warrants

Upon the sale or other disposition of a warrant (other than by exercise), a U.S. holder will generally recognize capital gain or loss equal to the difference between the amount realized on the sale or other disposition and the U.S. holder's tax basis in the warrant. This capital gain or loss will be long-term capital gain or loss if the U.S. holder's holding period in such warrant is more than one year at the time of the sale or other disposition. The deductibility of capital losses is subject to certain limitations.

In general, a U.S. holder will not be required to recognize income, gain or loss upon exercise of a warrant for its exercise price. A U.S. holder's tax basis in a share of common stock received upon exercise of warrants will be equal to the sum of (1) the U.S. holder's tax basis in the warrants exchanged therefor and (2) the exercise price of such warrants. A U.S. holder's holding period in the shares of common stock received upon exercise will commence on the day after such U.S. holder exercises the warrants. Although there is no direct legal authority as to the U.S. federal income tax treatment of an exercise of a warrant on a cashless basis, we intend to take the position that such exercise will not be taxable, either because the exercise is not a gain realization event or because it qualifies as a tax-free recapitalization. In the former case, the holding period of the shares of common stock received upon exercise of warrants should commence on the day after the warrants are exercised. In the latter case, the holding period of the shares of common stock received upon exercise of warrants would include the holding period of the exercised warrants. However, our position is not binding on the IRS and the IRS may treat a cashless exercise of a warrant as a taxable exchange. U.S. holders are urged to consult their tax advisors as to the consequences of an exercise of a warrant on a cashless basis, including with respect to their holding period and tax basis in the common stock received.

If a warrant expires without being exercised, a U.S. holder will recognize a capital loss in an amount equal to such holder's tax basis in the warrant. Such loss will be long-term capital loss if, at the time of the expiration, the U.S. holder's holding period in such warrant is more than one year. The deductibility of capital losses is subject to certain limitations.

Constructive Dividends on Warrants

We do not anticipate declaring or paying dividends to holders of our common stock in the foreseeable future. However, if at any time during the period in which a U.S. holder holds warrants, we were to pay a taxable dividend to our stockholders and, in accordance with the anti-dilution provisions of the warrants, the exercise price of the warrants were decreased, that decrease would be deemed to be the payment of a taxable dividend to a U.S. holder of the warrants to the extent of our earnings and profits, notwithstanding the fact that such holder will not receive a cash payment. If the exercise price is adjusted in certain other circumstances (or in certain circumstances, there is a failure to make adjustments), such adjustments may also result in the deemed payment of a taxable dividend to a U.S. holder. U.S. holders should consult their tax advisors regarding the proper treatment of any adjustments to the exercise price of the warrants.

Information Reporting and Backup Withholding

A U.S. holder may be subject to information reporting and backup withholding when such holder receives payments on the common stock or warrants (including constructive dividends) or receives

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proceeds from the sale or other taxable disposition of common stock or warrants. Certain U.S. holders are exempt from backup withholding, including corporations and certain tax-exempt organizations. A U.S. holder will be subject to backup withholding if such holder is not otherwise exempt and such holder:

fails to furnish the holder's taxpayer identification number, which for an individual is ordinarily his or her social security number;

furnishes an incorrect taxpayer identification number;

is notified by the IRS that the holder previously failed to properly report payments of interest or dividends; or

fails to certify under penalties of perjury that the holder has furnished a correct taxpayer identification number and that the IRS has not notified the holder that the holder is subject to backup withholding.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a U.S. holder's U.S. federal income tax liability, provided the required information is timely furnished to the IRS. U.S. holders should consult their tax advisors regarding their qualification for an exemption from backup withholding and the procedures for obtaining such an exemption.

Tax Considerations Applicable to Non-U.S. Holders

For purposes of this discussion, a "Non-U.S. holder" is a beneficial owner of the Securities that is neither a U.S. holder nor an entity treated as a partnership for U.S. federal income tax purposes.

Distributions

We do not anticipate declaring or paying dividends to holders of our common stock in the foreseeable future. However, if we do make distributions on our common stock, such distributions of cash or property on our common stock will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. Amounts not treated as dividends for U.S. federal income tax purposes will constitute a return of capital and first be applied against and reduce a non-U.S. holder's adjusted tax basis in its common stock, but not below zero. Any excess will be treated as capital gain and will be treated as described below in the section relating to the sale or disposition of our common stock or warrants. Because we may not know the extent to which a distribution is a dividend for U.S. federal income tax purposes at the time it is made, for purposes of the withholding rules discussed below we or the applicable withholding agent may treat the entire distribution as a dividend.

Subject to the discussion below on backup withholding and foreign accounts, dividends paid to a non-U.S. holder of our common stock that are not effectively connected with the non-U.S. holder's conduct of a trade or business within the United States will be subject to U.S. federal withholding tax at a rate of 30% of the gross amount of the dividends (or such lower rate specified by an applicable income tax treaty).

Non-U.S. holders may be entitled to a reduction in or an exemption from withholding on dividends as a result of either (a) an applicable income tax treaty or (b) the non-U.S. holder holding our common stock in connection with the conduct of a trade or business within the United States and dividends being effectively connected with that trade or business. To claim such a reduction in or exemption from withholding, the non-U.S. holder must provide the applicable withholding agent with a properly executed (a) IRS Form W-8BEN or W-8BEN-E (or other applicable documentation) claiming an exemption from or reduction of the withholding tax under the benefit of an income tax treaty

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between the United States and the country in which the non-U.S. holder resides or is established, or (b) IRS Form W-8ECI stating that the dividends are not subject to withholding tax because they are effectively connected with the conduct by the non-U.S. holder of a trade or business within the United States, as may be applicable. These certifications must be provided to the applicable withholding agent prior to the payment of dividends and must be updated periodically. Non-U.S. holders that do not timely provide the applicable withholding agent with the required certification, but that qualify for a reduced rate under an applicable income tax treaty, may obtain a refund of any excess amounts withheld by timely filing an appropriate claim for refund with the IRS.

If dividends paid to a non-U.S. holder are effectively connected with the non-U.S. holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, the non-U.S. holder maintains a permanent establishment in the United States to which such dividends are attributable), then, although exempt from U.S. federal withholding tax (provided the non-U.S. holder provides appropriate certification, as described above), the non-U.S. holder will be subject to U.S. federal income tax on such dividends on a net income basis at the regular graduated U.S. federal income tax rates. In addition, a non-U.S. holder that is a corporation may be subject to a branch profits tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on its effectively connected earnings and profits for the taxable year that are attributable to such dividends, as adjusted for certain items. Non-U.S. holders should consult their tax advisors regarding their entitlement to benefits under any applicable income tax treaty.

Exercise of Warrants

A non-U.S. holder generally will not be subject to U.S. federal income tax on the exercise of warrants into shares of common stock. However, if a cashless exercise of warrants results in a taxable exchange, as described in "Tax Considerations Applicable to U.S. holders Sale or Other Disposition, Exercise or Expiration of Warrants," the rules described below under "Sale or Other Disposition of Common Stock or Warrants" would apply.

Sale or Other Disposition of Common Stock or Warrants

Subject to the discussions below on backup withholding and foreign accounts, a non-U.S. holder will not be subject to U.S. federal income tax on any gain realized upon the sale or other disposition of our common stock or warrants unless:

the gain is effectively connected with the non-U.S. holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, the non-U.S. holder maintains a permanent establishment in the United States to which such gain is attributable);

the non-U.S. holder is a nonresident alien individual present in the United States for 183 days or more during the taxable year of the disposition and certain other requirements are met; or

our common stock or warrants constitute U.S. real property interests, or USRPIs, by reason of our status as a U.S. real property holding corporation, or USRPHC, for U.S. federal income tax purposes.

Gain described in the first bullet point above will generally be subject to U.S. federal income tax on a net income basis at the regular graduated U.S. federal income tax rates. A non-U.S. holder that is a foreign corporation also may be subject to a branch profits tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on such effectively connected gain, as adjusted for certain items.

A non-U.S. holder described in the second bullet point above will be subject to U.S. federal income tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on any gain derived from the disposition, which may be offset by certain U.S. source capital losses of the

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non-U.S. holder (even though the individual is not considered a resident of the United States) provided the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses.

With respect to the third bullet point above, we believe we are not currently and do not anticipate becoming a USRPHC. Because the determination of whether we are a USRPHC depends on the fair market value of our USRPIs relative to the fair market value of our other business assets and our non-U.S. real property interests, however, there can be no assurance we are not a USRPHC or will not become one in the future. Even if we are or were to become a USRPHC, (i) gain arising from the sale or other taxable disposition by a non-U.S. holder of our common stock will not be subject to U.S. federal income tax if our common stock is "regularly traded," as defined by applicable Treasury Regulations, on an established securities market, and such non-U.S. Holder owned, actually and constructively, 5% or less of our common stock throughout the shorter of the five-year period ending on the date of the sale or other taxable disposition or the non-U.S. Holder's holding period and (ii) gain arising from the sale or other taxable disposition by a non-U.S. holder of a warrant generally will not be subject to U.S. federal income tax if our common stock is "regularly traded," as defined by applicable Treasury Regulations, on an established securities market, and on the non-U.S. Holder's acquisition date for such warrants, the warrants held by such non-U.S. holder had a fair market value equal to or less than the fair market value on that date of 5% of our common stock by such non-U.S. Holder.

Non-U.S. holders should consult their tax advisors regarding potentially applicable income tax treaties that may provide for different rules.

Constructive Dividends on Warrants

We do not anticipate declaring or paying dividends to holders of our common stock in the foreseeable future. However, if at any time during the period in which a non-U.S. holder holds warrants we were to pay a taxable dividend to our stockholders and, in accordance with the anti-dilution provisions of the warrants, the exercise price of the warrants were decreased, that decrease would be deemed to be the payment of a taxable dividend to a non-U.S. holder to the extent of our earnings and profits, notwithstanding the fact that such holder will not receive a cash payment. If the exercise price is adjusted in certain other circumstances (or in certain circumstances, there is a failure to make adjustments), such adjustments may also result in the deemed payment of a taxable dividend to a non-U.S. holder. Any resulting withholding tax attributable to deemed dividends may be collected from other amounts payable or distributable to the non-U.S. holder. Non-U.S. holders should consult their tax advisors regarding the proper treatment of any adjustments to the warrants.

Information Reporting and Backup Withholding

Subject to the discussion below on foreign accounts, a non-U.S. holder will not be subject to backup withholding with respect to distributions on our common stock we make to the non-U.S. holder, provided the applicable withholding agent does not have actual knowledge or reason to know such holder is a United States person and the holder certifies its non-U.S. status, such as by providing a valid IRS Form W-8BEN, W-8BEN-E or W-8ECI, or other applicable certification. However, information returns generally will be filed with the IRS in connection with any distributions (including deemed distributions) made on our common stock and warrants to the non-U.S. holder, regardless of whether any tax was actually withheld. Copies of these information returns may also be made available under the provisions of a specific treaty or agreement to the tax authorities of the country in which the non-U.S. holder resides or is established.

Information reporting and backup withholding may apply to the proceeds of a sale or other taxable disposition of our common stock or warrants within the United States, and information reporting may (although backup withholding generally will not) apply to the proceeds of a sale or other taxable

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disposition of our common stock or warrants outside the United States conducted through certain U.S.-related financial intermediaries, in each case, unless the beneficial owner certifies under penalty of perjury that it is a non-U.S. holder on IRS Form W-8BEN or W-8BEN-E, or other applicable form (and the payor does not have actual knowledge or reason to know that the beneficial owner is a U.S. person) or such owner otherwise establishes an exemption. Proceeds of a disposition of our common stock or warrants conducted through a non-U.S. office of a non-U.S. broker generally will not be subject to backup withholding or information reporting.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a non-U.S. holder's U.S. federal income tax liability, provided the required information is timely furnished to the IRS.

Additional Withholding Tax on Payments Made to Foreign Accounts

Withholding taxes may be imposed under the Foreign Account Tax Compliance Act, or FATCA, on certain types of payments made to non-U.S. financial institutions and certain other non-U.S. entities. Specifically, a 30% withholding tax may be imposed on dividends (including deemed dividends) paid on our common stock or warrants, or gross proceeds from the sale or other disposition of our common stock or warrants paid to a "foreign financial institution" or a "non-financial foreign entity" (each as defined in the Code), unless (1) the foreign financial institution undertakes certain diligence and reporting obligations, (2) the non-financial foreign entity either certifies it does not have any "substantial United States owners" (as defined in the Code) or furnishes identifying information regarding each substantial United States owner, or (3) the foreign financial institution or non-financial foreign entity otherwise qualifies for an exemption from these rules. If the payee is a foreign financial institution and is subject to the diligence and reporting requirements in (1) above, it must enter into an agreement with the U.S. Department of the Treasury requiring, among other things, that it undertake to identify accounts held by certain "specified United States persons" or "United States-owned foreign entities" (each as defined in the Code), annually report certain information about such accounts, and withhold 30% on certain payments to non-compliant foreign financial institutions and certain other account holders. Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United States governing FATCA may be subject to different rules.

Under the applicable Treasury Regulations and administrative guidance, withholding under FATCA generally applies to payments of dividends (including deemed dividends), and will apply to payments of gross proceeds from the sale or other disposition of common stock or warrants on or after January 1, 2019. Because we may not know the extent to which a distribution is a dividend for U.S. federal income tax purposes at the time it is made, for purposes of these withholding rules we or the applicable withholding agent may treat the entire distribution as a dividend. Prospective investors should consult their tax advisors regarding the potential application of these withholding provisions.

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We are offering the shares of common stock and accompanying warrants described in this prospectus through a number of underwriters. Cantor Fitzgerald & Co. is acting as the sole bookrunner of the offering and as the representative of the underwriters. We have entered into an underwriting agreement with the underwriters, dated _____, 2016. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of common stock and accompanying warrants listed next to its name in the following table:

Name	Number of Shares	Number of Accompanying Warrants
Cantor Fitzgerald & Co.]		
Roth Capital Partners, LLC		
Griffin Securities, Inc.		

Total

The underwriters are committed to purchase all the shares of common stock and accompanying warrants offered by us if they purchase any shares of common stock and accompanying warrants. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the shares of common stock and accompanying warrants directly to the public at the public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of \$ _____ per share and accompanying warrant. After the public offering, the offering price and other selling terms may be changed by the underwriters.

Option to Purchase Additional Shares

The underwriters have an option to buy up to _____ additional shares of our common stock and accompanying warrants (15% of the securities sold in this offering) from us to cover sales of shares of common stock and accompanying warrants by the underwriters which exceed the number of shares of common stock and accompanying warrants specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this over-allotment option. If any shares of common stock and accompanying warrants are purchased with this over-allotment option, the underwriters will purchase shares of common stock and accompanying warrants in approximately the same proportion as shown in the table above. If any additional shares of common stock and accompanying warrants are purchased, the underwriters will offer the additional shares of common stock and accompanying warrants on the same terms as those on which the shares of common stock and accompanying warrants are being offered.

Underwriting Discounts and Expenses

The underwriting fee is equal to the public offering price per share of common stock and accompanying warrant less the amount paid by the underwriters to us per share of common stock and accompanying warrant. The underwriting fee is 6.0% of the gross proceeds. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters

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assuming both no exercise and full exercise of the underwriters' option to purchase additional shares and accompanying warrants.

	Per Combined Share and Related Warrant	Total Without Over-allotment Option	Total With Over-allotment Option
Public offering price	\$	\$	\$
Underwriting discounts and commissions	\$	\$	\$
Proceeds to us, before expenses	\$	\$	\$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately \$.

Indications of Interest

Intrexon, a corporation affiliated with Randal J. Kirk, our largest stockholder who beneficially owns approximately 37.9% of our common stock, and our collaboration partner on our development programs, has indicated an interest in purchasing 37.9% of the shares of our common stock and accompanying warrants being offered in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, fewer or no securities in this offering to Intrexon and Intrexon may determine to purchase more, fewer or no securities in this offering.

Electronic Offer, Sale and Distribution of Securities

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of securities to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make Internet distributions on the same basis as other allocations. Other than the prospectus in electronic format, the information on these websites is not part of this prospectus supplement, the accompanying prospectus or the registration statement of which this prospectus supplement and the accompanying prospectus forms a part, has not been approved or endorsed by us or any underwriter in its capacity as underwriter, and should not be relied upon by investors.

Lock-Up Agreements

We have agreed subject to certain limited exceptions, including for business acquisitions, that we will not (1) offer for sale, sell, pledge, or otherwise dispose of (or enter into any transaction or device that is designed to, or would be expected to, result in the disposition by any person at any time in the future of) any shares of our common stock or securities convertible into or exercisable or exchangeable for our common stock, (2) enter into any swap or other derivatives transaction that transfers to another, in whole or in part, any of the economic benefits or risks of ownership of such shares of our common stock, (3) file or cause to be filed a registration statement, including any amendments thereto, with respect to the registration of any shares of our common stock or securities convertible, exercisable or exchangeable into our common stock or any other of our securities, or (4) publicly disclose the intention to do any of the foregoing, in each case without the prior written consent of Cantor Fitzgerald & Co. for a period of 90 days after the date of this prospectus.

Our directors and executive officers, and certain of our stockholders have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which each

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of these persons or entities, with limited exceptions, for a period of 90 days after the date of this prospectus, may not, without the prior written consent of Cantor Fitzgerald & Co., (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into, or exercisable or exchangeable for, our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such directors, executive officers, managers and members in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant) or (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of our common stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of common stock or such other securities, in cash or otherwise, or publicly announce any intention to do any of the foregoing.

Indemnification

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

Listing

Our common stock is listed on NASDAQ under the symbol "FCSC."

Price Stabilization and Short Positions

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of our common stock while this offering is in progress. These stabilizing transactions may include making short sales of our common stock, which involves the sale by the underwriters of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be "covered" shorts, which are short positions in an amount not greater than the underwriters' over-allotment option referred to above, or may be "naked" shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their over-allotment option, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the over-allotment option. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of our common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock, and, as a result, the price of our common stock may be higher than the price that otherwise might exist in the open

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market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on NASDAQ or otherwise.

Passive Market Making

In connection with this offering, the underwriters and selling group members may engage in passive market making transactions in our common stock on NASDAQ in accordance with Rule 103 of Regulation M under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), during a period before the commencement of offers or sales of the shares and extending through the completion of the distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security; however, if all independent bids are lowered below the passive market maker's bid, which bid must then be lowered when specified purchase limits are exceeded.

Affiliations

Certain of the underwriters and their affiliates have provided in the past to us and our affiliates, and may provide from time to time in the future, certain commercial banking, financial advisory, investment banking and other services for us and such affiliates in the ordinary course of their business, for which they have received and may continue to receive customary fees and commissions. In addition, from time to time, certain of the underwriters and their affiliates may effect transactions for their own account or the account of customers, and hold on behalf of themselves or their customers, long or short positions in our debt or equity securities or loans, and may do so in the future.

Discretionary Accounts

The underwriters do not intend to confirm sales of the securities offered hereby to any accounts over which they have discretionary authority.

Offer Restrictions outside the United States

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus supplement. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

United Kingdom

Neither the information in this document nor any other document relating to the offer has been delivered for approval to the Financial Services Authority in the United Kingdom and no prospectus (within the meaning of section 85 of the Financial Services and Markets Act 2000, as amended ("FSMA")) has been published or is intended to be published in respect of our common stock. This document is issued on a confidential basis to "qualified investors" (within the meaning of section 86(7) of FSMA) in the United Kingdom, and our common stock may not be offered or sold in the United Kingdom by means of this document, any accompanying letter or any other document, except in circumstances that do not require the publication of a prospectus pursuant to section 86(1) FSMA. This

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document should not be distributed, published or reproduced, in whole or in part, nor may its contents be disclosed by recipients to any other person in the United Kingdom.

Any invitation or inducement to engage in investment activity (within the meaning of section 21 of FSMA) received in connection with the issue or sale of our common stock has only been communicated or caused to be communicated and will only be communicated or caused to be communicated in the United Kingdom in circumstances in which section 21(1) of FSMA does not apply to us.

In the United Kingdom, this document is being distributed only to, and is directed at, persons (i) who have professional experience in matters relating to investments falling within Article 19(5) (investment professionals) of the Financial Services and Markets Act 2000 (Financial Promotions) Order 2005 ("FPO"), (ii) who fall within the categories of persons referred to in Article 49(2)(a) to (d) (high net worth companies, unincorporated associations, etc.) of the FPO or (iii) to whom it may otherwise be lawfully communicated (together "relevant persons"). The investments to which this document relates are available only to, and any invitation, offer or agreement to purchase will be engaged in only with, relevant persons. Any person who is not a relevant person should not act or rely on this document or any of its contents.

European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State"), from and including the date on which the European Union Prospectus Directive (the "EU Prospectus Directive") was implemented in that Relevant Member State (the "Relevant Implementation Date") an offer of securities described in this prospectus supplement may not be made to the public in that Relevant Member State prior to the publication of a prospectus in relation to the shares which has been approved by the competent authority in that Relevant Member State or, where appropriate, approved in another Relevant Member State and notified to the competent authority in that Relevant Member State, all in accordance with the EU Prospectus Directive, except that, with effect from and including the Relevant Implementation Date, an offer of securities described in this prospectus supplement may be made to the public in that Relevant Member State at any time:

to any legal entity which is a qualified investor as defined under the EU Prospectus Directive;

to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150 natural or legal persons (other than qualified investors as defined in the EU Prospectus Directive); or

in any other circumstances falling within Article 3(2) of the EU Prospectus Directive, provided that no such offer of our common stock shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the EU Prospectus Directive or supplement prospectus pursuant to Article 16 of the EU Prospectus Directive.

For the purposes of this provision, the expression an "offer to the public" in relation to any securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the securities to be offered so as to enable an investor to decide to purchase or subscribe for the securities, as the same may be varied in that Member State by any measure implementing the EU Prospectus Directive in that Member State. The expression "EU Prospectus Directive" means Directive 2003/71/EC (and any amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State) and includes any relevant implementing measure in each Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

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LEGAL MATTERS

The validity of the securities we are offering will be passed upon by Hogan Lovells US LLP. In connection with this offering, Goodwin Procter LLP, New York, New York advised the underwriters with respect to certain U.S. securities law matters.

EXPERTS

The consolidated financial statements of Fibrocell Science, Inc. as of December 31, 2015 and for the year ended December 31, 2015 and management's assessment of the effectiveness of internal control over financial reporting (which is included in Management's Report on Internal Control over Financial Reporting) as of December 31, 2015 incorporated herein by reference to the Annual Report on Form 10-K for the year ended December 31, 2015 have been so incorporated in reliance on the report, which contains an explanatory paragraph relating to the Company's ability to continue as a going concern as described in Note 1 to the consolidated financial statements, of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

The consolidated financial statements of Fibrocell Science, Inc. as of December 31, 2014 and for the years ended December 31, 2014 and December 31, 2013 appearing in Fibrocell Science, Inc.'s 2015 Annual Report on Form 10-K have been audited by BDO USA, LLP, an independent registered public accounting firm, as set forth in their report thereon, included therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus supplement and the accompanying prospectus are part of the registration statement on Form S-3 we filed with the SEC under the Securities Act and do not contain all the information set forth in the registration statement. Whenever a reference is made in this prospectus supplement and the accompanying prospectus to any of our contracts, agreements or other documents, the reference may not be complete and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated herein by reference for a copy of such contract, agreement or other document. Because we are subject to the information and reporting requirements of the Exchange Act, we file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov>. You may also read and copy any document we file at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room.

We make available free of charge on our website our annual, quarterly and current reports, including amendments to such reports, as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the SEC. Please note, however, that we have not incorporated any other information by reference from our website, other than the documents listed under the heading "Incorporation of Certain Information by Reference" on page S-31 of this prospectus supplement. In addition, you may request copies of these filings at no cost by writing or telephoning us at the following address or telephone number:

Office of the Corporate Secretary
Fibrocell Science, Inc.
405 Eagleview Blvd.
Exton, Pennsylvania 19341
(484) 713-6000

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INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" information into this prospectus supplement. This means that we can disclose important information to you by referring you to other documents we have filed separately with the SEC, without actually including the specific information in this prospectus supplement. The information incorporated by reference is considered to be part of this prospectus supplement, and information that we file later with the SEC (and that is deemed to be "filed" with the SEC) will automatically update, and may supersede, information in this prospectus supplement.

Our Annual Report on Form 10-K for the year ended December 31, 2015 filed with the SEC on March 10, 2016;

Our Quarterly Report on Form 10-Q for the quarter ended March 31, 2016 filed with the SEC on May 5, 2016;

Our Quarterly Report on Form 10-Q for the quarter ended June 30, 2016 filed with the SEC on August 4, 2016;

Our Definitive Proxy Statement on Schedule 14A filed with the SEC on April 29, 2016, to the extent incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2015;

Our Current Reports on Form 8-K filed with the SEC on January 4, 2016 (except Item 7.01 and Exhibit 99.2), January 21, 2016, April 18, 2016 (except Items 2.02 and 7.01 and Exhibits 99.1 and 99.2), April 25, 2016 (except Item 7.01 and Exhibit 99.1), June 8, 2016, June 27, 2016, June 30, 2016 and July 27, 2016; and

The description of our common stock contained in our registration statement on Form 8-A (File No. 001-31564) filed on August 28, 2014, under the Exchange Act, including any amendment or report filed for the purpose of updating such description.

All reports and other documents subsequently filed by us pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act after the date of this prospectus supplement and prior to the termination or completion of the offering of securities under this prospectus shall be deemed to be incorporated by reference in this prospectus and to be a part hereof from the date of filing such reports and other documents.

To obtain copies of these filings, see "Where You Can Find More Information" on page S-30 of this prospectus supplement.

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PROSPECTUS

Fibrocell Science, Inc.
\$150,000,000
Common Stock, Preferred Stock,
Debt Securities, Warrants, Units And Subscription Rights

This prospectus covers our offer and sale from time to time of any combination of common stock, preferred stock, debt securities, warrants, units or subscription rights described in this prospectus in one or more offerings. This prospectus provides a general description of the securities we may offer and sell. Each time we offer and sell securities we will provide specific terms of the securities offered in a supplement to this prospectus. The prospectus supplement may also add, update or change information contained in this prospectus. The aggregate offering price of all securities sold by us under this prospectus may not exceed \$150,000,000.

The securities may be offered and sold by us from time to time at fixed prices, at market prices or at negotiated prices, and may be offered and sold to or through one or more underwriters, dealers or agents or directly to purchasers on a continuous or delayed basis. See "Plan of Distribution" in this prospectus and in the applicable prospectus supplement.

Our common stock is currently listed on The NASDAQ Capital Market on The Nasdaq Stock Market LLC ("NASDAQ") under the symbol "FCSC". On January 20, 2016, the last reported sale price of our common stock on NASDAQ was \$2.96 per share.

You should rely only on the information contained or incorporated by reference in this prospectus. We have not authorized any other person to provide you with different information.

Investing in these securities involves risks, including those set forth in the "Risk Factors" section of our most recent Annual Report on Form 10-K, as revised or supplemented by our Quarterly Reports on Form 10-Q filed with the SEC since the filing of our most recent Annual Report on Form 10-K, each of which is incorporated by reference into this prospectus. We may include specific risk factors in supplements to this prospectus under the caption "Risk Factors." This prospectus may not be used to sell our securities unless accompanied by a prospectus supplement.

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

This prospectus is dated February 9, 2016.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the SEC. This prospectus covers the primary offering by us of up to an aggregate of \$150,000,000 of securities. We may offer and sell any combination of the securities described in this prospectus in one or more offerings. This prospectus provides you with a general description of the securities we may offer and sell. Each time we offer and sell securities under this prospectus, we will provide a prospectus supplement 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 "Where You Can Find More Information."

We have filed or incorporated by reference exhibits to the registration statement of which this prospectus forms a part. You should read the exhibits carefully for provisions that may be important to you.

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

We have not authorized any dealer, salesman or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus and any accompanying supplement to this prospectus. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus or any accompanying prospectus supplement. This prospectus and any accompanying supplement to this prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus and any accompanying supplement to this prospectus constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

"Fibrocell," "Company," "we," "us" and "our" refer to Fibrocell Science, Inc. and its consolidated subsidiaries.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You may read and copy any document we file with the SEC at the SEC's public reference room at 100 F Street N.E., Washington, D.C. 20549. You may obtain information on the operation of the SEC's public reference facilities by calling the SEC at 1-800-SEC-0330. You can request copies of these documents, upon payment of a duplicating fee, by writing to the SEC at its principal office at 100 F Street NE, Room 1580, Washington, D.C. 20549-1004. The SEC maintains an Internet website at www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our SEC filings are accessible through the Internet at that website. Our reports on Forms 10-K, 10-Q and 8-K, and amendments to those reports, are also available for download, free of charge, as soon as reasonably practicable after these reports are filed with the SEC, at our website at www.fibrocell.com. The content contained in, or that can be accessed through, our website is not a part of this prospectus.

INCORPORATION OF INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" the information we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and information that we file later

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with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below:

Our Annual Report on Form 10-K for the fiscal year ended December 31, 2014 that we filed with the SEC on March 13, 2015;

Our Quarterly Report on Form 10-Q for the quarter ended March 31, 2015 that we filed with the SEC on May 8, 2015;

Our Quarterly Report on Form 10-Q for the quarter ended June 30, 2015 that we filed with the SEC on August 7, 2015;

Our Quarterly Report on Form 10-Q for the quarter ended September 30, 2015 that we filed with the SEC on November 5, 2015;

Our Definitive Proxy Statement on Schedule 14A filed with the SEC on April 30, 2015, to the extent incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2014;

Our Current Reports on Form 8-K filed with the SEC on March 18, 2015, April 21, 2015 (except Item 7.01 and Exhibit 99.1), May 1, 2015, May 12, 2015, June 8, 2015 (except Item 7.01 and Exhibit 99.1), June 24, 2015, July 20, 2015 (except Item 7.01 and Exhibit 99.1), July 21, 2015 (except for Item 2.02 and Exhibit 99.1), July 22, 2015, July 27, 2015, September 8, 2015, September 16, 2015, September 25, 2015, January 4, 2016 (excluding Item 7.01 and Exhibit 99.2), January 8, 2016 (including Item 2.02 but excluding Item 7.01 and Exhibit 99.1) (Our independent registered public accounting firm, PricewaterhouseCoopers LLP, has not audited, reviewed, compiled, or performed any procedures with respect to the preliminary financial data contained in Item 2.02. Accordingly, PricewaterhouseCoopers LLP does not express an opinion or any other form of assurance with respect thereto.) and January 21, 2016;

The description of our common stock contained in our registration statement on Form S-3, filed on August 15, 2013, which description is incorporated in the Form 8-A filed with the SEC on August 28, 2014, and any amendment or reports filed for the purpose of updating that description;

All documents filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, after the date of the initial filing of the registration statement of which this prospectus is a part and prior to the effectiveness of such registration statement; and

All documents filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the date of this prospectus and before we stop offering the securities under this prospectus.

We will provide without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon his or her written or oral request, a copy of any or all documents referred to above which have been or may be incorporated by reference into this prospectus but not delivered with this prospectus excluding exhibits to those documents unless they are specifically incorporated by reference into those documents. You can request those documents from Fibrocell Science, Inc., 405 Eagleview Boulevard, Exton, Pennsylvania 19341, Attention: Chief Financial Officer, telephone (484) 713-6000.

The most recent information that we file with the SEC automatically updates and supersedes older information. The information contained in any such filing will be deemed to be a part of this prospectus, commencing on the date on which the filing is made.

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Information furnished under Items 2.02 or 7.01 (or corresponding information furnished under Item 9.01 or any corresponding exhibit) in any past or future Current Report on Form 8-K that we file with the SEC, unless otherwise specified in such report or this prospectus, is not incorporated by reference in this prospectus.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference in this prospectus contain forward-looking statements. All statements that address operating performance, events or developments that we expect or anticipate will occur in the future are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "could," "would," "expects," "plans," "anticipates," "believes," "estimates," "projects," "predicts," "potential" and similar expressions intended to identify forward-looking statements.

These forward-looking statements are based on management's beliefs and assumptions and on information currently available to our management. Our management believes that these forward-looking statements are reasonable as and when made. However, you should not place undue reliance on any such forward-looking statements because such statements speak only as of the date when made. We do not undertake any obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. In addition, forward-looking statements are subject to certain risks and uncertainties that could cause actual results, events and developments to differ materially from our historical experience and our present expectations or projections. Before making an investment decision, you should carefully consider these risks as well as any other information we include or incorporate by reference in this prospectus or include in any applicable prospectus supplement. You should read this prospectus and the documents that we have filed as exhibits to the registration statement of which this prospectus forms a part in their entireties.

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RISK FACTORS

Our business is influenced by many factors that are difficult to predict, and that involve uncertainties that may materially affect actual operating results, cash flows and financial condition. Before making an investment decision, you should carefully consider these risks, including those set forth in the "Risk Factors" section of our most recent Annual Report on Form 10-K, as revised or supplemented by our Quarterly Reports on Form 10-Q filed with the SEC since the filing of our most recent Annual Report on Form 10-K, each of which is incorporated by reference into this prospectus, and you should also carefully consider any other information we include or incorporate by reference in this prospectus or include in any applicable prospectus supplement.

FIBROCELL SCIENCE, INC.

Overview

We are an autologous cell and gene therapy company translating personalized biologics into medical breakthroughs. All of our product candidates use our proprietary autologous fibroblast technology. Fibroblasts are the most common cells located in skin and connective tissue and are responsible for synthesizing extracellular matrix proteins that provide cellular structure and support. Our autologous fibroblast technology uses our patented manufacturing process, which involves collecting small skin biopsies from patients, separating the tissue into its component cells, then expanding the fibroblast cells using classic tissue culture techniques until the numbers are adequate for repeated injection. In this manner, each patient is treated with cells that were cultivated from his or her own dermal tissue (i.e., autologous).

Our current clinical and preclinical development program pipeline consists of the following:

Our most advanced development program is azficel-T for the treatment of chronic dysphonia resulting from vocal cord scarring or atrophy. We are currently in a Phase II clinical trial for this indication. We have completed dosing in this trial and expect to announce efficacy results in the second quarter of 2016.

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In collaboration with Intrexon, we are also in preclinical development with two gene-therapy product candidates. Our lead gene-therapy product candidate, FCX-007, has received orphan drug designation as well as rare pediatric disease designation from the U.S. Food and Drug Administration ("FDA") and is in late-stage preclinical development for the treatment of recessive dystrophic epidermolysis bullosa ("RDEB"), a devastating, rare, congenital, painful, progressive blistering skin disease that typically leads to premature death. We are also in preclinical development of our second gene-therapy product candidate, FCX-013, for the treatment of linear scleroderma, an excess production of extracellular matrix characterized by skin fibrosis and linear scars. We plan to seek orphan drug designation for FCX-013.

We also recently expanded our collaboration with Intrexon to pursue the research, development and commercialization of products for the treatment of chronic inflammation and degenerative diseases of human joints, including arthritis and other related conditions, through intra-articular or other local administration of genetically modified fibroblasts.

Development Programs

Azficel-T for Chronic Dysphonia

Dysphonia is a reduction in vocal capacity and is caused by damage to the fibroblast layer of the vocal cords, which limits airflow and results in severe and significant limitations in voice quality. Depending on the severity of dysphonia, a patient's resulting voice is hoarse or raspy and is perceived by sufferers as a communication disorder. Severe cases can lead to a total loss of voice. We estimate that approximately 64,000 patients in the U.S. suffer with vocal fold scarring resulting in chronic or severe dysphonia. No long-term effective therapy is presently available, and rehabilitation of subjects (for example, with voice therapy) is difficult. In our Phase I clinical trial of azficel-T for chronic dysphonia, which involved a feasibility study to determine the safety and efficacy of injections for the treatment of chronic dysphonia in patients who had failed to improve following currently available treatments, a positive trend of sustained improvement was noted in a majority of clinical trial subjects. Our Phase II clinical trial for chronic dysphonia currently in progress is a double-blind, randomized, placebo-controlled trial that is designed to test the safety and efficacy of azficel-T in subjects with chronic dysphonia caused by idiopathic vocal cord scarring or atrophy. Efficacy endpoints will be assessed four months after administration of final treatment. We have completed dosing in this trial and expect to report efficacy results in the second quarter of 2016.

FCX-007 for RDEB

Recessive dystrophic epidermolysis bullosa is a congenital, progressive, devastatingly painful and debilitating genetic disorder that often leads to death, and is the most severe form of dystrophic epidermolysis bullosa ("DEB"). RDEB is caused by a mutation of the COL7A1 gene, the gene which encodes for type VII collagen ("COL7"), a protein that forms anchoring fibrils. Anchoring fibrils hold together the layers of skin, and without them, skin layers separate causing severe blistering, open wounds and scarring in response to any kind of friction, including normal daily activities like rubbing or scratching. Children who inherit the condition are often called "butterfly children" because their skin is as fragile as a butterfly's wings. We estimate that there are approximately 1,100 - 2,500 RDEB patients in the United States. Current treatments for RDEB address only the sequelae, including daily bandaging, hydrogel dressings, antibiotics, feeding tubes and surgeries.

FCX-007, our lead gene-therapy product candidate, is an autologous fibroblast cell genetically modified to express COL7. We are developing FCX-007 in collaboration with Intrexon. We submitted an investigational new drug application ("IND") for FCX-007 to the FDA in July 2015. In September 2015, we received feedback from the FDA on the IND which required us to delay the initiation of our proposed Phase I/II clinical trial. The FDA's feedback related to the areas of chemistry, manufacturing

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and controls ("CMC"), toxicology and our proposed Phase I/II clinical trial protocol. Although the hybrid pharmacology/toxicology study performed based on the injection of FCX-007 into human skin that was xenografted onto SCID (severe combined immunodeficiency) mice was included in the IND and showed no signs of toxicity, the FDA requested that we execute a toxicology-specific study in which FCX-007 will be injected in non-grafted SCID mice. We have initiated this new toxicology study, and we expect to amend the IND in response to the FDA's feedback and to include data from the new study in the first quarter of 2016. As a result, we now expect to initiate a Phase I/II clinical trial for FCX-007 in the second quarter of 2016 subject to successful completion of the new toxicology study and addressing the FDA's other feedback.

FCX-013 for Linear Scleroderma

Linear scleroderma is a localized autoimmune skin disorder that manifests as excess production of extracellular matrix characterized by fibrosis and linear scars. The linear areas of skin thickening may extend to underlying tissue and muscle in children which may impair growth and development. Lesions appearing across joints can be painful, impair motion and may be permanent. Current treatments only address symptoms, including systemic or topical corticosteroids, UVA light therapy and physical therapy.

Our second gene-therapy product candidate, FCX-013, is also being developed in collaboration with Intrexon and is currently in preclinical development for the treatment of linear scleroderma. Our product development efforts to date have included gene selection and design, transduction efficiency and protein expression analysis, ligand development for use in connection with Intrexon's proprietary RheoSwitch Therapeutic System ("RTS") expression technology and analytical assay design. RTS is a biologic switch activated by a small molecule ligand that provides the ability to control level and timing of protein expression in those diseases where such control is critical. We have also successfully completed a proof-of-concept study for FCX-013 in which the primary objective was to determine whether the product candidate had the potential to reduce dermal thickness in fibrotic tissue. In this study, FCX-013 was evaluated in a bleomycin-induced scleroderma model, utilizing SCID mice. Data from the study demonstrated that FCX-013 reduced dermal thickness of fibrotic tissue to levels similar to non-bleomycin (saline) treated skin and further reduced the thickness of the sub-dermal muscle layer. FCX-013 will now be advanced into dose ranging studies for product optimization. We expect to submit an IND for FCX-013 to the FDA in 2017.

Research Collaboration with UCLA

We have a scientific research collaboration with the Regents of the University of California, Los Angeles ("UCLA") focusing on discoveries and technologies related to regenerative medicine. The technologies from this collaboration with UCLA may provide new development programs.

Commercial Programs

LAVIV (azficel-T) for Nasolabial Fold Wrinkles

LAVIV (azficel-T) is an FDA-approved biological product that uses our proprietary autologous fibroblast technology for the improvement of the appearance of moderate to severe nasolabial fold wrinkles in adults. In 2013, we shifted our strategic focus to rare skin and connective tissue diseases, resulting in the clinical and preclinical product candidates mentioned above. As a result, we no longer actively market or promote LAVIV to physicians but will continue to accept prescriptions, for which we expect a nominal amount in 2016. Given the limited use of LAVIV, we are experiencing difficulties in recruiting a sufficient number of subjects for the postmarketing study that the FDA required as a condition for the approval of LAVIV. We are actively engaged in discussions with the FDA about how to fulfill the requirement in light of the limited population of LAVIV users.

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Corporate Information

Our corporate headquarters is located at 405 Eagleview Boulevard, Exton, Pennsylvania 19341. Our phone number is (484) 713-6000. Our corporate website is www.fibrocell.com. We make available free of charge on our website our annual, quarterly and current reports, including amendments to such reports, as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the SEC. Information contained on our website is not incorporated by reference into this prospectus supplement or the accompanying prospectus, and you should not consider information contained on our website as part of this prospectus supplement or the accompanying prospectus.

USE OF PROCEEDS

Unless otherwise indicated in a prospectus supplement, we anticipate that the net proceeds from our sale of any securities will be used to fund the development of our clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding our working capital needs. We expect from time to time to evaluate the acquisition of businesses, products and technologies for which a portion of the net proceeds may be used, although we currently are not planning or negotiating any such transactions. Pending such uses, we may invest the net proceeds in investment grade interest-bearing securities.

The amounts actually expended for each purpose may vary significantly depending upon numerous factors, including the amount and timing of the proceeds from the offering and progress with our clinical development programs. Expenditures will also depend upon the establishment of collaborative arrangements with other companies, the availability of additional financing and other factors. Investors will be relying on the judgment of our management regarding the application of the proceeds of any sale of securities.

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RATIO OF EARNINGS TO FIXED CHARGES

Any time debt securities are offered pursuant to this prospectus, we will provide a table setting forth our ratio of earnings to fixed charges on a historical basis in the applicable prospectus supplement, if required.

GENERAL DESCRIPTION OF SECURITIES WE MAY OFFER

We may offer shares of our common stock and preferred stock, various series of debt securities, warrants or units or subscription rights to purchase any of such securities, with a total value of up to \$150,000,000, from time to time in one or more offerings under this prospectus at prices and on terms to be determined by market conditions at the time of the offering. This prospectus provides you with a general description of the securities that we may offer. In connection with each offering, we will provide a prospectus supplement that will describe the specific amounts, prices and terms of the securities being offered, including, to the extent applicable:

designation or classification;

aggregate offering price;

rates and times of payment of dividends;

redemption, conversion or exchange terms;

conversion or exchange prices or rates and any provisions for changes to or adjustments in the conversion or exchange prices or rates and in the securities or other property receivable upon conversion or exchange;

restrictive covenants;

voting or other rights; and

important federal income tax considerations.

The prospectus supplement also may add, update or change information contained in this prospectus or in documents we have incorporated by reference. However, no prospectus supplement will offer a security that is not included in the Registration Statement at the time of its effectiveness or offer a security of a type that is not described in this prospectus.

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

DESCRIPTION OF CAPITAL STOCK

Our authorized capital stock consists of 100,000,000 shares of common stock, par value \$0.001 per share, and 5,000,000 shares of preferred stock, par value \$0.001 per share. As of January 20, 2016, we had 43,898,785 shares of our common stock outstanding and zero shares of preferred stock outstanding. In addition, we had outstanding options to purchase 3,133,344 shares of common stock outstanding at a weighted average exercise price of \$6.23 per share and warrants to purchase 5,666,779 shares of common stock outstanding at a weighted average exercise price of \$7.14 per share.

Common Stock

Voting Rights

Each stockholder is entitled to one vote for each share of common stock held on all matters submitted to a vote of stockholders. Cumulative voting for any purpose is not authorized.

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Dividends

Subject to preferences that may be applicable to any preferred stock outstanding at the time, the holders of our common stock shall be entitled to receive such dividends, if any, as may be declared from time to time by our board of directors without distinction to series.

Liquidation

Upon the liquidation, dissolution or winding up of our company, the remaining assets legally available for distribution to stockholders, after payment of claims or creditors and payment of liquidation preferences, if any, on outstanding preferred stock, are distributable ratably among the holders of our common stock and any participating preferred stock outstanding at that time. Each outstanding share of common stock is fully paid and nonassessable.

No Preemptive or Similar Rights

Our common stock is not subject to conversion or redemption and holders of our common stock are not entitled to preemptive rights.

Anti-Takeover Effects of Provisions of Delaware Law and our Charter Documents

Provisions of Delaware law and our Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation"), and Fourth Amended and Restated Bylaws (the "Bylaws") could make the acquisition of our company through a tender offer, a proxy contest or other means more difficult and could make the removal of incumbent officers and directors more difficult. We expect these provisions to discourage coercive takeover practices and inadequate takeover bids and to encourage persons seeking to acquire control of our company to first negotiate with our Board of Directors. We believe that the benefits provided by our ability to negotiate with the proponent of an unfriendly or unsolicited proposal outweigh the disadvantages of discouraging these proposals. We believe the negotiation of an unfriendly or unsolicited proposal could result in an improvement of its terms.

Our Certificate of Incorporation provides for our Board of Directors to be divided into three classes serving staggered terms. Approximately one-third of the Board of Directors will be elected each year. The provision for a classified board could prevent a party who acquires control of a majority of the outstanding voting stock from obtaining control of the Board of Directors until the second annual stockholders' meeting following the date the acquirer obtains the controlling stock interest. The classified board provision could discourage a potential acquirer from making a tender offer or otherwise attempting to obtain control of our company and could increase the likelihood that incumbent directors will retain their positions.

Our Bylaws do not permit stockholders to call a special meeting of stockholders. Our Bylaws provide that special meetings of the stockholders may be called only by a majority of the members of our Board of Directors, our Chairman of the Board of Directors, our Chief Executive Officer or our President. Our Bylaws require that all stockholder actions be taken by a vote of the stockholders at an annual or special meeting, and do not permit our stockholders to act by written consent without a meeting. Our Bylaws provide for an advance notice procedure for stockholder proposals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to the Board of Directors. At an annual meeting, stockholders may only consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of the Board of Directors. Stockholders may also consider a proposal or nomination by a person who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given to our Secretary timely written notice, in proper form, of his, her or its intention to bring that business before the meeting. The Bylaws do not give our Board of Directors the power to approve or disapprove stockholder nominations of candidates or proposals regarding other business to

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be conducted at a special or annual meeting of the stockholders. However, our Bylaws may have the effect of precluding the conduct of business at a meeting if the proper procedures are not followed. These provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

Preferred Stock

Our Board of Directors has the authority, without action by our stockholders, to designate and issue preferred stock in one or more series. Our Board of Directors may also designate the rights, preferences and privileges of each series of preferred stock, any or all of which may be greater than the rights of the common stock. It is not possible to state the actual effect of the issuance of any shares of preferred stock on the rights of holders of the common stock until our Board of Directors determines the specific rights of the holders of the preferred stock. However, these effects might include: (a) restricting dividends on the common stock; (b) diluting the voting power of the common stock; (c) impairing the liquidation rights of the common stock; and (d) delaying or preventing a change in control of our company without further action by our stockholders.

DESCRIPTION OF DEBT SECURITIES

This prospectus describes certain general terms and provisions of our debt securities. When we offer to sell a particular series of debt securities, we will describe the specific terms of the series in a supplement to this prospectus. The following description of debt securities will apply to the debt securities offered by this prospectus unless we provide otherwise in the applicable prospectus supplement. The applicable prospectus supplement for a particular series of debt securities may specify different or additional terms.

We may offer under this prospectus up to \$150,000,000 aggregate principal amount of secured or unsecured debt securities, or if debt securities are issued at a discount, or in a foreign currency or composite currency, such principal amount as may be sold for a public offering price of up to \$150,000,000. The debt securities may be either senior debt securities, senior subordinated debt securities or subordinated debt securities. The debt securities offered hereby will be issued under an indenture between us and a trustee. A form of indenture, which will be qualified under, subject to, and governed by, the Trust Indenture Act of 1939, as amended, is filed as an exhibit to the registration statement.

General

The terms of each series of debt securities will be established by or pursuant to a resolution of our board of directors and detailed or determined in the manner provided in a board of directors' resolution, an officers' certificate or by an indenture. The particular terms of each series of debt securities will be described in a prospectus supplement relating to the series, including any pricing supplement.

We can issue debt securities that may be in one or more series with the same or various maturities, at par, at a premium or at a discount. We will set forth in a prospectus supplement, including any pricing supplement, relating to any series of debt securities being offered, the initial offering price, the aggregate principal amount and the following terms of the debt securities:

the title of the debt securities;

the price or prices (expressed as a percentage of the aggregate principal amount) at which we will sell the debt securities;

any limit on the aggregate principal amount of the debt securities;

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the date or dates on which we will pay the principal on the debt securities;

the rate or rates (which may be fixed or variable) per annum or the method used to determine the rate or rates (including any commodity, commodity index, stock exchange index or financial index) at which the debt securities will bear interest, the date or dates from which interest will accrue, the date or dates on which interest will commence and be payable and any regular record date for the interest payable on any interest payment date;

the place or places where the principal of, and premium and interest on, the debt securities will be payable;

the terms and conditions upon which we may redeem the debt securities;

any obligation we have to redeem or purchase the debt securities pursuant to any sinking fund or analogous provisions or at the option of a holder of debt securities;

the dates on which and the price or prices at which we will repurchase the debt securities at the option of the holders of debt securities and other detailed terms and provisions of these repurchase obligations;

the denominations in which the debt securities will be issued, if other than denominations of \$1,000 and any integral multiple thereof;

whether the debt securities will be issued in the form of certificated debt securities or global debt securities;

the portion of principal amount of the debt securities payable upon declaration of acceleration of the maturity date, if other than the principal amount;

the currency of denomination of the debt securities;

the designation of the currency, currencies or currency units in which payment of principal of, and premium and interest on, the debt securities will be made;

if payments of principal of, and premium or interest on, the debt securities will be made in one or more currencies or currency units other than that or those in which the debt securities are denominated, the manner in which the exchange rate with respect to these payments will be determined;

the manner in which the amounts of payment of principal of, and premium or interest on, the debt securities will be determined, if these amounts may be determined by reference to an index based on a currency or currencies other than that in which the debt securities are denominated or designated to be payable or by reference to a commodity, commodity index, stock exchange index or financial index;

any provisions relating to any security provided for the debt securities;

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any addition to or change in the events of default described in this prospectus or in the indenture with respect to the debt securities and any change in the acceleration provisions described in this prospectus or in the indenture with respect to the debt securities;

any addition to or change in the covenants described in this prospectus or in the indenture with respect to the debt securities;

any other terms of the debt securities, which may modify or delete any provision of the indenture as it applies to that series; and

any depositaries, interest rate calculation agents, exchange rate calculation agents or other agents with respect to the debt securities.

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We may issue debt securities that are exchangeable and/or convertible into other securities. The terms, if any, on which the debt securities may be exchanged and/or converted will be set forth in the applicable prospectus supplement. Such terms may include provisions for conversion, either mandatory, at the option of the holder or at our option, in which case the number of securities to be received by the holders of debt securities would be calculated as of a time and in the manner stated in the prospectus supplement.

We may issue debt securities that provide for an amount less than their stated principal amount to be due and payable upon declaration of acceleration of their maturity pursuant to the terms of the indenture. We will provide you with information on the federal income tax considerations and other special considerations applicable to any of these debt securities in the applicable prospectus supplement.

If we denominate the purchase price of any of the debt securities in a foreign currency or currencies or a foreign currency unit or units, or if the principal of and any premium and interest on any series of debt securities is payable in a foreign currency or currencies or a foreign currency unit or units, we will provide you with information on the restrictions, elections, general tax considerations, specific terms and other information with respect to that issue of debt securities and such foreign currency or currencies or foreign currency unit or units in the applicable prospectus supplement.

Payment of Interest and Exchange

Each debt security will be represented by either one or more global securities registered in the name of The Depository Trust Company, as Depository, or a nominee of the Depository (we will refer to any debt security represented by a global debt security as a book-entry debt security), or a certificate issued in definitive registered form (we will refer to any debt security represented by a certificated security as a certificated debt security), as described in the applicable prospectus supplement.

Certificated Debt Securities

You may transfer or exchange certificated debt securities at the trustee's office or paying agencies in accordance with the terms of the indenture. No service charge will be made for any transfer or exchange of certificated debt securities, but we may require payment of a sum sufficient to cover any tax or other governmental charge payable in connection with a transfer or exchange.

You may transfer certificated debt securities and the right to receive the principal of, and premium and interest on, certificated debt securities only by surrendering the old certificate representing those certificated debt securities and either we or the trustee will reissue the old certificate to the new holder or we or the trustee will issue a new certificate to the new holder.

Book-Entry Debt Securities

We may issue the debt securities of a series in the form of one or more book-entry debt securities that would be deposited with a depository or its nominee identified in the prospectus supplement. We may issue book-entry debt securities in either temporary or permanent form. We will describe in the prospectus supplement the terms of any depository arrangement and the rights and limitations of owners of beneficial interests in any book-entry debt security.

DESCRIPTION OF WARRANTS

General

We may issue warrants to purchase debt securities, common stock, preferred stock or other securities or any combination of the foregoing. We may issue warrants independently or together with other securities. Warrants sold with other securities may be attached to or separate from the other

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securities. We will issue warrants under one or more warrant agreements between us and a warrant agent that we will name in the prospectus supplement.

The prospectus supplement relating to any warrants that we may offer will include specific terms relating to the offering. We will file the form of any warrant agreement with the SEC, and you should read the warrant agreement for provisions that may be important to you. The prospectus supplement will include some or all of the following terms:

the title of the warrants;

the aggregate number of warrants offered;

the designation, number and terms of the debt securities, common stock, preferred stock or other securities purchasable upon exercise of the warrants, and procedures by which those numbers may be adjusted;

the exercise price of the warrants;

the dates or periods during which the warrants are exercisable;

the designation and terms of any securities with which the warrants are issued;

if the warrants are issued as a unit with another security, the date, if any, on and after which the warrants and the other security will be separately transferable;

if the exercise price is not payable in U.S. dollars, the foreign currency, currency unit or composite currency in which the exercise price is denominated;

any minimum or maximum amount of warrants that may be exercised at any one time;

any terms, procedures and limitations relating to the transferability, exchange, exercise, amendment or termination of the warrants; and

any adjustments to the terms of the warrants resulting from the occurrence of certain events or from the entry into or consummation by us of certain transactions.

DESCRIPTION OF UNITS

As specified in any applicable prospectus supplement, we may issue units consisting of one or more warrants, debt securities, shares of preferred stock, shares of common stock or any combination of such securities.

DESCRIPTION OF SUBSCRIPTION RIGHTS

As specified in any applicable prospectus supplement, we may issue subscription rights consisting of one or more debt securities, shares of preferred stock, shares of common stock or any combination of such securities.

PLAN OF DISTRIBUTION

We may sell the securities in one or more of the following ways (or in any combination) from time to time:

to or through one or more underwriters or dealers in a public offering and sale by them;

directly to a limited number of purchasers or to a single purchaser;

through agents;

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through block trades in which the broker or dealer engaged to handle the block trade will attempt to sell the securities as agent, but may position and resell a portion of the block as principal to facilitate the transaction; or

in any manner, as provided in the applicable prospectus supplement.

Each time we offer and sell securities under this prospectus, we will file a prospectus supplement. The prospectus supplement will state the terms of the offering of the securities, including:

the name or names of any underwriters, dealers or agents;

the purchase price of such securities and the proceeds to be received by us, if any;

any underwriting discounts or agency fees and other items constituting underwriters' or agents' compensation;

any public offering price;

any discounts or concessions allowed or reallocated or paid to dealers; and

any securities exchanges on which the securities may be listed.

Any public offering price and any discounts or concessions allowed or reallocated or paid to dealers may be changed from time to time.

If we use underwriters in the sale, the securities will be acquired by the underwriters for their own account and may be resold from time to time in one or more transactions, including:

negotiated transactions;

at a fixed public offering price or prices, which may be changed;

at market prices prevailing at the time of sale;

at prices related to prevailing market prices; or

at negotiated prices.

Unless otherwise stated in a prospectus supplement, the obligations of the underwriters to purchase any securities will be conditioned on customary closing conditions and the underwriters will be obligated to purchase all of such series of securities, if any are purchased.

We may sell the securities through agents from time to time and may enter into arrangements for "at-the-market" offerings or similar transactions. The prospectus supplement will name any agent involved in the offer or sale of the securities and any commissions we pay to them. Generally, any agent will be acting on a best efforts basis for the period of its appointment. An agent may also choose to purchase securities for its own account, as principal.

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We may authorize underwriters, dealers or agents to solicit offers by certain purchasers to purchase the securities from us at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. The contracts will be subject only to those conditions set forth in the prospectus supplement, and the prospectus supplement will set forth any commissions we pay for solicitation of these contracts.

In offering the shares covered by this prospectus, any broker-dealers and any other participating broker-dealers who execute sales, may be deemed to be "underwriters" within the meaning of the Securities Act in connection with these sales. Any profits realized by such broker-dealers may be deemed to be underwriting discounts and commissions.

Underwriters and agents may be entitled under agreements entered into with us to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, or to contribution with

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respect to payments which the underwriters or agents may be required to make. Underwriters and agents may be customers of, engage in transactions with, or perform services for us and our affiliates in the ordinary course of business.

Each series of securities will be a new issue of securities and will have no established trading market other than the common stock which is listed on NASDAQ. Any underwriters to whom securities are sold for public offering and sale may make a market in the securities, but such underwriters will not be obligated to do so and may discontinue any market making at any time without notice. The securities, other than the common stock, may or may not be listed on a national securities exchange.

The underwriters, dealers and agents may engage in other transactions with us, or perform other services for us, in the ordinary course of their business.

EXPERTS

The consolidated financial statements of Fibrocell appearing in its Annual Report (Form 10-K) for the year ended December 31, 2014, and the effectiveness of Fibrocell's internal control over financial reporting as of December 31, 2014, have been audited by BDO USA, LLP, independent registered public accounting firm, as set forth in their reports thereon, included therein, and incorporated herein by reference in reliance upon such reports given on the authority of such firm as experts in accounting and auditing.

LEGAL MATTERS

Pepper Hamilton LLP will provide us with an opinion as to certain legal matters in connection with the securities being offered hereby.

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Shares of Common Stock

Warrants to Purchase up to Shares of Common Stock

Prospectus Supplement

**Cantor Fitzgerald & Co.
Roth Capital Partners
Griffin Securities**

, 2016
