

INTREXON CORP
 Form 424B7
 April 23, 2015
Table of Contents

Filed pursuant to Rule 424(b)(7)
 Registration No. 333-198598

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities To Be Registered	Amount To Be Registered(1)	Proposed	Proposed	Amount of Registration Fee(3)
		Maximum Offering Price Per Security(2)	Maximum Aggregate Offering Price	
Common Stock, no par value	965,377 shares	\$42.74	\$41,260,213	\$4,795

- (1) Pursuant to Rule 416(a) the number of shares of common stock registered hereunder includes such indeterminate number of additional shares of common stock as may be offered or issued in the future to prevent dilution resulting from stock splits, stock dividends or similar transactions.
- (2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(c) under the Securities Act of 1933, as amended, or the Securities Act, based on the average of the high and low sales prices per share of common stock as reported on The New York Stock Exchange on April 20, 2015.
- (3) Calculated in accordance with Rule 456(b) and Rule 457(r) of the Securities Act.

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PROSPECTUS SUPPLEMENT

(To prospectus dated September 5, 2014)

965,377 Shares

INTREXON CORPORATION

Common Stock

This prospectus supplement relates to the possible resale from time to time of up to 965,377 shares of our common stock, no par value, by the selling shareholders named in this prospectus supplement under the caption "Selling Shareholders." We will not receive any proceeds from the sale of the shares of our common stock by the selling shareholders. The selling shareholders acquired these shares of common stock from us in connection with our acquisition of ActoGeniX NV ("ActoGeniX") on February 24, 2015.

The selling shareholders identified in this prospectus supplement or their pledges, transferees or other successors-in-interest may, from time to time, offer and sell the shares of common stock in public transactions or in privately negotiated transactions, without limitation, at market prices prevailing at the time of sale or at negotiated prices. The timing and amount of any sale are within the sole discretion of the selling shareholders. The selling shareholders may offer and sell the shares of common stock held directly by them or through underwriters, broker-dealers or agents, who may receive compensation in the form of discounts, commissions or concessions. The selling shareholders will pay all underwriting discounts, brokerage fees or selling commissions, if any, applicable to the sale of the shares of our common stock. We are paying certain other expenses relating to this offering and the registration of the shares of common stock with the Securities and Exchange Commission (the "SEC"). For further information regarding the possible methods by which shares of common stock may be distributed, see "Plan of Distribution" of this prospectus supplement.

Our common stock trades on the New York Stock Exchange under the symbol "XON." On April 22, 2015, the last reported sales price of our common stock on the New York Stock Exchange was \$44.53 per share.

Investing in our common stock involves risk. Before buying any shares, you should read the discussion of material risks of investing in our common stock in Risk Factors beginning on page S-6 of this prospectus

supplement, and in the risks discussed in the documents incorporated by reference in this prospectus supplement, as they may be amended, updated or modified periodically in our reports filed with the SEC.

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.

This prospectus supplement is dated April 23, 2015.

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You should rely only on the information contained in or incorporated by reference into this prospectus supplement or the accompanying prospectus. We have not, and the selling shareholders have not, authorized any other person to provide you with different or additional information. If anyone provides you with different or additional information, you should not rely on it. This prospectus supplement and the accompanying prospectus are not offers to sell, nor are they seeking an offer to buy, the shares offered by this prospectus supplement or the accompanying prospectus in any jurisdiction where the offer or sale is not permitted. The information contained in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein is accurate only as of the dates of the respective documents in which such information is included, regardless of the time of delivery of this prospectus supplement or any sale of the shares of common stock offered hereby.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is part of the registration statement that we filed with the SEC using a shelf registration process and consists of two parts. The first part is this prospectus supplement, including the documents incorporated by reference, which describes the specific terms of this offering. The second part, the accompanying prospectus, including the documents incorporated by reference, gives more general information, some of which does not apply to this offering. Generally, when we refer only to the prospectus, we are referring to both parts combined. This prospectus supplement may add to, update or change information contained in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement or the accompanying prospectus.

If information in this prospectus supplement is inconsistent with the accompanying prospectus or with any document incorporated by reference that was filed with the SEC before the date of this prospectus supplement, you should rely on this prospectus supplement. This prospectus supplement, the accompanying prospectus and the documents incorporated into each by reference include important information about us, the selling shareholders, the common stock being offered and other information you should know before investing in our common stock. You should also read and consider information in the documents we have referred you to in the section of this prospectus supplement and the accompanying prospectus entitled *Where You Can Find More Information* and *Incorporation of Certain Information by Reference*.

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.

We and the selling shareholders have not authorized anyone to provide you with information that is in addition to or different from that contained or incorporated by reference in this prospectus supplement and the accompanying prospectus, and any free writing prospectus. We and the selling shareholders take no responsibility for, and can provide no assurances as to the reliability of, any other information that others may give you. The selling shareholders are not offering to sell these securities in any jurisdiction where the offer or sale is not permitted. You should not assume that the information contained or incorporated by reference in this prospectus supplement or the accompanying prospectus is accurate as of any date other than as of the date of this prospectus supplement or the accompanying prospectus, as the case may be, or in the case of the documents incorporated by reference, the date of such documents regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or any sale of shares of our common stock. Our business, financial condition, liquidity, results of operations and prospects may have changed since those dates.

All references in this prospectus supplement or the accompanying prospectus to Intrexon, the Company, we, us, or mean Intrexon Corporation unless we state otherwise or the context otherwise indicates. Intrexon®, BeyondBio®, UltraVector®, RheoSwitch Therapeutic System®, RTS®, AttSite®, Better DNA® and LEAP® are our and/or our affiliates registered trademarks in the United States and mAbLogix is our common law trademark in the United States. This prospectus supplement and the information incorporated herein by reference contain references to trademarks, service marks and trade names owned by us or other companies. Solely for convenience, trademarks, service marks and trade names referred to in this prospectus supplement and the information incorporated herein, including logos, artwork, and other visual displays, may appear without the ® or symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks, service marks and trade names. We do not intend our use or display of other

companies trade names, service marks or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Other trademarks, trade names and service marks appearing in this prospectus supplement or any related free writing prospectus are the property of their respective owners.

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SUMMARY

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

Overview

At present rates of global industrialization and population growth, food and energy supplies and environmental and healthcare resources are becoming more scarce and/or costly. We believe it is not a viable option for mankind to continue on this path – new solutions will be necessary to preserve and globally expand a high quality of life. We believe that synthetic biology is a solution.

We believe we are a leader in the field of synthetic biology, an emerging and rapidly evolving discipline that applies engineering principles to biological systems. Using our suite of proprietary and complementary technologies, we design, build and regulate gene programs, which are DNA sequences that consist of key genetic components. A single gene program or a complex, multi-genic program is fabricated and stored within a DNA vector. Vectors are segments of DNA used as a vehicle to transmit genetic information. DNA vectors can, in turn, be introduced into cells in order to generate a simple or complex cellular system, which are the basic and complex cellular activities that take place within a cell and the interaction of those systems in the greater cellular environment. It is these genetically modified cell systems that can be used to produce proteins, produce small molecules, or serve as cell-based products, which enable the development of new and improved products and manufacturing processes across a variety of end markets, including health, food, energy, environment and consumer. Our synthetic biology capabilities include the ability to precisely control the amount, location and modification of biological molecules to control the function and output of living cells and optimize for desired results at an industrial scale.

Working with our collaborators, we seek to create more effective, less costly and more sustainable solutions than can be provided through current industry practices. We believe our approach to synthetic biology can enable new and improved biotherapeutics, increase the productivity and quality of food crops and livestock, create sustainable alternative energy sources and chemical feed stocks and provide for enhanced environmental remediation. Our business model is to commercialize our technologies through exclusive channel collaborations, or ECCs, with collaborators that have industry expertise, development resources and sales and marketing capabilities to bring new and improved products and processes to market.

Our technologies combine the principles of precision engineering, statistical modeling, automation and production at an industrial scale. We efficiently engineer precise and complex gene programs across many cell types. We apply the engineering principle of a design-build-test-learn continuum, through which we accumulate knowledge about the characteristics and performance of gene programs and cell lines. This process of continuous learning allows us to enhance our ability to design and build improved and more complex gene programs and cellular systems.

While the field of synthetic biology is still emerging, the addressable markets that may benefit from this approach are large and well-established. In healthcare, synthetic biology may provide new approaches to treating diseases, as well as improvements to the manufacture of existing products. It is estimated that the global human pharmaceuticals market is over \$900 billion and that biological therapeutics represent approximately \$150 billion of this market. While genetically modified salmon or trout may be considered new products, the global market for aquaculture is valued at approximately \$144 billion. Genetically modified agricultural plants are already

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grown on more than 180 million hectares around the world and are worth an estimated \$15 billion. In energy, we are working to create novel, highly engineered organisms that use specific feedstocks to create commercially valuable end products, such as isobutanol, which already has a variety of technical and industrial applications and is also being investigated as a gasoline alternative.

We believe our technologies are broadly applicable across many diverse end markets, including some end markets that have failed to recognize the applicability of synthetic biology or failed to efficiently utilize biologically based processes to produce products. Our business model entails the formation of ECCs with collaborators that have expertise within specific industry sectors. To date, no commercial products have been enabled by our technologies. In our ECCs, we provide expertise in the engineering, fabrication and modification of gene programs and cellular systems, and our collaborators are responsible for providing market and product development expertise, as well as regulatory, sales and marketing capabilities. Generally, our collaborators compensate us through technology access fees, royalties, milestones and reimbursements of certain costs. This business model allows us to leverage our capabilities and capital across a broader landscape of product opportunities and end markets than we would be capable of addressing on our own. Alternatively, where a collaborator wishes to work with us to develop an early-stage program, we may execute a research collaboration pursuant to which we receive reimbursement for our development costs but the grant of exclusive license rights, and payment of the related access fee, are deferred until completion of an initial research program.

In certain strategic circumstances, we may enter into a joint venture with a third party collaborator whereby we may contribute access to our technology, cash or both into the joint venture which we will jointly control with our ECC collaborator. We may be required to contribute additional capital to the joint venture, and we may be able to receive a higher financial return than we would normally receive from an ECC to the extent that we and our collaborator are successful in developing one or more products.

In 2011, we entered into our first collaboration and have added new collaborations since then, either by entering into new agreements or expanding or adding fields to existing ECCs. As of March 2, 2015, we have entered into 29 such agreements and expansions with 24 different counterparties, of which 27 remain active. We have 26 active ECCs, including four expansions, and one research collaboration that we anticipate could, if successful, become an ECC. Under the ECCs, we are developing products in the fields of healthcare, food, energy and consumer goods. We are also currently party to three joint venture arrangements.

Recent Developments

On January 13, 2015, we and ZIOPHARM Oncology, Inc., or ZIOPHARM, entered into a license agreement with The University of Texas System Board of Regents on behalf of The University of Texas M.D. Anderson Cancer Center, or MD Anderson. Pursuant to the license agreement, we hold an exclusive license to certain technologies owned and licensed by MD Anderson, including technologies relating to novel chimeric antigen receptor (CAR) T-cell therapies. The license agreement also includes co-licenses and non-exclusive licenses to certain other related technologies. Among the license rights, we received exclusive sublicensed rights, through MD Anderson, for intellectual property developed at the University of Minnesota for the development of cellular therapies to prevent, diagnose and/or treat cancers. We expect to employ the licensed technologies, together with our existing suite of proprietary technologies, through our existing exclusive collaboration agreement with ZIOPHARM to pursue the development and commercialization of non-viral adoptive cellular therapies based on designer cytokines and CARs under control of RheoSwitch technology targeting both hematologic and solid tumor malignancies. In addition to the licenses, the license agreement transferred to us and ZIOPHARM certain existing programs of MD Anderson, including ongoing clinical and preclinical programs. In connection with this transfer, ZIOPHARM committed to funding between \$15 million and \$20 million for ongoing research at MD Anderson for three years. We will have certain rights to

technologies developed through such research, as provided in the agreement.

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On January 27, 2015, we closed a public offering of 4,312,500 shares of our common stock at a public offering price of \$27.00 per share for total gross proceeds of approximately \$116.4 million, before deducting underwriting discounts, commissions and expenses.

On February 23, 2015, we accepted all offers to tender the outstanding equity interests of our majority-owned subsidiary, Exemplar Genetics, LLC, for approximately \$1.6 million in cash and 307,074 shares of our common stock.

On February 24, 2015, we acquired 100 percent of the membership interests of ActoGeniX, a European clinical stage biopharmaceutical company, for approximately \$30.0 million in cash and 965,377 shares of our common stock, pursuant to a Stock Purchase Agreement dated as of February 13, 2015, the transaction to which this prospectus supplement relates. ActoGeniX's platform technology complements our broad collection of technologies available for current and future collaborations.

On March 27, 2015, we entered into a worldwide License and Collaboration Agreement with a subsidiary of Merck Serono S.A. which is the biopharmaceutical business of Merck KGaA, and ZIOPHARM through which the parties established a collaboration for the research and development and commercialization of products for the prophylactic, therapeutic, palliative or diagnostic use for cancer in humans. Pursuant to the agreement and the Exclusive Channel Partner Agreement amendment described below, we and ZIOPHARM will receive an aggregate of \$115 million in cash in upfront consideration, potential payments for development and commercial milestones on products produced under the agreement (up to \$826 million of such milestones for the first two products), and potential royalty payments based on net sales of products produced under the agreement.

On March 27, 2015, we and ZIOPHARM entered into a Second Amendment to Exclusive Channel Partner Agreement amending their existing Exclusive Channel Partner Agreement. The amendment modifies the scope of the parties collaboration under the existing Exclusive Channel Partner Agreement in connection with the license and collaboration agreement with Merck, described above. The amendment provides that we will pay to ZIOPHARM fifty percent of all payments that we receive for upfronts, milestones and royalties under the Merck agreement, described above.

On April 17, 2015 we acquired Okanagan Specialty Fruits Inc., a British Columbia corporation, for \$10 million in cash and 707,853 shares of our common stock, pursuant to an Acquisition Agreement dated as of February 27, 2015.

We were founded by Thomas D. Reed, Ph.D., in 1998, as an Ohio limited liability company under the name Genomatix LTD. We were reincorporated as a Virginia corporation in 2004 and changed our name to Intrexon Corporation in 2005. The principal executive offices of Intrexon are located at 20374 Seneca Meadows Parkway, Germantown, Maryland 20876, and our telephone number is (301) 556-9900. Our website is www.dna.com. The information on, or that can be accessed through, our website does not constitute part of this prospectus supplement, and you should not rely on any such information in making the decision whether to purchase our common stock. Our common stock is traded on the NYSE under the symbol XON.

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The Offering

Common stock offered by the selling shareholders	965,377 shares
Use of proceeds	The selling shareholders will receive all of the proceeds from the sale or other disposition of the shares of common stock offered by this prospectus. We will not receive any of the proceeds from the sale or other disposition of the shares of common stock offered hereby. See Use of Proceeds.
Risk factors	In analyzing an investment in the shares of common stock being offered pursuant to this prospectus supplement, you should carefully consider, along with other matters included or incorporated by reference in this prospectus supplement or the accompanying prospectus, the information set forth under Risk Factors in this prospectus supplement and the risks discussed in the documents incorporated by reference in this prospectus supplement, as they may be amended, updated or modified periodically in our reports filed with the SEC.
New York Stock Exchange symbol	XON

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RISK FACTORS

An investment in our shares of common stock involves a high degree of risk. Prior to making a decision about investing in our shares of common stock, you should carefully consider the risks, uncertainties and assumptions discussed under Item 1A, Risk Factors, in our Annual Report on Form 10-K for the fiscal year ended December 31, 2014 and any subsequent updates described in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, all of which are incorporated herein by reference and may be amended, supplemented or superseded from time to time by other reports we file with the SEC in the future, together with information in this prospectus and any other information incorporated by reference into this prospectus. See the sections of this prospectus supplement entitled **Where You Can Find More Information** and **Incorporation of Certain Information by Reference**. Additional risks and uncertainties not presently known to us, or that we currently see as immaterial, may also harm our business. If any of these risks occur, our business, financial condition and operating results could be harmed, the trading price of our common stock could decline and you could lose part or all of your investment.

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

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the information incorporated herein by reference contain forward-looking statements within the meaning of the federal securities laws, which statements involve substantial risks and uncertainties. All statements, other than statements of historical facts, included or incorporated by reference in this prospectus supplement and the accompanying prospectus regarding our strategy, future events, future operations, future financial position, future revenue, projected costs, prospects, plans, objectives of management and expected market growth are forward-looking statements. The words *anticipate*, *believe*, *estimate*, *expect*, *intend*, *plan*, *predict*, *project*, *would* and similar expressions are intended to identify forward-looking statements, although all forward-looking statements contain these identifying words. These forward-looking statements include, among other things, statements about:

our current and future exclusive channel collaborations (ECCs) and other collaborations;

developments concerning our collaborators;

our ability to successfully enter new markets or develop additional products, whether with our collaborators or independently;

competition from existing technologies and products or new technologies and products that may emerge;

actual or anticipated variations in our operating results;

actual or anticipated fluctuations in our competitors' or our collaborators' operating results or changes in their respective growth rates;

our cash position;

market conditions in our industry;

our ability, and the ability of our collaborators, to protect our intellectual property and other proprietary rights and technologies;

our ability, and the ability of our collaborators, to adapt to changes in laws or regulations and policies;

the ability of our collaborators to secure any necessary regulatory approvals to commercialize any products developed under the ECCs and joint ventures;

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the rate and degree of market acceptance of any products developed by a collaborator under an ECC or through a joint venture;

our ability to retain and recruit key personnel;

our expectations related to the use of proceeds from our public offerings and other financing efforts; and

our estimates regarding expenses, future revenue, capital requirements and needs for additional financing. Forward-looking statements may also concern our expectations relating to our subsidiaries and other affiliates. We caution you that the foregoing list may not contain all of the forward-looking statements made in this prospectus supplement, the accompanying prospectus and the information incorporated herein.

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

You should read this prospectus supplement, the accompanying prospectus, the documents that we reference in this prospectus supplement, our Annual Report on Form 10-K for the year ended December 31, 2014, our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, and the documents that we have filed as exhibits to our filings with the SEC completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

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USE OF PROCEEDS

The selling shareholders will receive all of the proceeds from the sale or other disposition of the shares of common stock covered by this prospectus. We will not receive any of the proceeds from the sale or other disposition of the shares of common stock offered hereby.

SELLING SHAREHOLDERS

The selling shareholders acquired the shares of common stock from us that we are registering for resale by this prospectus supplement in connection with our acquisition of ActoGeniX on February 24, 2015 (the ActoGeniX Acquisition). The issuance of our shares of common stock from us to the selling shareholders in the ActoGeniX Acquisition qualified for exemption from registration under the Securities Act of 1933, as amended (the Securities Act). This prospectus supplement is being filed pursuant to our obligations under the ActoGeniX Acquisition.

The following table sets forth, to our knowledge, certain information about the selling shareholders. The percentage of outstanding shares of common stock beneficially owned before the offering is based on 104,981,271 shares of common stock outstanding as of February 15, 2015. The selling shareholders may offer from time to time all or some or none of their shares of common stock under this prospectus. Since the selling shareholders are not obligated to sell, transfer or otherwise dispose of their shares of common stock, and because the selling shareholders may acquire shares of our publicly traded common stock, we cannot estimate how many shares each selling shareholder will own after this offering.

The number and percentage of outstanding shares of common stock beneficially owned after the offering listed in the table below assumes that all of the shares of our common stock being offered by the selling shareholders are sold and assumes that no additional shares of our common stock are purchased by the selling shareholders prior to the completion of this offering.

Unless otherwise indicated in the footnotes below, based on representations made to us by the selling shareholders, none of the selling shareholders has or within the past three years has had, any position, office or other material relationship with us or any of our affiliates other than (i) as a result of the ActoGeniX Acquisition and (ii) the selling shareholders' beneficial ownership of our common stock. To our knowledge, none of the selling shareholders are broker-dealers or affiliates of broker-dealers, nor at the time of the acquisition, did any selling shareholder have direct or indirect agreements or understandings with any person to distribute their shares. Information about the selling shareholders may change from time to time. Any changed information will be set forth in prospectus supplements, if required by applicable law.

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For information on the procedure for sales by selling shareholders, see Plan of Distribution in this prospectus supplement.

Name of Beneficial Owner(1)	Shares Beneficially Owned Prior to this Offering(1)		Shares Being Sold in the Offering	Shares Beneficially Owned After this Offering(1)	
	Number	Percentage		Number	Percentage
GIMV NV	105,127	*	105,127		%
Adviesbeheer GIMV Life Sciences 2004 NV	18,552	*	18,552		%
Biotech Fonds Vlaanderen NV	204,287	*	204,287		%
Vlaams Interuniversitair Instituut voor Biotechnologie vzw	19,783	*	19,783		%
Microbial Technics Ltd	221	*	221		%
LSP III Omni Investment Coöperatief U.A.	67,991	*	67,991		%
Coöperatieve AESCAP Venture I U.A.	148,237	*	148,237		%
FPCI Ventech Capital III	164,035	*	164,035		%
Baekeland Fonds II NV	21,585	*	21,585		%
Biovest Comm. VA	130,255	*	130,255		%
UT-Saffel NV	62,862	*	62,862		%
Mark Vaeck	1,830	*	1,830		%
Bernard Coulie	3,921	*	3,921		%
Emil Pot	183	*	183		%
Lothar Steidler	2,027	*	2,027		%
Hannol Healthcare & Innovation LLC	14,481	*	14,481		%

* Percentage of shares owned is less than one percent of total outstanding shares of common stock.

- (1) Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting and/or investment power with respect to securities. Shares of common stock subject to options or warrants currently exercisable, or exercisable within 60 days of the date hereof, are deemed outstanding for computing the percentage of the person holding such options or warrants but are not deemed outstanding for computing the percentage of any other person.

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PLAN OF DISTRIBUTION

We are registering the shares of common stock on behalf of the selling shareholders. The selling shareholders will act independently of us in making decisions with respect to the timing, manner and size of each sale. The selling shareholders may, from time to time, sell any or all of their shares of common stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. These sales may be at fixed or negotiated prices. The selling shareholders may use any one or more of the following methods when selling shares:

ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;

block trades in which the broker-dealer will attempt to sell the shares as agent but may position and resell a portion of the block as principal to facilitate the transaction;

purchases by a broker-dealer as principal and resale by the broker-dealer for its account;

an exchange distribution in accordance with the rules of the applicable exchange;

privately negotiated transactions;

short sales;

through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;

broker-dealers may agree with the selling shareholders to sell a specified number of such shares at a stipulated price per share;

a combination of any such methods of sale; and

any other method permitted pursuant to applicable law.

The selling shareholders may also sell shares under Rule 144 under the Securities Act, if available, rather than under this prospectus supplement and accompanying prospectus.

Broker-dealers engaged by the selling shareholders may arrange for other brokers-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the selling shareholders (or, if any broker-dealer acts as agent for the purchaser of shares, from the purchaser) in amounts to be negotiated. The selling shareholders do not expect these commissions and discounts to exceed what is customary in the types of transactions involved. Any profits

on the resale of shares of common stock by a broker-dealer acting as principal might be deemed to be underwriting discounts or commissions under the Securities Act. Discounts, concessions, commissions and similar selling expenses, if any, attributable to the sale of shares will be borne by a selling shareholder. The selling shareholders may agree to indemnify any agent, dealer or broker-dealer that participates in transactions involving sales of the shares if liabilities are imposed on that person under the Securities Act.

We are not aware of any agreements, understandings or arrangements that the selling shareholders have entered into with any underwriters or broker-dealers regarding the sale of their shares of common stock, nor are we aware of any underwriter or coordinating broker acting in connection with a proposed sale of shares of common stock by any selling shareholder. If we are notified by any selling shareholder that any material arrangement has been entered into with a broker-dealer for the sale of shares of common stock, if required, we will file an amendment to this prospectus supplement. If the selling shareholders use this prospectus supplement and accompanying prospectus for any sale of the shares of common stock, they will be subject to the prospectus delivery requirements of the Securities Act.

The selling shareholders also may transfer the shares of common stock in other circumstances, in which case the transferees or other successors in interest will be the selling beneficial owners for purposes of this prospectus supplement and accompanying prospectus and may sell the shares of common stock from time to time

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under this prospectus supplement and accompanying prospectus after we have filed an amendment to this prospectus supplement under Rule 424(b)(3) or other applicable provision of the Securities Act supplementing or amending the list of selling shareholders to include the transferee or other successors in interest as selling shareholders under this prospectus supplement.

The selling shareholders and any broker-dealers or agents that are involved in selling the shares of common stock may be deemed to be underwriters within the meaning of the Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the shares of common stock purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act.

The selling shareholders and any other person participating in a distribution will be subject to the Exchange Act. The Exchange Act rules include, without limitation, Regulation M, which may limit the timing of purchases and sales of shares of our common stock by the selling shareholders and any such other person. In addition, Regulation M of the Exchange Act may restrict sales activity by a person engaged in the distribution of the shares for a period of up to five business days prior to the commencement of such distribution. This may affect the marketability of the shares of our common stock and the ability of any person or entity to engage in market-making activities with respect to shares of our common stock. We have informed the selling shareholders that the anti-manipulative provisions of Regulation M may apply to their sales in the market.

We will pay substantially all of the expenses incident to this offering of the shares by the selling shareholders to the public other than commissions and discounts of underwriters, brokers, dealers or agents.

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

We do not assure you that the selling shareholders will sell any or all of the shares offered by them pursuant to this prospectus. In addition, we do not assure you that the selling shareholders will not transfer, devise or gift the shares by other means not described in this prospectus. Moreover, any shares of common stock covered by this prospectus that qualify for sale pursuant to Rule 144 may be sold under Rule 144 rather than pursuant to this prospectus.

We may suspend the use of this prospectus if we learn of any event that causes this prospectus to include an untrue statement of a material fact or omit to state a material fact required to be stated in this prospectus or necessary to make the statements in this prospectus not misleading in light of the circumstances then existing. If this type of event occurs, a prospectus supplement or post-effective amendment, if required, will be distributed to each selling shareholder.

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LEGAL MATTERS

The validity of the shares of common stock being offered will be passed upon for us by Troutman Sanders LLP, Richmond, Virginia.

EXPERTS

The consolidated financial statements 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) of Intrexon Corporation incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2014, have been so incorporated in reliance upon the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given upon the authority of said firm as experts in auditing and accounting.

The financial statements of ZIOPHARM Oncology, Inc. as of and for the years ended December 31, 2014 and 2013 incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2014, have been audited by McGladrey LLP, an independent registered public accounting firm, as stated in their report incorporated by reference herein, and have been so incorporated in reliance upon such reports and upon the authority of such firm as experts in accounting and auditing.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference information and reports we file with it, which means that we can disclose important information to you by referring to those documents. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus, except for information superseded by information in this prospectus supplement. We hereby incorporate by reference the documents listed below, which means that we are disclosing important information to you by referring you to those documents. The information that we file later with the SEC will automatically update and in some cases supersede this information (other than portions of these documents that are either (1) described in paragraph (e) of Item 201 of Registration S-K or paragraphs (d)(1)-(3) and (e)(5) of Item 407 of Regulation S-K promulgated by the SEC or (2) furnished under Item 2.02 or Item 7.01 of a Current Report on Form 8-K). Specifically, we incorporate by reference the following documents or information filed with the SEC (other than, in each case, documents or information deemed to have been furnished and not filed in accordance with SEC rules, unless otherwise indicated):

Our Annual Report on Form 10-K for the year ended December 31, 2014, filed on March 2, 2015;

Our Current Reports on Form 8-K filed on March 3, 2015, April 1, 2015, and April 2, 2015;

The description of Medistem Inc., (Medistem) and the description of our merger with Medistem appearing within the Registration Statement on Form S-4, filed on February 3, 2014;

The description of our common stock, no par value, contained in our Form 8-A filed on August 5, 2013, including any amendment or report filed for the purpose of updating such description; and

Future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended (the Exchange Act) on or after the date of this prospectus, until we have sold all of the offered securities to which this prospectus relates or the offering is otherwise terminated.

All documents filed by us with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, from the date of this prospectus supplement until the completion of the offering to which this prospectus supplement relates or this offering is terminated, shall also be deemed to be incorporated by reference in, and to be part of, this prospectus supplement and the accompanying prospectus from the date any such document is filed. We are not, however, incorporating, in each case, any documents or information that we are deemed to furnish and not file in accordance with SEC rules.

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

You may request a copy of the above-documented filings at no cost by contacting the Corporate Secretary in writing at Intrexon Corporation, 20374 Seneca Meadows Parkway, Germantown, Maryland 20876.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You can inspect and copy these reports, proxy statements and other information at the public reference facilities of the SEC at the SEC's Public Reference Room located 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. The SEC also maintains an internet web site that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC (www.sec.gov). We make available, free of charge through our website, www.dna.com, our annual report, quarterly reports, current reports, proxy statements, section 16 reports and other information (and any amendments thereto) as soon as practicable after filing or furnishing the material to the SEC, in addition to our Corporate Governance Guidelines, codes of ethics and the charters of the Audit, Compensation, and Nominating and Governance Committees. However, the information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference. These materials also may be requested by contacting the Corporate Secretary in writing at Intrexon Corporation, 20374 Seneca Meadows Parkway, Germantown, Maryland 20876. You can also inspect reports, proxy statements and other information about us at the offices of the New York Stock Exchange, 20 Broad Street, New York, New York 10005.

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

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PROSPECTUS

INTREXON CORPORATION

DEBT SECURITIES

COMMON STOCK

PREFERRED STOCK

WARRANTS

RIGHTS

STOCK PURCHASE CONTRACTS

STOCK PURCHASE UNITS

We or any selling securityholder may, from time to time, offer and sell in one or more offerings:

senior or subordinated debt securities;

shares of our common stock;

shares of our preferred stock;

warrants to purchase our debt securities or shares of our common stock or preferred stock, or other securities;

rights to purchase our debt securities or shares of our common stock or preferred stock, or other securities;

stock purchase contracts to purchase shares of our common stock or our preferred stock;

stock purchase units, each representing ownership of a stock purchase contract and any of our debt securities, shares of our common stock or preferred stock, or preferred securities or debt obligations of third parties, including U.S. Treasury securities, any other securities described in the applicable prospectus supplement, or any combination of the foregoing, securing the holder's obligation to purchase shares of our common stock or preferred stock under the stock purchase contracts; or

any combination thereof.

The debt securities may consist of debentures, notes, bonds or other types of indebtedness. The debt securities, preferred stock, warrants, rights, stock purchase contracts and stock purchase units may be convertible or exercisable or exchangeable for common or preferred stock or other securities of ours.

Our common stock is listed on the New York Stock Exchange under the symbol XON. If we decide to seek a listing of any securities offered by this prospectus, the applicable prospectus supplement will disclose the exchange or market on which such securities will be listed, if any, or where we have made an application for listing, if any.

We or any selling securityholder may offer and sell our securities to or through one or more underwriters, dealers, agents or other third parties, or directly to one or more purchasers, on a continuous or delayed basis. These securities also may be resold by securityholders, if so provided in a prospectus supplement hereto. We will provide specific terms of any securities to be offered, including the amount, prices and other terms of the securities and information about any selling securityholders, in one or more supplements to this prospectus. The prospectus supplement may also add, update or change information contained in this prospectus. You should read this prospectus and any applicable prospectus supplement carefully before you invest. **This prospectus may not be used to sell securities unless accompanied by a prospectus supplement and/or free writing prospectus.**

INVESTING IN OUR SECURITIES INVOLVES A HIGH DEGREE OF RISK. YOU SHOULD REVIEW CAREFULLY THE RISKS AND UNCERTAINTIES REFERENCED UNDER THE HEADING RISK FACTORS ON PAGE 8 OF THIS PROSPECTUS AS WELL AS THOSE CONTAINED IN THE APPLICABLE PROSPECTUS SUPPLEMENT AND ANY RELATED FREE WRITING PROSPECTUS, AND IN THE OTHER DOCUMENTS THAT ARE INCORPORATED BY REFERENCE INTO THIS PROSPECTUS OR THE APPLICABLE PROSPECTUS SUPPLEMENT.

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

The date of this prospectus is September 5, 2014.

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We are responsible for the information contained and incorporated by reference in this prospectus, in any accompanying prospectus supplement, and in any related free writing prospectus we prepare or authorize. We have not authorized anyone to give you any other information, and we take no responsibility for any other information that others may give you. If you are in a jurisdiction where offers to sell, or solicitations of offers to purchase, the securities offered by this documentation are unlawful, or if you are a person to whom it is unlawful to direct these types of activities, then the offer presented in this document does not extend to you. The information contained in this document speaks only as of the date of this document, unless the information specifically indicates that another date applies. Our business, financial condition, results of operations and prospectus may have changed since those dates.

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ABOUT THIS PROSPECTUS

This prospectus is part of an automatic shelf registration statement on Form S-3 that we filed with the Securities and Exchange Commission (the SEC), as a well-known seasoned issuer as defined in Rule 405 under the Securities Act of 1933, as amended (the Securities Act). By using a shelf registration statement, we and/or selling securityholders may offer and sell, at any time and from time to time, in one or more offerings, any combination of the securities described in this prospectus. As allowed by the SEC rules, this prospectus and any prospectus supplement or other offering materials do not contain all of the information included in the registration statement. For further information, we refer you to the registration statement, including its exhibits. Statements contained in this prospectus and any prospectus supplement or other offering materials about the provisions or contents of any agreement or other document are not necessarily complete. If the SEC's rules and regulations require that an agreement or document be filed as an exhibit to the registration statement, please see that agreement or document for a complete description of these matters.

This prospectus provides you with a general description of the securities that we and/or selling securityholders may offer. Each time we and/or selling securityholders sell securities, we will provide a prospectus supplement that contains specific information about the terms of that offering, including the specific amounts, prices and terms of the securities offered. The prospectus supplement may also add information to this prospectus or update or change information in this prospectus. To the extent that this prospectus is used by any securityholder to resell any securities, information with respect to the securityholder and the terms of the securities being offered will be contained in a prospectus supplement. You should read this prospectus and any prospectus supplement together with any additional information you may need to make your investment decision. You should also read and carefully consider the information in the documents we have referred you to in **Where You Can Find More Information** and **Incorporation by Reference** below. Information incorporated by reference after the date of this prospectus is considered a part of this prospectus and may add, update or change information contained in this prospectus. Any information in such subsequent filings that is inconsistent with this prospectus will supersede the information in this prospectus or any earlier prospectus supplement. You should rely only on the information incorporated by reference or provided in this prospectus and any supplement. We have not authorized anyone else to provide you with other information.

You should not assume that the information in this prospectus, any prospectus supplement or any other offering materials is accurate as of any date other than the date on the front of each document. Our business, financial condition, results of operations and prospects may have changed since then.

When used in this prospectus, the terms **Intrexon**, **the Company**, **we**, **our** and **us** refer to Intrexon Corporation and its subsidiaries, unless otherwise specified or the context otherwise requires. **Intrexon®**, **BeyondBio®**, **UltraVector®**, **RheoSwitch Therapeutic System®**, **RTS®**, **AttSite®**, **Better DNA®** and **LEAP®** are our and/or our affiliates registered trademarks in the United States and **mAbLogix** is our common law trademark in the United States. This prospectus and the information incorporated herein by reference contains references to trademarks, service marks and trade names owned by us or other companies. Solely for convenience, trademarks, service marks and trade names referred to in this prospectus and the information incorporated herein, including logos, artwork, and other visual displays, may appear without the ® or ™ symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks, service marks and trade names. We do not intend our use or display of other companies' trade names, service marks or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Other trademarks, trade names and service marks appearing in this prospectus and any accompanying prospectus supplement or any related free writing prospectus are the property of their respective owners.

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WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You can inspect and copy these reports, proxy statements and other information at the public reference facilities of the SEC at the SEC's Public Reference Room located 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. The SEC also maintains an internet web site that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC (www.sec.gov). Our internet address is www.dna.com. However, the information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference. In addition, you can inspect reports and other information we file at the office of the New York Stock Exchange, Inc., 20 Broad Street, New York, New York 10005.

We have the authority to designate and issue more than one class or series of stock having various preferences, conversion and other rights, voting powers, restrictions, limitations as to dividends, qualifications, and terms and conditions of redemption. See Description of Capital Stock Preferred Stock. We will furnish a full statement of the relative rights and preferences of each class or series of our stock which has been so designated and any restrictions on the ownership or transfer of our stock to any shareholder upon request and without charge. Written requests for such copies should be directed to 20374 Seneca Meadows Parkway, Germantown, Maryland 20876, Attention: Chief Legal Officer, or by telephone request to (301) 556-9900.

We have filed a registration statement and related exhibits with the SEC under the Securities Act. The registration statement contains additional information about us and the securities we may issue. You may inspect the registration statement and exhibits without charge at the office of the SEC at 100 F Street, N.E., Washington, D.C. 20549, and you may obtain copies from the SEC at prescribed rates.

INCORPORATION BY REFERENCE

The SEC allows us to incorporate by reference information and reports we file with the SEC into this prospectus, which means that we can disclose important information to you by referring to those documents. We hereby incorporate by reference the documents listed below, which means that we are disclosing important information to you by referring you to those documents. The information that we file later with the SEC will automatically update and in some cases supersede this information (other than portions of these documents that are either (1) described in paragraph (e) of Item 201 of Registration S-K or paragraphs (d)(1)-(3) and (e)(5) of Item 407 of Regulation S-K promulgated by the SEC or (2) furnished under Item 2.02 or Item 7.01 of a Current Report on Form 8-K). Specifically, we incorporate by reference the following documents or information filed with the SEC (other than, in each case, documents or information deemed to have been furnished and not filed in accordance with SEC rules, unless otherwise indicated):

Our Annual Report on Form 10-K for the year ended December 31, 2013, filed on March 31, 2014;

Our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2014 and June 30, 2014, filed on May 9, 2014 and August 14, 2014, respectively;

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Our Current Reports on Form 8-K filed on January 13, 2014, January 30, 2014, February 21, 2014, March 27, 2014 (as amended on April 4, 2014), April 16, 2014, May 12, 2014, June 13, 2014, July 3, 2014 and August 11, 2014;

The description of Medistem Inc., (Medistem) and the description of our merger with Medistem appearing within the Registration Statement on Form S-4, filed on February 3, 2014;

The description of our common stock, no par value, contained in our Form 8-A filed on August 5, 2013, including any amendment or report filed for the purpose of updating such description; and

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Future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended (the Exchange Act) on or after the date of this prospectus, until we have sold all of the offered securities to which this prospectus relates or the offering is otherwise terminated.

You may request a copy of these filings at no cost by writing or telephoning us at the following address:

Corporate Secretary

Intrexon Corporation

20374 Seneca Meadows Parkway

Germantown, Maryland 20876

(301) 556-9900

This prospectus is part of a registration statement we filed with the SEC. We have incorporated exhibits into this registration statement. You should read the exhibits carefully for provisions that may be important to you.

Neither we nor any selling securityholder have authorized anyone to provide you with information other than what is incorporated by reference or provided in this prospectus, any prospectus supplement or any free writing prospectus. Neither we nor any selling securityholder are making an offer of these securities in any state where the offer is not permitted. You should not assume that the information in this prospectus or in the documents incorporated by reference is accurate as of any date other than the date on the front of this prospectus or those documents.

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CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, the documents incorporated by reference into this prospectus and our future oral and written statements, may contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 concerning our business, consolidated financial condition and results of operations. All statements other than statements of historical facts included or incorporated by reference into this prospectus regarding our strategies, prospects, financial condition, costs, plans and objectives are forward-looking statements. The SEC encourages companies to disclose forward-looking statements so that investors can better understand a company's future prospects and make informed investment decisions. These forward-looking statements reflect our beliefs and expectations as to future events and trends affecting our business, our consolidated financial condition and results of operations. These forward-looking statements are based upon our current expectations concerning future events and discuss, among other things, anticipated future financial performance and future business plans. Forward-looking statements are necessarily subject to risks and uncertainties, many of which are outside our control, that could cause actual results to differ materially from these statements. Forward-looking statements can be identified by such words as anticipates, believes, plan, assumes, could, should, estimates, expects, intends, potential, seek, predict, m expressions.

These forward-looking statements include, among other things, statements about:

our current and future exclusive channel collaborations (ECCs);

developments concerning our collaborators;

our ability to successfully enter new markets or develop additional products, whether with our collaborators or independently;

competition from existing technologies and products or new technologies and products that may emerge;

actual or anticipated variations in our operating results;

actual or anticipated fluctuations in our competitors' or our collaborators' operating results or changes in their respective growth rates;

our cash position;

market conditions in our industry;

our ability, and the ability of our collaborators, to protect our intellectual property and other proprietary rights and technologies;

our ability, and the ability of our collaborators, to adapt to changes in laws or regulations and policies;

our ability, and the ability of our collaborators, to secure any necessary regulatory approvals to commercialize any products developed under ECCs or other ventures;

the rate and degree of market acceptance of any products developed by us or our collaborators under an ECC or other venture;

our ability to retain and recruit key personnel;

our expectations related to the use of proceeds from any offering of our securities;

our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
and

our expectations relating to AquaBounty Technologies, Inc. and Trans Ova Genetics, L.C.

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. Item 1A, Risk Factors

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in our Annual Report on Form 10-K, and Item 1A, Risk Factors in our Quarterly Reports on Form 10-Q, which are incorporated by reference into this prospectus, includes factors that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments that we may make.

We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

Table of Contents**OVERVIEW**

We believe we are a leader in the field of synthetic biology, an emerging and rapidly evolving discipline that applies engineering principles to biological systems. Using our suite of proprietary and complementary technologies, we design, build and regulate gene programs, which are DNA sequences that consist of key genetic components. A single gene program or a complex, multi-genic program are fabricated and stored within a DNA vector. Vectors are segments of DNA used as a vehicle to transmit genetic information. DNA vectors can, in turn, be introduced into cells in order to generate a simple or complex cellular system, which are the basic and complex cellular activities that take place within a cell and the interaction of those systems in the greater cellular environment. It is these genetically modified cell systems that can be used to produce proteins, produce small molecules, or serve as cell-based products, which enable the development of new and improved products and manufacturing processes across a variety of end markets, including health, food, energy, environment, and consumer. Intrexon's synthetic biology capabilities include the ability to precisely control the amount, location and modification of biological molecules to control the function and output of living cells and optimize for desired results at an industrial scale.

We have devised our business model to bring many different commercial products to market through the formation of exclusive channel collaborations, or ECCs, with collaborators that have expertise within specific industry segments. Through our ECCs, we provide expertise in the engineering, creation and modification of gene programs and cellular systems, and our collaborators are responsible for providing market and product development expertise, as well as regulatory, sales and marketing capabilities. Generally, our collaborators compensate us through payment of technology access fees, royalties, milestones and reimbursement of certain costs. This business model allows us to leverage our capabilities and capital across a broader landscape of product opportunities and end markets than we would be capable of addressing on our own.

In certain strategic circumstances, we may enter into a joint venture with an ECC collaborator. In that event, we will enter into an ECC with a joint venture entity and may contribute access to our technology, cash or both into the joint venture which we will jointly control with our ECC collaborator. Pursuant to a joint venture agreement, we may be required to contribute additional capital to the joint venture, and we may be able to receive a higher financial return than we would normally receive from an ECC to the extent that we and our ECC collaborator are successful in developing one or more products. We currently are party to three such joint venture agreements: S & I Ophthalmic, LLC, which is a joint venture with a subsidiary of Sun Pharmaceutical Industries Ltd., an international specialty pharmaceutical company focused on chronic diseases, OvaXon, LLC, which is a joint venture with OvaScience, Inc., a life sciences company focused on the discovery, development and commercialization of new treatments for infertility, and Intrexon Energy Partners, LLC, a joint venture with a select group of external investors, to optimize and scale-up our gas-to-liquid bioconversion platform for the production of certain fuels and lubricants. As an alternative to either an ECC or joint venture, where a collaborator wishes to work with us to develop an early-stage program, we may execute a research collaboration pursuant to which we receive reimbursement for our development costs but the exclusive license rights, and related access fee, are deferred until completion of an initial research program.

In 2011, we entered into our first collaboration and have added new collaborations since then, either by entering into new agreements or expanding or adding fields to existing ECCs. As of September 2, 2014, we have entered into 24 such agreements and expansions with 20 different counterparties, of which 22 remain active. We have 21 active ECCs, including three expansions, and one research collaboration that we anticipate could, if successful, become an ECC. Under the ECCs, we are developing products in the fields of healthcare, food, energy and consumer goods. In healthcare, our ECCs include programs in oncology, anti-infectives, antibiotics and tissue repair. In food, we are working to increase the productivity and nutritional value of salmon and other fish. In energy, we are working to develop certain fuels and lubricants from natural gas. In consumer goods, we are working to advance new skin and

hair care products.

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On March 6, 2014, we acquired California-based Medistem, Inc., or Medistem, a pioneer in the development of Endometrial Regenerative Cells, or ERCs, universal donor adult-derived stem cells. We intend to employ our synthetic biology platforms to engineer a diverse array of cell-based therapeutic candidates using Medistem's multipotent ERCs. On August 8, 2014, we acquired Trans Ova Genetics, L.C., or Trans Ova, an industry-leading provider of bovine reproductive technologies. Intrexon and Trans Ova intend to build upon Trans Ova's current platform with new capabilities to allow for even higher levels of delivered value to dairy and beef cattle producers.

We were founded by Thomas D. Reed, Ph.D., in 1998, as an Ohio limited liability company under the name Genomatix LTD. We were reincorporated as a Virginia corporation in 2004 and changed our name to Intrexon Corporation in 2005. The principal executive offices of Intrexon are located at 20374 Seneca Meadows Parkway, Germantown, Maryland 20876, and our telephone number is (301) 556-9900. Our website is www.dna.com. The information on, or that can be accessed through, our website does not constitute part of this prospectus, and you should not rely on any such information in making the decision whether to purchase our common stock. Our common stock is traded on the NYSE under the symbol XON.

Table of Contents**RISK FACTORS**

Investing in our securities involves a high degree of risk. You should carefully consider the risks described in the documents incorporated by reference in this prospectus and any prospectus supplement, as well as other information we include or incorporate by reference into this prospectus and any applicable prospectus supplement, before making an investment decision. Our business, financial condition or results of operations could be materially adversely affected by the materialization of any of these risks. The trading price of our securities could decline due to the materialization of any of these risks, and you may lose all or part of your investment. This prospectus and the documents incorporated herein by reference also contain forward-looking statements that involve risks and uncertainties. Actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks described in the documents incorporated herein by reference, including (i) our most recent annual report on Form 10-K which is on file with the SEC and is incorporated herein by reference, (ii) our most recent quarterly report on Form 10-Q, which is on file with the SEC and is incorporated by reference into this prospectus, and (iii) other documents we file with the SEC that are deemed incorporated by reference into this prospectus. These risk factors may be amended, supplemented or superseded from time to time by risk factors contained in other Exchange Act reports that we file with the SEC, which will be subsequently incorporated herein by reference; by any prospectus supplement accompanying this prospectus; or by a post-effective amendment to the registration statement of which this prospectus forms a part. In addition, new risks may emerge at any time and we cannot predict such risks or estimate the extent to which they may affect our financial performance. For more information, see [Where You Can Find More Information](#), [Incorporation By Reference](#) and [Cautionary Statement Regarding Forward-Looking Statements](#).

RATIO OF EARNINGS TO FIXED CHARGES AND RATIO OF EARNINGS TO COMBINED FIXED CHARGES AND PREFERRED STOCK DIVIDENDS

The following table sets forth our historical ratio of earnings to fixed charges and ratio of earnings to combined fixed charges and preferred stock dividends for each of the periods indicated. You should read this table in conjunction with our consolidated financial statements and related notes and Management's Discussion and Analysis of Financial Condition and Results of Operations, which are incorporated by reference in this prospectus. For further information, see Exhibit 12.1 (Computation of Ratio of Earnings to Fixed Charges and Ratio of Earnings to Combined Fixed Charges and Preferred Stock Dividends) to the registration statement of which this prospectus forms a part.

	Quarter Ended June 30, 2014	Year Ended December 31, 2013	2012	2011
Ratio of earnings to fixed charges				
Ratio of earnings to combined fixed charges and preferred stock dividends				

The historical ratios were prepared on a consolidated basis using amounts calculated in accordance with U.S. generally accepted accounting principles, or U.S. GAAP, and, therefore, reflect all consolidated earnings, fixed charges and preferred stock dividends. For purposes of calculating the ratios for the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011 above, earnings consist of pre-tax loss from continuing operations before adjustment for loss from equity method investment plus fixed charges. Fixed charges for the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011 include interest expense and an estimate of interest expense within rental expense. Preferred stock dividends for the years ended December 31, 2013, 2012 and 2011 include the accretion of dividends on our redeemable convertible preferred stock outstanding during

those periods. All outstanding shares of redeemable convertible preferred stock along with cumulative dividends that existed prior to our initial public offering in August 2013 were converted into shares of common stock in connection with our initial public offering. As of the date hereof, no shares of preferred stock are outstanding.

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We did not record earnings for the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011. Accordingly, during those periods our earnings were insufficient to cover fixed charges in such periods and we are unable to disclose a ratio of earnings to fixed charges for such periods. Due to our losses for the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011, the ratio coverage was less than 1:1. For the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011, we would have needed to generate additional earnings of \$47.8 million, \$40.3 million, \$82.1 million and \$85.3 million, respectively, to achieve an earnings to fixed charges coverage ratio of 1:1.

During the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011, our earnings were insufficient to cover fixed charges and preferred stock dividends in such periods and we are unable to disclose a ratio of earnings to combined fixed charges and preferred stock dividends for such periods. Due to our losses for the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011, the ratio coverage was less than 1:1. For the six months ended June 30, 2014 and the years ended December 31, 2013, 2012 and 2011, we would have needed to generate additional earnings of \$47.8 million, \$58.7 million, \$104.1 million and \$99.1 million, respectively, to achieve an earnings to combined fixed charges and preferred stock dividends coverage ratio of 1:1. We had no preferred stock outstanding during the six months ended June 30, 2014.

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USE OF PROCEEDS

The securities that may, from time to time, be listed under this prospectus may be sold by us or by selling securityholders.

Unless we state otherwise in the accompanying prospectus supplement, we intend to use the net proceeds from the sale of the securities offered by us pursuant to this prospectus for general corporate purposes. General corporate purposes may include additions to working capital, financing of capital expenditures, repayment or redemption of existing indebtedness, and future acquisitions and strategic investment opportunities. We have not determined the amount of net proceeds to be used specifically for such purposes. As a result, management will retain broad discretion over the allocation of net proceeds. Additional information on the use of net proceeds from any sale of securities offered under this prospectus may be set forth in the prospectus supplement or in any related free writing prospectus relating to a specific offering. Pending the application of net proceeds, we expect to invest the net proceeds in investment grade, interest-bearing securities.

We may file prospectus supplements allowing selling securityholders to sell securities received from us in connection with acquisition transactions, private offerings, or other transactions. Unless otherwise set forth in a prospectus supplement, we will not receive any proceeds from sales by selling securityholders.

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DESCRIPTION OF DEBT SECURITIES

We may offer debt securities which may be senior or subordinated. We refer to the senior debt securities and the subordinated debt securities collectively as debt securities. The following description summarizes the general terms and provisions of the debt securities. We will describe the specific terms of the debt securities and the extent, if any, to which the general provisions summarized below apply to any series of debt securities in the prospectus supplement relating to the series and any applicable free writing prospectus that we authorize to be delivered. When we refer to the Company, we, our, and us in this section, we mean Intrexon Corporation, a Virginia corporation, excluding, unless the context otherwise requires or as otherwise expressly stated, our subsidiaries.

We may issue senior debt securities from time to time, in one or more series under a senior indenture to be entered into between us and a senior trustee to be named in a prospectus supplement, which we refer to as the senior trustee. We may issue subordinated debt securities from time to time, in one or more series under a subordinated indenture to be entered into between us and a subordinated trustee to be named in a prospectus supplement, which we refer to as the subordinated trustee. The forms of senior indenture and subordinated indenture are filed as exhibits to the registration statement of which this prospectus forms a part. Together, the senior indenture and the subordinated indenture are referred to as the indentures and, together, the senior trustee and the subordinated trustee are referred to as the trustees. This prospectus briefly outlines some of the provisions of the indentures. The following summary of the material provisions of the indentures is qualified in its entirety by the provisions of the indentures, including definitions of certain terms used in the indentures. Wherever we refer to particular sections or defined terms of the indentures, those sections or defined terms are incorporated by reference in this prospectus or the applicable prospectus supplement. You should review the indentures that are filed as exhibits to the registration statement of which this prospectus forms a part for additional information.

None of the indentures will limit the amount of debt securities that we may issue. The applicable indenture will provide that debt securities may be issued up to an aggregate principal amount authorized from time to time by us and may be payable in any currency or currency unit designated by us or in amounts determined by reference to an index.

General

The senior debt securities will constitute our unsecured and unsubordinated general obligations and will rank pari passu with our other unsecured and unsubordinated obligations. The subordinated debt securities will constitute our unsecured and subordinated general obligations and will be junior in right of payment to our senior indebtedness (including senior debt securities), as described under the heading **Certain Terms of the Subordinated Debt Securities Subordination**.

The debt securities will be our unsecured obligations. Any secured debt or other secured obligations will be effectively senior to the debt securities of any series to the extent of the value of the assets securing such debt or other obligations.

The applicable prospectus supplement and/or free writing prospectus will include any additional or different terms of the debt securities being offered, including the following terms:

the title and type of the debt securities;

whether the debt securities will be senior or subordinated debt securities, and, with respect to debt securities issued under the subordinated indenture, the terms on which they are subordinated;

the aggregate principal amount of the debt securities;

the price or prices at which we will sell the debt securities;

the maturity date or dates of the debt securities and the right, if any, to extend such date or dates;

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the rate or rates, if any, per year, at which the debt securities will bear interest, or the method of determining such rate or rates;

the date or dates from which such interest will accrue, the interest payment dates on which such interest will be payable or the manner of determination of such interest payment dates and the related record dates;

the right, if any, to extend the interest payment periods and the duration of that extension;

the manner of paying principal and interest and the place or places where principal and interest will be payable;

provisions for a sinking fund, purchase fund or other analogous fund, if any;

any redemption dates, prices, obligations and restrictions on the debt securities;

the currency, currencies or currency units in which the debt securities will be denominated and the currency, currencies or currency units in which principal and interest, if any, on the debt securities may be payable;

any conversion or exchange features of the debt securities;

whether and upon what terms the debt securities may be defeased;

any events of default or covenants in addition to or in lieu of those set forth in the indenture;

whether the debt securities will be issued in definitive or global form or in definitive form only upon satisfaction of certain conditions;

whether the debt securities will be guaranteed as to payment or performance;

any special tax implications of the debt securities; and

any other material terms of the debt securities.

When we refer to principal in this section with reference to the debt securities, we are also referring to premium, if any.

We may from time to time, without notice to or the consent of the holders of any series of debt securities, create and issue further debt securities of any such series ranking equally with the debt securities of such series in all respects (or in all respects other than (1) the payment of interest accruing prior to the issue date of such further debt securities or (2) the first payment of interest following the issue date of such further debt securities). Such further debt securities may be consolidated and form a single series with the debt securities of such series and have the same terms as to status, redemption or otherwise as the debt securities of such series.

A holder may present debt securities for exchange and may present debt securities for transfer in the manner, at the places and subject to the restrictions set forth in the debt securities and the applicable prospectus supplement. We will provide those services to the holders without charge, although the holder may have to pay any tax or other governmental charge payable in connection with any exchange or transfer, as set forth in the indenture.

Debt securities may bear interest at a fixed rate or a floating rate. Debt securities bearing no interest or interest at a rate that at the time of issuance is below the prevailing market rate (original issue discount securities) may be sold at a discount below their stated principal amount. U.S. federal income tax considerations applicable to any such discounted debt securities or to certain debt securities issued at par that are treated as having been issued at a discount for U.S. federal income tax purposes will be described in the applicable prospectus supplement.

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We may issue debt securities with the principal amount payable on any principal payment date, or the amount of interest payable on any interest payment date, to be determined by reference to one or more currency exchange rates, securities or baskets of securities, commodity prices or indices. The holder may receive a payment of principal on any principal payment date, or a payment of interest on any interest payment date, that is greater than or less than the amount of principal or interest otherwise payable on such dates, depending on the value on such dates of the applicable currency, security or basket of securities, commodity or index. Information as to the methods for determining the amount of principal or interest payable on any date, the currencies, securities or baskets of securities, commodities or indices to which the amount payable on such date is linked and certain related tax considerations will be set forth in the applicable prospectus supplement.

Certain Terms of the Senior Debt Securities

Covenants. Unless we indicate otherwise in a prospectus supplement, the senior debt securities will not contain any financial or restrictive covenants, including covenants restricting either us or any of our subsidiaries from incurring, issuing, assuming or guaranteeing any indebtedness secured by a lien on any of our or our subsidiaries' property or capital stock, or restricting either us or any of our subsidiaries from entering into sale and leaseback transactions.

Consolidation, Merger and Sale of Assets. Unless we indicate otherwise in a prospectus supplement, we may not consolidate with or merge into any other person in a transaction in which we are not the surviving corporation, or convey, transfer or lease our properties and assets substantially as an entirety to any person, in either case, unless:

the successor entity, if any, is a U.S. corporation, limited liability company, partnership or trust (subject to certain exceptions provided for in the senior indenture);

the successor entity assumes our obligations on the senior debt securities and under the senior indenture;

immediately after giving effect to the transaction, no default or event of default shall have occurred and be continuing; and

certain other conditions are met.

No Protection in the Event of a Change in Control. Unless we indicate otherwise in a prospectus supplement with respect to a particular series of senior debt securities, the senior debt securities will not contain any provisions that may afford holders of the senior debt securities protection in the event we have a change in control or in the event of a highly leveraged transaction (whether or not such transaction results in a change in control).

Events of Default. The following are events of default under the senior indenture for any series of senior debt securities:

failure to pay interest on any senior debt securities of such series when due and payable, if that default continues for a period of 90 days (or such other period as may be specified for such series);

failure to pay principal on the senior debt securities of such series when due and payable whether at maturity, upon redemption, by declaration or otherwise (and, if specified for such series, the continuance of such failure for a specified period);

default in the performance of or breach of any of our covenants or agreements in the senior indenture applicable to senior debt securities of such series, other than a covenant breach which is specifically dealt with elsewhere in the senior indenture, and that default or breach continues for a period of 90 days after we receive written notice from the trustee or from the holders of 25% or more in aggregate principal amount of the senior debt securities of such series;

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certain events of bankruptcy or insolvency, whether or not voluntary; and

any other event of default provided for in such series of senior debt securities as may be specified in the applicable prospectus supplement.

The default by us under any other debt, including any other series of debt securities, is not a default under the senior indenture.

If an event of default other than an event of default specified in the fourth bullet point immediately above occurs with respect to a series of senior debt securities and is continuing under the senior indenture, then, and in each such case, either the trustee or the holders of not less than 25% in aggregate principal amount of such series then outstanding under the senior indenture (each such series voting as a separate class) by written notice to us and to the trustee, if such notice is given by the holders, may, and the trustee at the request of such holders shall, declare the principal amount of and accrued interest on such series of senior debt securities to be immediately due and payable, and upon this declaration, the same shall become immediately due and payable.

If an event of default specified in the fourth bullet point immediately above occurs and is continuing, the entire principal amount of and accrued interest on each series of senior debt securities then outstanding shall become immediately due and payable.

Unless otherwise specified in the prospectus supplement relating to a series of senior debt securities originally issued at a discount, the amount due upon acceleration shall include only the original issue price of the senior debt securities, the amount of original issue discount accrued to the date of acceleration and accrued interest, if any.

Upon certain conditions, declarations of acceleration may be rescinded and annulled and past defaults may be waived by the holders of a majority in aggregate principal amount of all the senior debt securities of such series affected by the default, each series voting as a separate class. Furthermore, prior to a declaration of acceleration and subject to various provisions in the senior indenture, the holders of a majority in aggregate principal amount of a series of senior debt securities, by notice to the trustee, may waive an existing default or event of default with respect to such senior debt securities and its consequences, except a default in the payment of principal of or interest on such senior debt securities or in respect of a covenant or provision of the senior indenture which cannot be modified or amended without the consent of the holders of each such senior debt security. Upon any such waiver, such default shall cease to exist, and any event of default with respect to such senior debt securities shall be deemed to have been cured, for every purpose of the senior indenture; but no such waiver shall extend to any subsequent or other default or event of default or impair any right consequent thereto.

The holders of a majority in aggregate principal amount of a series of senior debt securities may direct the time, method and place of conducting any proceeding for any remedy available to the trustee or exercising any trust or power conferred on the trustee with respect to such senior debt securities. However, the trustee may refuse to follow any direction that conflicts with law or the senior indenture, that may involve the trustee in personal liability or that the trustee determines in good faith may be unduly prejudicial to the rights of holders of such series of senior debt securities not joining in the giving of such direction and may take any other action it deems proper that is not inconsistent with any such direction received from holders of such series of senior debt securities. A holder may not pursue any remedy with respect to the senior indenture or any series of senior debt securities unless:

the holder gives the trustee written notice of a continuing event of default;

the holders of at least 25% in aggregate principal amount of such series of senior debt securities make a written request to the trustee to pursue the remedy in respect of such event of default;

the requesting holder or holders offer the trustee indemnity satisfactory to the trustee against any costs, liability or expense;

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the trustee does not comply with the request within 60 days after receipt of the request and the offer of indemnity; and

during such 60-day period, the holders of a majority in aggregate principal amount of such series of senior debt securities do not give the trustee a direction that is inconsistent with the request.

These limitations, however, do not apply to the right of any holder of a senior debt security to receive payment of the principal of and interest on such senior debt security in accordance with the terms of such debt security, or to bring suit for the enforcement of any such payment in accordance with the terms of such debt security, on or after the due date for the senior debt securities, which right shall not be impaired or affected without the consent of the holder.

The senior indenture requires certain of our officers to certify, on or before a fixed date in each year in which any senior debt security is outstanding, as to their knowledge of our compliance with all covenants, agreements and conditions under the senior indenture.

Satisfaction and Discharge. We can satisfy and discharge our obligations to holders of any series of debt securities if:

we pay or cause to be paid, as and when due and payable, the principal of and any interest on all senior debt securities of such series outstanding under the senior indenture; or

all senior debt securities of such series have become due and payable or will become due and payable within one year (or are to be called for redemption within one year) and we deposit in trust a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

Under current U.S. federal income tax law, the deposit and our legal release from the debt securities would be treated as though we took back the debt securities and gave the holder their share of the cash and debt securities or bonds deposited in trust. In that event, the holder could recognize gain or loss on the debt securities such holder gives back to us. Purchasers of the debt securities should consult their own advisers with respect to the tax consequences to them of such deposit and discharge, including the applicability and effect of tax laws other than the U.S. federal income tax law.

Defeasance. Unless the applicable prospectus supplement provides otherwise, the following discussion of legal defeasance and discharge and covenant defeasance will apply to any series of debt securities issued under the indentures.

Legal Defeasance. We can legally release ourselves from any payment or other obligations on the debt securities of any series (called legal defeasance) if certain conditions are met, including the following:

We deposit in trust for the benefit of all direct holders of the debt securities of the same series a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

There is a change in current U.S. federal income tax law or an IRS ruling that lets us make the above deposit without causing the holder to be taxed on the debt securities any differently than if we did not make the deposit and instead repaid the debt securities ourselves when due. Under current U.S. federal income tax law, the deposit and our legal release from the debt securities would be treated as though we took back the debt securities and gave the holder their share of the cash and debt securities or bonds deposited in trust. In that event, the holder could recognize gain or loss on the debt securities such holder gives back to us.

We deliver to the trustee a legal opinion of our counsel confirming the tax law change or ruling described above.

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If we ever did accomplish legal defeasance, as described above, holders would have to rely solely on the trust deposit for repayment of the debt securities. The holders could not look to us for repayment in the event of any shortfall.

Covenant Defeasance. Without any change of current U.S. federal tax law, we can make the same type of deposit described above and be released from some of the covenants in the debt securities (called "covenant defeasance"). In that event, the holder would lose the protection of those covenants but would gain the protection of having money and securities set aside in trust to repay the debt securities. In order to achieve covenant defeasance, we must do the following (among other things):

We must deposit in trust for the benefit of all direct holders of the debt securities of the same series a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

We must deliver to the trustee a legal opinion of our counsel confirming that under current U.S. federal income tax law we may make the above deposit without causing the holders to be taxed on the debt securities any differently than if we did not make the deposit and instead repaid the debt securities ourselves when due.

If we accomplish covenant defeasance, the holders can still look to us for repayment of the debt securities if there were a shortfall in the trust deposit. In fact, if one of the Events of Default occurred (such as our bankruptcy) and the debt securities become immediately due and payable, there may be such a shortfall. Depending on the events causing the default, the holders may not be able to obtain payment of the shortfall.

Modification and Waiver. We and the trustee may amend or supplement the senior indenture or the senior debt securities without the consent of any holder:

to convey, transfer, assign, mortgage or pledge any assets as security for the senior debt securities of one or more series;

to evidence the succession of a corporation, limited liability company, partnership or trust to us, and the assumption by such successor of our covenants, agreements and obligations under the senior indenture;

to add to our covenants such new covenants, restrictions, conditions or provisions for the protection of the holders, and to make the occurrence, or the occurrence and continuance, of a default in any such additional covenants, restrictions, conditions or provisions an event of default;

to cure any ambiguity, defect or inconsistency in the senior indenture or in any supplemental indenture or to conform the senior indenture or the senior debt securities to the description of senior debt securities of such series set forth in this prospectus or any applicable prospectus supplement;

to provide for or add guarantors with respect to the senior debt securities of any series;

to establish the form or forms or terms of the senior debt securities as permitted by the senior indenture;

to evidence and provide for the acceptance of appointment under the senior indenture by a successor trustee, or to make such changes as shall be necessary to provide for or facilitate the administration of the trusts in the senior indenture by more than one trustee;

to add to, delete from or revise the conditions, limitations and restrictions on the authorized amount, terms, purposes of issue, authentication and delivery of any series of senior debt securities;

to make any change to the senior debt securities of any series so long as no senior debt securities of such series are outstanding; or

to make any change that does not adversely affect the rights of any holder in any material respect.

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Other amendments and modifications of the senior indenture or the senior debt securities issued may be made, and our compliance with any provision of the senior indenture with respect to any series of senior debt securities may be waived, with the consent of the holders of a majority of the aggregate principal amount of the outstanding senior debt securities of all series affected by the amendment or modification (voting together as a single class); provided, however, that each affected holder must consent to any modification, amendment or waiver that:

extends the final maturity of any senior debt securities of such series;

reduces the principal amount of on any senior debt securities of such series;

reduces the rate or extends the time of payment of interest on any senior debt securities of such series;

reduces the amount payable upon the redemption of any senior debt securities of such series;

changes the currency of payment of principal of or interest on any senior debt securities of such series;

reduces the principal amount of original issue discount securities payable upon acceleration of maturity or the amount provable in bankruptcy;

waives a default in the payment of principal of or interest on the senior debt securities;

changes the provisions relating to the waiver of past defaults or changes or impairs the right of holders to receive payment or to institute suit for the enforcement of any payment or conversion of any senior debt securities of such series on or after the due date therefor;

modifies any of the provisions of these restrictions on amendments and modifications, except to increase any required percentage or to provide that certain other provisions cannot be modified or waived without the consent of the holder of each senior debt security of such series affected by the modification; or

reduces the above-stated percentage of outstanding senior debt securities of such series whose holders must consent to a supplemental indenture or to modify or amend or to waive certain provisions of or defaults under the senior indenture.

It shall not be necessary for the holders to approve the particular form of any proposed amendment, supplement or waiver, but it shall be sufficient if the holders' consent approves the substance thereof. After an amendment, supplement or waiver of the senior indenture in accordance with the provisions described in this section becomes effective, the trustee must give to the holders affected thereby certain notice briefly describing the amendment, supplement or waiver. Any failure by the trustee to give such notice, or any defect therein, shall not, however, in any

way impair or affect the validity of any such amendment, supplemental indenture or waiver.

No Personal Liability of Incorporators, Shareholders, Officers, Directors. The senior indenture provides that no recourse shall be had under any obligation, covenant or agreement of ours in the senior indenture or any supplemental indenture, or in any of the senior debt securities or because of the creation of any indebtedness represented thereby, against any of our incorporators, shareholders, officers or directors, past, present or future, or of any predecessor or successor entity thereof under any law, statute or constitutional provision or by the enforcement of any assessment or by any legal or equitable proceeding or otherwise. Each holder, by accepting the senior debt securities, waives and releases all such liability.

Concerning the Trustee. The senior indenture provides that, except during the continuance of an event of default, the trustee will not be liable except for the performance of such duties as are specifically set forth in the senior indenture. If an event of default has occurred and is continuing, the trustee will exercise such rights and powers vested in it under the senior indenture and will use the same degree of care and skill in its exercise as a prudent person would exercise under the circumstances in the conduct of such person's own affairs.

The senior indenture and the provisions of the Trust Indenture Act of 1939 incorporated by reference therein contain limitations on the rights of the trustee thereunder, should it become a creditor of ours or any of our

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subsidiaries, to obtain payment of claims in certain cases or to realize on certain property received by it in respect of any such claims, as security or otherwise. The trustee is permitted to engage in other transactions, provided that if it acquires any conflicting interest (as defined in the Trust Indenture Act), it must eliminate such conflict or resign.

We may have normal banking relationships with the senior trustee in the ordinary course of business.

Unclaimed Funds. All funds deposited with the trustee or any paying agent for the payment of principal, premium, interest or additional amounts in respect of the senior debt securities that remain unclaimed for two years after the date upon which such principal, premium or interest became due and payable will be repaid to us. Thereafter, any right of any holder of senior debt securities to such funds shall be enforceable only against us, and the trustee and paying agents will have no liability therefor.

Governing Law. The senior indenture and the senior debt securities will be governed by, and construed in accordance with, the internal laws of the State of New York.

Certain Terms of the Subordinated Debt Securities

Other than the terms of the subordinated indenture and subordinated debt securities relating to subordination or otherwise as described in the prospectus supplement relating to a particular series of subordinated debt securities, the terms of the subordinated indenture and subordinated debt securities are identical in all material respects to the terms of the senior indenture and senior debt securities.

Additional or different subordination terms may be specified in the prospectus supplement applicable to a particular series.

Subordination. The indebtedness evidenced by the subordinated debt securities is subordinate to the prior payment in full of all of our senior indebtedness, as defined in the subordinated indenture.

During the continuance beyond any applicable grace period of any default in the payment of principal, premium, interest or any other payment due on any of our senior indebtedness, we may not make any payment of principal or interest on the subordinated debt securities (except for certain sinking fund payments). In addition, upon any payment or distribution of our assets upon any dissolution, winding-up, liquidation or reorganization, the payment of the principal of and interest on the subordinated debt securities will be subordinated to the extent provided in the subordinated indenture in right of payment to the prior payment in full of all our senior indebtedness. Because of this subordination, if we dissolve or otherwise liquidate, holders of our subordinated debt securities may receive less, ratably, than holders of our senior indebtedness. The subordination provisions do not prevent the occurrence of an event of default under the subordinated indenture.

The term *senior indebtedness* of a person means with respect to such person the principal of, premium, if any, interest on, and any other payment due pursuant to any of the following, whether outstanding on the date of the subordinated indenture or incurred by that person in the future:

all of the indebtedness of that person for money borrowed;

all of the indebtedness of that person evidenced by notes, debentures, bonds or other securities sold by that person for money;

all of the lease obligations that are capitalized on the books of that person in accordance with generally accepted accounting principles;

all indebtedness of others of the kinds described in the first two bullet points immediately above and all lease obligations of others of the kind described in the third bullet point immediately above that the person, in any manner, assumes or guarantees or that the person in effect guarantees through an agreement to purchase, whether that agreement is contingent or otherwise; and

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all renewals, extensions or refundings of indebtedness of the kinds described in the first, second or fourth bullet points immediately above and all renewals or extensions of leases of the kinds described in the third or fourth bullet points immediately above;

unless, in the case of any particular indebtedness, renewal, extension or refunding, the instrument creating or evidencing it or the assumption or guarantee relating to it expressly provides that such indebtedness, renewal, extension or refunding is not superior in right of payment to the subordinated debt securities. Our senior debt securities constitute senior indebtedness for purposes of the subordinated debt indenture.

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DESCRIPTION OF CAPITAL STOCK

The following description summarizes information about our capital stock. This information does not purport to be complete and is subject to, and qualified in its entirety by reference to, the terms of our amended and restated articles of incorporation and amended and restated bylaws, which are included as exhibits to the registration statement of which this prospectus forms a part, and the applicable provisions of Virginia law, the state in which we are incorporated.

As of August 31, 2014, our authorized capital stock consisted of 200,000,000 shares of common stock, no par value per share, and 25,000,000 shares of preferred stock, no par value per share.

As of August 31, 2014, there were 100,500,079 shares of common stock outstanding and held of record by approximately 187 shareholders. The actual number of shareholders is greater than this number of record holders and includes shareholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include shareholders whose shares may be held in trust by other entities. All outstanding shares of common stock are fully paid and nonassessable. There are no shares of preferred stock outstanding.

Common Stock

Shares of our common stock have the following rights, preferences and privileges:

Voting rights

Each outstanding share of common stock is entitled to one vote on all matters submitted to a vote of our shareholders, including the election of directors. Holders of our common stock do not have cumulative voting rights in the election of directors, and therefore the holders of a plurality of the shares of common stock voting for the election of directors may elect all of our directors standing for election.

Dividends

Holders of common stock are entitled to receive dividends if and when dividends are declared by our board of directors out of assets legally available for the payment of dividends, subject to preferential rights of outstanding shares of preferred stock, if any.

Liquidation

In the event of a liquidation, dissolution or winding up of the affairs of our Company, whether voluntary or involuntary, after payment of our debts and other liabilities and making provision for the holders of outstanding shares of preferred stock, if any, we will distribute the remainder of our assets ratably among the holders of shares of common stock.

Rights and preferences

The common stock has no preemptive, redemption, conversion or subscription rights. The rights, powers, preferences and privileges of holders of common stock are subject to, and may be impaired by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Stock options

As of August 31, 2014, options to purchase 8,479,905 shares of our common stock were outstanding, of which options to purchase 1,251,419 shares of our common stock were exercisable.

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Warrants

As of August 31, 2014, we had outstanding warrants to purchase shares of our common stock that will be exercisable for an aggregate of 373,102 shares of our common stock. Each of these warrants was and remains exercisable in full.

Registration Rights

We have entered into an investors' rights agreement with certain of our shareholders who will have the right to require us to register their shares under the Securities Act under specified circumstances and will have incidental registration rights as described below. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act.

Certain holders who were issued shares of our common stock upon the consummation of our acquisition of Trans Ova Genetics, L.C. will have the right to require us to register these shares under the Securities Act under specified circumstances. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act.

Demand registration rights

Certain holders, or Demand Holders, have demand registration rights. Beginning on February 4, 2014, subject to specified limitations set forth in the investor rights agreement, at any time the Demand Holders who are holders of at least 75 percent of the then-outstanding registrable securities, as defined in the investor rights agreement, of all Demand Holders as a class, acting together, may demand in writing that we register their registrable securities under the Securities Act. We are not obligated to file a registration statement pursuant to this demand provision on more than two occasions, subject to specified exceptions.

In addition, subject to specified limitations, the holders of registrable securities may demand in writing that we register on Form S-3 the registrable securities held by them so long as the total amount of registrable securities being registered has an aggregate offering price of at least \$500,000. We are not obligated to file a Form S-3 pursuant to this provision within 12 months of the effective date of any other Form S-3 registration statement that we may file.

In addition, certain holders who entered into securities purchase agreements with us on March 26, 2014, or March 2014 Investors, have demand registration rights. Any March 2014 Investor who purchased at least \$10.0 million of our common stock in the March 2014 private placement has the right to require us to register such shares of our common stock on a registration statement on Form S-3, if available for use.

Incidental registration rights

If we propose to file a registration statement to register any of our securities under the Securities Act for our own account, other than pursuant to a Form S-4 or Form S-8, the holders of our registrable securities are entitled to notice of registration and, subject to specified exceptions, we will be required to register the registrable securities then held by them that they request that we register. The holders of these registrable securities may be deemed to have such rights with respect to offerings under any prospectus supplement.

Expenses

Pursuant to the investor rights agreement, we are required to pay all registration expenses, including all registration, filing and qualification fees, printers' and accounting fees, fees and expenses incurred in connection with complying

with state securities or blue sky laws, fees and expenses of listing registrable securities on any securities exchange on which shares of our common stock are then listed, fees and disbursements of our counsel,

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but excluding any underwriting discounts and commissions, related to any demand or incidental registration. The investor rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling shareholders in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions in the registration statement attributable to them.

Preferred Stock

As of August 31, 2014, we have no shares of preferred stock issued or outstanding. Our amended and restated articles of incorporation authorize our board to designate and issue from time to time one or more series of preferred stock without shareholder approval. Our board may fix and determine the preferences, limitations and relative rights of each series of preferred stock issued. Because our board has the power to establish the preferences and rights of each series of preferred stock, it may afford the holders of any series of preferred stock preferences and rights, voting or otherwise, senior to the rights of holders of our common stock. It is not possible to state the actual effect of the issuance of any shares of preferred stock upon the rights of holders of common stock until our board determines the specific rights of the holders of preferred stock. However, the effects might include:

restricting dividends on our common stock;

diluting the voting power of our common stock;

impairing liquidation rights of our common stock; or

delaying or preventing a change in control of us without further action by our shareholders.

We have no present plans to issue any shares of preferred stock.

Anti-takeover Effects of Provisions of our Charter and Bylaws and of Virginia Law

Our amended and restated articles of incorporation, bylaws and Virginia law contain provisions that may have the effect of impeding the acquisition of control of us by means of a tender offer, a proxy contest, open market purchases or otherwise in a transaction not approved by our board of directors. These provisions are designed to reduce, or have the effect of reducing, our vulnerability to coercive takeover practices and inadequate takeover bids. The existence of these provisions could limit the price that investors might otherwise pay in the future for shares of common stock. In addition, these provisions make it more difficult for our shareholders to remove our board of directors or management, should they choose to do so.

Articles of Incorporation and Bylaws

Preferred stock

Our amended and restated articles of incorporation authorize our board to establish one or more series of preferred stock and to determine, with respect to any series of preferred stock, the preferences, rights and other terms of such series. See *Preferred stock* above for additional information. Under this authority, our board could create and

issue a series of preferred stock with rights, preferences or restrictions that have the effect of discriminating against an existing or prospective holder of our capital stock as a result of such holder beneficially owning or commencing a tender offer for a substantial amount of our common stock. One of the effects of authorized but unissued and unreserved shares of preferred stock may be to render it more difficult for, or to discourage an attempt by, a potential acquiror to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, and thereby protect the continuity of our management. The issuance of shares of preferred stock may have the effect of delaying, deferring or preventing a change in control of our Company without any action by our shareholders.

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Qualification and election of directors

Our bylaws provide that to be eligible to be a nominee for election to our board of directors, a person must submit a written questionnaire regarding his or her background and qualifications and must agree to other representations as set forth in our bylaws. In addition, we have adopted a director resignation policy. The director resignation policy is incorporated into our bylaws and Corporate Governance Guidelines and provides that any nominee for director in an uncontested election who receives a greater number of votes withheld from his or her election than votes for his or her election must tender his or her resignation to the board of directors for consideration in accordance with the procedures set forth in our Corporate Governance Guidelines. The Nominating and Governance Committee will then evaluate the best interests of us and our shareholders and will recommend to the board of directors the action to be taken with respect to the tendered resignation. Following the board of directors' determination, we will promptly publicly disclose the board of directors' decision of whether or not to accept the resignation and an explanation of how the decision was reached, including, if applicable, the reasons for rejecting the resignation.

Board vacancies; removal

Our amended and restated articles of incorporation provide that any vacancy occurring on our board of directors may be filled by a majority of directors then in office, even if less than a quorum.

Special meetings of shareholder

Our bylaws provide that the vote of 25 percent of shareholders is required to call a special meeting, and that shareholders may only conduct business at special meetings of shareholders that was specified in the notice of the meeting.

Advance notification of shareholder nominations and proposals

Our amended and restated bylaws establish advance notice procedures with respect to shareholder proposals and the nomination of persons for election as directors, other than nominations made by or at the direction of our board.

Virginia Anti-takeover Statutes

Affiliated transactions statute

Virginia law contains provisions governing affiliated transactions. In general, these provisions prohibit a Virginia corporation from engaging in affiliated transactions with any holder of more than 10 percent of any class of its outstanding voting shares, or an interested shareholder, for a period of three years following the date that such person became an interested shareholder unless:

a majority of (but not fewer than two) disinterested directors of the corporation and the holders of two-thirds of the voting shares, other than the shares beneficially owned by the interested shareholder, approve the affiliated transaction; or

before or on the date the person became an interested shareholder, a majority of disinterested directors approved the transaction that resulted in the shareholder becoming an interested shareholder.

Affiliated transactions subject to this approval requirement include mergers, share exchanges, material dispositions of corporate assets not in the ordinary course of business, any dissolution of the corporation proposed by or on behalf of an interested shareholder or any reclassification, including reverse stock splits, recapitalizations or mergers of the corporation with its subsidiaries, which increases the percentage of voting shares owned beneficially by an interested shareholder by more than five percent.

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Virginia law permits a corporation to exempt itself from this statutory provision by placing a statement to that effect in its articles of incorporation. Our amended and restated articles of incorporation do not specifically address the Virginia statute regarding affiliated transactions; therefore, we are subject to this provision.

Control share acquisitions statute

Virginia law also contains provisions relating to control share acquisitions, which are transactions causing the voting strength of any person acquiring beneficial ownership of shares of a Virginia public corporation to meet or exceed certain threshold percentages (20 percent, 33 $\frac{1}{3}$ percent or 50 percent) of the total votes entitled to be cast for the election of directors. Shares acquired in a control share acquisition have no voting rights unless:

the voting rights are granted by a majority vote of all outstanding shares other than those held by the acquiring person or any officer or employee director of the corporation; or

the articles of incorporation or bylaws of the corporation provide that these Virginia law provisions do not apply to acquisitions of its shares.

The acquiring person may require that a special meeting of the shareholders be held within 50 days of the acquiring person's request to consider the grant of voting rights to the shares acquired in the control share acquisition. If voting rights are not granted and the corporation's articles of incorporation or bylaws permit, the acquiring person's shares may be repurchased by the corporation, at its option, at a price per share equal to the acquiring person's cost. Virginia law grants dissenters' rights to any shareholder who objects to a control share acquisition that is approved by a vote of disinterested shareholders and that gives the acquiring person control of a majority of the corporation's voting shares.

Our amended and restated articles of incorporation provide that this second statutory provision does not apply to our Company; therefore, we are not subject to this provision.

Indemnification and Limitation of Directors and Officers Liability

The Virginia Stock Corporation Act and our articles of incorporation provide for indemnification of our directors and officers in a variety of circumstances, which may include liabilities under the Securities Act. Virginia law provides that, unless limited by its articles of incorporation, a corporation must indemnify a director or officer who entirely prevails in the defense of any proceeding to which he was a party because he is or was a director or officer of the corporation against reasonable expenses incurred by him in connection with the proceeding. Virginia law permits a corporation to indemnify, after a determination has been made that indemnification of the director is permissible in the circumstances because he has met the following standard of conduct, an individual made a party to a proceeding because he is or was a director against liability incurred in the proceeding if:

he conducted himself in good faith;

he believed in the case of conduct in his official capacity with the corporation, that his conduct was in its best interests and in all other cases that his conduct was at least not opposed to its best interests; and

in the case of any criminal proceeding, he had no reasonable cause to believe his conduct was unlawful. A Virginia corporation may not indemnify a director in connection with a proceeding by or in the right of the corporation in which the director was adjudged liable to the corporation or in connection with any other proceeding charging improper personal benefit to him, whether or not involving action in his official capacity, in which he was adjudged liable on the basis that personal benefit was improperly received by him, unless in either case a court orders indemnification and then only for expenses. In addition, the Virginia Stock Corporation Act permits a corporation to advance reasonable expenses to a director or officer upon the corporation's receipt of:

a written affirmation by the director or officer of his good faith belief that he has met the standard of conduct necessary for indemnification by the company; and

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a written undertaking by the director or on the director's behalf to repay the amount paid or reimbursed by the corporation if it is ultimately determined that the director is not entitled to indemnification and did not meet the relevant standard of conduct.

In addition, Virginia law permits a corporation to make any further indemnity, including indemnity with respect to a proceeding by or in the right of the corporation, and to make additional provision for advances and reimbursement of expenses, to any director or officer that may be authorized by the articles of incorporation or any bylaw made by the shareholders or any resolution adopted by the shareholders, except an indemnity against his willful misconduct or a knowing violation of the criminal law.

In addition, the Virginia Stock Corporation Act permits a Virginia corporation to limit the personal liability of an officer or director in any proceeding brought by or in the name of the corporation or its shareholders, except if the director or officer engaged in willful misconduct or a knowing violation of the criminal law or any federal or state securities laws, including insider trading or market manipulation.

Our articles of incorporation require indemnification of directors and officers with respect to certain liabilities, expenses, and other amounts imposed on them by reason of having been a director or officer, except in the case of willful misconduct or a knowing violation of criminal law. Our articles of incorporation also limit the liability of our officers and directors to the extent not prohibited by Virginia law. We also carry insurance on behalf of directors, officers, employees or agents which may cover liabilities under the Securities Act.

Insofar as the foregoing provisions permit indemnification of directors, officers or persons controlling us for liability arising under the Securities Act, we have been informed that in the opinion of the SEC, this indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Listing on the New York Stock Exchange

Our common stock is listed on the New York Stock Exchange under the symbol XON.

Authorized but Unissued Shares

The authorized but unissued shares of common stock and preferred stock are available for future issuance without shareholder approval, subject to any limitations imposed by the New York Stock Exchange listing rules. These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make it more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Transfer Agent and Registrar

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

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DESCRIPTION OF WARRANTS

We may issue warrants to purchase debt securities, preferred stock, common stock or other securities. We may issue warrants independently or together with other securities. Warrants sold with other securities may be attached to or separate from the other securities. We will issue warrants under one or more warrant agreements between us and a warrant agent that we will name in the applicable prospectus supplement. The warrant agent will act solely as our agent in connection with the warrants and will not assume any obligation or relationship of agency or trust for or with any holders or beneficial owners of warrants. Further terms of the warrants and the applicable warrant agreements will be set forth in the applicable prospectus supplement.

The prospectus supplement relating to any warrants we offer will include specific terms relating to the offering. These terms will include some or all of the following:

the title of the warrants;

the aggregate number of warrants offered;

the designation, number and terms of the debt securities, preferred stock, common 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 on and after which the warrants and the other security will be separately transferable;

if the exercise price is not payable in United States 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 relating to the modification of the warrants;

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

any other specific terms of the warrants.

We and the warrant agent may amend or supplement the warrant agreement for a series of warrants without the consent of the holders of the warrants issued thereunder to effect changes that are not inconsistent with the provisions of the warrants and that do not materially and adversely affect the interests of the holders of the warrants.

The description in the applicable prospectus supplement of any warrants that we may offer will not necessarily be complete and will be qualified in its entirety by reference to the applicable warrant agreement, which will be filed with the SEC.

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DESCRIPTION OF RIGHTS

We may issue rights to purchase debt securities, preferred stock, common stock or other securities. These rights may be issued independently or together with any other security offered hereby and may or may not be transferable by the shareholder receiving the rights in such offering. The applicable prospectus supplement may add, update or change the terms and conditions of the rights as described in this prospectus.

The applicable prospectus supplement will describe the specific terms of any offering of rights for which this prospectus is being delivered, including the following:

the price, if any, per right;

the exercise price payable for debt securities, preferred stock, common stock, or other securities upon the exercise of the rights;

the number of rights issued or to be issued to each shareholder;

the number and terms of debt securities, preferred stock, common stock, or other securities which may be purchased per right;

the extent to which the rights are transferable;

any other terms of the rights, including the terms, procedures and limitations relating to the exchange and exercise of the rights;

the date on which the holder's ability to exercise the rights shall commence, and the date on which the rights shall expire;

the extent to which the rights may include an over-subscription privilege with respect to unsubscribed securities; and

if applicable, the material terms of any standby underwriting or purchase arrangement entered into by us in connection with the offering of such rights.

Holders may exercise rights as described in the applicable prospectus supplement. Upon receipt of payment and the rights certificate properly completed and duly executed at the corporate trust office of the rights agent or any other office indicated in the prospectus supplement, we will, as soon as practicable, forward the applicable securities purchased upon exercise of the rights. If less than all of the rights issued in any rights offering are exercised, we may offer any unsubscribed securities directly to persons other than shareholders, to or through agents, underwriters or

dealers or through a combination of such methods, including pursuant to standby arrangements with one or more underwriters or other purchasers, pursuant to which the underwriters or other purchasers may be required to purchase any securities remaining unsubscribed for after such offering, as described in the applicable prospectus supplement.

The description in the applicable prospectus supplement of any rights that we may offer will not necessarily be complete and will be qualified in its entirety by reference to the applicable rights certificate, which will be filed with the SEC.

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DESCRIPTION OF STOCK PURCHASE CONTRACTS AND STOCK PURCHASE UNITS

We may issue stock purchase contracts, including contracts obligating holders to purchase from or sell to us, and obligating us to sell to or purchase from the holders, a specified number of shares of common stock, preferred stock or other securities at a future date or dates, which we refer to in this prospectus as stock purchase contracts. The price per share of the securities and the number of shares of the securities may be fixed at the time the stock purchase contracts are issued or may be determined by reference to a specific formula set forth in the stock purchase contracts, and may be subject to adjustment under anti-dilution formulas. The stock purchase contracts may be issued separately or as part of units consisting of a stock purchase contract and our debt securities, shares of our common stock or preferred stock, or preferred securities or debt obligations of third parties, including U.S. Treasury securities, any other securities described in the applicable prospectus supplement, or any combination of the foregoing, securing the holder's obligations to purchase shares of our common stock or preferred stock under the stock purchase contracts, which we refer to herein as stock purchase units. The stock purchase units may require holders to secure their obligations under the stock purchase contracts in a specified manner. The stock purchase units also may require us to make periodic payments to the holders of the stock purchase contracts or the stock purchase units, as the case may be, or vice versa, and those payments may be unsecured or pre-funded on some basis.

The applicable prospectus supplement will describe the terms of the stock purchase contracts or stock purchase units. This description is not complete and the description in the prospectus supplement will not necessarily be complete, and reference is made to the stock purchase contracts, and, if applicable, collateral or depositary arrangements relating to the stock purchase contracts or stock purchase units, which will be filed with the SEC each time we issue stock purchase contracts or stock purchase units. If any particular terms of the stock purchase contracts or stock purchase units described in the prospectus supplement differ from any of the terms described herein, then the terms described herein will be deemed superseded by that prospectus supplement. Material United States federal income tax considerations applicable to the stock purchase units and the stock purchase contracts will also be discussed in the applicable prospectus supplement.

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SELLING SECURITYHOLDERS

Selling securityholders are persons or entities that, directly or indirectly, have acquired or will from time to time acquire from us our securities. Such selling securityholders may be parties to registration rights agreements with us, or we otherwise may have agreed or will agree to register their securities for resale. The initial purchasers of our securities, as well as their transferees, pledges, donees or successors, all of whom we refer to as selling securityholders, may from time to time offer and sell our securities pursuant to this prospectus and any applicable prospectus supplement.

The applicable prospectus supplement or post-effective amendment, or in filings we make with the SEC under the Exchange Act that are incorporated by reference to such registration statement, will set forth the name of each of the selling securityholders and the number of securities beneficially owned by such selling securityholder that are covered by such prospectus supplement. The applicable prospectus supplement will also disclose whether any of the selling securityholders has held any position or office with, has been employed by, or otherwise has had a material relationship with us during the three years prior to the date of the applicable prospectus supplement.

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PLAN OF DISTRIBUTION

We and/or any selling securityholder may sell our securities from time to time in one or more transactions. We and/or any selling securityholder may sell our securities to or through agents, underwriters, dealers, remarketing firms or other third parties or directly to one or more purchasers or through a combination of any of these methods. In some cases, we and/or any selling securityholder or dealers acting with us and/or any selling securityholder or on behalf of us and/or any selling securityholder may also purchase our securities and reoffer them to the public. We and/or any selling securityholder may also offer and sell, or agree to deliver, our securities pursuant to, or in connection with, any option agreement or other contractual arrangement. The securities may or may not be listed on a national securities exchange.

Agents whom we designate may solicit offers to purchase our securities.

We and/or any selling securityholder will name any agent involved in offering or selling our securities, and disclose any commissions that we will pay to the agent, in the applicable prospectus supplement.

Unless we and/or any selling securityholder indicate otherwise in the applicable prospectus supplement, agents will act on a best efforts basis for the period of their appointment.

Agents may be deemed to be underwriters under the Securities Act, of any of our securities that they offer or sell.

We and/or any selling securityholder may use an underwriter or underwriters in the offer or sale of our securities.

If we and/or any selling securityholder use an underwriter or underwriters, we will execute an underwriting agreement with the underwriter or underwriters at the time that we reach an agreement for the sale of our securities.

We and/or any selling securityholder will include the names of the specific managing underwriter or underwriters, as well as the names of any other underwriters, and the terms of the transactions, including the compensation the underwriters and dealers will receive, in the applicable prospectus supplement.

The underwriters will use the applicable prospectus supplement, together with the prospectus, to sell our securities.

We may use a dealer to sell our securities.

If we and/or any selling securityholder use a dealer, we will sell our securities to the dealer, as principal.

The dealer will then sell our securities to the public at varying prices that the dealer will determine at the time it sells our securities.

We and/or any selling securityholder will include the name of the dealer and the terms of the transactions with the dealer in the applicable prospectus supplement.

We and/or any selling securityholder may solicit directly offers to purchase our securities, and we may directly sell our securities to institutional or other investors. We and/or any selling securityholder will describe the terms of direct sales in the applicable prospectus supplement.

We and/or any selling securityholder may engage in at-the-market offerings into an existing trading market in accordance with Rule 415(a)(4) of the Securities Act.

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We and/or any selling securityholder will indemnify agents, underwriters and dealers against certain liabilities, including liabilities under the Securities Act. Agents, underwriters and dealers, or their affiliates, may be customers of, engage in transactions with or perform services for us or our respective affiliates in the ordinary course of business.

We and/or any selling securityholder may authorize agents and underwriters to solicit offers by certain institutions to purchase our securities the public offering price under delayed delivery contracts.

If we and/or any selling securityholder use delayed delivery contracts, we will disclose that we are using them in the prospectus supplement and will tell you when we will demand payment and when delivery of our securities will be made under the delayed delivery contracts.

These delayed delivery contracts will be subject only to the conditions that we describe in the prospectus supplement.

We and/or any selling securityholder will describe in the applicable prospectus supplement the commission that underwriters and agents soliciting purchases of our securities under delayed delivery contracts will be entitled to receive.

Unless otherwise specified in connection with a particular underwritten offering of our securities, the underwriters will not be obligated to purchase offered securities unless specified conditions are satisfied, and if the underwriters do purchase any offered securities, they will purchase all offered securities.

In connection with underwritten offerings of the offered securities and in accordance with applicable law and industry practice, the underwriters in certain circumstances are permitted to engage in certain transactions that stabilize the price of our securities. Such transactions consist of bids or purchases for the purpose of pegging, fixing or maintaining the price of our securities. If the underwriters create a short position in our securities in connection with the offering (*i.e.*, if they sell more securities than are set forth on the cover page of the applicable prospectus supplement), the underwriters may reduce that short position by purchasing our securities in the open market or as otherwise provided in the applicable prospectus supplement. The underwriters may also impose a penalty bid, whereby selling concessions allowed to dealers participating in the offering may be reclaimed if the securities sold by them are repurchased in connection with stabilization transactions. In general, purchases of a security for the purpose of stabilization or to reduce a short position could cause the price of the security to be higher than it might be in the absence of such purchases. The imposition of a penalty bid might also have an effect on the price of our securities to the extent that it were to discourage resales of our securities. The underwriters are not required to engage in these activities and may end any of these activities at any time.

We and/or any selling securityholder may effect sales of securities in connection with forward sale, option or other types of agreements with third parties. Any distribution of securities pursuant to any forward sale agreement may be effected from time to time in one or more transactions that may take place through a stock exchange, including block trades or ordinary broker's transactions, or through broker-dealers acting either as principal or agent, or through privately-negotiated transactions, or through an underwritten public offering, or through a combination of any such methods of sale, at market prices prevailing at the time of sale, prices relating to such prevailing market prices or at negotiated or fixed prices.

The specific terms of the lock-up provisions, if any, in respect of any given offering will be described in the applicable prospectus supplement.

In compliance with the guidelines of the Financial Industry Regulatory Authority, or FINRA, as of the date of this prospectus, the maximum consideration or discount to be received by any FINRA member or independent broker dealer may not exceed 8.0% of the aggregate amount of the securities offered by this prospectus.

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LEGAL MATTERS

The validity of the securities being offered by this prospectus will be passed upon by Troutman Sanders LLP, Richmond, Virginia.

EXPERTS

The consolidated financial statements of Intrexon Corporation incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2013, have been so incorporated in reliance upon the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given upon the authority of said firm as experts in auditing and accounting.

The financial statements of ZIOPHARM Oncology, Inc. as of and for the years ended December 31, 2013 and 2012 incorporated in this Prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2013, have been audited by McGladrey LLP, an independent registered public accounting firm, as stated in their report incorporated by reference herein, and have been so incorporated in reliance upon such reports and upon the authority of such firm as experts in accounting and auditing.

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965,377 Shares

COMMON STOCK

PROSPECTUS SUPPLEMENT

April 23, 2015