

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

FORM S-3  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933  
SENESCO TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

**Delaware**  
(State or other jurisdiction  
of incorporation or organization)

**84-1368850**  
(I.R.S. employer  
identification no.)

**Joel Brooks**  
**Chief Financial Officer**  
**Senesco Technologies, Inc.**  
**303 George Street, Suite 420**  
**New Brunswick, New Jersey 08901**  
**Telephone: (732) 296-8400**  
(Name, address, including zip code, and telephone number, including area code, of agent for service)

*Copies to:*  
**Emilio Ragosa, Esq.**  
**Morgan, Lewis & Bockius LLP**  
**502 Carnegie Center**  
**Princeton, New Jersey 08540**  
**Telephone: (609) 919-6633**  
**Facsimile: (609) 919-6701**

**APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC:** As  
soon as practicable on or after the effective date of this Registration Statement.

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

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

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

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

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box. ☐

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company **x**

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

**CALCULATION OF REGISTRATION FEE**

| <b>Title of Each Class of<br/>Securities to be Registered</b>  | <b>Amount<br/>to be<br/>Registered(1)</b> | <b>Proposed<br/>Maximum<br/>Offering<br/>Price Per<br/>Security(2)</b> | <b>Proposed<br/>Maximum<br/>Offering<br/>Price(2)</b> | <b>Amount of<br/>Registration<br/>Fee</b> |
|--|---|--|---|---|
| Shares of common stock, \$0.01 par value, issuable upon conversion and/or redemption of Series A Preferred Stock | 32,178,125                                | \$ 0.55  | \$ 17,697,968.75                                      | \$ 1,261.87                               |
| Shares of common stock issuable upon exercise of April 2010 warrants   | 33,210,938                                | \$ 0.55  | \$ 18,266,015.90                                      | \$ 1,302.37                               |
| Shares of common stock issuable in lieu of cash dividends on Series A Preferred Stock (3)                        | 13,790,623                                | \$ 0.55  | \$ 7,584,842.65                                       | \$ 540.80                                 |
| Total Amount of Registration Fee   | 79,179,686                                | \$ 0.55  | \$ 43,548,827.30                                      | \$ 3,105.04                               |

- (1) Pursuant to Rule 416 of the Securities Act of 1933, as amended, there are also being registered such indeterminable additional shares as may be issued to the selling securityholders to prevent dilution resulting from stock dividends, stock splits or similar transactions.
- (2) Estimated solely for the purpose of calculating the registration fee. Pursuant to Rule 457(c) of the Securities Act of 1933, as amended, the registration fee has been calculated based upon the average of the high and low prices, as reported by NYSE Amex, for the registrant's common stock on April 21, 2010.
- (3) Estimated number of shares of common stock which may be issued in payment of dividends on the Series A preferred stock.
- 
-

The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

**Subject to completion, dated April 23, 2010**

**PRELIMINARY PROSPECTUS**

79,179,686 shares of common stock

**SENESCO TECHNOLOGIES, INC.**

---

The selling securityholders listed on page 22 of this prospectus are offering for resale up to 79,179,686 shares of our common stock, referred to as the “offered shares.” All of the offered shares are issuable, or may in the future become issuable, with respect to securities issued in connection with the private placement of 10,297 shares of our Series A convertible preferred stock, referred to as the Series A preferred stock or preferred stock, and 33,210,938 common stock purchase warrants, referred to as the April 2010 warrants, that we completed in April 2010, referred to as the April 2010 financing.

The offered shares may only be offered for resale by the selling securityholders pursuant to this prospectus if and when they are actually issued. The offered shares are comprised of the following: (a) 32,178,125 shares of common stock issuable upon conversion of our Series A preferred stock, (b) an additional 13,790,623 shares of common stock that have been registered pursuant to the registration statement of which this prospectus forms a part to cover resales by the selling securityholders of shares of our common stock which may be issued to them in the future in payment of dividends on the Series A preferred stock, (c) 33,210,938 shares of common stock issuable upon exercise of the April 2010 warrants. We will not receive any of the proceeds from the sale by the selling securityholders of the securities offered hereby, but we will receive proceeds from any cash exercise of the April 2010 warrants.

The securities offered hereby may be offered from time to time by the selling securityholders through ordinary brokerage transactions in the over-the-counter markets, in negotiated transactions or otherwise, at market prices prevailing at the time of sale or at negotiated prices and in other ways as described in the “Plan of Distribution.”

Our common stock is quoted on the NYSE Amex under the symbol “SNT.” On April 21, 2010, the last sale prices for our common stock was \$0.635.

---

**Investing in our securities involves a high degree of risk. For more information, see “Risk Factors” beginning on page 8.**

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 April \_\_, 2010

---

## TABLE OF CONTENTS

|   | Page |
|---|------|
| FORWARD-LOOKING STATEMENTS                      | 1    |
| OUR COMPANY                                     | 1    |
| RISK FACTORS                                    | 8    |
| USE OF PROCEEDS                                 | 21   |
| SELLING SECURITYHOLDERS                         | 22   |
| PLAN OF DISTRIBUTION                            | 28   |
| LEGAL MATTERS                                   | 29   |
| EXPERTS   | 29   |
| WHERE YOU CAN FIND MORE INFORMATION             | 29   |
| INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE | 29   |

## FORWARD-LOOKING STATEMENTS

Certain statements in this prospectus or the documents incorporated by reference herein constitute “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Senesco Technologies, Inc. to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such factors include, among others, those set forth under the caption “Risk Factors.” The words “believe,” “expect,” “anticipate,” “intend,” and “plan” and similar expressions identify forward-looking statements. Readers are cautioned not to place undue reliance on any of these forward-looking statements, which speak only as of the date of the statement was made. Senesco undertakes no obligation to update any forward-looking statement.

## OUR COMPANY

The primary business of Senesco Technologies, Inc., a Delaware corporation incorporated in 1999, and its wholly-owned subsidiary, Senesco, Inc., a New Jersey corporation incorporated in 1998, collectively referred to as the “Company,” “Senesco,” “we,” “us” or “our,” is to utilize our patented and patent-pending genes, primarily eucaryotic translation initiation Factor 5A, or Factor 5A, and deoxyhypusine synthase, or DHS, and related technology for inhibition in human health applications to:

- develop novel approaches to treat inflammatory and apoptotic related diseases in humans;
- develop novel approaches to treat cancer, a group of diseases in which apoptosis does not occur normally; and

We believe that our gene technology could have broad applicability in the human health field, by either inhibiting or accelerating apoptosis. Inducing apoptosis may be useful in treating certain forms of cancer because the cancerous cells have failed to initiate apoptosis on their own due to damaged or inhibited apoptotic pathways. Inhibiting apoptosis may be useful in preventing or treating a wide range of inflammatory and ischemic diseases attributed to premature apoptosis, including diabetes, diabetic retinopathy and lung inflammation, among others.

Our human health research program, which has consisted of pre-clinical in-vitro and in-vivo experiments designed to assess the role and method of action of the Factor 5A genes in human diseases, is performed by approximately 5 third party researchers, at our direction, at Mayo Clinic and the University of Waterloo.

Certain preclinical human health results to date include:

- Performing efficacy, toxicological and dose-finding studies in mice for our potential multiple myeloma drug candidate, SNS-01. SNS-01 is a nano-encapsulated combination therapy of Factor 5A and an siRNA against Factor 5A. Our efficacy study in severe combined immune-deficient (“SCID”) mice with subcutaneous human multiple myeloma tumors tested SNS-01 dosages ranging from 0.15 mg/kg to 1.5 mg/kg. In these studies, mice treated with a dose of either 0.75 mg/kg or 1.5 mg/kg both showed a 91% reduction in tumor volume and a decrease in tumor weight of 87% and 95%, respectively. For mice that received smaller doses of either 0.38 mg/kg or 0.15 mg/kg, there was also a reduction in tumor volume (73% and 61%, respectively) and weight (74% and 36%, respectively). All of the treated mice, regardless of dose, survived. This therapeutic dose range study provided the basis for an 8-day maximum tolerated dose study in which normal mice received two intravenous doses of increasing amounts of SNS-01 (from 2.2 mg/kg). Body weight, organ weight and serum levels of liver enzymes were used as clinical indices to assess toxicity. A dose between 2.2 mg/kg and 2.9 mg/kg was well tolerated with respect to these clinical indices, and the survival rate at 2.9 mg/kg was 80%. Those mice receiving above 2.9 mg/kg of SNS-01 showed evidence of morbidity and up to 80% mortality. The 2.9 mg/kg threshold, twice the upper end of the proposed therapeutic dose range, was therefore determined to be the maximum tolerated dose in mice.
- demonstrated significant tumor regression and diminished rate of tumor growth of multiple myeloma tumors in SCID mice treated with Factor 5A technology encapsulated in nanoparticles;

- increased median survival by approximately 250% in a tumor model of mice injected with melanoma cancer cells;
- induced apoptosis in both human cancer cell lines derived from tumors and in lung tumors in mice;
- induced apoptosis of cancer cells in a human multiple myeloma cell line in the presence of IL-6;
- measured VEGF reduction in mouse lung tumors as a result of treatment with our genes;
- decreased ICAM and activation of NFkB in cancer cells employing siRNA against Factor 5A;
- increased the survival rate in H1N1 mouse influenza survival studies from 14% in untreated mice to 52% in mice treated with our siRNA against Factor 5A. Additionally, the treated mice reversed the weight loss typically seen in infected mice and had other reduced indicators of disease severity as measured by blood glucose and liver enzymes.
- increased the survival, while maintaining functionality, of mouse pancreatic islet cells isolated for transplantation, using intraperitoneal administration of our technology. Initial animal studies have shown that our technology administered prior to harvesting beta islet cells from a mouse, has a significant impact not only on the survival of the beta islet cells, but also on the retention of the cells' functionality when compared to the untreated beta islet cells. Additional studies have shown that the treated beta islet cells survive a pro-inflammatory cytokine challenge, while maintaining their functionality with respect to insulin production. These further studies also revealed Factor-5A's involvement in the modulation of inducible nitric oxide synthase (iNOS), an important indicator of inflammation; and
- increased the survival rate of mice in a lethal challenge sepsis model. Additionally, a broad spectrum of systemic pro-inflammatory cytokines were down-regulated, while not effecting the anti-inflammatory cytokine IL-10.

We are advancing our research in multiple myeloma with the goal of initiating a Phase I clinical trial, and may select additional human health indications to bring into clinical trials. In connection with the potential clinical trial, we have engaged a clinical research organization, or CRO, to assist us through the process. We have also determined the delivery system for our technology, contracted for the supply of pharmaceutical grade materials to be used in toxicology and human studies, performed certain toxicology studies, and have contracted with a third party laboratory to conduct additional toxicology studies. Together with the assistance of our CRO, we will have additional toxicology studies performed with the goal of filing an investigational new drug application, or IND application, with the U.S. Food and Drug Administration, or FDA, for their review and consideration in order to initiate a clinical trial. We estimate that it will take approximately eight (8) months to complete these objectives.

Our agricultural research focuses on the discovery and development of certain gene technologies, which are designed to confer positive traits on fruits, flowers, vegetables, forestry species and agronomic crops. To date, we have isolated and characterized the senescence-induced Lipase gene, DHS, and Factor 5A in certain species of plants. Our goal is to modulate the expression of these genes in order to achieve such traits as extended shelf life, increased biomass, increased yield and increased resistance to environmental stresses and disease, thereby demonstrating proof of concept in each category of crop.

Certain agricultural results to date include:

- longer shelf life of perishable produce;
- increased biomass and seed yield;
- greater tolerance to environmental stresses, such as drought and soil salinity;
- greater tolerance to certain fungal and bacterial pathogens;
- more efficient use of fertilizer; and

· advancement to field trials in banana, lettuce, and trees.

We presently license our technology to agricultural companies capable of incorporating our technology into crops grown for commercial agriculture. We anticipate revenues from these relationships in the form of licensing fees and royalties from our partners, usage fees, or sharing gross profits. In addition, we anticipate payments from our partners upon our achievement of certain research and development benchmarks. This commercialization strategy allows us to generate revenues at various stages of product development, while ensuring that our technology is incorporated into a wide variety of crops. Our optimal partners combine the technological expertise to incorporate our technology into their product line along with the ability to successfully market the enhanced final product, thereby eliminating the need for us to develop and maintain a sales force. We have entered into eight license agreements and one joint collaboration with established agricultural biotechnology companies.

Our executive offices are located at 303 George Street, Suite 420, New Brunswick, New Jersey 08901, our telephone number is (732) 296-8400 and our Internet address is <http://www.senesco.com>. The information on our Internet website is not incorporated by reference in this prospectus, and our website address is included in this prospectus as a textual reference only.

## **RECENT APRIL 2010 FINANCING**

### **Summary of the Offering**

On March 26, 2010, the Company entered into two Purchase Agreements, referred to herein as the Non-Affiliate Purchase Agreements, between the Company and certain non-affiliated investors who are a party thereto, referred to herein as the Non-Affiliated Investors. The Company also entered into a Purchase Agreement with certain affiliates of the Company referred to herein as the Affiliated Investors, and the Affiliate Purchase Agreement. Collectively the Non-Affiliate Purchase Agreements shall be referred to herein as the Purchase Agreements and collectively the Non-Affiliated Investors shall be referred to herein as the Investors. The respective Purchase Agreements contain substantially similar terms.

Pursuant to the Non-Affiliate Purchase Agreements, the Company agreed to issue to the Non-Affiliated Purchasers, in a private placement, an aggregate of approximately 10,297 shares of the Company's 10% Series A Convertible Preferred Stock, par value \$0.01 per share, initially convertible into approximately 32,178,125 shares of the Company's common stock, par value \$0.01 per share, and (ii) immediately exercisable warrants to purchase up to approximately 32,178,125 shares of common stock for an aggregate offering price of approximately \$10,297,000.

We expect to use the net proceeds from the transaction for general corporate purposes.

In connection with the offering, the Company has agreed to solicit shareholder approval of (i) the ability of the Investors to convert the securities into common stock, which in the aggregate exceed 20% of our currently outstanding shares of common stock and (ii) the issuance of the securities to certain Affiliated Investors pursuant to the terms and conditions of an Affiliate Purchase Agreement at a stockholders' meeting to be held as soon as possible, referred to herein as the Shareholders' Meeting.

The Company closed on the offering with the Non-Affiliate Purchasers on April 1, 2010 and, further, will close the offering with the Affiliate Purchasers as soon as reasonably possible after the receipt of stockholder approval at the Shareholders' Meeting.

### **Warrants**

Pursuant to the Purchase Agreements, the Company agreed to deliver each of a Series A Warrant to the Non-Affiliate Investors as well as certain Placement Agent Warrants, referred to herein as the Warrants. Each Warrant has an initial exercise price of \$0.35 per share of common stock. The Warrants are immediately exercisable and have a five (5) year term. The Warrants are subject to a 19.99% blocker provision to comply with NYSE Amex Rules, which provisions will expire if the stockholders approve the Offering at the Stockholders' Meeting. The Warrants also contain an provision which limits the holders beneficial ownership to a maximum of 4.99% (which percentage may be increased to 9.99% upon sixty (60) days notice to the Company). Upon the occurrence of certain dilutive events the number of shares underlying the Warrants may be increased.

## Registration Rights Agreement

The Company also entered into a Registration Rights Agreement dated as of March 26, 2010, by and among the Company and the Non-Affiliate Investors, referred to herein as the Registration Rights Agreement. Pursuant to the Registration Rights Agreement, the Company has agreed to file a registration statement, also referred to herein as the Registration Statement, with the Securities and Exchange Commission within, except for certain limited exceptions, thirty (30) days of closing the offering, also referred to herein as the Filing Deadline, to register the shares of common stock issuable upon conversion or exercise of the shares of Series A Preferred Stock and the Warrants, as the case may be, also referred to herein as the Underlying Shares. In the event the Company does not file the Registration Statement on or before the Filing Deadline, the Company will be required to pay liquidated damages in an amount equal to 1% of the aggregate amount purchase price paid by the holder for any unregistered securities then held by such Investor up to a maximum of 3%. The Company must file additional registration statements until all of the securities may be sold pursuant to an effective registration statement or the securities become eligible for sale under Rule 144 of the Securities Act.

## Certificates of Designations

On March 31, 2010 the Company filed a Certificate of Designations designating 10% Series A Convertible Preferred Stock, referred to herein as the Certificate of Designations, to its Amended and Restated Articles of Incorporation, as amended, referred to herein as the Articles of Incorporation, with the Secretary of State of the State of Delaware, establishing the preferred stock. The preferred stock does not have any voting rights. Each share of preferred stock has a stated value of \$1,000, referred to herein as the Stated Value. Each holder of shares of preferred stock is entitled to receive semi-annually dividends at the rate of 10% per annum of the Stated Value for each share of preferred stock held by such holder. Except in limited circumstances, the Company can elect to pay the dividends in cash or shares of Common Stock. Each share of preferred stock is entitled to a liquidation preference equal to the Stated Value plus any accrued and unpaid dividends. The shares of preferred stock are convertible into shares of common stock at an initial conversion price of \$0.32 per share, which price may be adjusted upon the occurrence of certain dilutive events, and are convertible at any time, provided that in the conversion of shares of preferred stock into shares of Common Stock is subject to a 19.99% blocker provision, which provision will expire if the stockholders approve the offering at the Stockholders' Meeting. The preferred stock is also subject to a provision which limits the holders' beneficial ownership to a maximum of 4.99% (which percentage may be increased to 9.99% upon sixty (60) days notice to the Company). In addition, until the earlier of (i) the earlier of (A) seventy-five (75) days after the date the Company's registration statement is declared effective or (B) nine (9) months after the closing date, or (ii) as long as less than twenty percent (20%) of the shares of preferred stock originally issued hereunder are outstanding, unless otherwise agreed to by a certain percentage of the holders of preferred stock, the Company may not (1) except in limited circumstances, enter into, create, incur assume, guarantee or suffer to exist any indebtedness for borrowed money, (2) except in limited circumstances, enter into, create, incur assume, guarantee or suffer to exist any liens, (3) except in connection with the issuance of the preferred stock, amend its charter documents in a manner that materially adversely effects the rights of any holder of preferred stock, (4) except in limited circumstances repay, repurchase or offer to repay, repurchase or otherwise acquire more than a de minimis number of shares of its common stock, (5) pay cash dividends or distributions on securities which are junior to the preferred stock or (5) enter into any transaction with an affiliate of the Company which is not at an arms-length basis or approved by a disinterested majority of the board. In addition, upon the occurrence of certain events, the holders of preferred stock may redeem all of their preferred stock. Such events include (1) if the Company fails to deliver certificates representing issuable upon a conversion hereunder prior to the tenth business day after such shares are required to be delivered, (2) the Company fails to pay in full the amount of cash due pursuant to a buy-in or other event within ten (10) business days, (3) the Company fails to have available a sufficient number of authorized and unreserved shares of Common Stock to issue to an Investor upon a conversion of the preferred stock, (4) the Company materially breaches a term in a document underlying the transaction which is not cured within thirty (30) days, (4) the Company redeems more than a de minimis number of securities which are junior to the preferred stock, (5) there occurs a change in control transaction or bankruptcy event or (6) the Common Stock shall fail to be listed or quoted for trading on a stock market for more than five (5) trading days. Each holder of preferred stock also has the right to participate in future financings of the Company. In the event a holder converts their preferred stock prior to March 26, 2013, we must also pay to the holder so converted cash, or at our option, in duly authorized, validly issued, fully paid and non-assessable shares of common stock, or a combination thereof, with respect to the preferred stock so converted in an amount equal to \$300 per \$1,000 of Stated Value of the preferred stock, less the amount of any dividend paid on such preferred stock before the date of conversion.



The following table illustrates the value of our common stock underlying the preferred stock and potential discount to market price that the selling securityholders may receive.

| <b>Market Price(1)</b> | <b>Conversion Price(2)</b> | <b>Total Shares Underlying Preferred Stock (3)</b> | <b>Total Value of Shares at Market Price(4)</b> | <b>Total Value of Shares at Conversion Price(5)</b> | <b>Total Possible Discount to Market Price(6)</b> |
|------------------------|----------------------------|--|---|---|---|
| \$ 0.386               | \$ 0.32                    | 32,178,125   | \$ 12,420,756                                   | \$ 10,297,000                                       | \$ 2,123,756                                      |

- 
- (1) Market price per share of our common stock on March 25, 2010 (the closing price prior to the signing of the definitive agreements).
- (2) The conversion price of the preferred stock.
- (3) Total number of shares of common stock underlying the preferred stock assuming full conversion at the fixed conversion price.
- (4) Total market value of shares of common stock underlying the preferred stock assuming full conversion of the preferred stock and based on the market price of the common stock on March 25, 2010.
- (5) Total value of shares of common stock underlying the preferred stock assuming full conversion of the preferred stock and based on the conversion price.
- (6) Discount to market price calculated by subtracting the result in footnote (5) from the result in footnote (4).

The following table illustrates the value of warrants assuming the selling securityholders exercise them on a cash basis.

| <b>Market Price (1)</b> | <b>Exercise Price (2)</b> | <b>Total Shares Underlying the Warrants(3)</b> | <b>Total Value of Shares at Market Price(4)</b> | <b>Total Value of Shares at Exercise Price(5)</b> | <b>Total Possible Discount to Market Price(6)</b> |
|-------------------------|---------------------------|--|---|---|---|
| \$ 0.386                | \$ 0.35                   | 33,210,938                                     | \$ 12,819,422                                   | \$ 11,623,828                                     | \$ 1,195,594                                      |

(1) Market price per share of our common stock on March 25, 2010.

(2) Exercise price per share of our common stock.

(3) Total number of shares of common stock underlying the warrants assuming full conversion of the warrants.

(4) Total market value of the shares of common stock underlying the warrants assuming full exercise of the warrants based on the market price of the common stock on March 25, 2010.

(5) Total value of shares of common stock underlying the warrants assuming full exercise of the warrants based on the exercise price.

(6) Discount to market price calculated by subtracting the result in footnote (5) from the result in footnote (4).

The following table summarizes the potential profit that the selling securityholders may achieve from the preferred stock and warrants. For purposes of the table, we have assumed the full amount of the stated value of the preferred stock is converted at the conversion price (\$0.32) and full exercise of the warrants. We also have given the potential profit calculations assuming different price levels of the common stock of the company. The first, third and fourth market prices were arbitrarily selected based on the recent trading history of the common stock.

| <b>Market Price</b> | <b>Total Possible Profit on Preferred Stock</b> | <b>Total Possible Profit on Warrant Shares</b> | <b>Total</b>   |
|---------------------|---|--|----------------|
| \$ 0.30             | \$ (643,562)                                    | \$ (1,660,547)                                 | \$ (2,304,109) |
| \$ 0.32             | \$ -  | \$ (996,328)                                   | \$ (996,328)   |
| \$ 0.35             | \$ 965,344                                      | \$ -   | \$ 965,344     |
| \$ 0.40             | \$ 2,574,250                                    | \$ 1,660,547                                   | \$ 4,234,797   |

The following table summarizes the potential payments we may be required to pay to the selling securityholders. For purposes of this table, we have assumed that the preferred stock was issued and sold by the Company to the selling securityholders on April 1, 2010, but the selling securityholders held the preferred stock for three years. The table reflects all the payments of interest and premiums due on the preferred stock and warrants.

| <b>Maximum Interest Payments (1)</b> | <b>Maximum Make Whole Payments(2)</b> | <b>Total Maximum Payments(3)</b> | <b>Total Net Proceeds to Company(4)</b> |
|--------------------------------------|---------------------------------------|----------------------------------|---|
| \$ 3,089,100                         | \$ 3,089,100                          | \$ 3,089,100                     | \$ 6,510,900                            |

(1) Maximum amount of interest that can accrue assuming all the preferred stock remain outstanding for a period of three years. We may pay accrued interest in either cash or, at our option, in shares of our common stock.

(2) In the event a holder converts their preferred stock prior to March 26, 2013, we must also pay to the holder so converted cash, or at our option, in duly authorized, validly issued, fully paid and non-assessable shares of common stock, or a combination thereof, with respect to the preferred stock so converted in an amount equal to \$300 per \$1,000 of stated value of the preferred stock, less the amount of any dividend paid on such preferred stock before the date of conversion.

(3) Total maximum payments that we may be required to make for the term of the preferred stock and assuming that we made all of the payments described in footnotes (1) or (2).

(4) Total net proceeds to us assuming that we are required to make any payments as described in footnotes (1) or (2).

## THE OFFERING

All of the securities being offered hereby are being offered for resale by the selling securityholders listed in the “Selling Securityholders” section of this prospectus, which commences on page 22. We will not receive any of the proceeds from the sale of the offered shares by the selling securityholders, but we will receive proceeds from any cash exercises of the April 2010 warrants pursuant to which certain of the offered shares are issuable. See “Use of Proceeds.”

## RISK FACTORS

*Any investment in shares of our common stock involves a high degree of risk. You should consider carefully the following information about these risks, together with all the other information contained in, or incorporated by reference into, this prospectus, including our financial statements and related notes, before you decide to purchase shares of our common stock. If any of the following risks actually occurs, our business, financial condition, operating results and future growth prospects could be materially and adversely affected. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our financial condition. Any adverse effect on our business, financial condition or operating results could result in a decline in the trading price of our common stock and your loss of all or part of your investment.*

### **Risks Related to Our Business**

***We have a limited operating history and have incurred substantial losses and expect to incur future losses.***

We are a development stage biotechnology company with a limited operating history and limited assets and capital. We have incurred losses each year since inception and had an accumulated deficit of \$33,111,093 at December 31, 2009. We have generated minimal revenues by licensing our technology for certain crops to companies willing to share in our development costs. In addition, our technology may not be ready for commercialization for several years. We expect to continue to incur losses for the next several years because we anticipate that our expenditures on research and development, and administrative activities will significantly exceed our revenues during that period. We cannot predict when, if ever, we will become profitable.

***Our independent auditors have expressed substantial doubt about our ability to continue as a going concern.***

In their audit opinion issued in connection with our consolidated balance sheet as of June 30, 2009 and our related consolidated statements of operations, stockholders' equity, and cash flows for the year then ended, our auditors have expressed substantial doubt about our ability to continue as a going concern given our recurring net losses, negative cash flows from operations, planned spending levels and the limited amount of funds on our balance sheet. We have prepared our financial statements on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. The consolidated financial statements do not include any adjustments that might be necessary should we be unable to continue in existence.

***We may need additional capital to fund our operations until we are able to generate a profit.***

Our operations to date have required significant cash expenditures. Our future capital requirements will depend on the results of our research and development activities, preclinical and clinical studies, and competitive and technological advances.

In addition, the financings with YA Global Investments, L.P., referred to herein as YA Global, and Stanford Venture Capital Holdings, Inc., referred to herein as Stanford, are secured by all of our assets. If we default under the convertible notes, the investors may foreclose on our assets and our business. As a result, we will need to obtain more funding in the future through collaborations or other arrangements with research institutions and corporate partners, or public and private offerings of our securities, including debt or equity financing. We may not be able to obtain adequate funds for our operations from these sources when needed or on acceptable terms. Future collaborations or similar arrangements may require us to license valuable intellectual property to, or to share substantial economic benefits with, our collaborators. If we raise additional capital by issuing additional equity or securities convertible into equity, our stockholders may experience dilution and our share price may decline. Any debt financing may result in restrictions on our spending.

If we are unable to raise additional funds, we will need to do one or more of the following:

- delay, scale-back or eliminate some or all of our research and product development programs;
- license third parties to develop and commercialize products or technologies that we would otherwise seek to develop and commercialize ourselves;
- seek strategic alliances or business combinations;
- attempt to sell our company;
- cease operations; or
- declare bankruptcy.

We believe that at the projected rate of spending as of December 31, 2009, we should have sufficient cash to maintain our present operations for two (2) to three (3) months from December 31, 2009.

In March 2010, we redeemed all of the convertible notes held by YA Global and the security interest held by YA Global was released.

Also in March 2010, the convertible notes held by Stanford were purchased by certain member of our board of directors. Such directors plan on converting those notes into common stock, subject to shareholder approval.

On April 1, 2010, we issued 10,297 shares of 10% convertible preferred stock for \$10,297,000 of gross proceeds. We believe that the funds received will allow us to maintain our present operations for at least the next twelve (12) months.

***We may be adversely affected by the current economic environment.***

Our ability to obtain financing, invest in and grow our business, and meet our financial obligations depends on our operating and financial performance, which in turn is subject to numerous factors. In addition to factors specific to our business, prevailing economic conditions and financial, business and other factors beyond our control can also affect our business and ability to raise capital. We cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

***We depend on a single principal technology and, if our technology is not commercially successful, we will have no alternative source of revenue.***

Our primary business is the development and licensing of technology to identify, isolate, characterize and promote or silence genes which control the death of cells in humans and plants. Our future revenue and profitability critically depend upon our ability to successfully develop apoptosis and senescence gene technology and later license or market such technology. We have conducted experiments on certain crops with favorable results and have conducted certain preliminary cell-line and animal experiments, which have provided us with data upon which we have designed additional research programs. However, we cannot give any assurance that our technology will be commercially successful or economically viable for any crops or human health applications.

In addition, no assurance can be given that adverse consequences might not result from the use of our technology such as the development of negative effects on humans or plants or reduced benefits in terms of crop yield or protection. Our failure to obtain market acceptance of our technology or of our current or potential licensees to successfully commercialize such technology would have a material adverse effect on our business.

***We outsource all of our research and development activities and, if we are unsuccessful in maintaining our alliances with these third parties, our research and development efforts may be delayed or curtailed.***

We rely on third parties to perform all of our research and development activities. Our research and development efforts take place at the University of Waterloo in Ontario, Canada, where our technology was discovered, Mayo Clinic and with our commercial partners. At this time, we do not have the internal capabilities to perform our research and development activities. Accordingly, the failure of third-party research partners to perform under agreements entered into with us, or our failure to renew important research agreements with these third parties, may delay or curtail our research and development efforts.

***We have significant future capital needs and may be unable to raise capital when needed, which could force us to delay or reduce our research and development efforts.***

As of December 31, 2009, we had cash of \$751,787 and working capital of \$881,652. Using our available reserves as of December 31, 2009, we believe that we can operate according to our current business plan for the next two (2) to three (3) months from December 31, 2009. On April 1, 2010, we issued 10,297 shares of 10% convertible preferred stock for \$10,297,000 of gross proceeds. We believe that the funds received will allow us to maintain our present operations for at least the next twelve (12) months.

To date, we have generated minimal revenues and anticipate that our operating costs will exceed any revenues generated over the next several years. Therefore, we will be required to raise additional capital in the future in order to operate in accordance with our current business plan, and this funding may not be available on favorable terms, if at all. If we are unable to raise additional funds, we will need to do one or more of the following:

- delay, scale back or eliminate some or all of our research and development programs;
- provide a license to third parties to develop and commercialize our technology that we would otherwise seek to develop and commercialize ourselves;
- seek strategic alliances or business combinations;
- attempt to sell our company;
- cease operations; or
- declare bankruptcy.

In addition, in connection with any funding, if we need to issue more equity securities than our certificate of incorporation currently authorizes, or more than 20% of the shares of our common stock outstanding, we may need stockholder approval. If stockholder approval is not obtained or if adequate funds are not available, we may be required to curtail operations significantly or to obtain funds through arrangements with collaborative partners or others that may require us to relinquish rights to certain of our technologies, product candidates, products or potential markets. Investors may experience dilution in their investment from future offerings of our common stock. For example, if we raise additional capital by issuing equity securities, such an issuance would reduce the percentage ownership of existing stockholders. In addition, assuming the exercise of all options and warrants outstanding and the conversion of the notes into common stock, as of December 31, 2009, we had 18,268,537 shares of common stock authorized but unissued and unreserved, which may be issued from time to time by our board of directors without stockholder approval. Furthermore, we may need to issue securities that have rights, preferences and privileges senior to our common stock. Failure to obtain financing on acceptable terms would have a material adverse effect on our liquidity.

Since our inception, we have financed all of our operations through private equity and debt financings. Our future capital requirements depend on numerous factors, including:

- the scope of our research and development;
- our ability to attract business partners willing to share in our development costs;
- our ability to successfully commercialize our technology;
- competing technological and market developments;
- our ability to enter into collaborative arrangements for the development, regulatory approval and commercialization of other products; and
- the cost of filing, prosecuting, defending and enforcing patent claims and other intellectual property rights.

***Our business depends upon our patents and proprietary rights and the enforcement of these rights. Our failure to obtain and maintain patent protection may increase competition and reduce demand for our technology.***

As a result of the substantial length of time and expense associated with developing products and bringing them to the marketplace in the biotechnology and agricultural industries, obtaining and maintaining patent and trade secret protection for technologies, products and processes is of vital importance. Our success will depend in part on several factors, including, without limitation:

- our ability to obtain patent protection for our technologies and processes;
- our ability to preserve our trade secrets; and
- our ability to operate without infringing the proprietary rights of other parties both in the United States and in foreign countries.

As of December 31, 2009, we have been issued twenty (20) patents by the PTO and thirty-nine (39) patents from foreign countries. We have also filed numerous patent applications for our technology in the United States and in several foreign countries, which technology is vital to our primary business, as well as several Continuations in Part on these patent applications. Our success depends in part upon the grant of patents from our pending patent applications.

Although we believe that our technology is unique and that it will not violate or infringe upon the proprietary rights of any third party, we cannot assure you that these claims will not be made or if made, could be successfully defended against. If we do not obtain and maintain patent protection, we may face increased competition in the United States and internationally, which would have a material adverse effect on our business.

Since patent applications in the United States are maintained in secrecy until patents are issued, and since publication of discoveries in the scientific and patent literature tend to lag behind actual discoveries by several months, we cannot be certain that we were the first creator of the inventions covered by our pending patent applications or that we were the first to file patent applications for these inventions.

In addition, among other things, we cannot assure you that:

- our patent applications will result in the issuance of patents;
- any patents issued or licensed to us will be free from challenge and if challenged, would be held to be valid;
- any patents issued or licensed to us will provide commercially significant protection for our technology, products and processes;
- other companies will not independently develop substantially equivalent proprietary information which is not covered by our patent rights;
- other companies will not obtain access to our know-how;
- other companies will not be granted patents that may prevent the commercialization of our technology; or
- we will not incur licensing fees and the payment of significant other fees or royalties to third parties for the use of their intellectual property in order to enable us to conduct our business.

***Our competitors may allege that we are infringing upon their intellectual property rights, forcing us to incur substantial costs and expenses in resulting litigation, the outcome of which would be uncertain.***

Patent law is still evolving relative to the scope and enforceability of claims in the fields in which we operate. We are like most biotechnology companies in that our patent protection is highly uncertain and involves complex legal and technical questions for which legal principles are not yet firmly established. In addition, if issued, our patents may not contain claims sufficiently broad to protect us against third parties with similar technologies or products, or provide us with any competitive advantage.

The PTO and the courts have not established a consistent policy regarding the breadth of claims allowed in biotechnology patents. The allowance of broader claims may increase the incidence and cost of patent interference proceedings and the risk of infringement litigation. On the other hand, the allowance of narrower claims may limit the scope and value of our proprietary rights.

The laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the United States, and many companies have encountered significant problems and costs in protecting their proprietary rights in these foreign countries.

We could become involved in infringement actions to enforce and/or protect our patents. Regardless of the outcome, patent litigation is expensive and time consuming and would distract our management from other activities. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we could because they have substantially greater resources. Uncertainties resulting from the initiation and continuation of any patent litigation could limit our ability to continue our operations.

***If our technology infringes the intellectual property of our competitors or other third parties, we may be required to pay license fees or damages.***

If any relevant claims of third-party patents that are adverse to us are upheld as valid and enforceable, we could be prevented from commercializing our technology or could be required to obtain licenses from the owners of such patents. We cannot assure you that such licenses would be available or, if available, would be on acceptable terms. Some licenses may be non-exclusive and, therefore, our competitors may have access to the same technology licensed to us. In addition, if any parties successfully claim that the creation or use of our technology infringes upon their intellectual property rights, we may be forced to pay damages, including treble damages.



***Our security measures may not adequately protect our unpatented technology and, if we are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology may be adversely affected.***

Our success depends upon know-how, unpatentable trade secrets, and the skills, knowledge and experience of our scientific and technical personnel. As a result, we require all employees to agree to a confidentiality provision in their employment agreement that prohibits the disclosure of confidential information to anyone outside of our company, during the term of employment and thereafter. We also require all employees to disclose and assign to us the rights to their ideas, developments, discoveries and inventions. We also attempt to enter into similar agreements with our consultants, advisors and research collaborators. We cannot assure you that adequate protection for our trade secrets, know-how or other proprietary information against unauthorized use or disclosure will be available.

We occasionally provide information to research collaborators in academic institutions and request that the collaborators conduct certain tests. We cannot assure you that the academic institutions will not assert intellectual property rights in the results of the tests conducted by the research collaborators, or that the academic institutions will grant licenses under such intellectual property rights to us on acceptable terms, if at all. If the assertion of intellectual property rights by an academic institution is substantiated, and the academic institution does not grant intellectual property rights to us, these events could limit our ability to commercialize our technology.

***As we evolve from a company primarily involved in the research and development of our technology into one that is also involved in the commercialization of our technology, we may have difficulty managing our growth and expanding our operations.***

As our business grows, we may need to add employees and enhance our management, systems and procedures. We may need to successfully integrate our internal operations with the operations of our marketing partners, manufacturers, distributors and suppliers to produce and market commercially viable products. We may also need to manage additional relationships with various collaborative partners, suppliers and other organizations. Although we do not presently conduct research and development activities in-house, we may undertake those activities in the future. Expanding our business may place a significant burden on our management and operations. We may not be able to implement improvements to our management information and control systems in an efficient and timely manner and we may discover deficiencies in our existing systems and controls. Our failure to effectively respond to such changes may make it difficult for us to manage our growth and expand our operations.

***We have no marketing or sales history and depend on third-party marketing partners. Any failure of these parties to perform would delay or limit our commercialization efforts.***

We have no history of marketing, distributing or selling biotechnology products and we are relying on our ability to successfully establish marketing partners or other arrangements with third parties to market, distribute and sell a commercially viable product both here and abroad. Our business plan envisions creating strategic alliances to access needed commercialization and marketing expertise. We may not be able to attract qualified sub-licensees, distributors or marketing partners, and even if qualified, these marketing partners may not be able to successfully market agricultural products or human health applications developed with our technology. If our current or potential future marketing partners fail to provide adequate levels of sales, our commercialization efforts will be delayed or limited and we may not be able to generate revenue.

***We will depend on joint ventures and strategic alliances to develop and market our technology and, if these arrangements are not successful, our technology may not be developed and the expenses to commercialize our technology will increase.***

In its current state of development, our technology is not ready to be marketed to consumers. We intend to follow a multi-faceted commercialization strategy that involves the licensing of our technology to business partners for the purpose of further technological development, marketing and distribution. We have and are seeking business partners who will share the burden of our development costs while our technology is still being developed, and who will pay us royalties when they market and distribute products incorporating our technology upon commercialization. The establishment of joint ventures and strategic alliances may create future competitors, especially in certain regions abroad where we do not pursue patent protection. If we fail to establish beneficial business partners and strategic alliances, our growth will suffer and the continued development of our technology may be harmed.

***Competition in the human health and agricultural biotechnology industries is intense and technology is changing rapidly. If our competitors market their technology faster than we do, we may not be able to generate revenues from the commercialization of our technology.***

Many human health and agricultural biotechnology companies are engaged in research and development activities relating to apoptosis and senescence. The market for plant protection and yield enhancement products is intensely competitive, rapidly changing and undergoing consolidation. We may be unable to compete successfully against our current and future competitors, which may result in price reductions, reduced margins and the inability to achieve market acceptance for products containing our technology. Our competitors in the field of plant senescence gene technology are companies that develop and produce transgenic plants and include major international agricultural companies, specialized biotechnology companies, research and academic institutions and, potentially, our joint venture and strategic alliance partners. These companies include: Mendel Biotechnology, Inc., Renessen LLC, Exelixis Plant Sciences, Inc., and Syngenta International AG, among others. Some of our competitors that are involved in apoptosis research include: Amgen Inc.; Centocor, Inc.; Genzyme Corporation; OSI Pharmaceuticals, Inc.; Novartis AG; Introgen Therapeutics, Inc.; Genta, Inc.; and Vertex Pharmaceuticals, Inc. Many of these competitors have substantially greater financial, marketing, sales, distribution and technical resources than us and have more experience in research and development, clinical trials, regulatory matters, manufacturing and marketing. We anticipate increased competition in the future as new companies enter the market and new technologies become available. Our technology may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors, which will prevent or limit our ability to generate revenues from the commercialization of our technology.

***Our business is subject to various government regulations and, if we or our licensees are unable to obtain regulatory approval, we may not be able to continue our operations.***

At present, the U.S. federal government regulation of biotechnology is divided among three agencies:

- the USDA regulates the import, field testing and interstate movement of specific types of genetic engineering that may be used in the creation of transgenic plants;
- the EPA regulates activity related to the invention of plant pesticides and herbicides, which may include certain kinds of transgenic plants; and
- the FDA regulates foods derived from new plant varieties.

The FDA requires that transgenic plants meet the same standards for safety that are required for all other plants and foods in general. Except in the case of additives that significantly alter a food's structure, the FDA does not require any additional standards or specific approval for genetically engineered foods, but expects transgenic plant developers to consult the FDA before introducing a new food into the marketplace.

Use of our technology, if developed for human health applications, will also be subject to FDA regulation. The FDA must approve any drug or biologic product before it can be marketed in the United States. In addition, prior to being sold outside of the U.S., any products resulting from the application of our human health technology must be approved by the regulatory agencies of foreign governments. Prior to filing a new drug application or biologics license application with the FDA, we would have to perform extensive clinical trials, and prior to beginning any clinical trial, we would need to perform extensive preclinical testing which could take several years and may require substantial expenditures.

We believe that our current activities, which to date have been confined to research and development efforts, do not require licensing or approval by any governmental regulatory agency. However, we are planning on performing clinical trials, which would be subject to FDA approval. Additionally, federal, state and foreign regulations relating to crop protection products and human health applications developed through biotechnology are subject to public concerns and political circumstances, and, as a result, regulations have changed and may change substantially in the future. Accordingly, we may become subject to governmental regulations or approvals or become subject to licensing requirements in connection with our research and development efforts. We may also be required to obtain such licensing or approval from the governmental regulatory agencies described above, or from state agencies, prior to the commercialization of our genetically transformed plants and human health technology. In addition, our marketing partners who utilize our technology or sell products grown with our technology may be subject to government regulations. If unfavorable governmental regulations are imposed on our technology or if we fail to obtain licenses or approvals in a timely manner, we may not be able to continue our operations.

***Preclinical studies of our human health applications may be unsuccessful, which could delay or prevent regulatory approval.***

Preclinical studies may reveal that our human health technology is ineffective or harmful, and/or may be unsuccessful in demonstrating efficacy and safety of our human health technology, which would significantly limit the possibility of obtaining regulatory approval for any drug or biologic product manufactured with our technology. The FDA requires submission of extensive preclinical, clinical and manufacturing data to assess the efficacy and safety of potential products. We are currently in the process of conducting preclinical toxicology studies for our multiple myeloma product candidate. Any delay in this toxicology study, or any potential negative findings in this toxicology study, will delay our ability to file an IND for our multiple myeloma product candidate. Furthermore, the success of preliminary studies does not ensure commercial success, and later-stage clinical trials may fail to confirm the results of the preliminary studies.

***Our success will depend on the success clinical trials that have not yet begun.***

It may take several years to complete the clinical trials of a product, and a failure of one or more of our clinical trials can occur at any stage of testing. We believe that the development of our product candidate involves significant risks at each stage of testing. If clinical trial difficulties and failures arise, our product candidate may never be approved for sale or become commercially viable.

There are a number of difficulties and risks associated with clinical trials. These difficulties and risks may result in the failure to receive regulatory approval to sell our product candidate or the inability to commercialize our product candidate. The possibility exists that:

- we may discover that the product candidate does not exhibit the expected therapeutic results in humans, may cause harmful side effects or have other unexpected characteristics that may delay or preclude regulatory approval or limit commercial use if approved;
- the results from early clinical trials may not be statistically significant or predictive of results that will be obtained from expanded, advanced clinical trials;
- institutional review boards or regulators, including the FDA, may hold, suspend or terminate our clinical research or the clinical trials of our product candidate for various reasons, including noncompliance with regulatory requirements or if, in their opinion, the participating subjects are being exposed to unacceptable health risks;

- subjects may drop out of our clinical trials;
- our preclinical studies or clinical trials may produce negative, inconsistent or inconclusive results, and we may decide, or regulators may require us, to conduct additional preclinical studies or clinical trials; and
- the cost of our clinical trials may be greater than we currently anticipate.

***If our clinical trials for our product candidates are delayed, we would be unable to commercialize our product candidates on a timely basis, which would materially harm our business.***

Planned clinical trials may not begin on time or may need to be restructured after they have begun. Clinical trials can be delayed for a variety of reasons, including delays related to:

- obtaining an effective investigational new drug application, or IND, or regulatory approval to commence a clinical trial;
- negotiating acceptable clinical trial agreement terms with prospective trial sites;
- obtaining institutional review board approval to conduct a clinical trial at a prospective site;
- recruiting qualified subjects to participate in clinical trials;
- competition in recruiting clinical investigators;
- shortage or lack of availability of supplies of drugs for clinical trials;
- the need to repeat clinical trials as a result of inconclusive results or poorly executed testing;
- the placement of a clinical hold on a study;
- the failure of third parties conducting and overseeing the operations of our clinical trials to perform their contractual or regulatory obligations in a timely fashion; and
- exposure of clinical trial subjects to unexpected and unacceptable health risks or noncompliance with regulatory requirements, which may result in suspension of the trial

We believe that our product candidate has significant milestones to reach, including the successful completion of clinical trials, before commercialization. If we have significant delays in or termination of clinical trials, our financial results and the commercial prospects for our product candidates or any other products that we may develop will be adversely impacted. In addition, our product development costs would increase and our ability to generate revenue could be impaired.

***Any inability to license from third parties their proprietary technologies or processes which we use in connection with the development of our technology may impair our business.***

Other companies, universities and research institutions have or may obtain patents that could limit our ability to use our technology in a product candidate or impair our competitive position. As a result, we would have to obtain licenses from other parties before we could continue using our technology in a product candidate. Any necessary licenses may not be available on commercially acceptable terms, if at all. If we do not obtain required licenses, we may not be able to develop our technology into a product candidate or we may encounter significant delays in development while we redesign methods that are found to infringe on the patents held by others.

***Clinical trials for our human health technology will be lengthy and expensive and their outcome is uncertain***

Before obtaining regulatory approval for the commercial sales of any product containing our technology, we must demonstrate through clinical testing that our technology and product containing our technology is safe and effective for use in humans. Conducting clinical trials is a time-consuming, expensive and uncertain process and typically requires years to complete. In our industry, the results from preclinical studies and early clinical trials often are not predictive of results obtained in later-stage clinical trials. Some products and technologies that have shown promising results in preclinical studies or early clinical trials subsequently fail to establish sufficient safety and efficacy data necessary to obtain regulatory approval. At any time during clinical trials we or the FDA might delay or halt any clinical trial for various reasons, including:

- occurrence of unacceptable toxicities or side effects;
- ineffectiveness of the product candidate;
- negative or inconclusive results from the clinical trials, or results that necessitate additional studies or clinical trials;
- delays in obtaining or maintaining required approvals from institutions, review boards or other reviewing entities at clinical sites;
- delays in patient enrollment; or
- insufficient funding or a reprioritization of financial or other resources.

Any failure or substantial delay in successfully completing clinical trials and obtaining regulatory approval for our product candidates could severely harm our business.

***Even if we receive regulatory approval, consumers may not accept products containing our technology, which will prevent us from being profitable since we have no other source of revenue.***

We cannot guarantee that consumers will accept products containing our technology. Recently, there has been consumer concern and consumer advocate activism with respect to genetically-engineered agricultural consumer products. The adverse consequences from heightened consumer concern in this regard could affect the markets for agricultural products developed with our technology and could also result in increased government regulation in response to that concern. If the public or potential customers perceive our technology to be genetic modification or genetic engineering, agricultural products grown with our technology may not gain market acceptance.

***We depend on our key personnel and, if we are not able to attract and retain qualified scientific and business personnel, we may not be able to grow our business or develop and commercialize our technology.***

We are highly dependent on our scientific advisors, consultants and third-party research partners. Our success will also depend in part on the continued service of our key employees and our ability to identify, hire and retain additional qualified personnel in an intensely competitive market. Although we have employment agreements with all of our key employees and a research agreement with Dr. John Thompson, these agreements may be terminated upon short or no notice. We do not maintain key person life insurance on any member of management. The failure to attract and retain key personnel could limit our growth and hinder our research and development efforts.

***Certain provisions of our charter, by-laws and Delaware law could make a takeover difficult.***

Certain provisions of our certificate of incorporation and by-laws could make it more difficult for a third party to acquire control of us, even if the change in control would be beneficial to stockholders. Our certificate of incorporation authorizes our board of directors to issue, without stockholder approval, except as may be required by the rules of the NYSE Amex Exchange, 5,000,000 shares of preferred stock with voting, conversion and other rights and preferences that could adversely affect the voting power or other rights of the holders of our common stock. Similarly, our by-laws do not restrict our board of directors from issuing preferred stock without stockholder approval.

In addition, we are subject to the Business Combination Act of the Delaware General Corporation Law which, subject to certain exceptions, restricts certain transactions and business combinations between a corporation and a stockholder owning 15% or more of the corporation's outstanding voting stock for a period of three years from the date such stockholder becomes a 15% owner. These provisions may have the effect of delaying or preventing a change of control of us without action by our stockholders and, therefore, could adversely affect the value of our common stock.

Furthermore, in the event of our merger or consolidation with or into another corporation, or the sale of all or substantially all of our assets in which the successor corporation does not assume our outstanding equity awards or issue equivalent equity awards, our current equity plans require the accelerated vesting of such outstanding equity awards.

### **Risks Related to Our Common Stock**

***We currently do not meet the NYSE Amex Exchange continued listing standards. If our common stock is delisted from the NYSE Amex Exchange, we may not be able to list on any other stock exchange, and our common stock may be subject to the "penny stock" regulations which may affect the ability of our stockholders to sell their shares.***

The NYSE Amex Exchange requires us to meet minimum financial requirements in order to maintain our listing. Currently, we do not meet the \$6,000,000 minimum net worth continued listing requirement of the NYSE Amex Exchange and have received a notice of noncompliance from the NYSE Amex Exchange. We submitted a plan of compliance to the NYSE Amex Exchange discussing how we intend to regain compliance with the continued listing requirements. The NYSE Amex Exchange has accepted our plan of compliance and granted us an extension until April 29, 2011 to regain compliance with the NYSE's continued listing standards. During the extension period, we remain subject to periodic review by NYSE Staff. Failure to make progress consistent with the plan or to regain compliance with the continued listing standards by the end of the extension period could result in our company being delisted from the NYSE. If we are delisted from the NYSE Amex Exchange, our common stock likely will become a "penny stock." In general, regulations of the SEC define a "penny stock" to be an equity security that is not listed on a national securities exchange or the NASDAQ Stock Market and that has a market price of less than \$5.00 per share or with an exercise price of less than \$5.00 per share, subject to certain exceptions. If our common stock becomes a penny stock, additional sales practice requirements would be imposed on broker-dealers that sell such securities to persons other than certain qualified investors. For transactions involving a penny stock, unless exempt, a broker-dealer must make a special suitability determination for the purchaser and receive the purchaser's written consent to the transaction prior to the sale. In addition, the rules on penny stocks require delivery, prior to and after any penny stock transaction, of disclosures required by the SEC.

If our stock is not accepted for listing on the NYSE Amex Exchange, we will make every possible effort to have it listed on the Over the Counter Bulletin Board, or the OTC Bulletin Board. If our common stock were to be traded on the OTC Bulletin Board, the Securities Exchange Act of 1934, as amended, and related Securities and Exchange Commission (SEC) rules would impose additional sales practice requirements on broker-dealers that sell our securities. These rules may adversely affect the ability of stockholders to sell our common stock and otherwise negatively affect the liquidity, trading market and price of our common stock.

We believe that the listing of our common stock on a recognized national trading market, such as the NYSE Amex Exchange, is an important part of our business and strategy. Such a listing helps our stockholders by providing a readily available trading market with current quotations. Without that, stockholders may have a difficult time getting a quote for the sale or purchase of our stock, the sale or purchase of our stock would likely be made more difficult and the trading volume and liquidity of our stock would likely decline. The absence of such a listing may adversely affect the acceptance of our common stock as currency or the value accorded it by other parties. In that regard, the absence of a listing on a recognized national trading market will also affect our ability to benefit from the use of our operations and expansion plans, including for use in licensing agreements, joint ventures, the development of strategic relationships and acquisitions, which are critical to our business and strategy and none of which is currently the subject of any agreement, arrangement or understanding, with respect to any future financing or strategic relationship it may undertake. A delisting from the NYSE Amex Exchange could result in negative publicity and could negatively impact our ability to raise capital in the future.

***Our management and other affiliates have significant control of our common stock and could significantly influence our actions in a manner that conflicts with our interests and the interests of other stockholders.***

As of December 31, 2009, our executive officers, directors and affiliated entities together beneficially own approximately 61.2% of the outstanding shares of our common stock, assuming the exercise of options and warrants which are currently exercisable or will become exercisable within 60 days of December 31, 2009, held by these stockholders. As a result, these stockholders, acting together, will be able to exercise significant influence over matters requiring approval by our stockholders, including the election of directors, and may not always act in the best interests of other stockholders. Such a concentration of ownership may have the effect of delaying or preventing a change in control of us, including transactions in which our stockholders might otherwise receive a premium for their shares over then current market prices. Stanford is one such major stockholder of the Company.

In February 2009, the SEC filed a civil lawsuit accusing certain executives of Stanford of fraud and Stanford's assets were subsequently placed in receivership. It is unclear at this point, what impact, if any, the ongoing investigation of Stanford may have on the Company.

***A significant portion of our total outstanding shares of common stock may be sold in the market in the near future, which could cause the market price of our common stock to drop significantly.***

As of December 31, 2009, we had 28,640,934 shares of our common stock issued and outstanding, of which approximately 1,986,306 shares are registered pursuant to a registration statement on Form S-3 and 26,654,628 of which are either eligible to be sold under SEC Rule 144 or are in the public float. In addition, we have registered 2,632,194 shares of our common stock underlying warrants previously issued on the Form S-3 registration statement and we registered 6,137,200 shares of our common stock underlying options granted or to be granted under our stock option plan. Consequently, sales of substantial amounts of our common stock in the public market, or the perception that such sales could occur, may have a material adverse effect on our stock price.

***Our common stock has a limited trading market, which could limit your ability to resell your shares of common stock at or above your purchase price.***

Our common stock is quoted on the NYSE Amex Exchange and currently has a limited trading market. The NYSE Amex Exchange requires us to meet minimum financial requirements in order to maintain our listing. Currently, we do not meet the continued listing requirements of the NYSE Amex Exchange. If we do not meet the continued listing standards, we could be delisted. We cannot assure you that an active trading market will develop or, if developed, will be maintained. As a result, our stockholders may find it difficult to dispose of shares of our common stock and, as a result, may suffer a loss of all or a substantial portion of their investment.

***The market price of our common stock may fluctuate and may drop below the price you paid.***

We cannot assure you that you will be able to resell the shares of our common stock at or above your purchase price. The market price of our common stock may fluctuate significantly in response to a number of factors, some of which are beyond our control. These factors include:

- quarterly variations in operating results;
- the progress or perceived progress of our research and development efforts;
- changes in accounting treatments or principles;

- announcements by us or our competitors of new technology, product and service offerings, significant contracts, acquisitions or strategic relationships;
- additions or departures of key personnel;
- future offerings or resales of our common stock or other securities;
- stock market price and volume fluctuations of publicly-traded companies in general and development companies in particular; and
- general political, economic and market conditions.

For example, during the quarter ended December 31, 2009, our common stock traded between \$0.49 per share and \$0.30 per share.

***Because we do not intend to pay, and have not paid, any cash dividends on our shares of common stock, our stockholders will not be able to receive a return on their shares unless the value of our common stock appreciates and they sell their shares.***

We have never paid or declared any cash dividends on our common stock and we intend to retain any future earnings to finance the development and expansion of our business. We do not anticipate paying any cash dividends on our common stock in the foreseeable future. Therefore, our stockholders will not be able to receive a return on their investment unless the value of our common stock appreciates and they sell their shares.

***Our stockholders may experience substantial dilution as a result of the conversion of outstanding convertible debentures, or the exercise of options and warrants to purchase our common stock.***

As of December 31, 2009, we have outstanding warrants to purchase 22,105,793 shares of our common stock. In addition, as of December 31, 2009, we have reserved 10,212,884 shares of our common stock for issuance upon the exercise of options granted or available to be granted pursuant to our stock option plan, all of which may be granted in the future. The exercise of these options and warrants will result in dilution to our existing stockholders and could have a material adverse effect on our stock price. In addition, any shares issued in connection with the YA Global financing or Stanford financing, as further discussed elsewhere in this Form 10-Q, can also have a dilutive effect and a possible material adverse effect on our stock price. The conversion price of the warrants are also subject to certain anti-dilution adjustments. The agreements with YA Global and Stanford provide for the potential issuance of up to a total of 62,388,888 shares of our common stock, of which 13,883,332 shares are included in outstanding warrants noted above

In March 2010, we redeemed all of the convertible notes held by YA Global and the security interest held by YA Global was released.

Also in March 2010, the convertible notes held by Stanford were purchased by certain member of our board of directors. Such directors plan on converting those notes into common stock, subject to shareholder approval.

On April 1, 2010, we issued 10,297 shares of 10% convertible preferred stock and 32,178,125 warrants to purchase common stock at an exercise price of \$0.35. Such warrants have a 5 year term and are immediately exercisable. The convertible preferred stock may convert into 32,178,125 share of common stock, subject to certain anti-dilution provisions. Additionally, the dividends on the convertible preferred stock may be paid in cash or common stock. Such dividends are subject to a 30% make-good provision.



## USE OF PROCEEDS

We will not receive any proceeds from the sale of offered shares by the selling securityholders named in this prospectus. Any proceeds we receive from any exercise of the April 2010 warrants, pursuant to which some of the offered shares are issuable, will be used by us for working capital and other general corporate purposes.

We have already received gross proceeds of \$10,297,000 (and net proceeds of approximately \$9,600,000 after deducting commissions and estimated expenses), in connection with our sale of securities to the Non-Affiliated Investors.

We have agreed to pay certain expenses in connection with the registration of the securities offered by the selling securityholders for resale pursuant to this prospectus.

## SELLING SECURITYHOLDERS

Based on information provided by the selling securityholders, the table below sets forth certain information, as of April 20, 2010 unless otherwise noted, regarding the selling securityholders.

The shares being offered by the selling securityholders as set forth in the table below are comprised of (a) shares of common stock issuable upon conversion and/or redemption of their shares of Series A preferred stock, referred to below as “offered conversion shares,” (b) their pro rata portion of an aggregate maximum of 13,790,623 shares that have been reserved for issuance in the event we elect in the future to make dividend payments on our preferred stock in the form of common stock, referred to below as “future dividend shares,” and (c) shares of common stock issuable upon exercise of their April 2010 warrants, referred to below as “offered warrant shares.”

Percentage ownership of common stock is based on 33,584,121 shares of our common stock outstanding as of April 19, 2010. In addition, the table below assumes for calculating each selling securityholder’s beneficial ownership, both prior to and after this offering, as well as each such selling securityholder’s percentage ownership following this offering, that options, warrants and convertible securities held by such securityholder, if any, that are exercisable or convertible within 60 days as of April 20, 2010 have been exercised or converted and the shares underlying them added to the number of shares of our common stock deemed to be outstanding. The calculation of each selling securityholder’s beneficial ownership and percentage ownership following this offering also assumes that all future dividend shares included in those that may be offered by such selling securityholder (but not, unless otherwise noted, those that may be offered by any other selling securityholder) were issued and added to the number of shares of our common stock deemed to be outstanding.

| Name of selling securityholder   | Number of shares of common stock beneficially owned prior to the offering | Percentage of shares of common stock beneficially owned prior to the offering | Number of offered shares being offered (1) | Common stock Beneficially owned after the offering |                                      |
|--|---|---|--|--|--------------------------------------|
|  |   |   |  | Number of Shares                                   | Percentage of outstanding shares (2) |
| Marlin Capital Marketing LLC (3)                                       | -   | -   | 1,897,321                                  | 1,897,321  | 2.4%                                 |
| Linden Growth Partners Master Fund, L.P. (4)                           | -   | -   | 1,328,125                                  | 1,328,125  | 1.7%                                 |
| Whalehaven Capital Fund Ltd (5)  | -   | -   | 3,035,714                                  | 3,035,714  | 3.8%                                 |
| MOG Capital, LLC (6)   | -   | -   | 3,794,643                                  | 3,794,643  | 4.7%                                 |
| Iroquois Master Fund Ltd (7)   | 208,405   | *   | 3,794,643                                  | 4,003,048  | 4.9%                                 |
| Anson Investments Master Fund, LP (8)                                  | -   | -   | 758,929                                    | 758,929  | 1.0%                                 |
| Midsummer Ventures, LP (9)   | -   | -   | 1,897,321                                  | 1,897,321  | 2.4%                                 |
| Hudson Bay Fund LP (10)  | -   | -   | 1,555,804                                  | 1,555,804  | 1.9%                                 |
| Hudson Bay Overseas Fund, Ltd (11)                                     | -   | -   | 2,238,839                                  | 2,238,839  | 2.8%                                 |
| The Hewlett Fund (12)  | -   | -   | 1,897,321                                  | 1,897,321  | 2.4%                                 |
| Alpha Capital Anstalt (13)   | -   | -   | 5,691,964                                  | 5,691,964  | 7.0%                                 |
| Perceptive Life Sciences Master Fund, L.P. (14)                        | -   | -   | 7,589,286                                  | 7,589,286  | 9.2%                                 |
| Chestnut Ridge Partners, LP (15)                                       | -   | -   | 1,897,321                                  | 1,897,321  | 2.4%                                 |
| Brio Capital L.P.(16)  | -   | -   | 1,707,589                                  | 1,707,589  | 2.1%                                 |
| Next View Capital, LP (17)   | -   | -   | 2,276,786                                  | 2,276,786  | 2.8%                                 |
| Pacific Capital Management, LLC (18)                                   | -   | -   | 3,794,643                                  | 3,794,643  | 4.7%                                 |
| Joaquin B. Viso  | -   | -   | 1,897,321                                  | 1,897,321  | 2.4%                                 |
| Paul Klaver  | -   | -   | 1,517,857                                  | 1,517,857  | 1.9%                                 |
| Michael Berry  | 95,000  | *   | 1,138,393                                  | 1,233,393  | 1.5%                                 |
| Harrison and Andree F. Nesbit  | 1,200,000   | 3.6%  | 758,929                                    | 1,958,929  | 2.5%                                 |
| Nat T. Harris  | -   | -   | 758,929                                    | 759,929  | 1.0%                                 |
| Tony Alford  | -   | -   | 1,062,500                                  | 1,062,500  | 1.3%                                 |
| John T. Boundas  | 63,700  | *   | 645,089                                    | 708,789  | *                                    |
| Marshall & Ilsley Trust Company N.A. as Trustee of Mark D. Johnson IRA | -   | -   | 303,571                                    | 303,571  | *                                    |
| PTE Investments, LLC (19)  | -   | -   | 531,250                                    | 531,250  | *                                    |
| Heart 1, LLC (20)  | -   | -   | 303,571                                    | 303,571  | *                                    |
| Michael W. Hyder   | 10,000  | *   | 265,625                                    | 275,625  | *                                    |
| Judith A. Morton   | 16,000  | *   | 227,679                                    | 243,679  | *                                    |
| Thomas E. Williams   | -   | -   | 250,446                                    | 250,446  | *                                    |
| Clayton and Delcie Napier JTWROS                                       | -   | -   | 250,446                                    | 250,446  | *                                    |
| Margaret M. Lyle   | -   | -   | 250,446                                    | 250,446  | *                                    |

| Name of selling securityholder                  | Number of shares of common stock beneficially owned prior to the offering | Percentage of shares of common stock beneficially owned prior to the offering | Number of offered shares being offered (1) | Common stock Beneficially owned after the offering |                                      |
|---|---|---|--|--|--------------------------------------|
|   |   |   |  | Number of Shares                                   | Percentage of outstanding shares (2) |
| Frederick J. Lyle                               | -   | -   | 265,625                                    | 265,625  | *                                    |
| Edward D. Brown                                 | -   | -   | 189,732                                    | 189,732  | *                                    |
| Sheree Frank                                    | -   | -   | 189,732                                    | 189,732  | *                                    |
| Jack P. Kennedy                                 | -   | -   | 159,375                                    | 159,375  | *                                    |
| BMO Nesbitt Burns ITF Wm. Michael Phippen       | 63,291  | *   | 379,464                                    | 442,755  | *                                    |
| Partlet Holdings Limited (21)                   | 4,166,666   | 11.7%   | 3,794,643                                  | 7,961,309  | 9.6%                                 |
| John V. Winfield                                | -   | -   | 1,517,857                                  | 1,517,857  | 1.9%                                 |
| InterGroup Corporation (22)                     | -   | -   | 1,138,393                                  | 1,138,393  | 1.4%                                 |
| Portsmouth Square, Inc (22)                     | -   | -   | 1,517,857                                  | 1,517,857  | 1.9%                                 |
| Santa Fe Financial Corporation (22)             | -   | -   | 758,929                                    | 758,929  | 1.0%                                 |
| Defiance Fund, Ltd (23)                         | 524,500   | 1.6%  | 3,794,643                                  | 4,319,143  | 5.3%                                 |
| Culross Managed Account Platform SPF, Ltd. (24) | 216,100   | *   | 3,794,643                                  | 4,010,743  | 4.9%                                 |
| Northern Rivers Innovation Fund LP (25)         | -   | -   | 2,656,250                                  | 2,656,250  | 3.3%                                 |
| Northern Rivers Innovation RSP Fund (26)        | -   | -   | 379,464                                    | 379,464  | *                                    |
| Hugh Charles Cleland                            | -   | -   | 227,679                                    | 227,679  | *                                    |
| Hugh John Charles Cleland                       | -   | -   | 455,357                                    | 455,357  | *                                    |
| Ronald K. Stack                                 | 41,500  | *   | 227,679                                    | 269,179  | *                                    |
| Charles T. Parker                               | 35,100  | *   | 242,857                                    | 277,957  | *                                    |
| Dhananjaya Dvivedi                              | 331,128   | *   | 758,929                                    | 1,090,057  | 1.4%                                 |
| Christopher Woodman                             | -   | -   | 379,464                                    | 3749,464   | *                                    |
| Ladenburg Thalmann & Co. Inc. (27)              | 74,184  | *   | 929,688                                    | 1,003,872  | 1.3%                                 |
| Midtown Partners & Co., LLC (28)                | 22,000  | *   | 103,125                                    | 125,125  | *                                    |

\*Less than 1%.

- (1) Represents, for each selling securityholder, its offered conversion shares, offered warrant shares and future dividend shares.
- (2) Pursuant to the certificate of designation for our Series A preferred stock and the April 2010 warrants, no holder of such securities is permitted to convert its shares of Series A preferred stock or April 2010 warrants to the extent that any such conversion or exercise would result in its beneficial ownership of more than 4.99% which may be increased to 9.99% upon notice to the Company, of our outstanding common stock after giving effect to such conversion or exercise.

- (3) Marlin Capital Marketing is owned by Michael and Betsey Brauser, as tenants by the entirety and GRQ Consultants. Barry Honig is the sole owner of GRQ consultant. Barry Honig and Michael Brauser are co-manager of Marlin Capital Marketing and share voting and investment control over these securities. Each of Mr. Honig and Brauser disclaims beneficial ownership over these securities. Marlin Capital Marketing is not a broker-dealer or in any way affiliated with any broker-dealer.
- (4) Linden Capital Management IV is the general partner of Linden Growth Partners Master Fund, L.P and has voting and investment control over these securities. Paul Coviello is the President of Linden Capital Management IV. Mr Coviello disclaims beneficial ownership over these securities. Linden Growth Partners Master Fund, L.P is not a broker-dealer or in any way affiliated with any broker-dealer.
- (5) Arthur Jones and Trevor Williams, as Directors of Whalehaven Capital Fund Ltd. have voting and investment control over such securities. Messers. Mazzella, Jones and Trevor disclaim beneficial ownership over these securities. Whalehaven Capital Fund Ltd. is not a broker-dealer or in any way affiliated with any broker-dealer.
- (6) Alphabet Partners, L.P. is the investment manager of MOG Capital, LLC. Jason Adler is the managing member of Alphabet Partners, LP. and has investment and voting control over these securities. Mr. Adler disclaims beneficial ownership over these securities. Alphabet Partners, L.P. is a NASD member and received the securities in the ordinary course of business and at the time of receiving the securities, had no agreements or understandings, directly or indirectly, with any person to distribute them.
- (7) Joshua Silverman has voting and investment control over the shares of common stock and warrants to purchase common stock held by Iroquois Master Fund, Ltd. Mr. Silverman disclaims beneficial ownership over these securities. Iroquois Master Fund, Ltd. is not a broker dealer or in any way affiliated with any broker dealer.
- (8) Frigate Ventures, LP is the investment manager of Anson Investments Master Fund LP, and has voting and investment control over these securities. Bruce Winson is the managing member of Admiralty Advisors, LLC, the general partner of Frigate Ventures, LP. Bruce Winson disclaims beneficial ownership over these securities. Anson Investments Master Fund, LP. is not a broker dealer or in any way affiliated with any broker dealer.
- (9) Midsummer Capital, LLC (“Midsummer Capital”) is the investment advisor to Midsummer Ventures, LP. By virtue of such relationship, Midsummer Capital may be deemed to have dispositive power over the shares owned by Midsummer Ventures, LP. Midsummer Capital disclaims beneficial ownership of such shares. Mr. Michel Amsalem and Mr. Joshua Thomas have delegated authority from the members of Midsummer Capital with respect to the shares of common stock owned by Midsummer Ventures, LP. Messrs. Amsalem and Thomas may be deemed to share dispositive power over the shares of common stock held by Midsummer Ventures, LP. Messrs. Amsalem and Thomas disclaim beneficial ownership of such shares of common stock, and neither person has any legal right to maintain such delegated authority. Midsummer Ventures, LP is not a broker dealer or in any way affiliated with any broker dealer.
- (10) Hudson Bay Capital Management, L.P., is the investment manager of Hudson Bay Fund LP, has voting and investment power over these securities. Sander Gerber is the managing member of Hudson Bay Capital GB LLC, which is the general partner of Hudson Bay Capital Management, L.P. Sander Gerber disclaims beneficial ownership over these securities. Hudson Bay Capital Management, L.P. is not a broker dealer or in any way affiliated with any broker dealer.
- (11) Hudson Bay Capital Management, L.P., is the investment manager of Hudson Bay Overseas Fund Ltd., has voting and investment power over these securities. Sander Gerber is the managing member of Hudson Bay Capital GB LLC, which is the general partner of Hudson Bay Capital Management, L.P. Sander Gerber disclaims beneficial ownership over these securities. Hudson Bay Capital Management, L.P. is not a broker dealer or in any way affiliated with any broker dealer.
- (12) Martin Chop has voting and investment control over the shares of common stock and warrants to purchase common stock held by The Hewlett Fund. Mr. Chop disclaims beneficial ownership over these securities. The Hewlett Fund is not a broker dealer or in any way affiliated with any broker dealer.
- (13) Konrad Ackerman is the director of Alpha Capital Anstalt Mr. Konrad Ackerman, Director, has voting and dispositive power over the shares held by Alpha Capital. Mr. Ackerman may be deemed to beneficially own the shares of Common Stock held by Alpha Capital. Mr. Ackerman disclaims beneficial ownership of such shares. Alpha Capital Anstalt is not a broker dealer or in any way affiliated with any broker dealer.

- (14) Perceptive Advisores LLC, the investment manager of Perceptive Life Sciences Master Fund, Ltd., has voting and investment power over these securities. Joseph E. Edelman is the managing member of Perceptive Advisors LLC. Mr. Edelman disclaims beneficial ownership over these securities. Perceptive Life Sciences Master Fund, L.P. is not a broker dealer or in any way affiliated with any broker dealer.
- (15) Kenneth Pasternak is the managing member of Chestnut Ridge Capital, LLC, which is the General Partner of Chestnut Ridge Partners, LP and has voting and investment power over these securities. Mr. Pasternak disclaims beneficial ownership over these securities. Chestnut Ridge Partners, LP is not a broker dealer or in any way affiliated with any broker dealer.
- (16) Shaye Hirsch has voting and investment control over the shares of common stock and warrants to purchase common stock held by Brio Capital LP. Mr. Hirsch disclaims beneficial ownership over these securities. Brio Capital LP is not a broker dealer or in any way affiliated with any broker dealer.
- (17) Next View Partners LLC, the general partner of Next View Capital, LP, has voting and investment power over these securities. Stewart Flink is the sole manager of Next View Partners LLC. Mr. Flink disclaims beneficial ownership over these securities. Next View Capital, LP is not a broker dealer or in any way affiliated with any broker dealer.
- (18) Pacific Capital Management, LLC ("PCM") is a Delaware limited liability company. Its investment manager is JMG Capital Management, Inc (the "Manager"), a California corporation that has voting and dispositive power over PCM's' investments, including the securities. Jonathan M. Glaser is the Executive Officer and Director of the Manager and has sole investment discretion over PCM's portfolio holdings. Pacific Capital Management, LLC is not a broker dealer or in any way affiliated with any broker dealer.
- (19) PTE Investments is a limited liability company. Reginald Powell is the managing member of PTE Investments, LLC. and has voting and investment control over the securities. Reginald Powell disclaims beneficial ownership of the securities. PTE Investments, LLC is not a broker dealer or in any way affiliated with any broker dealer.
- (20) The members of Heart 1, LLC are Frederick Scruggs, Ron Lovelace, Joseph Tubbs, James Windle, Dale Abrahames, Allen Leath, William Shumate, and Richared Read. Mr. Scruggs has voting and investment power over these securities. Mr. Scruggs disclaims beneficial ownership over these securities. Heart 1, LLC is not a broker dealer or in any way affiliated with any broker dealer.
- (21) Partlet Holdings Limited is a holding company of the The Candor Trust. Each of Robert M. Blackie, Julie Coward, Leitia Cummins and Frank Gee are on the Board of Directors of Partlet Holdings Limited. While each of Robert M. Blackie, Julie Coward, Leitia Cummins and Frank Gee have voting and investment control over the securities, each disclaims beneficial ownership of the securities. Partlet Holdings Limited is not a broker dealer or in any way affiliated with any broker dealer.
- (22) John V. Winfield is the Chairman, President and CEO of the InterGroup Corporation and its subsidiaries, Portsmouth Square, Inc., and Sante Fe Corporation. In those capacities, Mr. Winfield has voting and investment control over the securities owned by the InterGroup Corporation, Portsmouth Square, Inc. and Sante Fe Corporation. Mr. Winfield disclaims beneficial ownership over these securities. InterGroup Corporation is not a broker dealer or in any way affiliated with any broker dealer.
- (23) Defiance Capital, LLC., is the investment manager of Defiance Fund, Ltd., has voting and investment power over these securities. Francois Parenteau is the managing member of Defiance Capital, LLC, and disclaims beneficial ownership of these securities. Defiance Fund, Ltd is not a broker dealer or in any way affiliated with any broker dealer.

- (24) Culross Global Asset Management Limited, the investment manager to the Culross Defiance Segregated Portfolio, a segregated portfolio of Culross Managed Account Platform SPC Limited, has voting and investment power over these securities. Defiance Capital, LLC is the investment advisor to Culross Global Asset Management Limited with respect to the Culross Defiance Segregated Portfolio. Culross Managed Account Platform SPF, Ltd. is not a broker dealer or in any way affiliated with any broker dealer.
- (25) BluMont Capital Corporation is the investment manager of Northern Rivers Innovation Fund LP, and has voting and investment power over these securities. Victor Koloshuk, Stephen Johnson and Veronika Hirsch are on the Board of Directors of BluMont Capital Corporation and each disclaims beneficial ownership over these securities. Northern Rivers Innovation Fund LP is not a broker dealer or in any way affiliated with any broker dealer.
- (26) BluMont Capital Corporation is the investment manager of Northern Rivers Innovation RSP Fund, and has voting and investment power over these securities. Victor Koloshuk, Stephen Johnson and Veronika Hirsh are on the Board of Directors of BluMont Capital Corporation and each disclaims beneficial ownership over these securities. Northern Rivers Innovation RSP Fund is not a broker dealer or in any way affiliated with any broker dealer.
- (27) Represents 929,688 shares of common stock that may be purchased upon exercise of presently exercisable warrants. Ladenburg Thalmann & Co. Inc. is a NASD member and received the securities in the ordinary course of business and at the time of receiving the securities, had no agreements or understandings, directly or indirectly, with any person to distribute them. Ladenburg Thalmann & Co. Inc. was entitled to receive these securities as partial compensation for its services as placement agent. These securities are subject to a 180-day lock-up agreement in accordance with the requirements of FINRA Rule 5110(g)(1).
- (28) Represents 103,125 shares of common stock that may be purchased upon exercise of presently exercisable warrants. Midtown Partners & Co., LLC. is a NASD member and received the securities in the ordinary course of business and at the time of receiving the securities, had no agreements or understandings, directly or indirectly, with any person to distribute them. Midtown Partners & Co., LLC was entitled to receive these securities for its services as partial compensation for its services as placement agent. These securities are subject to a 180-day lock-up agreement in accordance with the requirements of FINRA Rule 5110 (g)(1).

## PLAN OF DISTRIBUTION

Each selling securityholder of the common stock and any of their pledgees, assignees and successors-in-interest may, from time to time, sell any or all of their shares of common stock covered hereby on the NYSE Amex or any other 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. A selling securityholder 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;
- settlement of short sales entered into after the effective date of the registration statement of which this prospectus is a part;
- in transactions through broker-dealers that agree with the selling securityholder to sell a specified number of such shares at a stipulated price per share;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- a combination of any such methods of sale; or
- any other method permitted pursuant to applicable law.

The selling securityholder may also sell shares under Rule 144 under the Securities Act of 1933, as amended (the “Securities Act”), if available, rather than under this prospectus.

Broker-dealers engaged by the selling securityholders may arrange for other brokers-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the selling securityholders (or, if any broker-dealer acts as agent for the purchaser of shares, from the purchaser) in amounts to be negotiated, but, except as set forth in a supplement to this Prospectus, in the case of an agency transaction not in excess of a customary brokerage commission in compliance with FINRA Rule 2440; and in the case of a principal transaction a markup or markdown in compliance with FINRA IM-2440.

In connection with the sale of the common stock or interests therein, the selling securityholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the common stock in the course of hedging the positions they assume. The selling securityholders may also sell shares of the common stock short and deliver these securities to close out their short positions, or loan or pledge the common stock to broker-dealers that in turn may sell these securities. The selling securityholders may also enter into option or other transactions with broker-dealers or other financial institutions or create one or more derivative securities which require the delivery to such broker-dealer or other financial institution of shares offered by this prospectus, which shares such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The selling securityholders and any broker-dealers or agents that are involved in selling the shares 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 purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. Each selling securityholder has informed the Company that it does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the common stock. In no event shall any broker-dealer receive fees, commissions and markups which, in the aggregate, would exceed eight percent (8%).

The Company is required to pay certain fees and expenses incurred by the Company incident to the registration of the shares. The Company has agreed to indemnify the selling securityholders against certain losses, claims, damages and liabilities, including liabilities under the Securities Act.

Because selling securityholders may be deemed to be “underwriters” within the meaning of the Securities Act, they will be subject to the prospectus delivery requirements of the Securities Act including Rule 172 thereunder. The selling securityholders have advised us that there is no underwriter or coordinating broker acting in connection with the proposed sale of the resale shares by the selling securityholders.



We agreed to keep this prospectus effective until the earlier of (i) the date on which the shares may be resold by the selling securityholders without registration and without regard to any volume or manner-of-sale limitations by reason of Rule 144, without the requirement for the Company to be in compliance with the current public information under Rule 144 under the Securities Act or any other rule of similar effect or (ii) all of the shares have been sold pursuant to this prospectus or Rule 144 under the Securities Act or any other rule of similar effect. The resale shares will be sold only through registered or licensed brokers or dealers if required under applicable state securities laws. In addition, in certain states, the resale shares of common stock covered hereby may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Under applicable rules and regulations under the Exchange Act, any person engaged in the distribution of the resale shares may not simultaneously engage in market making activities with respect to the common stock for the applicable restricted period, as defined in Regulation M, prior to the commencement of the distribution. In addition, the selling securityholders will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of shares of the common stock by the selling securityholders or any other person. We will make copies of this prospectus available to the Selling Stockholders and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale (including by compliance with Rule 172 under the Securities Act).

## **LEGAL MATTERS**

Morgan, Lewis & Bockius LLP of Princeton, New Jersey has passed upon the validity of the securities being offered by this prospectus.

## **EXPERTS**

The financial statements and schedule of Senesco Technologies, Inc. as of June 30, 2009 and 2008 and for the years then ended incorporated by reference in this prospectus and in the registration statement of which this prospectus forms a part, have been audited by McGladrey & Pullen, LLP, independent registered public accounting firm, and are incorporated herein in reliance upon the report of McGladrey & Pullen, LLP given upon their authority as experts in accounting and auditing.

The financial statements for the year ended June 30, 2007 and cumulative amounts from July 1, 1998 (inception) to June 30, 2007 incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended June 30, 2009, have been so incorporated in reliance on the report of Goldstein Golub Kessler LLP, independent public accounting firm, given on the authority of said firm as experts in auditing and accounting.

## **WHERE YOU CAN FIND MORE INFORMATION**

We are subject to the informational requirements of the Securities Exchange Act of 1934 and we file reports and other information with the SEC.

You may read and copy any of the reports, statements, or other information we file with the SEC at the SEC's Public Reference Section at 100 F Street, N.E., Washington, D.C. 20549 at prescribed rates. Information on the operation of the Public Reference Room may be obtained by calling the SEC at 1-800-SEC-0330. The SEC maintains a Web site at <http://www.sec.gov> that contains reports, proxy statements and other information regarding issuers that file electronically with the SEC.

## **INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE**

We have filed with the SEC, Washington, D.C., a registration statement on Form S-3 under the Securities Act, covering the securities offered by this prospectus. This prospectus does not contain all of the information that you can find in our registration statement and the exhibits to the registration statement. Statements contained in this prospectus as to the contents of any contract or other document referred to are not necessarily complete and in each instance such statement is qualified by reference to each such contract or document filed or incorporated by reference as an exhibit to the registration statement.

The SEC allows us to “incorporate by reference” the information we file with them. This means that we can disclose important information to you by referring you to other documents that are legally considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede the information in this prospectus and the documents listed below. We incorporate by reference the documents listed below, and any future filings made with the SEC under Section 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934 until the selling securityholders sell all the offered shares:

- (a) Our Annual Report on Form 10-K, as amended and restated on Form 10-K/A, for the fiscal year ended June 30, 2009 (Commission File No. 001-31326), filed on September 28, 2009, with such amended and restated 10-K/A filed on October 28, 2009, pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), in which there is set forth the audited financial statements for the Registrant’s fiscal year ended June 30, 2009;
- (b) Our Quarterly Report on Form 10-Q for each of the quarters ended September 30, 2009 and December 31, 2009;
- (c) Our Current Reports on Form 8-K, filed with the Commission on July 10, 2009, July 10, 2009, July 30, 2009, November 4, 2009, November 9, 2009, November 16, 2009, November 25, 2009, January 11, 2010, January 19, 2010, February 4, 2010, February 22, 2010, February 22, 2010, February 22, 2010, March 4, 2010, March 5, 2010, March 29, 2010, April 5, 2010, April 8, 2010 (as amended by Form 8-K/A on April 8, 2010); and
- (d) Our registration statement on Form 8-A filed with the Commission on May 14, 2002, in which there is described the terms, rights and provisions applicable to the Registrant’s outstanding common stock.

All reports and definitive proxy or information statements filed pursuant to Section 13(a), 13(c), 14 and 15(d) of the Exchange Act after the date of this registration statement and prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or which registers all securities then remaining unsold, shall be deemed to be incorporated by reference into this registration statement and to be a part hereof from the date of filing of such documents. Unless expressly incorporated into this registration statement, a report furnished on Form 8-K under the Exchange Act shall not be incorporated by reference into this registration statement. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this registration statement to the extent that a statement contained herein or in any subsequently filed document which also is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this registration statement.

---

We have not authorized anyone else to provide you with information different from that contained or incorporated by reference in this prospectus. This prospectus is not an offer to sell nor is it a solicitation of an offer to buy any security in any jurisdiction where the offer or sale is not permitted. Neither the delivery of this prospectus nor any sale made under this prospectus shall, under any circumstances, imply that there has been no change in our affairs since the date of this prospectus or that the information contained in this prospectus or incorporated by reference herein is correct as of any time subsequent to its date.

**79,179,686 shares of  
common stock**

# **Senesco Technologies, Inc.**

\_\_\_\_\_  
**PROSPECTUS**  
\_\_\_\_\_

\_\_\_\_\_, 2010

---

---

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

**Item 14. Other Expenses of Issuance and Distribution.**

The expenses payable by the Registrant in connection with the issuance and distribution of the securities being registered (estimated except for the SEC Registration fee) are as follows:

|                              |    |                |
|------------------------------|----|----------------|
| SEC Registration Fee         | \$ | 3,105          |
| Accounting Fees and Expenses | \$ | 25,000         |
| Legal Fees and Expenses      | \$ | 100,000        |
| Miscellaneous Expenses       | \$ | 96,895         |
| Total                        | \$ | <u>225,000</u> |

**Item 15. Indemnification of Directors and Officers.**

Section 145 of the Delaware General Corporation Law empowers a Delaware corporation to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of such corporation) by reason of the fact that such person is or was a director, officer, employee or agent of such corporation, or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. A corporation may, in advance of the final disposition of any civil, criminal, administrative or investigative action, suit or proceeding, pay the expenses (including attorneys' fees) incurred by any officer, director, employee or agent in defending such action, provided that the director or officer undertakes to repay such amount if it shall ultimately be determined that he is not entitled to be indemnified by the corporation. A corporation may indemnify such person against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if he acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful.

A Delaware corporation may indemnify officers and directors in an action by or in the right of the corporation to procure a judgment in its favor under the same conditions, except that no indemnification is permitted without judicial approval if the officer or director is adjudged to be liable to the corporation. Where an officer or director is successful on the merits or otherwise in the defense of any action referred to above, the corporation must indemnify him against the expenses (including attorneys fees) which he actually and reasonably incurred in connection therewith. The indemnification provided is not deemed to be exclusive of any other rights to which an officer or director may be entitled under any corporation's by-law, agreement, vote or otherwise.

Our certificate of incorporation includes a provision that eliminates the personal liability of our directors to us or our stockholders for monetary damages for breach of their fiduciary duty to the maximum extent permitted by the DGCL. The DGCL does not permit liability to be eliminated (i) for any breach of a director's duty of loyalty to us or our stockholders, (ii) for acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law, (iii) for unlawful payments of dividends or unlawful stock repurchases or redemptions, as provided in Section 174 of the DGCL, or (iv) for any transaction from which the director derived an improper personal benefit. In addition, as permitted in Section 145 of the DGCL, our certificate of incorporation and by-laws provide that we shall indemnify our directors and officers to the fullest extent permitted by the DGCL, including those circumstances in which indemnification would otherwise be discretionary, subject to certain exceptions. Our by-laws also provide that we shall advance expenses to directors and officers incurred in connection with an action or proceeding as to which they may be entitled to indemnification, subject to certain exceptions.

Each of our indemnification agreements with each of our executive officers and directors provides for indemnification to the maximum extent permitted by applicable law. We also indemnify each of our directors and executive officers with the maximum indemnification allowed to directors and executive officers by the DGCL, subject to certain exceptions, as well as certain additional procedural protections. In addition, we will generally advance expenses incurred by directors and executive officers in any action or proceeding as to which they may be entitled to indemnification, subject to certain exceptions.

The indemnification provisions in our certificate of incorporation and by-laws also permit indemnification for liabilities arising under the Securities Act of 1933. Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act of 1933 and is, therefore, unenforceable.

We currently carry director and officer liability insurance in the amount of \$5,000,000.

#### **Item 16. Exhibits.**

- 4.1 Form of Warrant (Incorporated by reference to exhibit 4.1 of Form 8-K which was filed on March 29, 2010)
- 5.1 Opinion of Morgan, Lewis & Bockius, LLP
- 10.1 Registration Rights Agreement dated as of March 26, 2010 by and between the Company and the Investors (Incorporated by reference to exhibit 10.1 of Form 8-K which was filed on March 29, 2010)
- 10.2 Securities Purchase Agreement dated as of March 26, 2010 by and between the Company and certain Non-Affiliated Investors (Ladenburg) (Incorporated by reference to exhibit 10.2 of Form 8-K which was filed on March 29, 2010)
- 10.3 Securities Purchase Agreement dated as of March 26, 2010 by and between the Company and certain Non-Affiliated Investors (Non-Ladenburg) (Incorporated by reference to exhibit 10.3 of Form 8-K which was filed on March 29, 2010)
- 23.1 Consent of McGladrey & Pullen, LLP
- 23.2 Consent of Goldstein Golub Kessler LLP
- 23.3 Consent of Morgan, Lewis & Bockius, LLP (included in Exhibit 5.1)
- 24.1 Power of Attorney (included on the signature page of the Registration Statement)

#### **Item 17. Undertakings**

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

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

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

*provided, however*, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) do not apply if the information required to be included in a post-effective amendment by these paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in this registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

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

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

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

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

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

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities:

The undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

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

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

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

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

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

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

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of New Brunswick, State of New Jersey, on the 23rd day of April, 2010.

SENESCO TECHNOLOGIES, INC.

By: /s/ Jack Van Hulst

Name: Jack Van Hulst

Title: President and Chief Executive Officer

Each person whose signature appears below authorizes each of Jack Van Hulst and Joel Brooks, jointly and severally, or either of them acting individually, as his true and lawful attorney-in-fact, each with full power of substitution, to sign this Registration Statement on Form S-3 of Senesco Technologies, Inc., including any and all pre-effective and post-effective amendments, in the name and on behalf of each such person, individually and in each capacity stated below, and to file the same, with exhibits thereto and other documents in connection therewith with the Securities and Exchange Commission.

In accordance with the requirements of the Securities Act of 1933, this Registration Statement was signed by the following person in the capacities and on the dates stated.

| Signature   | Title   | Date           |
|---|---|----------------|
| <u>/s/ Jack Van Hulst</u><br>Jack Van Hulst                 | President, Chief Executive Officer and Director<br>(Principal Executive Officer)      | April 23, 2010 |
| <u>/s/ Joel Brooks</u><br>Joel Brooks                       | Chief Financial Officer and Treasurer<br>(Principal Financial and Accounting Officer) | April 23, 2010 |
| <u>/s/ Harlan W. Waksal, M.D.</u><br>Harlan W. Waksal, M.D. | Chairman of the Board and Director  | April 23, 2010 |
| <u>/s/ John E. Thompson</u><br>John E. Thompson, Ph.D.      | Executive Vice President of Research and<br>Development and Director                  | April 23, 2010 |
| <u>/s/ John N. Braca</u><br>John N. Braca                   | Director  | April 23, 2010 |
| <u>/s/ Christopher Forbes</u><br>Christopher Forbes         | Director  | April 23, 2010 |
| <u>/s/ Warren J. Isabelle</u><br>Warren J. Isabelle         | Director  | April 23, 2010 |
| <u>/s/ Thomas C. Quick</u><br>Thomas C. Quick               | Director  | April 23, 2010 |
| <u>/s/ David Rector</u><br>David Rector                     | Director  | April 23, 2010 |
| <u>/s/ Rudolf Stalder</u><br>Rudolf Stalder                 | Director  | April 23, 2010 |



April 23, 2010

Senesco Technologies, Inc.  
303 George Street, Suite 420  
New Brunswick, New Jersey 08901

Re: Registration Statement on Form S-3

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-3 (the "Registration Statement") to be filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of 79,179,686 shares (the "Shares") of Common Stock, \$0.01 par value per share (the "Common Stock"), of Senesco Technologies, Inc., a Delaware corporation (the "Company"), that may be issued upon conversion of preferred stock, upon the payment of dividends on the preferred stock in lieu of cash and/or upon the exercise of warrants (the "Securities") held by certain stockholders. Each of the Shares are being registered on behalf of certain stockholders of the Company (the "Selling Stockholders").

We are acting as counsel for the Company in connection with the registration for resale of the Securities. We have examined signed copies of the Registration Statement to be filed with the Commission. We have also examined and relied upon minutes of meetings of the stockholders and the Board of Directors of the Company as provided to us by the Company, stock record books of the Company as provided to us by the Company, the Amended and Restated Certificate of Incorporation and Amended and Restated By-Laws of the Company, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

We assume that the appropriate action will be taken, prior to the offer and sale of the Shares, to register and qualify the Shares for sale under all applicable state securities or "blue sky" laws.

We express no opinion herein as to the laws of any state or jurisdiction other than the laws of the State of New Jersey, the General Corporation Law of the State of Delaware and the federal laws of the United States of America.

Based upon and subject to the foregoing, and assuming the receipt of the appropriate consideration for the Shares, we are of the opinion that the Shares have been duly authorized and reserved, and upon the proper issuance, conversion or exercise of the Securities, as applicable, will be validly issued, fully paid and nonassessable.

It is understood that this opinion is to be used only in connection with the offer and sale of the Shares while the Registration Statement is in effect.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

Princeton Philadelphia Washington New York Los Angeles San Francisco Miami Pittsburgh Chicago Minneapolis  
Palo Alto Dallas Houston Harrisburg Irvine Boston London Paris Brussels Frankfurt Beijing Tokyo

---

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related prospectus under the caption “Legal Matters.” In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

/s/ Morgan, Lewis & Bockius LLP

---

### **Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in this Registration Statement on Form S-3 of Senesco Technologies, Inc. of our report dated September 25, 2009, relating to our audit of the consolidated financial statements as of June 30, 2009 and 2008 and for the years then ended, which appear in the Annual Report on Form 10-K of Senesco Technologies, Inc. for the year ended June 30, 2009. Our report dated September 25, 2009, relating to the consolidated financial statements includes an emphasis paragraph relating to an uncertainty as to the Company's ability to continue as a going concern.

We also consent to the reference to our firm under the caption "Experts" in the Prospectus, which is part of this Registration Statement.

/s/ McGladrey & Pullen, LLP

New York, New York  
April 22, 2010

---

## **CONSENT OF INDEPENDENT PUBLIC ACCOUNTING FIRM**

To the Board of Directors  
Senesco Technologies, Inc.

We consent to the incorporation by reference in this Registration Statement on Form S-3 of Senesco Technologies, Inc. of our report dated September 26, 2007 on the consolidated statements of operations, stockholders' equity and cash flows of Senesco Technologies, Inc and Subsidiary for the year ended June 30, 2007 and the cumulative amounts from July 1, 1998 (inception) to June 30, 2007, which appears in the June 30, 2009 Annual Report on Form 10-K of Senesco Technologies, Inc. Our report dated September 26, 2007 relating to the consolidated financial statements includes an emphasis paragraph relating to the uncertainty as to the Company's ability to continue as a going concern.

We also consent to the reference to our firm under the caption "Experts" in the registration statement.

/s/ Goldstein Golub Kessler LLP

**GOLDSTEIN GOLUB KESSLER LLP**

New York, New York  
April 22, 2010

---