

SENESCO TECHNOLOGIES INC

Form S-3

May 27, 2005

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As filed with the Securities and Exchange Commission on May 27, 2005

Registration No. 333-

**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 Number)

303 George Street, Suite 420, New Brunswick, New Jersey 08901

(732) 296-8400

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

Bruce C. Galton, President and Chief Executive Officer

303 George Street, Suite 420, New Brunswick, New Jersey 08901

(732) 296-8400

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

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

David J. Sorin, Esq.

Emilio Ragosa, Esq.

Morgan, Lewis & Bockius LLP

502 Carnegie Center

Princeton, New Jersey 08540

(609) 919-6600

APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: From time to time, at the discretion of the selling stockholders, as soon as practicable after this registration statement becomes effective.

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

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If this form is filed to register additional securities for an offering pursuant to Rule 462(b) 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. o

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. o

If delivery of the prospectus is expected to be made pursuant to Rule 434, check the following box. o

CALCULATION OF REGISTRATION FEE

| Title of Shares To Be Registered | Amount To Be Registered | Proposed Maximum Aggregate Price Per Share | Proposed Maximum Aggregate Offering Price | Amount Of Registration Fee |
|---|------------------------------------|---|--|---------------------------------------|
| Common Stock, \$0.01 par value | 2,561,031(1) | \$2.205(2) | \$5,647,073.30 | \$664.67 |

(1) Includes 965,380 shares of common stock that may be issued upon the exercise of warrants held by the selling stockholders. Pursuant to Rule 416 of the Securities Act of 1933, as amended, this registration statement shall also cover any additional shares of common stock by reason of any stock dividend, stock split, recapitalization or other similar transaction or to cover such additional shares as may hereinafter be offered or issued to prevent dilution resulting from stock splits, stock dividends, recapitalizations or certain other capital adjustments, effected without the registrant's receipt of consideration, which results in an increase in the number of the outstanding shares of registrant's common stock.

(2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(c). Such price is based upon the average of the high and low prices of the registrant's common stock as reported on the American Stock Exchange on May 25, 2005.

THE REGISTRANT HEREBY AMENDS THIS REGISTRATION STATEMENT ON SUCH DATE OR DATES AS MAY BE NECESSARY TO DELAY ITS EFFECTIVE DATE UNTIL THE REGISTRANT SHALL FILE A FURTHER AMENDMENT WHICH SPECIFICALLY STATES THAT THIS REGISTRATION STATEMENT SHALL THEREAFTER BECOME EFFECTIVE IN ACCORDANCE WITH SECTION 8(A) OF THE SECURITIES ACT OF 1933 OR UNTIL THE REGISTRATION STATEMENT SHALL BECOME EFFECTIVE ON SUCH DATE AS THE COMMISSION, ACTING PURSUANT TO SAID SECTION 8(A), MAY DETERMINE.

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The information in this prospectus is not complete and may be changed. The selling stockholders named in this prospectus 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 MAY 27, 2005

PROSPECTUS

SENESCO TECHNOLOGIES, INC.

2,561,031 Shares of Common Stock

The stockholders of Senesco listed in this prospectus are offering and selling an aggregate of 2,561,031 shares of our common stock. Of those shares, 965,380 are issuable upon the exercise of warrants held by the selling stockholders at an exercise price of \$3.38 per share.

The shares of our common stock may be offered and sold from time to time by the selling stockholders identified in this prospectus, or their pledgees, donees, transferees or other successors-in-interest through public or private transactions at prevailing market prices, at prices related to prevailing market prices or at privately negotiated prices. The selling stockholders will pay all underwriting discounts and selling commissions, if any, applicable to the sale of the shares. We will not receive any proceeds from the sale of the shares other than the exercise price payable to us upon the potential exercise of warrants held by the selling stockholders.

Our common stock is traded on the American Stock Exchange under the ticker symbol "SNT." On May 25, 2005, the last reported sale price of our common stock was \$2.24 per share. You are urged to obtain current market quotations for the common stock.

Investing in our common stock involves a high degree of risk. See "Risk Factors" beginning on page 4 for a discussion of certain factors that you should consider before you invest in any of the common stock being offered with this prospectus.

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

The date of this prospectus is [], 2005.

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As used in this prospectus, references to "Senesco," "we," "us," and "our" refer to Senesco Technologies, Inc. and its subsidiary, Senesco, Inc., unless the context otherwise requires.

PROSPECTUS SUMMARY

About This Prospectus

This prospectus is a part of a registration statement on Form S-3 filed by us with the Securities and Exchange Commission, referred to herein as the SEC, to register 2,561,031 shares of our common stock. This prospectus does not contain all of the information set forth in the registration statement, certain parts of which are omitted in accordance with the rules and regulations of the SEC. Accordingly, you should refer to the registration statement and its exhibits for further information about us and our common stock. Copies of the registration statement and its exhibits are on file with the SEC. Statements contained in this prospectus concerning the documents we have filed with the SEC are not intended to be comprehensive, and in each instance we refer you to the copy of the actual document filed as an exhibit to the registration statement or otherwise filed with the SEC.

We have not authorized anyone to provide you with information different from that contained or incorporated by reference in this prospectus. The selling stockholders are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or of any sale of common stock.

About Senesco

We are a development stage biotechnology company whose mission is to utilize its patented and patent-pending genes, primarily DHS, Factor 5A and Lipase, to:

enhance the quality and productivity of fruits, flowers, vegetables and agronomic crops through the control of cell death in plants, referred to as senescence;

develop novel approaches to treat inflammatory and/or programmed cell death diseases in humans, referred to as apoptosis, such as rheumatoid arthritis, Crohn's disease, glaucoma, or heart disease, which are the result of inflammation and/or premature apoptosis; and

develop novel approaches to treat cancer, a group of diseases in which apoptosis does not occur normally.

Agricultural results to date include:

longer shelf life of perishable produce;

increased seed and biomass yield;

greater tolerance to environmental stresses, such as drought; and

greater tolerance to certain fungal diseases.

Human health results to date include:

determining the expression of our patent-pending genes in both ischemic and non-ischemic heart tissue;

correlating such genes to certain key immune regulators, known as cytokines, that have been found to be involved in apoptosis;

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reducing cytokine induced apoptosis in human optic nerve cell lines and in human epithelial cell lines of the intestine;

inducing apoptosis, while retarding cell proliferation, in both human cancer cell lines derived from tumors and in lung tumors in mice which have the same genetic defect that can cause lung cancer in humans; and

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increasing the survival rate in mice in which sepsis has been induced by a lethal injection of LPS.

Our preliminary research reveals that DHS and Factor 5A genes regulate apoptosis in human cells. We have shown that there are multiple, functionally distinct, isoforms of Factor 5A. In humans, there are two different isoforms of Factor 5A: the apoptosis isoform, which carries out cell death and the growth isoform, which carries out cell proliferation. We believe that our Factor 5A technology may have potential application as a means for controlling a broad range of apoptotic diseases, both inflammatory/ischemic diseases and cancers. We have commenced preclinical *in-vivo* and *in-vitro* research to determine Factor 5A's ability to regulate key execution genes, inflammatory cytokines, receptors, and transcription factors which are implicated in numerous apoptotic diseases.

We believe that our technology's downregulation of the cell death isoform of Factor 5A may have potential application as a means for controlling a broad range of diseases that are attributable to either premature apoptosis, ischemia, or inflammation. Apoptotic diseases include neurodegenerative diseases, ocular diseases, such as glaucoma, heart disease, and certain inflammatory diseases such as Crohn's disease, sepsis and rheumatoid arthritis, among others. We have commenced preclinical research on a variety of these diseases. Using siRNAs against the apoptosis isoform of Factor 5A to inhibit its expression, we have reduced pro-inflammatory cytokine formation and formation of receptors for LPS, interferon gamma and TNF-alpha. *In-vitro* experiments have shown that siRNAs against Factor 5A protected human lamina cribrosa (optic nerve) and colon epithelial (HT-29) cells from TNF alpha induced apoptosis. *In-vivo* mouse studies have shown that the siRNAs against Factor 5A (i) protect thymocyte cells from apoptosis and decreases formation of myeloperoxidase, TNF, MIP-1alpha, and IL-1 in the lungs of mice challenged with LPS; and (ii) increases the survival rate in which sepsis had been induced by a lethal injection of LPS. We have also determined that inhibiting the apoptosis isoform of Factor 5A downregulates NFkB and JAK1 and decreases the inflammatory cytokines formed through the NFkB and JAK/STAT pathways. The siRNAs against Factor 5A are currently being tested in several preclinical *in-vivo* inflammatory disease models.

We have established in preclinical studies that upregulation of the apoptosis Factor 5A isoform carries out cell death in cancer cells through both the p53 (intrinsic) and cell death receptor (extrinsic) immune pathways. Tumors arise when cells that have been targeted by the immune system to undergo apoptosis are unable to do so because of an inability to activate the apoptotic pathways. Since the Factor 5A gene appears to function at the initiation point of the apoptotic pathways, we believe that our gene technology may have potential application as a means of combating a broad range of cancers and have initiated studies with *in-vivo* cancer models to determine Factor 5A's ability to selectively cause cell death in human tumors grafted onto mice. We have found that upregulating the apoptosis isoform results in upregulation of p53, inflammatory cytokine production, increased cell death receptor formation, and caspase activity. These features, coupled with a simultaneous downregulation of bcl-2 and telomerase, result in apoptosis of cancer cells, while normal cells do not show any signs of irregular apoptosis or toxicity.

Senesco was formed in June 1998. We are a Delaware corporation and our business is currently operated through Senesco and our wholly-owned subsidiary Senesco, Inc., a New Jersey corporation.

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.

THE OFFERING

Number of shares of our common stock offered by the selling stockholders 2,561,031 shares

Use of proceeds We will not receive any proceeds from the sale of common stock by the selling stockholders. We may receive the proceeds from the exercise of warrants held by the selling stockholders, if any are exercised. However, at anytime when this registration statement is not declared effective, the selling stockholders have the right to exercise the warrants pursuant to a cashless exercise provision, in which case, we will not receive any proceeds from the exercise of the warrants from the selling stockholders.

American Stock Exchange symbol SNT

RISK FACTORS

Investing in our common stock involves a high degree of risk. Before you invest in our common stock, you should carefully consider the following factors and cautionary statements, as well as the other information set forth herein. Additional risks and uncertainties may also impair our business operations. If any of the following risks actually occur, our business, financial condition or results of operations may suffer. As a result, the trading price of our common stock could decline, and you could lose all or a substantial portion of your investment in our common stock.

Risks Related to Our Business

We have a limited operating history and have incurred substantial losses and expect 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 have an accumulated deficit of \$14,292,237 at March 31, 2005. We have generated minimal revenues by licensing certain of our technology to companies willing to share in our development costs. However, our technology may not be ready for widespread commercialization for several years. We expect to continue to incur losses over the next two to three years because we anticipate that our expenditures on research and development, commercialization and administrative activities will significantly exceed our revenues during that period. We cannot predict when, if ever, we will become profitable.

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 commercial exploitation of technology to identify, isolate, characterize and silence genes which control the death of cells in plants and humans. Our future revenue and profitability critically depend upon our ability to successfully develop senescence and apoptosis gene technology and later market and license such technology at a profit. 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 plants or humans or reduced benefits in terms of crop yield or protection. Our failure to obtain market acceptance of our technology or to successfully commercialize such technology or develop a commercially viable product 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 primary research and development efforts take place at the University of Waterloo in Ontario, Canada, where our technology was discovered, the University of Colorado, the Mayo Clinic, the University of Virginia, a research hospital in Canada, 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, such as the University of Waterloo, 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 March 31, 2005, we had cash and highly-liquid investments valued at \$2,286,473 and working capital of \$2,007,393. On May 9, 2005, we received aggregate net proceeds of approximately \$2,966,000 from the private placement of our equity securities being registered hereby. Using our available reserves as of March 31, 2005 and the net proceeds from the private equity financing, we believe that we can operate according to our current business plan for at least the next twelve 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 may be required to raise additional capital in the future in order to operate according to our current business plan, and this funding may not be available on favorable terms, if at all. 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, as of March 31, 2005, we had 9,078,052 shares of common stock authorized but unissued, which may be issued from time to time by our board of directors without stockholder approval. In connection with our private placement of equity securities, in May 2005, we issued an aggregate of an additional 1,595,651 shares of common stock and warrants to purchase 965,380 shares of common stock. Therefore, assuming the exercise of all options and warrants granted as of May 9, 2005 we had 6,517,021 shares of common stock authorized but unissued, 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 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 agricultural and biotechnology 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;

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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.

We have been issued six patents by the U.S. Patent and Trademark Office, or PTO. We have also filed 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 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 that 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 require licensing and the payment of significant 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 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 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 the collaborators to 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 will 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 intend to conduct research and development activities in-house, we may undertake those activities in the future. Expanding our

business will 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 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 also 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 we fail to successfully establish distribution channels, or if our marketing partners fail to provide adequate levels of sales, our commercialization efforts will be delayed or limited and we will 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 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 agricultural and human health 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 agricultural and human health biotechnology companies are engaged in research and development activities relating to senescence and apoptosis. 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: Icoria (formerly Paradigm Genetics); Mendel Biotechnology; Renessen LLC; Exelixis, Inc.; and Eden Bioscience, among others. Some of our competitors that are involved in apoptosis research include: Amgen; Centocor; Genzyme; OSI Pharmaceuticals, Inc.; Idun Pharmaceuticals; Novartis; 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 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 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, 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 and clinical trials 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 clinical trials 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. 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.

Even if we receive regulatory approval, consumers may not accept 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 consumer products. The adverse consequences from heightened consumer concern in this regard could affect the markets for 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. Thompson, these agreements may be terminated upon no or short 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 American Stock 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 outstanding options or issue equivalent options, our board of directors is required to provide accelerated vesting of outstanding options.

Increasing political and social turmoil, such as terrorist and military actions, increase the difficulty for us and our strategic partners to forecast accurately and plan future business activities.

Recent political and social turmoil, including the conflict in Iraq and the current crisis in the Middle East, can be expected to put further pressure on economic conditions in the United States and worldwide. These political, social and economic conditions may make it difficult for us to plan future business activities. Specifically, if the current crisis in Israel continues to escalate, our joint venture with Rahan Meristem Ltd. could be adversely affected.

Risks Related to Our Common Stock

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 March 31, 2005, our executive officers, directors and affiliated entities together beneficially own approximately 45.9% 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 March 31, 2005, held by these stockholders. As of May 9, 2005, upon the closing of our private placement of equity securities, our executive officers, directors and affiliated entities together beneficially own approximately 41.9% of the outstanding shares of our common stock, assuming the exercise of options and warrants which are currently exercisable, 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.

Our stockholders may experience substantial dilution as a result of the exercise of outstanding options and warrants to purchase our common stock.

As of March 31, 2005, we have granted options outside of our stock option plan to purchase 10,000 shares of our common stock and outstanding warrants to purchase 4,928,711 shares of our common stock. In addition, as of March 31, 2005, we have reserved 3,000,000 shares of our common stock for issuance upon the exercise of options granted pursuant to our stock option plan, 2,201,500 of which have been granted, 90,000 of which have been exercised, 2,111,500 of which are outstanding, and 798,500 of which may be granted in the future. As of May 9, 2005, upon the closing of our private placement of equity securities, we have outstanding warrants to purchase 5,894,091 shares of our common stock. 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.

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 March 31, 2005, we had 13,871,737 shares of our common stock issued and outstanding, of which approximately 1,536,922 shares are registered pursuant to a registration statement on Form S-3, which was declared effective on May 14, 2004, and the remainder of which are either eligible to be sold under SEC Rule 144 or are in the public float. In addition, we have registered 1,114,741 shares of our common stock underlying warrants previously issued on the Form S-3 registration statement that was declared effective on May 14, 2004, and we registered 3,000,000 shares of our common stock underlying options granted or to be granted under our stock option plan. As of May 9, 2005, upon the closing of our private placement of equity securities, we had 15,467,388 shares of our common stock issued and outstanding. Pursuant to the terms of such equity offering, we were obligated to file a registration statement on Form S-3 within 30 days of the closing date to register such shares of common stock. We are hereby filing this registration statement in order to register those securities. 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 American Stock Exchange and currently has a limited trading market. 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.

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.

If our common stock is delisted from the American Stock Exchange, it may be subject to the "penny stock" regulations which may affect the ability of our stockholders to sell their shares.

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 the American Stock Exchange delists our common stock, it could be deemed a penny stock, which imposes additional sales practice requirements 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 common stock were subject to the rules on penny stocks, the market liquidity for our common stock could be severely and adversely affected. Accordingly, the ability of holders of our common stock to sell their shares in the secondary market may also be adversely affected.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus includes and incorporates forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934 based upon the beliefs of our management, as well as assumptions made by, and the information currently available to, our management. All statements, other than statements of historical facts, included or incorporated in this prospectus regarding our strategy, future operations, financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. The words "anticipates," "believes," "estimates," "expects," "intends," "may," "plans," "projects," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot assure you that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included or incorporated in this prospectus, particularly under the heading "Risk Factors," that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date of this prospectus. Except for special circumstances in which a duty to update arises when prior disclosure becomes materially misleading in light of subsequent circumstances, we do not intend to update any of these forward-looking statements to reflect events or circumstances after the date of this prospectus or to reflect the occurrence of unanticipated events.

USE OF PROCEEDS

We will not receive any proceeds from the sale of common stock by the selling stockholders. We may receive the proceeds from the exercise of warrants held by the selling stockholders, if any are exercised. However, at anytime when this registration statement is not declared effective, the selling stockholders have the right to exercise the warrants pursuant to a cashless exercise provision, in which case, we will not receive any proceeds from the exercise of the warrants from the selling stockholders. The warrants entitle the selling stockholders to purchase shares of our common stock at an exercise price of \$3.38 per share.

The selling stockholders will pay any underwriting discounts and commissions and expenses incurred by the selling stockholders in disposing of the shares. We will bear all other costs, fees and expenses incurred in effecting the issuance and registration of the shares covered by this prospectus, including, without limitation, all registration and filing fees, American Stock Exchange listing fees and fees and expenses of our counsel and our accountants.

SELLING STOCKHOLDERS

The following table sets forth, to our knowledge, the common stock ownership of the selling stockholders, as of May 9, 2005, as adjusted to reflect the sale of the common stock in this offering. Except as described in this prospectus, the selling stockholders have not held any position or office or had any other material relationship with us or any of our predecessors or affiliates within the past three years.

The 2,561,031 shares covered by this prospectus represent approximately 15.6% of our common stock, based on 15,467,388 shares of common stock outstanding as of May 9, 2005, plus an aggregate of 965,380 shares of our common stock issuable upon the exercise of options and warrants held by the selling stockholders. We considered the following factors and made the following assumptions regarding the table:

beneficial ownership is determined under Section 13(d) of the Securities Exchange Act of 1934 and generally includes voting or investment power with respect to securities and including any securities that grant the selling stockholder the right to acquire common stock within 60 days of May 9, 2005;

unless otherwise indicated below, to our knowledge, the selling stockholders named below have sole voting and investment power with respect to their shares of common stock, except to the extent authority is shared by spouses under applicable law; and

the selling stockholders may sell all of the securities offered by this prospectus under certain circumstances.

Notwithstanding these assumptions, the selling stockholders may sell less than all of the shares listed on the table. In addition, the shares listed below may be sold pursuant to this prospectus or in privately negotiated transactions. Accordingly, we cannot estimate the number of shares of common stock that the selling stockholders will sell under this prospectus.

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Each of the selling stockholders listed below has sole voting and investment power with respect to the shares beneficially owned by the stockholder unless noted otherwise, subject to community property laws where applicable.

| Name of Selling Stockholders | Beneficial Ownership of Selling Stockholders Prior to Offering(1) | | Number of Shares Offered Hereby(2) | Beneficial Ownership of Shares After Offering(1)(2) | |
|--|---|---------|------------------------------------|---|---------|
| | Number | Percent | Number | Number | Percent |
| Akst, Hyme(3) | 35,546 | * | 35,546 | | * |
| Alice H. Hechter Trust(4) | 35,546 | * | 35,546 | | * |
| Bragin, Stephen M.(10) | 17,772 | * | 17,772 | | * |
| Briggs, Yvonne(6) | 17,354 | * | 7,500 | 9,854 | * |
| Capital Ventures International(7) | 355,451 | 2.28% | 355,451 | | * |
| Castille, Robert A.(5) | 10,664 | * | 10,664 | | * |
| Castle Creek Healthcare Partners LLC(8) | 177,725 | 1.14% | 177,725 | | * |
| Colen, Frank Kee(9) | 91,029 | * | 18,000 | 73,029 | * |
| Dennis, Paul S.(3) | 35,546 | * | 35,546 | | * |
| Dworkin, Doris(10) | 17,772 | * | 17,772 | | * |
| Elsas, Roger(11) | 31,772 | * | 17,772 | 14,000 | * |
| Fidanza, Lou(12) | 14,219 | * | 14,219 | | * |
| Friedman, Joel(10) | 17,772 | * | 17,772 | | * |
| Grobman, Richard(13) | 12,500 | * | 7,500 | 5,000 | * |
| Hartzmark Investment, LLC(14) | 71,090 | * | 71,090 | | * |
| Heiser, Marian(10) | 17,772 | * | 17,772 | | * |
| Iroquos Master Fund Ltd.(15) | 426,540 | 2.73% | 426,540 | | * |
| James A. Schoke Rev. Trust UTD 11/19/93(16) | 17,772 | * | 17,772 | | * |
| Jo-Bar Enterprises, LLC(17) | 35,546 | * | 35,546 | | * |
| Kogod, Marvin(18) | 71,090 | * | 71,090 | | * |
| Lowenthal Pruzan, Lisa(19) | 34,439 | * | 17,772 | 16,667 | * |
| Lowenthal, Daryl E.(20) | 34,439 | * | 17,772 | 16,667 | * |
| Lowenthal, Robert S.(21) | 34,439 | * | 17,772 | 16,667 | * |
| Marks, Bennett(12) | 14,219 | * | 14,219 | | * |
| Mintz, Cherie(10) | 17,772 | * | 17,772 | | * |
| Mintz, Stephen(10) | 17,772 | * | 17,772 | | * |
| Morton E Goulder Rev. Trust(22) | 35,546 | * | 35,546 | | * |
| Mory, Zubin R.(23) | 3,555 | * | 3,555 | | * |
| Neuhoff, Robert(24) | 58,000 | * | 18,000 | 40,000 | * |
| Nite Capital LP(25) | 177,725 | 1.14% | 177,725 | | * |
| Noble, Arlene(10) | 17,772 | * | 17,772 | | * |
| Okin, Robert and Okin, Susan(26) | 18,000 | * | 18,000 | | * |
| Omicron Master Trust(27) | 284,360 | 1.83% | 284,360 | | * |
| Oppenheimer & Co. Inc.(28) | 205,744 | 1.33% | 167,544 | 38,200 | * |
| Reichle, Kenneth M.(29) | 53,318 | * | 53,318 | | * |
| Rojas, Rafael(10) | 17,772 | * | 17,772 | | * |
| Rubinstein, Lawrence and Rubinstein, Camille(30) | 10,500 | * | 10,500 | | * |
| Ruch, Edward L.(3) | 35,546 | * | 35,546 | | * |
| Sandor, Andrew(5) | 10,664 | * | 10,664 | | * |
| Scaravilli, Victor(3) | 35,546 | * | 35,546 | | * |
| Schwartz, Mark(10) | 17,772 | * | 17,772 | | * |

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| | | | | |
|------------------------|--------|---|--------|---|
| Shapiro, Donald E.(18) | 71,090 | * | 71,090 | * |
| Synerberg, Howard(3) | 35,546 | * | 35,546 | * |
| Taussig, Lynn(12) | 14,219 | * | 14,219 | * |
| Zimmerman, Oscar(31) | 24,882 | * | 24,882 | * |

*

Less than one percent.

- (1) Shares of common stock issuable under stock options and warrants that are exercisable within 60 days after May 9, 2005 are deemed outstanding for computing the percentage ownership of the selling stockholder holding the options or warrants, prior to and after giving effect to the offering, but are not deemed outstanding for computing the percentage ownership of any other selling stockholder.
- (2) We do not know when or in what amounts a selling stockholder may offer shares for sale. The selling stockholders might not sell any or all of the shares offered by this prospectus. Because the selling stockholders may offer all or some of the shares pursuant to this offering and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares, we cannot estimate the number of the shares that will be held by the selling stockholders after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the selling stockholders.
- (3) Consists of 23,697 shares of common stock and warrants to purchase 11,849 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (4) Albert Lowenthal has voting and investment control over the shares of common stock and warrants to purchase common stock held by Alice H. Hechter Trust, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 23,697 shares of common stock and warrants to purchase 11,849 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (5) Consists of 7,109 shares of common stock and warrants to purchase 3,555 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (6) Consists of 5,000 shares of common stock and warrants to purchase 2,500 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 6,854 shares of common stock and warrants to purchase 3,000 shares of common stock with an exercise price equal to \$3.19 per share, with all such warrants currently exercisable.
- (7) Heights Capital Management, Inc., the authorized agent of Capital Ventures International, has voting and investment control over the shares of common stock and warrants to purchase common stock held by Capital Ventures International, but it disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 236,967 shares of common stock and warrants to purchase 118,484 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (8) A beneficial owner of the Castle Creek Healthcare Partners has a beneficial ownership interest in a number of broker dealers. None of the broker dealers are participating in this offering in any manner. As investment manager under a management agreement, Castle Creek Partners, LLC has voting and investment control over the shares of common stock and warrants to purchase common

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stock held by Castle Creek Healthcare Partners LLC, but it disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Daniel Asher is the managing member of Castle Creek Partners, LLC. Mr. Asher disclaims beneficial ownership of the shares owned by Castle Creek Healthcare Partners LLC. Consists of 118,483 shares of common stock and warrants to purchase 59,242 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.

- (9) Consists of 12,000 shares of common stock and warrants to purchase 6,000 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 65,529 shares of common stock and warrants to purchase 7,500 shares of common stock with an exercise price equal to \$3.19 per share, with all such warrants currently exercisable.
- (10) Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (11) Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 14,000 shares of common stock in an investment retirement account.
- (12) Consists of 9,479 shares of common stock and warrants to purchase 4,740 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (13) Consists of 5,000 shares of common stock and warrants to purchase 2,500 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 5,000 shares of common stock.
- (14) Dolores Hartzmark has voting and investment control over the shares of common stock and warrants to purchase common stock held by Hartzmark Investment, LLC, but she disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 47,393 shares of common stock and warrants to purchase 23,697 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (15) Joshua Silverman has voting and investment control over the shares of common stock and warrants to purchase common stock held by Iroquos Master Fund Ltd., but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 284,360 shares of common stock and warrants to purchase 142,180 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (16) James Schoke has voting and investment control over the shares of common stock and warrants to purchase common stock held by James A. Schoke Rev. Trust UTD 11/19/93, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (17) Russell Stone has voting and investment control over the shares of common stock and warrants to purchase common stock held by Jo-Bar Enterprises, LLC, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 23,697 shares of common stock and warrants to purchase 11,849 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (18) Consists of 47,393 shares of common stock and warrants to purchase 23,697 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.

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- (19) Albert Lowenthal has voting and investment control over the shares of common stock and warrants to purchase common stock held by Lisa Lowenthal Pruzan, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 16,667 shares of restricted common stock.
- (20) Albert Lowenthal has voting and investment control over the shares of common stock and warrants to purchase common stock held by Daryl Lowenthal, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 16,667 shares of restricted common stock.
- (21) Consists of 11,848 shares of common stock and warrants to purchase 5,924 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 16,667 shares of restricted common stock.
- (22) Morton E. Goulder has voting and investment control over the shares of common stock and warrants to purchase common stock held by Morton E. Goulder Rev Trust, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 23,697 shares of common stock and warrants to purchase 11,849 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (23) Consists of 2,370 shares of common stock and warrants to purchase 1,185 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (24) Consists of 12,000 shares of common stock and warrants to purchase 6,000 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable and 40,000 shares of restricted common stock.
- (25) Keith Goodman has voting and investment control over the shares of common stock and warrants to purchase common stock held by Nite Capital LP, but he disclaims beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 118,483 shares of common stock and warrants to purchase 59,242 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (26) Robert Okin and Susan Okin have ownership jointly with right of survivorship. Consists of 12,000 shares of common stock and warrants to purchase 6,000 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (27) Omicron Capital, L.P., Omicron Capital, Inc. and Winchester Global Trust Company Limited have voting and investment control over the shares of common stock and warrants to purchase common stock held by Omicron Master Trust, but they disclaim beneficial ownership of such shares and warrants, except to the extent of any pecuniary interest therein. Consists of 189,573 shares of common stock and warrants to purchase 94,787 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (28) Consists of 24,000 shares of common stock and warrants to purchase 167,544 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable, and warrants to purchase 14,200 shares of common stock with an exercise price equal to \$3.19 per share, with all such warrants currently exercisable.
- (29) Consists of 35,545 shares of common stock and warrants to purchase 17,773 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.

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- (30) Consists of 7,000 shares of common stock and warrants to purchase 3,500 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.
- (31) Consists of 16,588 shares of common stock and warrants to purchase 8,294 shares of common stock with an exercise price equal to \$3.38 per share, with all such warrants currently exercisable.

PLAN OF DISTRIBUTION

The selling stockholders and any of their pledges, assignees, donees selling shares received from such selling stockholders as a gift, and successors-in-interest may, from time to time, sell any or all of their shares of common stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. These sales may be at fixed or negotiated prices. The selling stockholders 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;

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

a combination of any such methods of sale; and

any other method permitted pursuant to applicable law.

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

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

The selling stockholders 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.

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

To the extent required, the Company will amend or supplement this prospectus to disclose material arrangements regarding the plan of distribution.

To comply with the securities laws of certain jurisdictions, registered or licensed brokers or dealers may need to offer or sell the shares offered by this prospectus. The applicable rules and regulations under the Securities Exchange Act of 1934, as amended, may limit any person engaged in a distribution of the shares of common stock covered by this prospectus in its ability to engage in market activities with respect to such shares. A selling stockholder, for example, will be subject to applicable provisions of the Securities Exchange Act of 1934, as amended, and the rules and regulations under it, which provisions may limit the timing of purchases and sales of any shares of common stock by that selling stockholder.

We have agreed with the selling stockholders to keep the registration statement of which this prospectus constitutes a part effective until the earlier of:

such time as all of the shares covered by this prospectus have been disposed of pursuant to and in accordance with the registration statement; or

May 9, 2007.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus has been passed upon for us by Morgan, Lewis & Bockius LLP, Princeton, New Jersey.

EXPERTS

The audited consolidated financial statements and schedules incorporated by reference in this prospectus and elsewhere in the registration statement have been audited by Goldstein Golub Kessler LLP, independent public accountants, as indicated in their report with respect thereto, and are incorporated by reference in reliance upon the authority of said firm as experts in accounting and auditing in giving said report.

WHERE YOU CAN FIND MORE INFORMATION

We file reports, proxy statements and other documents with the SEC. You may read and copy any document we file at the SEC's public reference room at Judiciary Plaza Building, 450 Fifth Street, N.W., Room 1024, Washington, D.C. 20549. You should call 1-800-SEC-0330 for more information on the public reference room. Our SEC filings are also available to you on the SEC's Internet site at <http://www.sec.gov>.

This prospectus is part of a registration statement that we filed with the SEC. The registration statement contains more information than this prospectus regarding us and our common stock, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's Internet site.

INCORPORATION BY REFERENCE

The SEC allows us to "incorporate by reference" much of the information we file with them (former Commission File No. 0-22307 and current Commission File No. 001-31326), which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference is considered to be part of this prospectus, and any of our subsequent filings with the SEC will automatically update and supersede this information. This prospectus incorporates by reference the documents listed below and any future filings made by us with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, until the filing of a post-effective amendment to this prospectus which indicates that all securities registered have been sold or which deregisters all securities then remaining unsold:

our annual report on Form 10-KSB for the fiscal year ended June 30, 2004, filed on September 28, 2004;

our current report on Form 8-K, dated October 19, 2004, filed on October 20, 2004;

our proxy statement filed on October 28, 2004 for our annual meeting of stockholders held on December 16, 2004;

our quarterly report on Form 10-QSB for the quarter ended September 30, 2004, filed on November 12, 2004;

our quarterly report on Form 10-QSB for the quarter ended December 31, 2004, filed on February 14, 2005;

our current report on Form 8-K, dated May 4, 2005, filed on May 5, 2005;

our current report on Form 8-K, dated May 9, 2005, filed on May 10, 2005;

our quarterly report on Form 10-QSB for the quarter ended March 31, 2005, filed on May 16, 2005; and

all of our filings pursuant to the Securities Exchange Act of 1934, as amended, after the date of filing the initial registration statement and prior to effectiveness of the registration statement.

You may request a copy of any or all of these filings, at no cost, by writing or telephoning us at: Senesco Technologies, Inc., 303 George Street, Suite 420, New Brunswick, New Jersey 08901; telephone (732) 296-8400, attention: Joel Brooks.

You should rely only on the information incorporated by reference or provided in this prospectus or any supplement. We have not authorized anyone else to provide you with different information. The selling stockholders will not make an offer of these shares in any state where the offer is not permitted. You should not assume that information in this prospectus or any supplement is accurate as of any date other than the date on the front of these documents.

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 \$4,000,000.

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 hereby are as follows:

| | <u>Amount</u> |
|-----------------------------|--------------------|
| SEC Registration Fee | \$ 665 |
| Amex Additional Listing Fee | \$ 45,000 |
| Legal Expenses | \$ 50,000* |
| Accounting Expenses | \$ 2,250* |
| Printing Expenses | \$ 1,000* |
| Miscellaneous Expenses | \$ 5,000* |
| Total | \$ 103,915* |

*

Estimated

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 \$4,000,000.

Item 16. Exhibits.

| Exhibit No. | Description |
|----------------|--|
| 4.1 | Form of Warrant issued to certain accredited investors (with attached schedule of parties and terms thereto). Incorporated by reference to Exhibit 4.1 of our Current Report on Form 8-K, filed on May 5, 2005. |
| 4.2 | Form of Warrant issued to Oppenheimer & Co. Inc. or its designees. Incorporated by reference to Exhibit 4.2 of our Quarterly Report on Form 10-QSB, for the quarter ended March 31, 2005, filed on May 6, 2005. |
| 5.1* | Opinion of Morgan, Lewis & Bockius LLP. |
| 10.1 | Form of Securities Purchase Agreement by and between Senesco Technologies, Inc. and certain accredited investors (with attached schedule of parties and terms thereto). Incorporated by reference to Exhibit 10.1 of our Current Report on Form 8-K, filed on May 5, 2005. |
| 10.2 | Placement Agent Agreement by and between Senesco Technologies, Inc. and Oppenheimer & Co. Inc. (with attachments thereto). Incorporated by reference to Exhibit 10.2 of our Current Report on Form 8-K, filed on May 5, 2005. |
| 23.1* | Consent of Goldstein Golub Kessler LLP. |
| 23.2* | Consent of Morgan, Lewis & Bockius LLP (included in Exhibit 5.1). |
| 24.1* | Power of Attorney (included on signature page). |

*
Filed herewith.

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 together, represent a fundamental change in the information in the registration statement. Notwithstanding the foregoing, any increase or decrease in the 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 SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than twenty 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) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed by the registrant pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in 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; and

(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.

(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 this 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 of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the provisions described under Item 15 above, or otherwise, the registrant has 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. 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 Securities Act of 1933 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 May 27, 2005.

SENESCO TECHNOLOGIES, INC.

(Registrant)

By: /s/ BRUCE C. GALTON

Bruce C. Galton
President and Chief Executive Officer

II-4

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Bruce C. Galton and Joel Brooks, jointly and severally, his true and lawful attorneys-in-fact and agents, each with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to sign any and all amendments to this registration statement, and to file the same, with exhibits thereto, and other documents in connection therewith, with the SEC, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that each of said attorneys-in-fact and agents, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

| Signature | Title | Date |
|--|--|--------------|
| <u>/s/ BRUCE C. GALTON</u> Bruce C. Galton | President, Chief Executive Officer and Director | May 27, 2005 |
| <u>/s/ JOEL BROOKS</u> Joel Brooks | Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer) | May 27, 2005 |
| <u>/s/ RUEDI STALDER</u> Ruedi Stalder | Chairman of the Board and Director | May 27, 2005 |
| <u>/s/ JOHN E. THOMPSON</u> John E. Thompson, Ph.D. | Executive Vice President of Research and Development and Director | May 27, 2005 |
| <u>/s/ CHRISTOPHER FORBES</u> Christopher Forbes | Executive Vice President of Research and Development and Director | May 27, 2005 |
| <u>/s/ THOMAS C. QUICK</u> Thomas C. Quick | Director | May 27, 2005 |
| <u>/s/ DAVID RECTOR</u> David Rector | Director | May 27, 2005 |
| <u>/s/ JOHN BRACA</u> John Braca | Director | May 27, 2005 |

INDEX OF EXHIBITS

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Filed herewith.

QuickLinks

SUBJECT TO COMPLETION, DATED MAY 27, 2005 PROSPECTUS SENESCO TECHNOLOGIES, INC. 2,561,031 Shares of Common Stock

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