

PRO PHARMACEUTICALS INC
Form 10-K
March 12, 2010
Table of Contents

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

x Annual report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
For the fiscal year ended December 31, 2009

.. Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
For the transition period from to

Commission File No. 000-32877

PRO-PHARMACEUTICALS, INC.

Nevada
(State or other jurisdiction

of incorporation)

7 Wells Avenue, Newton, Massachusetts
(Address of Principal Executive Offices)

(617) 559-0033

(Registrant's Telephone Number, Including Area Code)

04-3562325
(I.R.S. Employer

Identification No.)

02459
(Zip Code)

Securities registered pursuant to Section 12(b) of the Act:

None

Securities registered pursuant to Section 12(g) of the Act:

Common Stock, Par Value \$.001

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES NO

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. YES NO

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES NO

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES NO

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES NO

The aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was sold, or the average bid and asked price of such common equity, as of June 30, 2009 was \$13.0 million.

The number of shares outstanding of the registrant's common stock as of March 1, 2010 was 51,742,090.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for the 2010 Annual Meeting of Stockholders are incorporated by reference into Part III of this Report.

Table of Contents

INDEX TO FORM 10-K

FOR THE YEAR ENDED DECEMBER 31, 2009

| | PAGE |
|---|-------------|
| <u>PART I</u> | |
| ITEM 1. <u>Business</u> | 2 |
| ITEM 1A. <u>Risk Factors</u> | 10 |
| ITEM 1B. <u>Unresolved Staff Comments</u> | 18 |
| ITEM 2. <u>Properties</u> | 18 |
| ITEM 3. <u>Legal Proceedings</u> | 18 |
| ITEM 4. <u>Reserved</u> | 19 |
| <u>PART II</u> | |
| ITEM 5. <u>Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u> | 20 |
| ITEM 6. <u>Selected Consolidated Financial Data</u> | 20 |
| ITEM 7. <u>Management's Discussion and Analysis of Financial Condition and Results of Operations</u> | 21 |
| ITEM 8. <u>Financial Statements and Supplementary Data</u> | 29 |
| ITEM 9. <u>Changes In and Disagreements with Accountants on Accounting and Financial Disclosure</u> | 29 |
| ITEM 9A. <u>Controls and Procedures</u> | 29 |
| ITEM 9B. <u>Other Information</u> | 30 |
| <u>PART III</u> | |
| ITEM 10. <u>Directors, Executive Officers and Corporate Governance</u> | 31 |
| ITEM 11. <u>Executive Compensation</u> | 31 |
| ITEM 12. <u>Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u> | 31 |
| ITEM 13. <u>Certain Relationships, Related Transactions and Director Independence</u> | 31 |
| ITEM 14. <u>Principal Accounting Fees and Services</u> | 31 |
| <u>PART IV</u> | |
| ITEM 15. <u>Exhibits, Financial Statement Schedules</u> | 32 |
| <u>SIGNATURES</u> | 37 |

Table of Contents

FORWARD-LOOKING STATEMENTS

This annual report on Form 10-K contains, in addition to historical information, forward-looking statements within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements relate to future events or our future financial performance and can be identified by the use of forward-looking terminology such as project, may, could, expect, anticipate, estimate, or other similar words. These forward-looking statements are based on management's current expectations and are subject to a number of factors and uncertainties which could cause actual results to differ materially from those described in these statements. The following are some of the important factors that could cause our actual performance to differ materially from those discussed in the forward-looking statements:

We have incurred significant operating losses since our inception and cannot assure you that we will generate revenue or profit.

As a result of our lack of financial liquidity and negative stockholders' equity, our auditors have indicated there is uncertainty of our ability to continue as a going concern.

If we fail to raise additional capital by the end of April 2010, we may need to significantly curtail operations, cease operations or seek federal bankruptcy protection.

We are subject to extensive and costly regulation by the U.S. Food and Drug Administration, or FDA, which must approve our product candidates in development and could restrict the sales and marketing of such products in development.

We may be unable to achieve commercial viability and acceptance of our proposed products.

We may be unable to improve upon, protect and/or enforce our intellectual property.

We may be unable to enter into strategic partnerships for the development, commercialization, manufacturing and distribution of our proposed product candidates.

We are subject to significant competition.

As a public company, we must implement additional and expensive finance and accounting systems, procedures and controls as we grow our business and organization to satisfy new reporting requirements, which will increase our costs and require additional management resources.

We caution investors that actual results or business conditions may differ materially from those projected or suggested in forward-looking statements as a result of various factors including, but not limited to, those described above and in the Risk Factors section of this annual report on Form 10-K. We cannot assure you that we have identified all the factors that create uncertainties. Moreover, new risks emerge from time to time and it is not possible for our management to predict all risks, nor can we assess the impact of all risks on our business or the extent to which any risk, or combination of risks, may cause actual results to differ from those contained in any forward-looking statements. Readers should not place undue reliance on forward-looking statements. We undertake no obligation to publicly release the result of any revision of these forward-looking statements to reflect events or circumstances after the date they are made or to reflect the occurrence of unanticipated events.

PART I

Item 1. Business

We are a development-stage company engaged in the discovery and development of therapeutics that target Galectin receptors that we believe enhance existing cancer treatments and could also be used in the treatment of liver, microbial and inflammatory diseases. All of our products are presently in development, including pre-clinical and clinical trials.

Table of Contents

Since our inception on July 10, 2000, our primary focus has been the development of a new generation of anti-cancer treatments using polysaccharide polymers which are aimed at increasing survival and improving the quality of life for cancer patients. Our lead product candidate, DAVANAT[®], is a patented new chemical entity that we believe, when administered in combination with chemotherapy, increases the efficacy while reducing adverse side effects of the chemotherapy. We hold the patent on DAVANAT[®], which was invented by company founders David Platt, Ph.D., our former Chief Executive Officer, and Anatole Klyosov, Ph.D., our Chief Scientist.

On February 12, 2009, David Platt, Ph.D. resigned as Chairman of our Board of Directors and as Chief Executive Officer and each of Dale H. Conaway, Dr. Henry J. Esber and Dr. James T. Gourzis resigned from our Board of Directors. Theodore Zucconi, Ph.D. was named our Chief Executive Officer and President. Also, on February 12, 2009, James C. Czirr, Rod Martin, Gilbert Amelio, Ph.D. and Peter Traber, M.D., were elected to our Board of Directors. Mr. Czirr and Mr. Martin were designated as the Series B Directors and Dr. Amelio and Dr. Traber were the Series B Nominees under the terms of our Series B convertible preferred stock agreement announced on February 12, 2009.

In 2002, the Federal Drug Administration (FDA) granted us an Investigational New Drug application (IND), for use of DAVANAT[®] combination with 5-fluorouracil (5-FU), to treat late-stage cancer patients with solid tumors. 5-FU is FDA-approved and one of the most widely used chemotherapies for treatment of various types of cancer, including colorectal, breast and gastrointestinal. In September 2008, we submitted a clinical and pre-clinical package to the FDA in support of our DAVANAT[®] New Drug Application (NDA). The FDA reported to us in its minutes for the December 2008 meeting that we will be required to conduct a Phase III trial to demonstrate superiority to the best standard of care for late stage colorectal cancer patients. We believe that using DAVANAT[®] in combination with 5-FU enables greater absorption of the chemotherapy in cancer cells while reducing its toxic side effects.

We plan to submit an NDA for co-administration of DAVANAT[®] with 5-FU for the indication of colorectal cancer.

We were incorporated under Nevada law on January 26, 2001 and in May of that year acquired a Massachusetts corporation (organized on July 10, 2000) engaged in the business we now undertake. We have a wholly-owned Delaware subsidiary that we formed in 2003 to hold our cash and cash equivalents. We also own 10% of a Nevada subsidiary that we formed in October 2008 for the development of our technology in cardiovascular treatments.

Our Strengths and Strategies

Focus on novel therapeutic opportunities that target Galectin receptors. We believe our company is one of the pioneers focused on development of therapeutics that target Galectin receptors to treat cancer. Carbohydrate molecules, which are essential to the transmission and recognition of cellular information, have been shown to play an important role in major diseases including cancer, cardiovascular disease, Alzheimer's disease, inflammatory disease and viral infections. We believe this offers a largely untapped area for treatment of disease including chemotherapeutics, infection treatment, vaccines and antibiotics.

Leverage extensive scientific expertise. Our scientists have substantial expertise, developed over decades, in the area of carbohydrates that target Galectin receptors. Our team has conducted research in therapeutic application of carbohydrate-based therapeutics for more than 20 years. Dr. Klyosov, who headed the Carbohydrate Research Laboratory at the USSR Academy of Sciences and was a visiting biochemistry professor at Harvard Medical School, holds more than 20 patents. We believe that his expertise, supplemented by members of our Scientific and Medical Advisory Boards, provides us with a substantial advantage in this relatively new area of drug development.

Table of Contents

Completion of development milestones toward commercialization of DAVANAT® and 5-FU combination cancer therapy. We have completed important milestones in the development of DAVANAT® in combination with 5-FU to treat late-stage cancer patients with solid tumors. These include our submission of the Drug Master File, or DMF, to the FDA in May 2008, which we believe demonstrates our ability to produce commercial quantities of pharmaceutical-grade DAVANAT® under manufacturing standards known as cGMP (current Good Manufacturing Process); our submission in September 2008 of a clinical and pre-clinical package to the FDA in support of our DAVANAT® NDA; and our December 2008 pre-NDA meeting with the FDA which provided guidance as to certain components of a Phase III trial of DAVANAT®/5-FU that would be needed for an NDA demonstrating superiority to the best standard of care for late stage colorectal patients. We also have explored utilizing DAVANAT® with other therapeutics and also as a potential stand-alone therapeutic.

Apply our technology to broad range of applications. Our research indicates that DAVANAT® has the potential for broad application. Following development of DAVANAT® in combination with chemotherapies and biologics, we plan to combine it with other drugs to extend its use to treat other serious diseases. Generally speaking, a biologic is a therapeutic product based on materials derived from living materials, whereas chemotherapies are chemical compounds, typically used in cancer treatment. Pre-clinical studies indicate that DAVANAT® and other proprietary therapeutics we have in development, may have application for advanced treatment of liver, microbial and inflammatory diseases. This could substantially increase the marketability of our products.

Product Development

We are initially developing a pipeline of compounds that may be combined with chemotherapies, such as 5-FU and biologics, such as Avastin®, so as to improve the clinical benefit to cancer patients. Based on our research, we believe DAVANAT®, when combined with chemotherapies and biologics can significantly increase the clinical benefit to cancer patients by extending survival and increasing quality of life. Our lead product candidate, DAVANAT®, is a patented new chemical entity that has completed Phase II trials for treatment of colorectal cancer in combination with 5-FU.

To date, DAVANAT® has been administered to approximately 100 cancer patients in Phase I and II trials. Data from a Phase II trial for late-stage colorectal cancer patients showed DAVANAT® extended median survival to 6.7 months with significantly reduced side effects, as compared to 4.6 months for best standard of care as determined by the patient's physician. Patients have improved quality of life as result of experiencing fewer adverse side effects of the chemotherapy and requiring less hospitalization.

In addition, results of pre-clinical studies we have conducted in mice show that more 5-FU accumulates in the tumor when co-administered with DAVANAT® than when 5-FU is administered alone in the mice. Our pre-clinical and clinical trial data also show that DAVANAT® is safe and non-toxic.

Our NDA for DAVANAT® will seek FDA approval for co-administration of DAVANAT® with 5-FU for intravenous injection for the treatment of colorectal cancer. We plan additionally to file NDAs for DAVANAT® in combination with other chemotherapeutics and biologics.

According to its published guidance, the FDA initially determines whether an NDA filing is complete for purposes of allowing a review, and, if allowed, then determines whether to approve the NDA, a process that takes six months (typically for a chemotherapy) or ten months (typically for a biologic). Upon approval, an applicant may commence commercial marketing and distribution of the approved products. We have retained Camargo Pharmaceutical Services, LLC (Camargo) for regulatory support of our submission with the FDA. Camargo's expertise in regulatory affairs and submissions includes the preparation and submission of NDAs.

We are also developing other therapeutic compounds for treatment of other serious disease, such as liver and kidney fibrosis. These product candidates are all in the pre-clinical stage of development. We entered into research collaborations with the Mount Sinai School of Medicine to study the anti-fibrotic effects of our

Table of Contents

compounds on liver fibrosis and with Brigham and Women's Hospital to evaluate the anti-fibrotic effects of these compounds to treat acute and chronic kidney disease. Our compound reduced collagen expression and reversed fibrosis in animal models. Whereas previously *in vitro* data indicated a reversal of fibrosis markers, in this proof-of-concept animal study, the compounds clearly reduced collagen expression and reversed liver fibrosis.

DAVANAT®

DAVANAT®, our lead product candidate in development, is a proprietary polysaccharide polymer comprised of mannose and galactose that is derived from plant sources and has a precisely defined chemical structure. More specifically, it is galactomannan which is isolated from seeds of guar and subjected to a controlled partial chemical and physical degradation. Guar is a legume grown in the United States and elsewhere for a wide variety of food and non-food uses.

We believe the mechanism of action for DAVANAT® is based upon interaction with lectins, which are cell surface proteins that bind only to a particular kind of carbohydrate. DAVANAT® is formulated to attach to specific lectins, called galectins, which are abundant on the surface of tumor cells, while selectively avoiding healthy tissue. We believe the structure of DAVANAT® is such that it is attracted to Galectin receptors that are specific and over-expressed on cancer cells. The Galectin receptor effectively interacts with DAVANAT® and the chemotherapy and/or biologic combination and assists in the accumulation of the chemotherapy in the cancer cell. This may allow for administration of higher doses of chemotherapy thereby increasing efficacy while reducing toxicity.

Pre-clinical Studies of DAVANAT®

Our pre-clinical studies demonstrate that DAVANAT® when used in combination with chemotherapies, such as 5-FU and irinotecan, and biologics, such as Avastin®, may improve the clinical benefit of anti-cancer treatments. Pre-clinical studies also demonstrated delayed tumor growth and tumor shrinkage against a control group of animals when DAVANAT® was used in combination with standard therapies. These studies demonstrated that DAVANAT® could be used effectively with different chemotherapies and biologics.

Clinical Trial Development of DAVANAT®

Results from our Phase II clinical trial data in late-stage cancer patients shows that DAVANAT® extends median survival to 6.7 months from 4.6 months (or a 46% increase) after other treatments were exhausted. The results of this trial also demonstrated reduction of adverse gastrointestinal, hematological and other side effects of chemotherapy treatment.

Phase I Trial for Late-Stage Patients with Solid Tumors. In 2005, we completed a Phase I study to evaluate DAVANAT®, alone and in combination with 5-FU, to treat solid tumors in a trial of 40 end-stage patients with advanced solid tumors who failed chemotherapy, radiation therapy, and/or surgical treatments. The objective of the open label study was to evaluate the safety and tolerability of escalating doses of DAVANAT® (30-280mg/m²) when administered alone and in combination.

Based on objective tumor assessment using Response Evaluation Criteria in Solid Tumors, or RECIST, the disease was stabilized in 14 of 26 of the evaluable patients with measurable disease. Furthermore, 7 of 10 patients were stabilized at the highest dose level of DAVANAT® administered in the study. Efficacy results are analyzed based on RECIST following completion of the second cycle of treatment. According to RECIST, a stable disease is a disease with neither sufficient shrinkage to qualify for Partial Response (more than 30% shrinkage) nor sufficient increase to qualify for Progressive Disease (greater than 20% increase) taking as reference the smallest sum longest diameter since the treatment started.

Table of Contents

The Phase I data also indicate that DAVANAT[®] was well tolerated by patients. The maximum tolerated dose was not reached indicating DAVANAT[®] is safe and has the potential for further dose escalation. Adverse side effects were primarily disease related. Additionally, the results showed that the DAVANAT[®]/5-FU combination remained in the bloodstream up to eight times longer, which we believe increases the efficacy of the treatment.

Phase II Trial for Late Stage Patients with Metastatic Colorectal Cancer. In 2004, we initiated a Phase II clinical trial to further evaluate DAVANAT[®] for late-stage patients with metastatic colorectal cancer. The multi-center, open label, single-dose level study was designed to evaluate up to 15 patients in stage one, and up to 18 patients in stage two. The study, which was designed to evaluate the efficacy and safety of DAVANAT[®] in combination with chemotherapy when administered in monthly cycles, had two objectives: (1) to document the rate of response and stabilization of patients with advanced colorectal cancer; and (2) to continue evaluating the safety of the DAVANAT[®] in combination 5-FU. Dosing of patients began in May 2005. We stopped recruiting for the study in May 2006 because we achieved our objective. The data for the study indicates that based on objective tumor assessment one patient experienced a partial tumor response and the disease was stabilized in 6 of 20 patients. Data on 20 patients from this trial showed that DAVANAT[®] extended median survival. We tracked these patients and gathered data after they left the trial. The patients entered the trial with disease that progressed despite previously being treated with standard chemotherapies and biologics.

Phase II Trial for First-line Treatment of Patients with Biliary Cancer. In 2007, we initiated a Phase II trial for the first-line treatment of patients with biliary (gall bladder) cancer. Biliary cancer may represent an opportunity for orphan drug status approval. See FDA Orphan Drug Designation below under Government Regulation. The multi-center, open label, single-dose level study is designed to evaluate up to 42 patients. The study was designed to evaluate the efficacy and safety of DAVANAT[®] when administered for at least two monthly cycles or until disease progression. The trial had two objectives: (1) complete/partial tumor response in 20% of patients (17% in the first stage); and (2) the safety of DAVANAT[®] regimen in this patient population. We stopped the trial due to financial constraints in the second quarter of 2008 and do not expect to resume it.

Phase II Trial for First-line Treatment of Patients with Colorectal Cancer. In 2006, we initiated a Phase II trial for initial treatment of colorectal cancer patients. The multi-center, open label, single-dose level study was designed to evaluate up to 50 patients who are unable to sustain the high toxicity of current intensive combination chemotherapy. The study was expected to evaluate the efficacy and safety of DAVANAT[®] when administered in combination with the current standard of care in two monthly cycles or until disease progression or toxicity. The primary objectives of the study were a complete or partial response in 33% of the patients and a secondary measurement of progression free survival at 6 and 12 months. We stopped the trial due to financial constraints in the second quarter of 2008 and do not expect to resume it.

See Risk Factors Risks Related to our Company We have one drug candidate in clinical trials and results are uncertain for additional discussion of risks related to clinical trials.

Patents and Proprietary Rights

Our development and commercial viability, and ultimately our competitiveness, depend on our ability to develop and maintain the proprietary aspects of our technology and operate without infringing on the proprietary rights of others. We rely on a combination of patent, trademark, trade secret and copyright law and contract restrictions to protect the proprietary aspects of our technologies. We seek to limit disclosure of our intellectual property by requiring employees, consultants, and any third parties with access to our proprietary information to execute confidentiality agreements and by restricting access to that information.

As of December 31, 2009, we held five U.S. patents and have patent applications pending from the U.S. Patent and Trademark Office. Many of our patents and patent applications cover methods and composition for

Table of Contents

reducing toxicity and enhancing chemotherapeutic drugs by co-administering a polysaccharide with a chemotherapeutic agent. We have corresponding patent applications pending in Europe, Canada, Israel, Brazil, Japan, China and Australia. Additionally, we have patent applications in other areas to utilize our carbohydrate-based compounds to treat disease other than cancer. See **Risk Factors** **Risks Related to the Drug Development Industry** Our competitive position depends on protection of our intellectual property.

Research

Our initial focus is on the design and analysis of Galectin targeting therapeutics to improve the clinical benefit of chemotherapeutic agents and biologics. We contract with independent laboratories and other facilities to conduct our research, which is designed, evaluated and managed by our scientists. We do not anticipate building in-house research or development facilities or hiring staff other than for purposes of designing and managing our out-sourced research.

As we develop products eligible for clinical trials, we contract with independent parties to design the trial protocols, arrange for and monitor the clinical trials, collect data and analyze data. In addition, certain clinical trials for our products may be conducted by government-sponsored agencies and will be dependent on governmental participation and funding. Our dependence on independent parties and clinical sites involves risks including reduced control over the timing and other aspects of our clinical trials.

Our research and development expenditures totaled \$18.5 million for the cumulative period from inception (July 10, 2000) through December 31, 2009. During the years ended December 31, 2009 and 2008, our expenditures for research and development were \$1.1 million and \$1.8 million, respectively.

Manufacturing and Marketing

We are a development stage company at this time and do not intend to establish internal facilities for the manufacture of our products for clinical or commercial production. To have our products manufactured, we have developed and will continue to develop relationships with third-parties that have established manufacturing capabilities. We are not a party to any long-term agreement with any of our suppliers and, accordingly, we have our products manufactured on a purchase-order basis from one of two primary suppliers.

Because our products are in the development stage, we have not created a sales and marketing staff to commercialize pharmaceutical products. If we develop products eligible for commercial sale, we will need to develop a sales and marketing capability or rely on third parties such as licensees, collaborators, joint venture partners or independent distributors to market and sell those products. Our dependence on third-party manufacturers and marketers will involve risks relating to our reduced control, and other risks including those discussed in **Risk Factors** **Risks Related to our Company** We will depend on third parties to manufacture and market our products and to design trial protocols, arrange for and monitor the clinical trials, and collect and analyze data.

Competition

Many biotechnology and pharmaceutical companies are developing new technologies for the treatment of cancer and other diseases. Technologies such as monoclonal antibodies, developed by Genentech, Inc., could be competitive with our Galectin therapeutic platforms. Companies, such as Momenta Pharmaceuticals Inc., are developing technologies to improve or develop new or existing drugs. Other companies, such as ImClone Systems Incorporated, are trying to improve the therapeutic profile of widely used protein-based drugs. While these companies may broaden the market for our products they may also provide competitive alternatives to our products.

See **Risk Factors** **Risks Related to the Drug Development Industry** We face intense competition in the biotechnology and pharmaceutical industries for additional discussion related to our current and potential competition.

Table of Contents

Government Regulation

The research, development, testing, manufacture, labeling, promotion, advertising, distribution, and marketing, among other things, of our products are extensively regulated by governmental authorities in the United States and other countries. The FDA regulates drugs under the federal Food, Drug, and Cosmetic Act and its implementing regulations. Failure to comply with the applicable U.S. requirements may subject us to administrative or judicial sanctions, such as FDA refusal to approve pending NDAs, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, and/or criminal prosecution.

Drug Approval Process

Drugs may not be marketed in the U.S. until the FDA has approved them. The steps required before a drug may be marketed in the U.S. include (similar rules apply in other countries):

1. Pre-clinical laboratory tests, animal studies, and formulation studies,
2. Submission to the FDA of an IND for human clinical testing, which must become effective before human clinical trials may begin,
3. Adequate and well-controlled human clinical trials to establish the safety and efficacy of the drug for each indication,
4. Submission to the FDA of an NDA,
5. Satisfactory completion of an FDA inspection of the manufacturing facility or facilities, at which the drug is produced to assess compliance with cGMP established by the FDA,
6. FDA review and approval of the NDA, and
7. FDA review and approval of a trademark used in connection with a pharmaceutical.

Pre-clinical tests include laboratory evaluation of product chemistry, toxicity, and formulation, as well as animal studies. The results of the pre-clinical tests, together with manufacturing information and analytical data, are submitted to the FDA as part of an IND, which must become effective before human clinical trials may begin. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions about issues such as the conduct of the trials as outlined in the IND. In such a case, the IND sponsor and the FDA must resolve any outstanding FDA concerns or questions before clinical trials can proceed. There is no certainty that submission of an IND will result in the FDA allowing clinical trials to begin.

Clinical trials involve the administration of the investigational drug to human subjects under the supervision of qualified investigators. Clinical trials are conducted under protocols detailing the objectives of the study, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. Each protocol must be submitted to the FDA as part of the IND.

Clinical trials typically are conducted in three sequential phases, but the phases may overlap or be combined. Each trial must be reviewed and approved by an independent Institutional Review Board, IRB, before it can begin. Study subjects must sign an informed consent form before participating in a clinical trial. Phase I usually involves the initial introduction of the investigational drug into patients to evaluate its safety, dosage tolerance, pharmacodynamics, and, if possible, to gain an early indication of its effectiveness. Phase II usually involves trials in a limited patient population to (i) evaluate dosage tolerance and appropriate dosage; (ii) identify possible adverse effects and safety risks; and (iii) evaluate preliminarily the efficacy of the drug for specific indications. Phase III trials usually further evaluate clinical efficacy and test further for safety by using the drug in its final form in an expanded patient population. There is no assurance that these trials will be completed within a specified period of time, if at all.

Table of Contents

Assuming successful completion of the required clinical testing, the results of the pre-clinical studies and of the clinical studies, together with other detailed information, including information on the manufacture and composition of the drug, are submitted to the FDA in an NDA requesting approval to market the product for one or more indications. Before approving an NDA, the FDA usually will inspect the facilities at which the drug is manufactured, and will not approve the product unless compliance with cGMP is satisfactory. If the FDA evaluates the NDA and the manufacturing facilities as acceptable, the FDA will issue an approval letter. If the FDA evaluates the NDA submission or the manufacturing facilities as not acceptable, the FDA will outline the deficiencies in the submission and often will request additional testing or information. Even if an applicant submits the requested additional information, the FDA ultimately may decide that the NDA does not satisfy the regulatory criteria for approval. The testing and approval process requires substantial time, effort, and financial resources, and there is no assurance that any approval will be granted on a timely basis, if at all. After approval, certain changes to the approved product, such as adding new indications, manufacturing changes, or additional labeling claims are subject to further FDA review and approval.

See **Risk Factors** **Risks Related to the Drug Development Industry** We will need regulatory approvals to commercialize our products for additional discussion of regulatory risks related to our drug development program.

FDA Priority Review

FDA procedures provide for priority review of an NDA submitted for drugs that, compared to currently marketed products, offer a significant improvement in the treatment, diagnosis, or prevention of a disease. NDAs that are granted priority review are acted upon more quickly than NDAs given standard review. If we were to seek priority review, there can be no guarantee that the FDA will grant priority review status, that priority review status will affect the time of review, or that the FDA will approve the NDA submitted for any of our product candidates, whether or not priority review status is granted.

Post-Approval Requirements

If FDA approval of one or more of our products is obtained, we will be required to comply with a number of post-approval requirements. For example, holders of an approved NDA are required to report certain adverse reactions to the FDA and to comply with certain requirements concerning advertising and promotional labeling for their products. Also, quality control and manufacturing procedures must continue to conform to cGMP after approval, and the FDA periodically inspects manufacturing facilities to assess compliance with cGMP. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. In addition, discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved NDA, including withdrawal of the product from the market. Also, new government requirements may be established that could delay or prevent regulatory approval of our products under development.

FDA Orphan Drug Designation

The FDA may grant orphan drug designation to drugs intended to treat a rare disease or condition, which generally is a disease or condition that affects fewer than 200,000 individuals in the United States. Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are publicly disclosed by the FDA. Orphan drug designation does not convey an advantage in, or shorten the duration of, the regulatory review and approval process. If a product which has an orphan drug designation subsequently receives the first FDA approval for the indication for which it has such designation, the product is entitled to orphan exclusivity, meaning that the FDA may not approve any other applications to market the same drug for the same indication, except in certain very limited circumstances, for a period of seven years. As well, orphan drugs usually receive ten years of marketing exclusivity in the European Union. We currently are not seeking orphan drug designation.

Table of Contents

Regulation Outside the United States

Before our products can be marketed outside of the United States, they are subject to regulatory approval similar to that required in the United States, although the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary widely from country to country. No action can be taken to market any product in a country until an appropriate application has been approved by the regulatory authorities in that country. The current approval process varies from country to country, and the time spent in gaining approval varies from that required for FDA approval. In certain countries, the sales price of a product must also be approved. The pricing review period often begins after market approval is granted. No assurance can be given that even if a product is approved by a regulatory authority, satisfactory prices will be approved for such product.

Environmental Regulation

Pharmaceutical research and development involves the controlled use of hazardous materials. Biotechnology and pharmaceutical companies must comply with laws and regulations governing the use, generation, manufacture, storage, air emission, effluent discharge, handling and disposal of certain materials, biological specimens and wastes. We do not anticipate building in-house research, development or manufacturing facilities, and, accordingly, do not expect to have to comply directly with environmental regulation. However, our contractors and others conducting research, development or manufacturing activities for us may be required to incur significant compliance cost, and this could in turn could increase our expense or delay our completion of research or manufacturing programs.

Employees

As of December 31, 2009, we had six full-time employees, two of whom were involved primarily in management of our pre-clinical research and development and clinical trials and four who were involved primarily in financial management and administration of our company. We also had one part-time contractor who provides manufacture and clinical trial support and two part-time contractors, one of whom provides financial management services and the other of whom serves as our medical director.

Item 1A. Risk Factors

An investment in our common stock involves a high degree of risk. You should carefully consider the risks described below and the other information before deciding to invest in our common stock. The risks described below are not the only ones facing our company. Additional risks not presently known to us or that we currently consider immaterial may also adversely affect our business. We have attempted to identify below the major factors that could cause differences between actual and planned or expected results, but we cannot assure you that we have identified all of those factors.

If any of the following risks actually happen, our business, financial condition and operating results could be materially adversely affected. In this case, the trading price of our common stock could decline, and you could lose all or part of your investment.

Risks Related to Our Company

We are at an early stage of development and have not generated any revenue.

We are a development-stage company with a limited operating history, and we have not generated any revenues to date. We have no products available for sale, and none are expected to be commercially available for several years, if at all. We may never obtain FDA approval of our products in development and, even if we do so and are also able to commercialize our products, we may never generate revenue sufficient to become profitable. Our failure to generate revenue and profit would likely lead to loss of your investment in our company.

Table of Contents

We have incurred net losses to date and must raise additional capital by the end of April 2010 in order to continue to operate.

We have incurred net losses in each year of operation since our inception in July 2000. Our accumulated deficit as of December 31, 2009 was \$47.7 million. We will need to continue to conduct significant research, development, testing and regulatory compliance activities that, together with projected general and administrative expenses, we expect will result in substantial operating losses for the next several years. Accordingly, we do not expect to be generating sales or other revenue and will remain dependent on outside sources of financing during that time. If we are unable to raise funds from outside sources for our continuing operations, we may be adversely affected.

We may raise capital through public or private equity financings, partnerships, debt financings, bank borrowings, or other sources. Additional funding may not be available on favorable terms or at all. If adequate funds are not otherwise available, we may need to significantly curtail operations. To obtain additional funding, we may need to enter into arrangements that require us to relinquish rights to certain technologies, products and/or potential markets. To the extent that additional capital is raised through the sale of equity, or securities convertible into equity, our equity holders may experience dilution of their proportionate ownership of the company.

Based on \$251,000 of unrestricted cash as of December 31, 2009, combined with \$308,000 and \$322,000, net, respectively, received from offerings of our Series B-2 financings on January 29 and March 8, 2010, we believe that we have sufficient cash to meet our financial and operating obligations into April 2010. We will require more cash to fund our operations and believe that we will be able to obtain additional financing. However, there can be no assurance that we will be successful in obtaining such new financing or, if available, that such financing will be obtainable on terms favorable to us. We have taken steps to reduce our administrative and clinical spending, however, we must raise additional cash by the end of April 2010, or we may not be able to continue operations and may be forced to seek bankruptcy protection.

We were a counterclaim defendant in a lawsuit instituted by our former Chief Executive Officer that relates to certain of our intellectual property.

In January 2004, David Platt, Ph.D., our former Chairman and Chief Executive Officer, filed a lawsuit in Massachusetts Superior Court against GlycoGenesys, Inc., which asserted counterclaims against us related to our intellectual property. Prospect Therapeutics, Inc. subsequently purchased certain assets including this lawsuit from the GlycoGenesys bankruptcy estate. Before the Court could issue a decision after the lawsuit went to trial in March 2009, Prospect Therapeutics announced on May 15, 2009, that it had assigned all of its assets for the benefit of creditors and would liquidate. In response, we moved to dismiss the lawsuit on various grounds, including failure to prosecute. Prospect's assets, including the lawsuit, were sold at auction on June 29, 2009, and the new owner of the assets elected not to prosecute. After a post-trial hearing, the Court issued a judgment dated July 17, 2009, dismissing the lawsuit against us and Dr. Platt.

We are involved in litigation with Summer Street Research Partners.

On January 30, 2008, Custom Equity Research, Incorporated (d/b/a Summer Street Research Partners) filed a lawsuit against us in the Superior Court of the Commonwealth of Massachusetts, alleging claims for breach of contract, declaratory judgment and unjust enrichment arising out of an engagement letter under which Summer Street agreed to provide institutional investment placement services to us. Summer Street claims it is entitled to a placement fee for each placement made during the term of the agreement and for each issuance of securities made or agreed to be made by us from October 17, 2007 through November 16, 2008. We initially responded to the lawsuit with a motion to dismiss, which the Court denied on June 23, 2008, finding that the letter agreement was ambiguous with respect to Summer Street's entitlement to compensation. The Court also denied Summer Street's motion for a pre-judgment attachment and trustee process, preliminarily finding that Summer Street was

Table of Contents

not likely to prevail on any of its claims. On July 3, 2008, we filed our answer, denying Summer Street's material allegations. The parties are currently engaged in discovery and no trial date has been set for this matter. We believe the lawsuit is without merit and intend to contest it vigorously. However, if we were to receive an adverse decision, we might be required to pay cash damages to Summer Street which could have a material adverse effect on our financial position.

Our drug candidates are based on novel unproven technologies.

Our drug candidates in development are based on novel unproven technologies using proprietary compounds in combination with FDA approved drugs currently used in the treatment of cancer and other diseases. Therapeutics that target Galectin receptors are difficult to synthesize and we may not be able to synthesize them in a way that would make them usable as target delivery vehicles for the anti-cancer drugs.

We have one drug candidate in clinical trials and results are uncertain.

We have one product candidate in human clinical trials. Pre-clinical results in animal studies are not necessarily predictive of outcomes in human clinical trials. Clinical trials are expensive, time-consuming and may not be successful. They involve the testing of potential therapeutic agents, or effective treatments, in humans, typically in three phases, to determine the safety and efficacy of the product candidates necessary for an approved drug. Many products in human clinical trials fail to demonstrate the desired safety and efficacy characteristics. Even if our products progress successfully through initial human testing, they may fail in later stages of development. We may engage others to conduct our clinical trials, including clinical research organizations and, possibly, government-sponsored agencies. These trials may not start or be completed as we forecast, or may not achieve desired results.

We may be unable to commercialize our product candidates.

Even if our current and anticipated product candidates achieve positive results in clinical trials, we may be unable to commercialize them. Potential products may fail to receive necessary regulatory approvals, be difficult to manufacture on a large scale, be uneconomical to produce, fail to achieve market acceptance, or be precluded from commercialization by proprietary rights of third parties. Our inability to commercialize our products would substantially impair the viability of our company.

Our lack of operating experience may cause us difficulty in managing our growth.

We have limited experience in manufacturing or procuring products in commercial quantities, conducting other later-stage phases of the regulatory approval process, selling pharmaceutical products, or negotiating, establishing and maintaining strategic relationships. Any growth of our company will require us to expand our management and our operational and financial systems and controls. If we are unable to do so, our business and financial condition would be materially harmed. If rapid growth occurs, it may strain our operational, managerial and financial resources.

We will depend on third parties to manufacture and market our products and to design trial protocols, arrange for and monitor the clinical trials, and collect and analyze data.

We do not have, and do not now intend to develop, facilities for the manufacture of any of our products for clinical or commercial production. In addition, we are not a party to any long-term agreement with any of our suppliers, and accordingly, we have our products manufactured on a purchase-order basis from one of two primary suppliers. We will need to develop relationships with manufacturers and enter into collaborative arrangements with licensees or have others manufacture our products on a contract basis. We expect to depend on such collaborators to supply us with products manufactured in compliance with standards imposed by the FDA and foreign regulators.

Table of Contents

In addition, we have limited experience in marketing, sales or distribution, and we do not intend to develop a sales and marketing infrastructure to commercialize our pharmaceutical products. If we develop commercial products, we will need to rely on licensees, collaborators, joint venture partners or independent distributors to market and sell those products.

Moreover, as we develop products eligible for clinical trials, we may contract with independent parties to design the trial protocols, arrange for and monitor the clinical trials, collect data and analyze data. In addition, certain clinical trials for our products may be conducted by government-sponsored agencies and will be dependent on governmental participation and funding. Our dependence on independent parties and clinical sites involves risks including reduced control over the timing and other aspects of our clinical trials.

We are exposed to product liability, pre-clinical and clinical liability risks which could place a substantial financial burden upon us, should we be sued, because we do not currently have product liability insurance above and beyond our general insurance coverage.

Our business exposes us to potential product liability and other liability risks that are inherent in the testing, manufacturing and marketing of pharmaceutical formulations and products, as a result of which claims may be asserted against us. In addition, the use in our clinical trials of pharmaceutical formulations and products that our potential collaborators may develop and the subsequent sale of these formulations or products by us or our potential collaborators may cause us to bear a portion of or all product liability risks. A successful liability claim or series of claims brought against us could have a material adverse effect on our business, financial condition and results of operations.

Since we do not currently have any FDA-approved products or formulations, we do not currently have any product liability insurance covering commercialized products. We may not be able to obtain or maintain adequate product liability insurance on acceptable terms, if at all, or such insurance may not provide adequate coverage against our potential liabilities. Furthermore, our current and potential partners with whom we have collaborative agreements or our future licensees may not be willing to indemnify us against these types of liabilities and may not themselves be sufficiently insured or have sufficient liquidity to satisfy any product liability claims. Claims or losses in excess of any product liability insurance coverage that may be obtained by us could have a material adverse effect on our business, financial condition and results of operations.

If users of our proposed products are unable to obtain adequate reimbursement from third-party payers, or if new restrictive legislation is adopted, market acceptance of our proposed products may be limited and we may not achieve revenues.

The continuing efforts of government and insurance companies, health maintenance organizations and other payers of healthcare costs to contain or reduce costs of health care may affect our future revenues and profitability, and the future revenues and profitability of our potential customers, suppliers and collaborative partners and the availability of capital. For example, in certain foreign markets, pricing or profitability of prescription pharmaceuticals is subject to government control. In the U.S., given recent federal and state government initiatives directed at lowering the total cost of health care, the U.S. Congress and state legislatures will likely continue to focus on health care reform, the cost of prescription pharmaceuticals and on the reform of the Medicare and Medicaid systems. While we cannot predict whether any such legislative or regulatory proposals will be adopted, the announcement or adoption of such proposals could materially harm our business, financial condition and results of operations.

Our ability to commercialize our proposed products will depend in part on the extent to which appropriate reimbursement levels for the cost of our proposed formulations and products and related treatments are obtained by governmental authorities, private health insurers and other organizations, such as health management organizations, or HMOs. Third-party payers are increasingly challenging the prices charged for medical drugs and services. Also, the trend toward managed health care in the U.S. and the concurrent growth of organizations

Table of Contents

such as HMOs, which could control or significantly influence the purchase of health care services and drugs, as well as legislative proposals to reform health care or reduce government insurance programs, may all result in lower prices for or rejection of our products.

There are risks associated with our reliance on third parties for marketing, sales, managed care and distribution infrastructure and channels.

We expect that we will be required to enter into agreements with commercial partners to engage in sales, marketing and distribution efforts around our products in development. We may be unable to establish or maintain third-party relationships on a commercially reasonable basis, if at all. In addition, these third parties may have similar or more established relationships with our competitors. If we do not enter into relationships with third parties for the sales and marketing of our proposed products, we will need to develop our own sales and marketing capabilities.

We may be unable to engage qualified distributors. Even if engaged, these distributors may:

fail to satisfy financial or contractual obligations to us;

fail to adequately market our products;

cease operations with little or no notice to us; or

offer, design, manufacture or promote competing formulations or products.

If we fail to develop sales, managed care, marketing and distribution channels, we would experience delays in generating sales and incur increased costs, which would harm our financial results.

We depend on key individuals to develop our products and pursue collaborations.

We are highly dependent on Anatole Klyosov, Ph.D., our Chief Scientist who has scientific technical or other business expertise and experience that is critical to our success. The loss of Dr. Klyosov, or failure to attract or retain other key personnel, could prevent us from pursuing collaborations or developing our products and core technologies.

Risks Related to the Drug Development Industry

We will need regulatory approvals to commercialize our products.

We are required to obtain approval from the FDA in order to sell our products in the U.S. and from foreign regulatory authorities in order to sell our products in other countries. The FDA's review and approval process is lengthy, expensive and uncertain. Extensive pre-clinical and clinical data and supporting information must be submitted to the FDA for each indication for each product candidate in order to secure FDA approval. Before receiving FDA clearance to market our proposed products, we will have to demonstrate that our products are safe and effective on the patient population and for the diseases that are to be treated. Clinical trials, manufacturing and marketing of drugs are subject to the rigorous testing and approval process of the FDA and equivalent foreign regulatory authorities. The Federal Food, Drug and Cosmetic Act and other federal, state and foreign statutes and regulations govern and influence the testing, manufacture, labeling, advertising, distribution and promotion of drugs and medical devices. As a result, regulatory approvals can take a number of years or longer to accomplish and require the expenditure of substantial financial, managerial and other resources. The FDA could reject an application or require us to conduct additional clinical or other studies as part of the regulatory review process. Delays in obtaining or failure to obtain FDA approvals would prevent or delay the commercialization of our product candidates, which would prevent, defer or decrease our receipt of revenues. In addition, if we receive initial regulatory approval, our product candidates will be subject to extensive and rigorous ongoing domestic and foreign government regulation.

Table of Contents

Data obtained from clinical trials are susceptible to varying interpretations, which could delay, limit or prevent regulatory clearances.

Data already obtained, or in the future obtained, from pre-clinical studies and clinical trials do not necessarily predict the results that will be obtained from later pre-clinical studies and clinical trials. Moreover, pre-clinical and clinical data is susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. A number of companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials, even after promising results in earlier trials. The failure to adequately demonstrate the safety and effectiveness of a proposed formulation or product under development could delay or prevent regulatory clearance of the potential drug, resulting in delays to commercialization, and could materially harm our business. Our clinical trials may not demonstrate sufficient levels of safety and efficacy necessary to obtain the requisite regulatory approvals for our drugs, and thus our proposed drugs may not be approved for marketing.

Our competitive position depends on protection of our intellectual property.

Development and protection of our intellectual property are critical to our business. All of our intellectual property, patented or otherwise, has been invented and/or developed by employees of our company. If we do not adequately protect our intellectual property, competitors may be able to practice our technologies. Our success depends in part on our ability to obtain patent protection for our products or processes in the U.S. and other countries, protect trade secrets, and prevent others from infringing on our proprietary rights. We are a counterclaim defendant in a lawsuit instituted by our chief executive officer that relates to our intellectual property as described under **Risks Related to Our Company** above.

Since patent applications in the U.S. are maintained in secrecy for at least portions of their pendency periods (published on U.S. patent issuance or, if earlier, 18 months from earliest filing date for most applications) and since other publication of discoveries in the scientific or patent literature often lags behind actual discoveries, we cannot be certain that we are the first to make the inventions to be covered by our patent applications. The patent position of biopharmaceutical firms generally is highly uncertain and involves complex legal and factual questions. The U.S. Patent and Trademark Office has not established a consistent policy regarding the breadth of claims that it will allow in biotechnology patents.

Some or all of our patent applications may not issue as patents or the claims of any issued patents may not afford meaningful protection for our technologies or products. In addition, patents issued to us or our licensors may be challenged and subsequently narrowed, invalidated or circumvented. Patent litigation is widespread in the biotechnology industry and could harm our business. Litigation might be necessary to protect our patent position or to determine the scope and validity of third-party proprietary rights, and we may not have the required resources to pursue such litigation or to protect our patent rights.

Although we require our scientific and technical employees and consultants to enter into broad assignment of inventions agreements, and all of our employees, consultants and corporate partners with access to proprietary information to enter into confidentiality agreements, these agreements may not be honored.

Products we develop could be subject to infringement claims asserted by others.

We cannot assure that products based on our patents or intellectual property that we license from others will not be challenged by a third party claiming infringement of its proprietary rights. If we were not able to successfully defend our patents or licensed rights, we may have to pay substantial damages, possibly including treble damages, for past infringement.

We face intense competition in the biotechnology and pharmaceutical industries.

The biotechnology and pharmaceutical industries are intensely competitive. We face direct competition from U.S. and foreign companies focusing on pharmaceutical products, which are rapidly evolving. Our competitors include major multinational pharmaceutical and chemical companies, specialized biotechnology

Table of Contents

firms and universities and other research institutions. Many of these competitors have greater financial and other resources, larger research and development staffs and more effective marketing and manufacturing organizations, than we do. In addition, academic and government institutions are increasingly likely to enter into exclusive licensing agreements with commercial enterprises, including our competitors, to market commercial products based on technology developed at such institutions. Our competitors may succeed in developing or licensing technologies and products that are more effective or less costly than ours, or succeed in obtaining FDA or other regulatory approvals for product candidates before we do. Acquisitions of, or investments in, competing pharmaceutical or biotechnology companies by large corporations could increase such competitors' financial, marketing, manufacturing and other resources.

The market for our proposed products is rapidly changing and competitive, and new drugs and new treatments which may be developed by others could impair our ability to maintain and grow our business and remain competitive.

The pharmaceutical and biotechnology industries are subject to rapid and substantial technological change. Developments by others may render our proposed products noncompetitive or obsolete, or we may be unable to keep pace with technological developments or other market factors. Technological competition from pharmaceutical and biotechnology companies, universities, governmental entities and others diversifying into the field is intense and is expected to increase.

As a pre-revenue company engaged in the development of drug technologies, our resources are limited and we may experience technical challenges inherent in such technologies. Competitors have