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RXi
RXi Pharmaceuticals
Next Generation in RNAi
2008 Annual Report

Corporate Overview

RXi Pharmaceuticals is a leader in Next Generation RNAi, including its proprietary rxRNA™ discovery platform and delivery technologies, for the treatment of human diseases. RXi is a biopharmaceutical company engaged in the discovery, development and commercialization of proprietary therapeutics based on RNA interference (RNAi). RXi Pharmaceuticals believes it is well positioned to compete successfully in the RNAi therapeutics market with its strong technology platform, broad and early intellectual property position, a management team that is experienced in commercializing products, and accomplished scientific advisors, including Dr. Craig Mello, recipient of the 2006 Nobel Prize for his co-discovery of RNAi.

Management

Tod Woolf, Ph.D., *President and CEO*
Founder & CEO of Sequitur, an RNAi company acquired by Invitrogen
Co-invented and commercialized Stealth™ RNAi
Co-invented two of RPI's (Sirna-Merck) main RNA technologies

Stephen J. DiPalma, *EVP Business Operations and CFO*
Founded and served as President and CEO of Catalyst Oncology
Former CFO at Milkhaus Laboratory, Phytera and Athena Diagnostics
Successfully turned around Aquila Biopharmaceuticals

Anastasia Khvorova, Ph.D., *Chief Scientific Officer*
Served as CSO at leading RNAi technology company Dharmacon, a ThermoFisher Scientific Company
One of the most cited scientists in the field of RNAi
Developed self-delivering RNAi

Pamela Pavco, Ph.D., *VP of Pharmaceutical Development*
Brought Sirna's lead RNAi candidate to Phase I in under 12 months
Led three additional RNA drug candidates through IND at Sirna (RPI)
Managed Sirna's Allergan and Huntington Disease collaborations

Ramani Varanasi, MS, MBA, *VP of Business Development*
Formerly Head of Business Development at Archemix Corporation
Held senior management/Business Development positions at Momenta and Millennium
Over 15 years experience in the pharmaceutical & biotech industry

Konstantinos Andrikopoulos, Ph.D., J.D.,
VP Legal Counsel/Chief IP Counsel
Formerly Senior Patent Counsel with Shire Pharmaceuticals
Extensive patent prosecution and litigation experience
Broad scientific background

Dmitry Samarsky, Ph.D., *VP of Technology Development*
Organizer and speaker for dozens of RNAi conferences
Agreements with over a dozen pharma and biotech companies
Director of Technology Development at RNAi tech leader Dharmacon

Donna Falcetti, *Director of Investor Relations*
Served as Product Manager of RNAi Technologies at Invitrogen
Broad experience with RNAi in numerous assays and model systems
Over 15 years of management experience

RNAi Therapeutics

RNA interference (RNAi) is a naturally occurring process by which a gene's message in a cell is silenced before it creates a protein. RNAi offers a novel approach to the drug development process because RNAi compounds can potentially be designed to target any one of the genes in the human genome. Other potential advantages of RNAi therapeutics include:

- High potency, low doses
- Low toxicity, natural mechanism of action
- Ability to interfere with the expression of any gene
- High specificity for target genes
- Accelerated lead generation

RXi's Next Generation rxRNA™ Compounds

RXi uses its own version of RNAi compounds – rxRNA™ – developed by our team of world-class scientists. These proprietary rxRNA™ compounds provide an advanced alternative to conventional siRNAs and define the next generation of RNAi technology. rxRNA™ compounds are designed specifically for therapeutic use and contain many of the properties that are needed to move RNAi based drugs into the clinic such as high activity, increased nuclease stability, reduced toxicity levels and they are readily manufactured.

RXi's Delivery Technologies

RXi is pursuing a comprehensive delivery program that includes oral, systemic and local delivery approaches. These approaches take advantage of both direct delivery of RNAi compounds and administration of RNAi compounds using a delivery vehicle.

One novel formulation technology – Glucan Encapsulated RNAi Particles, or simply GeRPs – allows for oral administration of rxRNA™ compounds to macrophages that are involved in inflammatory diseases, such as rheumatoid arthritis, asthma, Crohn's disease, atherosclerosis, psoriasis and others. A solution for systemic delivery includes the use of nanotransporters to aid in the transport of RNAi compounds to various target tissues in the body, including the liver.

QUICK FACTS

Headquarters:
60 Prescott Street
Worcester, MA 01605

Founded by:
Craig Mello, Ph.D.
discoverer of RNAi
2006 Nobel Laureate
and other leaders
in the field

Initial Trading:
March 2008

Investor Contact:
Financial results,
corporate news, SEC
filings and company
information are available
on RXi's website at
www.rxipharma.com

Additional Information:
ir@rxipharma.com
508-929-3615

Letter to Our Stockholders

In just ten years since the seminal discovery of RNA interference (RNAi), RNAi has captured the imagination and attention of both the scientific community and the pharmaceutical industry because of its unique potential to silence numerous disease-causing genes, offering the possibility to treat diseases that may not be able to be addressed by traditional pharmaceuticals. We believe that RXi Pharmaceuticals has made significant advances in this new, exciting field and has emerged as one of the leading companies in RNAi therapeutics.

An RNAi compound can be custom-designed to block the production of disease-causing proteins in cells. RNAi therapeutics have the potential ability to target virtually any gene and accelerate the drug development process. Whereas traditional drug discovery is a long process that is expensive, time consuming and, most critically, prone to failure, RNA interference offers a potentially rapid, systematic way of finding compounds that can target genes involved in diseases. In just a matter of weeks, we can identify an RNAi compound that inhibits the disease-causing RNA.

We are focused on building a broad portfolio of potential therapeutic product candidates that have been selected with a rigorous focus on large markets with unmet medical needs. Specifically, we are developing RNAi compounds for the treatment of metabolic diseases as well as a variety of severe inflammatory diseases such as rheumatoid arthritis, psoriasis and inflammatory bowel disease such as Crohn's disease and ulcerative colitis.

Our brand of RNAi compounds - rxRNA™ - represent a decade of innovation from our internal and external scientific teams of leaders in the RNAi field. These rxRNA™ compounds are designed specifically for therapeutic use and contain many of the properties that are needed to move RNAi based drugs into the clinic. We believe that the use of rxRNA™ compounds gives RXi a strong competitive advantage in the field of RNA therapeutics.

The key to success in RNAi therapeutics lies in delivering intact RNAi compounds to the target tissue and the interior of the target cells. To accomplish this, we have committed extensive resources to pursue a comprehensive program that includes oral, systemic and local delivery approaches.

To successfully tackle the challenges ahead, we have recruited a world class RNAi team, filling out our accomplished management team with key additions that will allow us to move forward prudently with our RNAi therapeutic product candidates. Anastasia Khvorova, Ph.D,. joined as our Chief Scientific Officer and will provide significant leadership in developing next-generation RNAi therapeutics. Konstantinos Andrikopoulos, Ph.D., J.D., came on board as our new Vice President, Legal Counsel and Chief Intellectual Property Counsel and will expand our intellectual property position on our increasing pipeline of internally derived RNAi molecules and RNAi delivery technologies. More recently, Ramani Varanasi, MS, MBA, will focus on developing and driving RXi's product and partnering strategies in the newly created role of Vice President of Business Development. Soon after joining RXi's Scientific Advisory Board last summer, Victor Ambros, Ph.D. was awarded "America's Nobel" - the 2008 Albert Lasker Award for Basic Medical Research.

In order to maximize shareholder value and enhance our visibility among the investment community, in March 2008 RXi's shares began trading on the Nasdaq Capital Market under the ticker, RXII, as one of the few public companies exclusively pursuing RNAi therapeutics. Since that time, two analysts have initiated coverage on the company, RXi was added to the Russell Microcap Index and we have presented at over a dozen investor and analyst conferences.

RXi Pharmaceuticals has shown strong growth over the last year and we believe that we are well poised for success in 2009 and beyond. In particular, we look forward to continuing to build value for both our shareholders and the medical and scientific communities by creating and developing highly differentiated RNAi therapeutic products that have the potential to offer new and better treatment options for patients suffering from inflammatory and metabolic diseases. We would like to thank you, our shareholders, for your continued support and commitment.

Sincerely,

Tod Woolf

Tod Woolf, Ph.D.
President & Chief Executive Officer
Officer and Director

Transfer Agent:
Computershare Trust Company, N.A.
350 Indiana Street, Suite 750
Golden, CO 80401
800-962-4284

Independent Auditors:
BDO Seidman, LLP
Boston, MA

Legal Counsel:
Ropes & Gray LLP
Boston, MA

Stock Listing & Trading:
RXi's common stock is listed on the Nasdaq Capital Market under the trading symbol "RXII"

Therapeutic Areas

RXi is building a broad portfolio of potential therapeutic product candidates that have been selected with a rigorous focus on large markets with unmet medical needs. The therapeutic areas for which we are developing RNAi compounds include metabolic diseases as well as a variety of chronic, severe inflammatory diseases such as rheumatoid arthritis, psoriasis and inflammatory bowel disease such as Crohn's disease and ulcerative colitis.

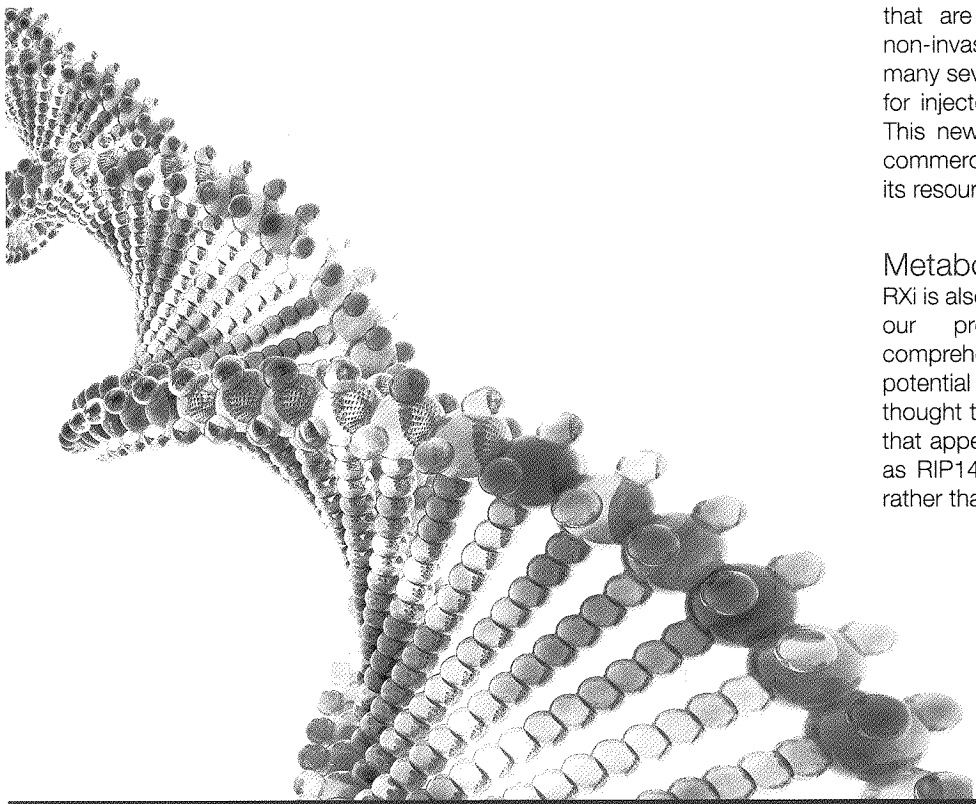
RXi may also pursue additional disease areas, with the goal of creating multiple clinical development programs. With that in mind, we are actively seeking to leverage our technology and expertise by working with major pharmaceutical and biotechnology partners.

Inflammatory Disease

Chronic, severe inflammatory diseases now affect millions of people around the world and, with a continued need for safe and effective alternatives to existing therapies, the market is experiencing tremendous growth. Ongoing research, including the area of RNAi therapeutics, is focused on targeting specific biological modifiers that might avoid generalized damage to the immune system. Specifically, RXi is working with a novel formulation technology that allows for oral administration of rxRNA™ compounds to macrophages that are involved in these inflammatory diseases. This non-invasive approach may lead to therapies that control many severe inflammatory diseases while negating the need for injected drugs which are the current standard of care. This new technology provides an important scientific and commercial opportunity for the company, and RXi is focusing its resources on this exciting therapeutic area.

Metabolic Disease

RXi is also exploring treatments for metabolic diseases using our proprietary rxRNA™ compounds and our comprehensive delivery program. We see a number of potential opportunities in this area, such as target genes thought to be responsible for elevated cholesterol, or genes that appear to be important regulators of metabolism, such as RIP140, a gene that can cause fat cells to metabolize rather than store fat.



ADVANTAGES OF RNAi THERAPEUTICS

- Rapid development of lead compounds
- Highly selective for the target gene
- Highly potent
- Natural mechanism of action

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

Form 10-K

(Mark One)

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2008

-OR-

☐ **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. 333-147009

RXi PHARMACEUTICALS CORPORATION

(Exact name of registrant as specified in its charter)

Delaware	**20-8099512**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification Number)*
60 Prescott Street Worcester, Massachusetts *(Address of principal executive offices)*	**01605** *(Zip Code)*

Registrant's telephone number, including area code:
(508) 767-3861

SECURITIES REGISTERED PURSUANT TO SECTION 12(b) OF THE ACT:

Title of Each Class	Name of Exchange on Which Registered
Common Stock, $0.0001 Par Value Per Share	**NASDAQ Capital Market**

SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT:
None

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 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. Yes ☐ No ☑

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

Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☑
(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☑

The aggregate market value of the voting Common Stock held by non-affiliates of the registrant, based on the last sale price of the registrant's Common Stock at the close of business on June 30, 2008, was $49, 407,736

As of March 9, 2009, the registrant had 13,821,629 shares of Common Stock, $0.0001 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE:

Portions of the registrant's definitive proxy statement for its 2009 annual meeting of stockholders, to be filed pursuant to Regulation 14A with the Securities and Exchange Commission not later than 120 days after the registrant's fiscal year end of December 31, 2008, are incorporated by reference into this Form 10-K.

RXi PHARMACEUTICALS CORPORATION

FORM 10-K — FISCAL YEAR ENDED DECEMBER 31, 2008

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PART I

FORWARD-LOOKING STATEMENTS

This annual report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 that involve risks and uncertainties, as well as assumptions that if they never materialize or prove incorrect, could cause the results of RXi Pharmaceuticals Corporation to differ materially from those expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including any projections of financing needs, revenue, expenses, earnings or losses from operations, or other financial items; any statements of the plans, strategies and objectives of management for future operations; any statements concerning product research, development and commercialization plans and timelines; any statements regarding safety and efficacy of product candidates, any statements of expectation or belief; and any statements of assumptions underlying any of the foregoing. In addition, forward looking statements may contain the words "believe," "anticipate," "expect," "estimate," "intend," "plan," "project," "will be," "will continue," "will result," "seek," "could," "may," "might," or any variations of such words or other words with similar meanings.

The risks, uncertainties and assumptions referred to above include risks that are described in this annual report and that are otherwise described from time to time in our Securities and Exchange Commission reports filed after this report.

The forward-looking statements included in this annual report represent our estimates as of the date of this annual report. We specifically disclaim any obligation to update these forward-looking statements in the future. These forward-looking statements should not be relied upon as representing our estimates or views as of any date subsequent to the date of this annual report.

ITEM 1. *BUSINESS*

Overview

We were incorporated as Argonaut Pharmaceuticals, Inc. in Delaware on April 3, 2006, changed our name to RXi Pharmaceuticals Corporation on November 28, 2006, and began operations in January 2007. We are a discovery-stage biopharmaceutical company pursuing proprietary therapeutics based on RNA interference, or RNAi, a naturally occurring cellular mechanism for the regulation of gene expression that has the potential to be harnessed to selectively inhibit the activity of any human gene. As described in Kim and Rossi's review published in March 2007 in *Nature Reviews Genetics,* it is believed that this inhibition may potentially treat human diseases by "turning off" genes that lead to disease. While no therapeutic RNAi products have yet been approved, there has been significant growth in the field of RNAi development and potential therapeutic applications. This growth is driven by the potential ability to use RNAi to rapidly develop lead compounds that specifically and selectively inhibit a target gene.

We intend to focus our internal research and development programs on certain inflammatory and metabolic diseases, and to pursue other therapeutic areas with potential partners. By utilizing our expertise in RNAi and the RNAi technology platform we have built, we believe we will be able to discover lead compounds and move them into clinical development more efficiently than traditional drug discovery approaches.

Our proprietary technology platform is comprised of two main components:

- Novel RNAi compounds, referred to as rxRNA™ compounds, that are distinct from, and we believe convey significant advantages over classic siRNA (conventionally-designed "small interfering RNA" compounds), and offer many of the properties that we believe are important to the clinical development of RNAi-based drugs. We have developed two unique forms of rxRNA compounds, both of which have been shown to be highly potent and, we believe, unencumbered by the intellectual property rights of others.

- Multiple technologies to potentially enable the delivery of our rxRNA compounds via local, systemic and oral administration. In October 2008, we exclusively licensed intellectual property rights to novel technology that we believe will enable the oral delivery of rxRNA compounds to macrophages, which are key inflammatory cells involved in the progression of various inflammatory diseases, resulting in efficient delivery of our rxRNA compounds to sites of inflammation. Oral administration is preferred to injection, the route used to administer current drugs from inflammation, as a method of administering a drug. We believe this technology provides us with a potential competitive advantage in the delivery of RNAi therapeutics, and is a major focus of our R&D activities. We are also pursuing other potential approaches for the local and systemic delivery of rxRNA compounds to other targets of interest, such as certain targets involved in metabolic disease.

We intend to use our RNAi technology platform and our expertise in RNAi to identify lead compounds and advance towards pre-clinical and clinical development programs in the following therapeutic areas:

- *Inflammatory disease.* Our lead program targets genes involved in inflammation, which is responsible for a variety of diseases representing significant unmet medical need and large market opportunities. Our initial targets include validated gene targets related to the TNFa pathway, which is involved in many diseases, including, for example, rheumatoid arthritis, Crohn's disease and psoriasis, and our follow-on programs involve other novel gene targets that are implicated in atherosclerosis, type 2 diabetes and other inflammatory diseases.

- *Metabolic disease.* We have two primary efforts in metabolic disease. First, we are targeting an undisclosed gene thought to be responsible for elevated cholesterol. We have also in-licensed intellectual property developed by Dr. Michael Czech (one of our scientific co-founders and scientific advisory board members) on genes that appear to be important regulators of metabolism. Studies conducted in Dr. Czech's laboratory at the University of Massachusetts Medical School (UMMS) and by others at Imperial College of London have demonstrated that inactivation of one of these genes, called RIP140, can cause fat cells to metabolize rather than store fat. Mice in these studies that did not express RIP140 remained lean and non-diabetic even when maintained on a high-fat diet. We are currently designing RNAi compounds targeting RIP140 as a potential treatment for obesity and obesity-related type 2 diabetes.

- *Additional indications.* There are many well-studied genes that have been associated with numerous diseases but have been difficult to target with conventional medicinal chemistry. We believe RNAi technology may play an important role in targeting these genes and potentially treating the related diseases. With that in mind, RXi may also pursue additional disease areas with the goal of creating multiple clinical development programs, either by our company alone or in partnership with pharmaceutical or larger biotechnology companies.

We believe that we possess a strong intellectual property portfolio. We have secured exclusive and nonexclusive licenses from both academic institutions and commercial entities to certain issued and pending patents and patent applications covering RNAi technologies in the following three categories: (i) therapeutic targets, (ii) chemistry and configurations of RNAi compounds and (iii) delivery of RNAi compounds within the body. We have also filed patents based on our internal discoveries in the each of the areas mentioned above.

We have an accomplished Scientific Advisory Board, or SAB, which includes Craig C. Mello, Ph.D., Tariq Rana, Ph.D., Gregory Hannon, Ph.D., Michael Czech, Ph.D., Nicholas Dean, Ph.D., Victor Ambros, Ph.D. and Nassim Usman, Ph.D., together known as the SAB members. SAB members participate in scientific planning meetings which are typically held every three to six months. During such meetings, our management team and SAB members review the progress of our research and licensing efforts and provide technological input, including suggestions for new experiments, suggestions regarding the therapeutic relevance of target genes and suggestions regarding new technologies we may want to consider licensing. Further, certain of our SAB Members periodically assist us in business-related activities, such as discussions with potential alliance partners.

We were formed in 2006 by CytRx Corporation (Nasdaq: CYTR) and four prominent RNAi researchers, including Dr. Craig Mello, who was awarded the 2006 Nobel Prize in Medicine for his co-discovery of RNAi. From 2003 through 2006, CytRx sponsored therapeutic RNAi research at UMMS and Massachusetts General Hospital. We commenced operations in January 2007 after CytRx contributed to us its portfolio of RNAi therapeutic assets in exchange for approximately 7.04 million shares of our common stock on January 8, 2007. These assets consisted primarily of RNAi licenses and related intellectual property, and a nominal amount of equipment.

To date, RXi's principal activities have consisted of acquiring RNAi-related assets through exclusive and non-exclusive licenses to key RNAi technologies and patent rights, initiating and conducting research and pre-clinical development activities utilizing our RNAi therapeutic platform, recruiting a RNAi-focused management and scientific/clinical advisory team, capital raising activities and conducting business development activities principally aimed at establishing development partnerships with pharmaceutical and larger biotechnology companies.

We have not generated revenue to date and may not generate product revenue in the foreseeable future, if ever. We expect to incur significant operating losses as we advance our product candidates through the drug development and regulatory process. In addition to increasing research and development expenses, we expect general and administrative costs to increase as we add personnel. We will need to generate significant revenues to achieve profitability and might never do so. In the absence of product revenues, our potential sources of operational funding are expected to be the proceeds from the sale of equity, funded research and development payments and other payments received pursuant to partnership agreements. On January 30, 2009, we entered into a Standby Equity Distribution Agreement, or SEDA, with YA Global Master SPV Ltd. or YA Global pursuant to which we may, at our sole and exclusive option, periodically sell to YA Global shares of our common stock at a price based on our then current market price, for a total purchase price of up to $25,000,000. We believe that our existing cash, cash equivalents, and potential proceeds from the SEDA are sufficient to fund our operations through at least the first half of 2010.

Our Competitive Strengths

We believe we are well positioned to compete successfully in the RNAi-based therapeutics market due to the following competitive strengths:

- Novel, proprietary technology platform with the potential to generate multiple RNAi therapeutic product opportunities, comprised of:
  - Our rxRNA compound platform that includes two distinct approaches, both of which offer novelty and potential high potency; and
  - Multiple delivery technologies, including oral delivery to macrophages to treat a variety of inflammatory diseases.
- Accomplished scientific and business team with significant experience in RNAi therapeutics and in managing emerging life sciences companies.
- Scientific advisors who are recognized leaders in RNAi research, including Dr. Craig Mello, recipient of the 2006 Nobel Prize in Medicine for co-discovering RNAi, and Dr. Victor Ambros, who was awarded the 2008 Albert Lasker Award for Basic Medical Research for his work leading to the groundbreaking discovery of the first microRNA (miRNA).
- Strong early intellectual property position covering
  - Novel approaches to RNAi chemistry and configuration,
  - Proprietary, delivery of active RNAi compounds, and
  - Key therapeutic targets.
- A focus on unmet medical needs and significant market opportunity, including inflammatory disease and metabolic disease.

Introduction to the Field of RNAi Therapeutics

RNAi is a naturally-occurring phenomenon where short double-stranded RNA molecules interfere with the expression of targeted genes. RNAi technology takes advantage of this phenomenon and potentially allows us to effectively interfere with particular genes within living cells by designing RNA-derived molecules targeting those genes. RNAi is regarded as a significant advancement, as evidenced by the journal *Science*'s selection of RNAi as the "Breakthrough of the Year" in 2002, and by the awarding of the 2006 Nobel Prize in Medicine to the co-discoverers of RNAi, including Dr. Craig Mello, a RXi founder and the SAB Chairman.

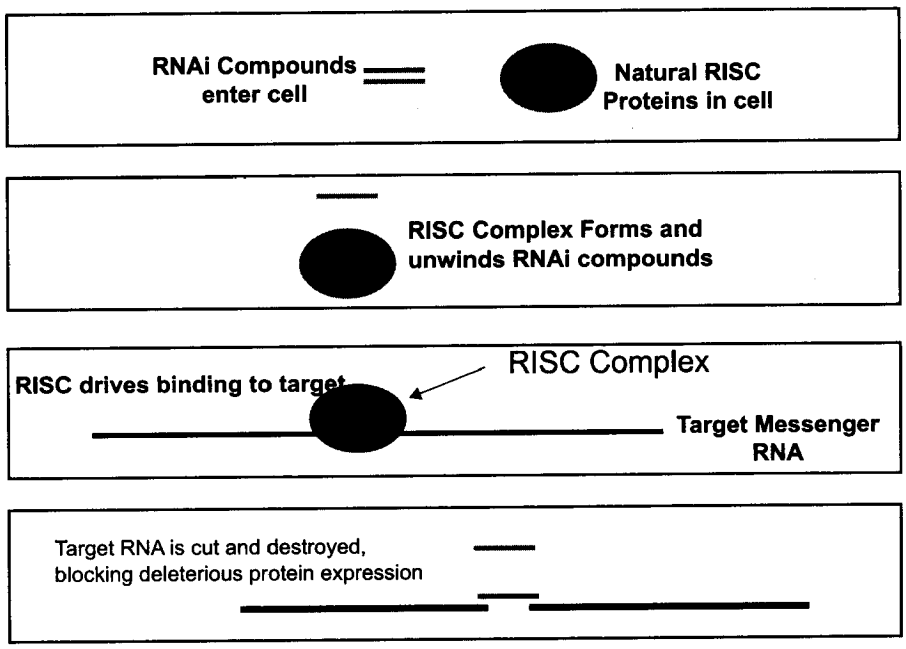
RNAi offers a novel approach to the drug development process because, as described below under "The RNAi Mechanism", RNAi compounds can potentially be designed to target any one of the thousands of human genes. In contrast, an article published in the December 2005 edition of *Drug Discovery Today* by Andreas P. Russ and Stefan Lampel has demonstrated that only a subset of the proteins encoded in the human genetic code (human genome) are able to be targeted efficiently by traditional medicinal chemistry or antibody-based approaches. The specificity of RNA interference is achieved by an intrinsic well-understood biological mechanism based on designing the sequence of an RNAi compound to match the sequence of the targeted gene. The specificity of RNAi may be sufficient to permit therapeutic targeting of only a single gene and, importantly, may even selectively reduce or eliminate expression from a single abnormal copy of a gene while preserving expression from a normal copy ("allele-specific" targeting). This is critical in diseases such as cancer and neurodegenerative disorders that are often caused by abnormal copies of genes.

The RNAi Mechanism

The genome is made of a double-strand of DNA (the double helix) that acts as an instruction manual for the production of the roughly 30,000 to 50,000 human proteins. Proteins are important molecules that allow cells and organisms to live and function. With rare exceptions, each cell in the human body has the entire complement of genes. However, only a subset of these genes directs the production of proteins in any particular cell type. For example, a muscle cell produces muscle-specific protein, whereas a skin cell does not.

In order for a gene to guide the production of a protein, it must first be copied into a single-stranded chemical messenger (messenger RNA or mRNA), which is then translated into protein. RNA interference is a naturally occurring process by which a particular messenger RNA can be destroyed before it is translated into protein. The process of RNAi can be artificially induced by introducing a small double-stranded fragment of RNA corresponding to a particular messenger RNA into a cell. A protein complex set of proteins within the cell called RISC (RNA-Induced Silencing Complex) recognizes this double-stranded RNA fragment and splits the double-strands apart, retaining one strand in the RISC complex. The RISC then helps this guide strand of RNA bind to and destroy its corresponding cellular messenger RNA target. Thus, RNAi provides a method to potentially block the creation of the proteins that cause disease, as depicted in the following figure.

Figure 1 — Mechanism of RNA interference within a cell



Since gene expression controls most cellular processes, the ability to inhibit gene expression provides a potentially powerful tool to treat human diseases. Furthermore, since the human genome has already been decoded, and based on numerous gene-silencing reports, we believe that RNAi compounds can readily be designed to interfere with the expression of any specific gene. We believe that the RNAi platform may create therapeutics with significant potential advantages, which we have identified in the scientific literature as well as through our own research, over traditional drug development methods, including:

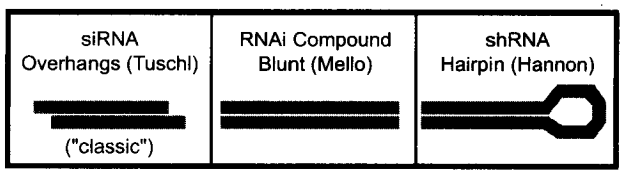
- high specificity for targeted genes,
- high potency (low doses),
- ability to interfere with the expression of potentially any gene,
- accelerated generation of lead compounds, and
- low toxicity, natural mechanism of action.

RXi's RNAi Therapeutic Platform

RNAi Compound Design

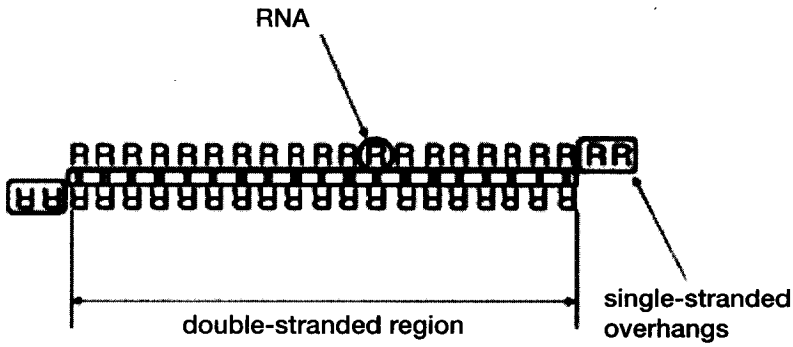
RNAi compounds are made from a strand or strands of RNA that are manufactured by a nucleic acid synthesizer. The synthesizer is programmed to assemble a strand of RNA of a particular sequence using the four kinds of nucleotide units (Adenine ("A"), Uracil ("U"), Cytidine ("C") and Guanosine ("G")) that match a small segment of the targeted gene. The hallmark of an RNAi compound is that it has a double stranded region. The compounds can be of various lengths of nucleotide units (nt). As seen in Figure 2 below, the two strands can have overhangs (as shown on the far left), or they can have blunt ends (as shown in the middle and right). A single strand can form an RNAi compound by forming a structure referred to as a hairpin.

Figure 2 — Types of RNAi Compounds



The length and shape of the compound can affect the activity and hence the potency of the RNAi in cells. The design of RNAi compounds that was the first to be pursued for development as a human therapeutic was a short double-stranded RNA that included at least one overhanging single-stranded region, known as small interfering RNA, or siRNA which we also refer to as classic siRNA and can be seen in Figure 2 above.

Figure 3 — First generation of RNAi pursued for human therapeutics: classic siRNA



In the case of classic siRNA, double-stranded RNA with single-stranded overhangs is used. The two strands comprising the RNA have bases that are complementary to each other in order to create double-stranded regions; that is, an "A" on one strand is paired with a "U" on the other, and a "C" on one strand is paired with a "G" on the other, creating double-stranded regions. The pairing holds the two strands together creating double-stranded RNA. The overhangs that are at the ends of the double-stranded RNA do not have a matching partner and thus these single-stranded bases in the overhang area are exposed to nucleases in the environment which can degrade the molecule. Classic siRNA therapeutics are about 19 to 23 base pairs long.

Based on our own research we believe that classic siRNAs have limitations and drawbacks that may limit the usefulness of those agents as human therapeutics, and that we may be able to utilize the technologies we have licensed and developed internally to optimize RNAi compounds for use as a human therapeutic agent. It is the combination of the length, the nucleotide sequence, and the configuration of chemical modifications that are important for effective RNAi therapeutics. For example, the RNA can be chemically modified in a manner that reduces its sensitivity to nucleases, which are enzymes that attack and degrade RNA. Likewise, it is our expectation that removing the single-stranded overhang regions will be a way of reducing the rate of spurious degradation of the RNAi, as single-stranded RNA is more susceptible to degradation than double-stranded RNA. The length range of 19 to 23 nucleotides can also be varied to yield more potent RNAi compounds. Introducing "mismatches" in the double-stranded region, that is, discrete internal portions of the duplex region that do not form good base pairs between the two strands, also may be a useful way of improving the potency of the resulting RNA. In certain instances, we have the option of using hairpin structures, a single-strand of nucleic acid which folds back on itself to form a double-stranded region, as the RNAi compound. These hairpin compounds may have improved efficacy as inhibitory agents, and we hope to demonstrate these may also improve the manufacturing process by requiring that only a single strand of RNA be produced, rather than two separate strands as is the case with classic siRNA.

We prefer to use RNAi compounds of this form without the overhangs as originally described by Dr. Craig Mello in the seminal patent application on RNAi. The RNAi compounds we prefer can also optionally be of the hairpin shape. The RNAi compounds we are developing, which are called rxRNA, are distinct from the

siRNA compounds used by many other companies developing RNAi therapeutics, are designed specifically for therapeutic use and offer many of the properties that we believe are important to the clinical development of RNAi-based drugs.

Our internal research leads us to believe that next generation rxRNA compounds offer significant advantages over classic siRNA used by other companies developing RNAi therapeutics, highlighted by the following characteristics:

- up to 100 times more active than classic siRNA,
- more resistant to nuclease degradation,
- readily manufactured,
- potentially more specific for the target gene, and
- more reliable at blocking immune side effects than classic siRNA.

Depending on the delivery method selected, stabilizing RNAi compounds by chemical modification may be critical for RNAi activity in animal models and in humans. The stabilization may be necessary to protect the RNAi compounds from being degraded by enzymes that exist in bodily fluids. Many of our employees and SAB Members are accomplished in the field of chemically modified RNAi design; for example, Dr. Tod Woolf, our President and CEO, was a co-inventor of the Stealth™ RNAi brand of chemically modified RNAi compounds and Dr. Anastasia Khvorova, our Chief Scientific Officer, was a co-inventor of On-Target, siStable and Accell brands of chemically modified RNAi compounds. We will continue to employ their collective expertise to design chemically modified RNAi compounds. We have in-licensed technology on chemically stabilized RNAi compounds that will serve as a foundation for our chemical modification strategy.

Delivery

Our founding scientists recognized that the key to therapeutic success with RNAi lies in delivering intact RNAi compounds to the target tissue and the interior of the target cells. To accomplish this, we have developed a comprehensive program that includes oral, systemic and local delivery approaches. We work with chemically synthesized RNAi compounds that are optimized for stability and efficacy, and combine delivery at the site of action and formulation with delivery agents to achieve optimal delivery to specific target tissues.

Oral Delivery

Most RNAi therapeutic products being developed today require recurring intravenous injections or other forms of administration that are not patient friendly. To address the desire for RNAi therapeutics with improved modes of administration, we are using a novel formulation technology, Glucan Encapsulated RNAi Particles (GeRPs), that may allow our rxRNA compounds to be incorporated into orally administered pills.

In mouse studies conducted by UMMS researchers and by us, it has been demonstrated that GeRPs deliver RNAi compounds directly to macrophages, key cells involved in the progression of various inflammatory diseases. Positive data from these pre-clinical studies suggest that delivery of RNAi compounds to macrophages using GeRP technology may eventually be effective for the treatment of numerous inflammatory diseases, including rheumatoid arthritis, atherosclerosis, diabetes, and inflammatory bowel diseases such as Crohn's disease and ulcerative colitis.

The GeRP delivery system uses hollow, porous, micron-sized shells that can be filled with one or more types of RNAi compounds. Once ingested, these shells are believed to be taken up by specialized M (Microfold) cells in the intestinal wall, and then transferred to immune cells residing in the underlying gut associated lymphatic tissue (GALT). Here, the GeRPs are taken up by macrophages and other phagocytic cell types. Once in the macrophage, the RNAi compounds are presumed to be released from the GeRP shell into the cytoplasm where they would silence the specific target gene.

Macrophages traffic throughout the body and are vital to the regulation of inflammation by producing an array of powerful chemical signals. In a healthy individual, macrophages are an intrinsic part of the body's

ability to defend against infection or inflammation caused by injury. In the disease state, macrophages have been demonstrated to play a key role in overactive or inappropriate immune responses resulting in pathologic inflammation.

The GeRP technology may allow us to regulate the production of these inappropriate chemical signals by delivering RNAi compounds directly to the macrophage cells. As the macrophage migrates from the intestine/ GALT to the other tissues in the body, the RNAi compound continues to silence the gene(s) causing disease for up to 3 weeks. We believe that with continued dosing we may be able to deliver the RNAi compound to macrophages trafficing throughout the body.

In research to date, the GeRP delivery system appears to be 5 to 250 times more potent than previous methods used for systemic delivery of RNAi therapeutics by intravenous injection. The GeRP system is very flexible and can either be used to administer a single RNAi compound, multiple RNAi compounds, or could potentially allow co-delivery of RNAi, DNA, protein and small molecule combinations.

Systemic and Local Delivery

We are also developing a portfolio of advanced systemic and local delivery solutions for our RNAi technology platform. One of the systemic solutions uses nanotransporters to aid in transport of RNAi compounds to various target tissues in the body, including the liver. The nanotransporters are chemically synthesized molecules that form nanometer-sized particles when mixed with RNAi compounds and help protect the RNAi compound in the body until it reaches the target tissue. Delivery of RNAi compounds to the liver might be critical for the treatment of many metabolic diseases and we have obtained gene specific inhibition at low doses (1 mg/kg) in a mouse model.

Therapeutic Programs and Markets

By utilizing our expertise in RNAi compound design and delivery, we intend to identify lead compounds in inflammatory and metabolic diseases. After identifying compounds, we intend to begin preclinical development in these focus areas as appropriate.

Inflammatory Disease

Market Opportunity

Inflammatory diseases now affect roughly 8 million people in the United States and, with a continued need for safe and effective alternatives to existing therapies, the market is experiencing tremendous growth. Ongoing research, including in RNAi therapeutics, is focused on targeting specific biological modifiers that might avoid generalized damage to the immune system. These new approaches have the potential to generate improved therapies for a number of high profile inflammatory disorders, including rheumatoid arthritis, atherosclerosis, diabetes, and inflammatory bowel diseases such as Crohn's disease and ulcerative colitis.

Our Inflammation Program

RXi is working with a new mode of RNAi therapy that takes advantage of an oral route of administration. This non-invasive approach may lead to therapies that control many severe inflammatory diseases while negating the need for injected drugs, which are the current standard of care. The use of RNAi oral administration in animal models clearly demonstrated a reduction in a systemic inflammatory response. This new technology provides an important scientific and commercial opportunity for the company, and RXi is focusing its resources on this promising therapeutic area.

Metabolic Disease

Market Opportunity

High cholesterol, obesity and type 2 diabetes are major health problems and affect hundreds of millions of people worldwide. The World Health Organization estimates that, on a worldwide basis, there are more than 300 million cases of obesity and 159 million cases of type 2 diabetes.

Our Metabolic Disease Program

RXi has two primary efforts in metabolic disease. First, we are targeting a gene we believe to be responsible for elevated cholesterol. Second, RXi has in-licensed intellectual property developed by Dr. Michael Czech, an RXi co-founder and Professor and Chair of Molecular Medicine and Professor of Biochemistry and Molecular Pharmacology at the University of Massachusetts Medical School (UMMS), on genes that appear to be important regulators of metabolism. Studies conducted in Dr. Czech's laboratory at UMMS and by others at Imperial College of London demonstrated that inactivation of one of these genes, called RIP140, can cause fat cells to metabolize rather than store fat. Mice in these studies that did not express RIP140 remained lean and non-diabetic even when maintained on a high-fat diet. RXi is currently designing rxRNA compounds targeting RIP140 as a potential treatment for obesity and obesity-related type 2 diabetes.

Alliance Partners in Therapeutic Areas

We are actively seeking to leverage our technology platform by seeking to work with larger pharmaceutical and biotechnology partners in the partners' fields of interest. Furthermore, our team has experience targeting genes in virtually every major therapeutic area, and we believe we will discover many more drug candidates than we can develop with our own resources. We seek to work with partners in the discovery and development of rxRNA based drugs in a number of therapeutic areas.

Business Strategy

We intend to use our RNAi technology platform and expertise in RNAi to develop and potentially commercialize RNA targeting therapeutics. The key elements of our business strategy are as follows:

- We are focused on the discovery and potential development of a pipeline of RNA based therapeutics to address inflammatory and metabolic diseases using our proprietary rxRNA compounds and delivery technologies. Our lead program targets genes involved in inflammation using our GeRP delivery technology, and our metabolic disease program is focused on genes involved with high cholesterol and other metabolic diseases.

- We intend to fund the initial development of a limited number of RNAi drug candidates with our own capital resources. We intend to develop drugs in these areas internally to establish significant value, at which point we may seek to partner them.

- We are seeking partnerships with large pharmaceutical and biotechnology companies to leverage our intellectual property and expand our development pipeline. Such partnerships may include traditionally structured drug development and commercialization licenses, discovery and development collaborations, research and technology collaborations, and intellectual property licenses.

- We intend to continue to develop and enhance our RNAi technology platform by expanding our intellectual property position in RNAi compound chemistry, delivery and target sequences through in-licensing scientific collaborations and in internal innovation.

- We intend to develop future RNAi technology improvements and believe we are well positioned to do so. Our management and advisors have developed much of the core technology in the field of oligonucleotide therapeutics, and RNAi therapeutics more specifically.

- We may also seek to collaborate with government and charitable institutions through grants and funded research for our development programs such as our collaboration with Dr. Czech and his colleagues at UMMS, which is funded in part by a grant from the Mass Life Sciences Center.

Intellectual Property and Proprietary Rights

We actively seek protection for our proprietary information by means of United States and foreign patents, trademarks, and copyrights, as appropriate. In addition, we rely upon trade secret protection and contractual arrangements to protect certain of our proprietary information and products. We have pending patent applications that relate to potential drug targets, compounds we are developing to modulate those targets (described throughout herein as rxRNA), methods of making or using those compounds and proprietary elements of our drug discovery platform.

Much of our technology and many of our processes depend upon the knowledge, experience and skills of key scientific and technical personnel. To protect our rights to our proprietary know-how and technology, we require all employees, as well as our consultants and advisors when feasible, to enter into confidentiality agreements that require disclosure and assignment to us of ideas, developments, discoveries and inventions made by these employees, consultants and advisors in the course of their service to us.

We have also obtained rights to various patents and patent applications under licenses with third parties, which provide for the payment of milestones and royalties by us. The ultimate degree of patent protection that will be afforded to biotechnology products and processes, including ours, in the United States and in other important markets remains uncertain and is dependent upon the scope of protection decided upon by the patent offices, courts and lawmakers in these countries. There is no certainty that our existing patents or others, if obtained, will afford us substantial protection or commercial benefit. Similarly, there is no assurance that our pending patent applications or patent applications licensed from third parties will ultimately be granted as patents or that those patents that have been issued or are issued in the future will stand if they are challenged in court. We assess our license agreements on an ongoing basis, and may from time to time terminate licenses to technology that we do not intend to employ in our RNAi technology platform, or in our product discovery or development activities.

rxRNA Platform

We have 13 pending patent applications encompassing what we believe to be important new compounds and their use as therapeutics in RNAi, chemical modifications of these and existing RNAi compounds that improve the compounds' suitability for therapeutic uses (including delivery), and compounds directed to specific targets (that address specific disease states). Any patents that may issue from these pending patent applications will be set to expire between 2028 and 2029, not including any patent term extensions that may be afforded to the patents that encompass products (or processes for making or using the same) that are human drug products subject to regulation under the Federal Food, Drug and Cosmetic Act (and the equivalent provisions in foreign jurisdictions) for any delays incurred during the regulatory approval process of the drug product.

In-Licensed Technologies and License Agreements

We have also secured exclusive and non-exclusive rights to develop RNAi therapeutics by licensing key RNAi technologies and patent rights. These rights relate to chemistry and configurations of RNAi compounds, delivery technologies of RNAi compounds to cells, and therapeutic targets.

Chemistry and Configurations of RNAi

We have a non-exclusive license to the Mello and Fire foundational RNAi patent (US 6,506,559, set to expire in 2018) and related applications covering the use of double stranded RNA to induce gene silencing that describes RNAi products, compositions and therapeutic RNAi methods.

In addition, we have secured exclusive and co-exclusive rights to technologies, patents and pending patent applications directed to producing and delivering *in vivo* stable and potent RNAi therapeutics including those from TriLink Biotechnologies, Inc., Invitrogen IP Holdings, Inc., and UMMS. See "License Agreements" below.

Delivery of RNAi Compounds to Cells

We have exclusive and non-exclusive licenses to technologies for the efficient delivery of RNAi therapeutics to cells in cell culture and/or in the intact organism. These technologies include but are not limited to:

- methods and compositions for the oral delivery of RNAi compounds which enable efficient therapeutic gene silencing in cells and animals which is licensed for all therapeutic areas, including inflammation, utilizing GeRPs; and
- methods and compositions using nanotransporters, for RNAi compound delivery which enable therapeutic gene silencing in cells and animals which is licensed for all therapeutic areas using systemic (injected) RNAi.

Therapeutic Targets

We have exclusive, co-exclusive and non exclusive licenses to obtain rights to therapeutic targets against which we may seek to develop therapeutics for inflammatory diseases, amyotrophic lateral sclerosis or ALS diabetes and obesity from UMMS to technology and pending patent applications covering the design, synthesis and delivery of chemically modified RNAi and *in vivo* methods using RNAi to treat allele-specific genetic diseases such as ALS.

License Agreements

University of Massachusetts Medical School

In connection with the Contribution Agreement dated January 8, 2007, CytRx assigned to us their rights under four exclusive license agreements, one co-exclusive license agreement and one non-exclusive license agreement with UMMS, entered into between CytRx and UMMS which cover potential therapeutic applications for proprietary RNAi technology in the treatment of specified diseases. Additionally, CytRx assigned to us their rights under the Collaboration and Invention Disclosure Agreement entered into between CytRx and UMMS.

As consideration for the licenses and Collaboration and Invention Disclosure Agreement assigned to us by CytRx, we agreed to assume and be responsible for all of the liabilities and obligations to the extent that such liabilities and obligations relate to the assigned licenses and agreement, including all of CytRx's payment, performance and other obligations under these assigned licenses.

In connection with the licenses entered into with UMMS that were assigned to us by CytRx, we have assumed the obligation to pay to UMMS annual license maintenance fees and certain additional amounts upon the attainment of certain specified product development milestones. These licenses will expire upon the expiration of all patents licensed under the licenses or ten years after the effective date of such license if no patents have been issued within that ten year period and are terminable by either party upon an uncured breach by the other party. We are generally required to indemnify UMMS for losses incurred by UMMS based on the exercise of the licensed patents by us.

On January 10, 2007, we entered into three exclusive licenses and one non-exclusive license with UMMS pursuant to which UMMS granted to us rights under certain UMMS patent applications to make, use and sell products related to applications of RNAi technologies in particular fields, including HCMV and retinitis, ALS, diabetes and obesity.

Under these licenses, UMMS granted to us exclusive, worldwide licenses, with the right to sub-license, to three different patent families and a non-exclusive, worldwide license to a fourth patent family. As

consideration for these licenses, we paid UMMS an up-front fee, reimbursed UMMS for previously incurred patent expenses and agreed to undertake to raise working capital by a specified date, agreed to expend a specified amount on the development of royalty-bearing products, and to meet a defined timeline relating to the clinical development of royalty-bearing products. Our obligation to raise working capital was satisfied when CytRx invested $17.0 million in us (before a $2.0 million reimbursement for expenses by us to CytRx) on April 30, 2007. Upon the completion of the $17.0 million financing from CytRx, we became obligated to pay UMMS additional licenses fees in an aggregate amount of $175,000, issued to UMMS approximately 308,075 shares of our common stock valued at $5.00 per share, for a total value of $1,540,375 and thereafter to pay UMMS annual maintenance fees, commencing on January 1, 2008, and certain additional amounts upon the attainment of certain specified product development milestones, as discussed above in "Management's Discussion and Analysis of Financial Condition and Results of Operation." We also will be required to pay to UMMS a percentage of income received from any sublicensees under these licenses and to pay expenses incurred by UMMS in prosecuting and maintaining the licensed patents.

These licenses will expire upon the expiration of all patents licensed under the licenses, are terminable by either party upon an uncured breach by the other party, and may be terminated by us for any reason following a specified notice period. We are generally required to indemnify UMMS for losses incurred by UMMS based on the exercise of the licensed patents by us.

Additionally, in connection with all of our licenses with UMMS, including those assigned to us by CytRx as well as those entered into directly between us and UMMS, we are obligated to pay specified royalties on net sales of products covered by the licensed patents, subject to minimum annual royalties, as discussed below in "Management's Discussion and Analysis of Financial Condition and Results of Operation."

On January 10, 2007, we also entered into an invention disclosure agreement with UMMS pursuant to which UMMS is obligated, for a period of three years from the effective date of the invention disclosure agreement, to disclose to us any unrestricted inventions conceived or reduced to practice by UMMS related to therapeutic applications of RNAi technologies. Under the invention disclosure agreement, UMMS grants to us an option to negotiate the terms of a license to inventions disclosed by UMMS pursuant to the invention disclosure agreement. If we exercise the option and are unable to reach agreement on the terms of any such license, we may elect to have an arbitrator determine the terms of such a license.

The invention disclosure agreement became effective on April 30, 2007. The invention disclosure agreement is terminable by either party upon an uncured breach by the other party and by us at any time for any reason. As consideration for the rights granted to us under the invention disclosure agreement, we issued to UMMS a total of 154,037 shares of our common stock at $5.00 per share for a total value of $770,185 and are obligated to pay UMMS specified fees on the effective date of the invention disclosure agreement and on each of the first and second anniversaries of the effective date of that agreement. We also will be obligated to pay UMMS a fee each time we exercise our right to negotiate a license under the invention disclosure agreement.

Other License Agreements

Consistent with our overall business strategy, we have enhanced our RNAi technology platform by entering into additional licenses for various aspects of RNAi technology, including:

- In August 2007, we entered into a license agreement with TriLink Biotechnologies, Inc. for three RNAi chemistry technologies for all therapeutic RNAi applications, for which we paid an up-front fee and agreed to pay yearly maintenance fees, as well as future clinical milestone payments and royalty payments based on sales of therapeutic products developed from the licensed technologies.
- In October 2007, we entered into a license agreement with Dharmacon, Inc. (now part of Thermo Fisher Scientific Inc.), pursuant to which we obtained an exclusive license to certain RNAi sequences to a number of target genes for the development of our rxRNA compounds. Further, we have obtained the right to license additional RNAi sequences, under the same terms, disclosed by Thermo Fisher Scientific Inc. in its pending patent applications against target genes and have received an option for

exclusivity for other siRNA configurations. As consideration for this license, we paid an up-front fee of $150,000 and agreed to pay future clinical milestone payments and royalty payments based on sales of siRNA compositions developed in connection with the licensed technology

- In November 2007, we entered into a license agreement with Invitrogen IP Holdings, Inc. pursuant to which we were granted rights under four patents relating to RNA target sequences, RNA chemical modifications, RNA configurations and/or RNA delivery to cells. As consideration for this license, we paid an up-front fee of $250,000 and agreed to pay yearly maintenance fees of the same amount beginning in 2008. Further, we are obligated to pay a fee for each additional gene target added to the license as well as a fee on the first and second anniversaries of the date we were granted consent to add the gene target to the list of those covered by the license. We have also been granted, for each gene target, an option to secure pre-clinical rights and/or the clinical rights, for which we would be required to pay additional fees. Further, we are required to make future clinical milestone payments and royalty payments based on sales of therapeutic products developed from the licensed technologies.

- In connection with the Contribution Agreement dated January 8, 2007, CytRx assigned to us their rights under one patent license agreement entered into between CytRx, Imperial College Innovations Limited and Imperial College of Science and Technology, which cover potential therapeutic applications for proprietary RNAi technology directed to controlling oxidative metabolism and burning of fat in adipose tissues. In connection with this license, we have assumed the obligation to make defined milestone and royalty payments based on sales of products developed using this technology. This license will expire upon the expiration of all patents licensed under the license, is terminable by us upon three months written notice and terminable by either party upon an uncured breach by the other party.

Competition

There are a number of competitors in the RNAi therapeutics field, and other approaches to gene silencing, such as antisense. These competitors include large and small pharmaceutical, chemical and biotechnology companies, as well as universities, government agencies, and other private and public research organizations that are focusing their efforts in the RNAi field or are developing pharmaceuticals for similar diseases as we are targeting through our research and development efforts.

Companies that are focusing their commercial efforts in the RNAi field include: Alnylam Pharmaceuticals, MDRNA, Cequent Pharmaceuticals, Tacere Therapeutics, Benitec, OPKO Health, Silence Therapeutics, Quark Pharmaceuticals, Rosetta Genomics, Lorus Therapeutics and Calando Pharmaceuticals, as well as a number of the multinational pharmaceutical companies. A number of the multinational pharmaceutical companies also either have in-house RNAi development programs or are collaborating with smaller biopharmaceutical companies. This competition will manifest itself not only in our potential product markets but also, and importantly at this stage in development of RNAi technology, in recruiting and retaining key scientific and management personnel, in securing strategic alliances, and in obtaining rights to key intellectual property.

Our RNAi-focused competitors, as well as companies in other fields, may be targeting the same diseases we are targeting. Competitive products for some of the disease indications that we have targeted are currently being marketed by other parties. For example, a number of products are currently being marketed by a variety of the multinational or other pharmaceutical companies for inflammatory diseases, including among others, the drug Celebrex™ by Pfizer and Enbril™ by Amgen and Wyeth Pharmaceuticals, the diabetes drug Avandia™ by GlaxoSmithKline PLC, Actos™ by Eli Lilly & Co., Glucophage™ and Junavia™ by Bristol-Myers Squibb Co., Symlin™ and Byetta™ by Amylin Pharmaceuticals, Inc. and Starlix™ by Novartis. For obesity, the drugs Acomplia™ by Sanofi-Aventis SA, Xenical™ by F. Hoffman-La Roche Ltd. and Meridia™ by Abbott Laboratories are presently on the market. Many major pharmaceuticals companies are also seeking to develop new therapies for these disease indications. Additional competitive products are under development and there may also be products under development that we are not aware of or products that may be developed in the future.

Competitors both in and outside of the RNAi field have financial resources, research and development staffs, and facilities that are, in most cases, substantially greater than ours or potentially those of our strategic partners or licensees and are engaged in the research and development of pharmaceutical products that could compete with our potential products. The industry is characterized by rapid technological advances and competitors may develop products more rapidly and such products may be more effective than those currently under development or that may be developed in the future by our strategic partners or licensees.

Government Regulation

The United States and other developed countries extensively regulate the pre-clinical and clinical testing, manufacturing, labeling, storage, record-keeping, advertising, promotion, export, marketing and distribution of drugs and biologic products. The United States Food and Drug Administration ("FDA") regulates pharmaceutical and biologic products under the Federal Food, Drug, and Cosmetic Act, the Public Health Service Act and other federal statutes and regulations.

To obtain approval of our future product candidates from the FDA, we must, among other requirements, submit data supporting safety and efficacy for the intended indication as well as detailed information on the manufacture and composition of the product candidate. In most cases, this will require extensive laboratory tests and pre-clinical and clinical trials. The collection of these data, as well as the preparation of applications for review by the FDA involve significant time and expense. The FDA also may require post-marketing testing to monitor the safety and efficacy of approved products or place conditions on any approvals that could restrict the therapeutic claims and commercial applications of these products. Regulatory authorities may withdraw product approvals if we fail to comply with regulatory standards or if we encounter problems at any time following initial marketing of our products.

The first stage of the FDA approval process for a new biologic or drug involves completion of pre-clinical studies and the submission of the results of these studies to the FDA. This data, together with proposed clinical protocols, manufacturing information, analytical data and other information submitted to the FDA, in an investigational new drug application, or IND, must become effective before human clinical trials may commence. Pre-clinical studies generally involve FDA regulated laboratory evaluation of product characteristics and animal studies to assess the efficacy and safety of the product candidate.

After the IND becomes effective, a company may commence human clinical trials. These are typically conducted in three sequential phases, but the phases may overlap. Phase I trials consist of testing the product candidate in a small number of patients or healthy volunteers, primarily for safety at one or more doses. Phase II trials, in addition to safety, evaluate the efficacy of the product candidate in a patient population somewhat larger than Phase I trials. Phase III trials typically involve additional testing for safety and clinical efficacy in an expanded population at multiple test sites. A company must submit to the FDA a clinical protocol, accompanied by the approval of the Institutional Review Boards at the institutions participating in the trials, prior to commencement of each clinical trial.

To obtain FDA marketing authorization, a company must submit to the FDA the results of the pre-clinical and clinical testing, together with, among other things, detailed information on the manufacture and composition of the product candidate, in the form of a new drug application, or NDA, or, in the case of a biologic, a biologics license application, or BLA.

The amount of time taken by the FDA for approval of an NDA or BLA will depend upon a number of factors, including whether the product candidate has received priority review, the quality of the submission and studies presented, the potential contribution that the compound will make in improving the treatment of the disease in question, and the workload at the FDA.

The FDA may, in some cases, confer upon an investigational product the status of a fast track product. A fast track product is defined as a new drug or biologic intended for the treatment of a serious or life threatening condition that demonstrates the potential to address unmet medical needs for this condition. The FDA can base approval of an NDA or BLA for a fast track product on an effect on a surrogate endpoint, or on another endpoint that is reasonably likely to predict clinical benefit. If a preliminary review of clinical data

suggests that a fast track product may be effective, the FDA may initiate review of entire sections of a marketing application for a fast track product before the sponsor completes the application.

We anticipate that our products will be manufactured by our strategic partners, licensees or other third parties. Before approving an NDA or BLA, the FDA will inspect the facilities at which the product is manufactured and will not approve the product unless the manufacturing facilities are in compliance with the FDA's current good manufacturing practice ("cGMP"), which are regulations that govern the manufacture, holding and distribution of a product. Manufacturers of biologics also must comply with the FDA's general biological product standards. Our manufacturers also will be subject to regulation under the Occupational Safety and Health Act, the Environmental Protection Act, the Nuclear Energy and Radiation Control Act, the Toxic Substance Control Act and the Resource Conservation and Recovery Act. Following approval, the FDA periodically inspects drug and biologic manufacturing facilities to ensure continued compliance with the good manufacturing practices regulations. Our manufacturers will have to continue to comply with those requirements. Failure to comply with these requirements subjects the manufacturer to possible legal or regulatory action, such as suspension of manufacturing or recall or seizure of product. Adverse patient experiences with the product must be reported to the FDA and could result in the imposition of marketing restrictions through labeling changes or market removal. Product approvals may be withdrawn if compliance with regulatory requirements is not maintained or if problems concerning safety or efficacy of the product occur following approval.

The labeling, advertising, promotion, marketing and distribution of a drug or biologic product also must be in compliance with FDA and Federal Trade Commission requirements which include, among others, standards and regulations for off-label promotion, industry sponsored scientific and educational activities, promotional activities involving the internet, and direct-to-consumer advertising. We also will be subject to a variety of federal, state and local regulations relating to the use, handling, storage and disposal of hazardous materials, including chemicals and radioactive and biological materials. In addition, we will be subject to various laws and regulations governing laboratory practices and the experimental use of animals. In each of these areas, as above, the FDA has broad regulatory and enforcement powers, including the ability to levy fines and civil penalties, suspend or delay issuance of product approvals, seize or recall products, and deny or withdraw approvals.

We will also be subject to a variety of regulations governing clinical trials and sales of our products outside the United States. Whether or not FDA approval has been obtained, approval of a product candidate by the comparable regulatory authorities of foreign countries and regions must be obtained prior to the commencement of marketing the product in those countries. The approval process varies from one regulatory authority to another and the time may be longer or shorter than that required for FDA approval. In the European Union, Canada and Australia, regulatory requirements and approval processes are similar, in principle, to those in the United States.

Environmental Compliance

Our research and development activities involve the controlled use of potentially harmful biological materials as well as hazardous materials, chemicals and various radioactive compounds. We are subject to federal, state and local laws and regulations governing the use, storage, handling and disposal of these materials and specific waste products. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of bio-hazardous materials. The cost of compliance with these laws and regulations could be significant and may adversely affect capital expenditures to the extent we are required to procure expensive capital equipment to meet regulatory requirements.

Human Resources

As of March 9, 2009, we had 26 employees, 25 of whom were full-time employees and 1 of whom was a part time employee. 16 of our employees are engaged in research and development and 10 of our employees

are engaged in management, administration and finance. None of our employees are represented by a labor union or covered by a collective bargaining agreement, nor have we experienced any work stoppages.

Insurance

The Company currently purchases insurance policies for property and liability risks arising out of current operations.

ITEM 1A. *RISK FACTORS*

Our business is subject to numerous risks. We caution you that the following important factors, among others, could cause our actual results to differ materially from those expressed in forward-looking statements made by us or on our behalf in filings with the SEC, press releases, communications with investors and oral statements. Any or all of our forward-looking statements in this annual report on Form 10-K and in any other public statements we make may turn out to be wrong. They can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties. Many factors mentioned in the discussion below will be important in determining future results. Consequently, no forward-looking statement can be guaranteed. Actual future results may vary materially from those anticipated in forward-looking statements. We explicitly disclaim any obligation to update any forward- looking statements to reflect events or circumstances that arise after the date hereof. You are advised, however, to consult any further disclosure we make in our reports filed with the SEC.

Risks Relating to RXi's Business and Industry

The approach we are taking to discover and develop novel therapeutics using RNAi is unproven and may never lead to marketable products.

The scientific discoveries that form the basis for our efforts to discover and develop new drugs are relatively new. The RNAi technologies that we have licensed or have created internally and that we intend to develop have not yet been clinically tested by us, nor are we aware of any clinical trials for efficacy having been completed by third parties involving these technologies. To date, neither we nor any other company has received regulatory approval to market therapeutics utilizing RNAi. The scientific evidence to support the feasibility of developing drugs based on these discoveries is both preliminary and limited. Successful development of RNAi-based products by us will require solving a number of issues, including providing suitable methods of stabilizing the RNAi material and delivering it into target cells in the human body. We may spend large amounts of money trying to solve these issues and never succeed in doing so. In addition, any compounds that we develop may not demonstrate in patients the chemical and pharmacological properties ascribed to them in laboratory studies, and they may interact with human biological systems in unforeseen, ineffective or even harmful ways.

Further, our exclusive focus on RNAi technology for developing products as opposed to multiple, more proven technologies for drug development increases the risk associated with our business. If we are not successful in developing a product candidate using RNAi technology, we may not be able to identify and successfully implement an alternative product development strategy.

We will be subject to competition and may not be able to compete successfully.

A number of medical institutions and pharmaceutical companies are seeking to develop therapeutic products. Companies working in this area include : Alnylam Pharmaceuticals, MDRNA, Cequent Pharmaceuticals, Tacere Therapeutics, Benitec, OPKO Health, Silence Therapeutics, Quark Pharmaceuticals, Rosetta Genomics, Lorus Therapeutics and Calando Pharmaceuticals, as well as a number of the multinational pharmaceutical companies. In addition, a number of companies are developing therapeutics for the same diseases we are targeting using technologies other than RNA interference. Most of these competitors have substantially greater research and development capabilities and financial, scientific, technical, manufacturing, marketing, distribution, and other resources than us, and we may not be able to successfully compete with them. In addition, even if we are successful in developing our product candidates, in order to compete

successfully we may need to be first to market or to demonstrate that our RNAi based products are superior to therapies based on different technologies. If we are not first to market or are unable to demonstrate such superiority, any products for which we are able to obtain approval may not be successful. For example, Isis Pharmaceuticals, Inc. is conducting pre-clinical toxicology studies for an antisense-based therapeutic product candidate, for which the FDA has granted orphan drug status, that targets the same gene for ALS that we intend to target. If Isis is able to successfully bring this treatment to market before we are able to complete the development of an RNAi therapeutic in this area, even if our development efforts are successful, we may not receive any market advantages that we would have benefited from if ours were the first such therapeutic product available on the market. Furthermore, under U.S. law, if a competitor has orphan drug status for a product and if our product candidate is determined to be contained within the competitor's product for the same indication or disease, then that competitor would have market exclusivity and approval of our product for that indication or disease could potentially be blocked for seven years. Note that Isis' product candidate for ALS should not present this challenge to any of our potential ALS treatments, since its product is antisense-based, which is a separate and distinct technology from RNAi. However, if a competitor were to develop a RNAi-based product that was granted orphan drug status for one of the indications or diseases we plan to target, then the approval of any RNAi-based product candidate that we were developing for that same indication or disease may be delayed for seven years.

We may not be able to maintain the third party relationships that are necessary to develop or potentially commercialize some or all of our product candidates.

We expect to depend on collaborators, partners, licensees, clinical research organizations and other third parties to support our discovery efforts, to formulate product candidates, and to conduct clinical trials for some or all of our product candidates. We cannot guarantee that we will be able to successfully negotiate agreements for or maintain relationships with collaborators, partners, licensees, clinical investigators and other third parties on favorable terms, if at all. If we are unable to obtain or maintain these agreements, we may not be able to clinically develop, formulate, obtain regulatory approvals for or commercialize our product candidates. Under certain license agreements that we have already entered into, we have minimum dollar amounts per calendar year that we are obligated to spend on the development of the technology we have licensed from our contract partners. If we fail to meet this requirement under any of our licenses, we may be in breach of our obligations under such agreement which may result in the loss of the technology licensed. We cannot necessarily control the amount or timing of resources that our contract partners will devote to our research and development programs, product candidates or potential product candidates, and we cannot guarantee that these parties will fulfill their obligations to us under these arrangements in a timely fashion.

We will rely upon third parties for the manufacture of our clinical product candidates.

We do not have the facilities or expertise to manufacture supplies of any of our potential product candidates. Accordingly, we will be dependent upon contract manufacturers for these supplies. We have no manufacturing supply arrangements for any of our product candidates, and there can be no assurance that we will be able to secure needed supply arrangements on attractive terms, or at all. Our failure to secure these arrangements as needed could have a materially adverse effect on our ability to complete the development of our product candidates or, if we obtain regulatory approval for our product candidates, to commercialize them.

We have engaged specialty organic chemistry synthesis companies to manufacture nanotransporters for which we have an exclusive license from UMMS for delivery of our product candidates. The synthesis methods for nanotransporters are described in the patent applications which we have licensed from UMMS. It is anticipated that refinement and scale-up in the synthesis methods will be performed under contract with this manufacturer. However, as the nanotransporters are unique chemicals, the costs of synthesis are not currently known and there is potential for technical challenges with respect to scale-up.

Our current plans call for the manufacture of our RNAi compounds by contract manufacturers offering research grade, Good Laboratory Practices toxicology studies and Good Manufacturing Practices grade RNAi for clinical use. The chemistry, manufacturing and controls for RNAi active pharmaceutical ingredient will be addressed by our clinical development team in close collaboration with a contract manufacturer with extensive

experience in RNA drug synthesis. RNA is a complex molecule requiring many synthesis steps, which may lead to challenges with purification and scale-up. These challenges could result in increased costs and delays in manufacturing. Additionally, although we are not currently aware of any such litigation or threatened litigation or challenge, if we have litigation or threatened litigation for or challenge to the composition of our products candidates in the future, manufacturers may refuse to manufacture such compounds.

Any drug candidates we develop may fail in development or be delayed or may not be commercially viable.

All of our products in development must be approved by the FDA or similar foreign governmental agencies before they can be marketed. The process for obtaining FDA approval is both time-consuming and costly, with no certainty of a successful outcome. This process typically includes the conduct of extensive preclinical and clinical testing, which may take longer or cost more than we anticipate, and may prove unsuccessful due to numerous factors. Product candidates that may appear to be promising at early stages of development may not successfully reach the market for a number of reasons. The results of pre-clinical and initial clinical testing of these products may not necessarily indicate the results that will be obtained from later or more extensive testing. Companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in advanced clinical trials, even after obtaining promising results in earlier trials.

We, the FDA or other applicable regulatory authorities, or an institutional review board ("IRB"), an independent committee under the oversight of the U.S. Department of Health and Human Services ("HHS"), which has been formally registered with HHS and functions to approve, monitor and review biomedical and behavioral research involving humans, may suspend clinical trials of a drug candidate at any time for various reasons, including if we or they believe the subjects or patients participating in such trials are being exposed to unacceptable health risks. Among other reasons, adverse side effects of a drug candidate on subjects or patients in a clinical trial could result in the FDA or other regulatory authorities suspending or terminating the trial and refusing to approve a particular drug candidate for any or all indications of use.

Clinical trials of a new drug candidate require the enrollment of a sufficient number of patients, including patients who are suffering from the disease the drug candidate is intended to treat and who meet other eligibility criteria. Rates of patient enrollment are affected by many factors, and delays in patient enrollment can result in increased costs and longer development times.

Clinical trials also require the review and oversight of IRBs, which approve and continually review clinical investigations and protect the rights and welfare of human subjects. An inability or delay in obtaining IRB approval could prevent or delay the initiation and completion of clinical trials and the FDA may decide not to consider any data or information derived from a clinical investigation not subject to initial and continuing IRB review and approval.

Numerous factors could affect the timing, cost or outcome of our drug development efforts, including the following:

- Delays in filing initial drug applications,
- Difficulty in securing centers to conduct trials,
- Conditions imposed on us by the FDA or comparable foreign authorities regarding the scope or design of our clinical trials,
- Problems in engaging IRBs to oversee trials or problems in obtaining or maintaining IRB approval of studies,
- Difficulty in enrolling patients in conformity with required protocols or projected timelines,
- Unexpected adverse reactions by patients in trials,
- Difficulty in obtaining clinical supplies of the product,

- Negative or inconclusive results from our clinical trials or the clinical trials of others for drug candidates similar to our own or inability to generate statistically significant data confirming the efficacy of the product being tested,

- Changes in the FDA's requirements for our testing during the course of that testing,

- Modification of the drug during testing,

- Reallocation of our limited financial and other resources to other clinical programs, and

- Adverse results obtained by other companies developing RNAi drugs.

The substances we are intending to develop may represent a new class of drug, and the FDA has not yet established any definitive policies, practices or guidelines in relation to these drugs. While we expect any product candidates that we develop will be regulated as a new drug under the Federal Food, Drug, and Cosmetic Act, the FDA could decide to regulate them or other products we may develop as biologics under the Public Health Service Act. The lack of policies, practices or guidelines may hinder or slow review by the FDA of any regulatory filings that we may submit. Moreover, the FDA may respond to these submissions by defining requirements that we may not have anticipated.

It is possible that none of the product candidates that we develop will obtain the appropriate regulatory approvals necessary for us to begin selling them or that any regulatory approval to market a product may be subject to limitations on the indicated uses for which we may market the product. The time required to obtain FDA and other approvals is unpredictable but often can take years following the commencement of clinical trials, depending upon the complexity of the drug candidate. Any analysis we perform of data from clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. Any delay or failure in obtaining required approvals could have a material adverse effect on our ability to generate revenue from the particular drug candidate.

We are also subject to numerous foreign regulatory requirements governing the conduct of clinical trials, manufacturing and marketing authorization, pricing and third-party reimbursement. The foreign regulatory approval process includes all of the risks associated with FDA approval described above as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. Approval by the FDA does not assure approval by regulatory authorities outside of the United States.

The FDA approval process may be delayed for any drugs we develop that require the use of specialized drug delivery devices or vehicles.

Some drug candidates that we develop may need to be administered using specialized vehicles that deliver RNAi therapeutics directly to diseased parts of the body. For example, we anticipate using an implantable pump to deliver drug candidates to the nervous system. While we expect to rely on drug delivery vehicles that have been approved by the FDA or other regulatory agencies to deliver our drug candidates, we may need to modify the design or labeling of these delivery vehicles for some products we may develop. In such an event, the FDA may regulate the product as a combination product of a drug and a device or require additional approvals or clearances for the modified delivery. Additionally, it has been observed in at least one previous clinical trial, conducted by another company, that delivery vehicles similar to the delivery vehicle in-licensed from UMMS may cause toxicity, which could delay or prevent approval of this delivery vehicle.

Further, to the extent the specialized delivery vehicle is owned by another company, we would need that company's cooperation to implement the necessary changes to the vehicle, or its labeling, and to obtain any additional approvals or clearances. Any delays in finding suitable drug delivery vehicles to administer RNAi therapeutics directly to diseased parts of the body could negatively affect our ability to successfully develop our RNAi therapeutics.

If we are not successful in developing pre-clinical product candidates, we will not be able to commence clinical trials in humans or obtain approval for our product candidates.

We are in the new drug discovery phase and we have not yet identified any lead compounds for therapeutic development in our initial areas of focus. RNA interference is a relatively new scientific field, and the technologies are still in the early stage of development. We have no compounds in pre-clinical toxicology studies, and we may not be able to advance any product candidate through the pre-clinical stage into clinical trials. Additionally, our development efforts may never result in the identification of a pre-clinical candidate which we are able to successfully develop into a drug. Even if we are able to designate a lead candidate, we may not be able to identify data that would support entering such a candidate into clinical trials. Furthermore, even if we successfully enter into clinical studies, the results from pre-clinical testing of a drug candidate may not predict the results that will be obtained on human clinical trials.

If our pre-clinical testing does not produce successful results or our clinical trials do not demonstrate safety and efficacy in humans, we will not be able to commercialize our drug candidates.

Before obtaining regulatory approval for the sale of our drug candidates, we must conduct, at our own expense, extensive pre-clinical tests and clinical trials to demonstrate the safety and efficacy in humans of our drug candidates. However, we are required to do extensive testing in animal models with our product candidates before we can be approved by the FDA to initiate clinical trials in humans. Furthermore, we cannot be sure that our product candidates will be safely tolerated by humans or be efficacious. Pre-clinical and clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. Success in pre-clinical testing and early clinical trials does not ensure that later clinical trials will be successful, and interim results of a clinical trial do not necessarily predict final results.

A failure of one or more of our pre-clinical studies or clinical trials can occur at any stage of testing. We may experience numerous unforeseen events during, or as a result of, the pre-clinical testing and the clinical trial process that could delay or prevent our ability to receive regulatory approval or potentially commercialize our drug candidates, including:

- Regulators or IRBs may not authorize us to commence a clinical trial or conduct a clinical trial at a prospective trial site,
- Our pre-clinical tests or clinical trials may produce negative or inconclusive results, and we may decide, or regulator may require us, to conduct additional pre-clinical testing or clinical trials, or we may abandon projects that we previously expected to be promising,
- Enrollment in our clinical trials may be slower than we anticipate or participants may drop out of our clinical trials at a higher rate than we anticipate, resulting in significant delays,
- Our third party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner,
- Our drug candidates may have very different chemical and pharmacological properties in humans than in laboratory testing and it may interact with human biological systems in unforeseen, ineffective or harmful ways,
- We might have to suspend or terminate our clinical trials if the participants are being exposed to unacceptable health risks,
- IRBs or regulators, including the FDA, may require that we hold, suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements,
- The cost of our clinical trials may be greater than we anticipate,
- The supply or quality of our drug candidates or other necessary materials necessary to conduct our clinical trials may be insufficient or inadequate, and
- Effects of our drug candidates may not be the desired effects or may include undesirable side effects or the drug candidates may have other unexpected characteristics.

Even if we obtain regulatory approvals, our marketed drugs will be subject to ongoing regulatory review. If we fail to comply with continuing U.S. and foreign regulations, we could lose our approvals to market drugs and our business would be materially adversely affected.

Following any initial regulatory approval of any drugs we may develop, we will also be subject to continuing regulatory review, including the review of adverse drug experiences and clinical results that are reported after our drug products are made available to patients. This would include results from any post marketing tests or vigilance required as a condition of approval. The manufacturer and manufacturing facilities we use to make any of our drug candidates will also be subject to periodic review and inspection by the FDA. The discovery of any new or previously unknown problems with the product, manufacturer or facility may result in restrictions on the drug or manufacturer or facility, including withdrawal of the drug from the market. Our product promotion and advertising also will be subject to regulatory requirements and continuing regulatory review. If we fail to comply with applicable continuing regulatory requirements, we may be subject to fines, suspension or withdrawal of regulatory approval, product recalls and seizures, operating restrictions and other adverse consequences.

Even if we receive regulatory approval to market our product candidates, our product candidates may not be accepted commercially, which may prevent us from becoming profitable.

The product candidates that we are developing are based on new technologies and therapeutic approaches. RNAi products are expected to be substantially more expensive to manufacture than traditional small molecule drugs, which may make them more costly than competing small molecule drugs. Additionally, RNAi products are likely to require injection or implantation, and do not readily cross the so-called blood brain barrier, which will make them less convenient to administer than drugs administered orally. Key participants in the pharmaceutical marketplace, such as physicians, medical professionals working in large reference laboratories, public health laboratories and hospitals, third-party payors and consumers, may not accept products intended to improve therapeutic results based on RNAi technology. As a result, it may be more difficult for us to convince the medical community and third-party payors to accept and use our product, or to provide favorable reimbursement. And if medical professionals working with large reference laboratories, public health laboratories and hospitals choose not to adopt and use our RNAi technology, our products may not achieve broader market acceptance.

Other factors that we believe will materially affect market acceptance of our product candidates include:

- The timing of our receipt of any marketing approvals, the terms of any approvals and the countries in which approvals are obtained,
- The safety, efficacy and ease of administration of our product candidates,
- The advantages of our product candidates over those of our competitors,
- The willingness of patients to accept relatively new therapies,
- The success of our physician education programs,
- The availability of government and third-party payor reimbursement,
- The pricing of our products, particularly as compared to alternative treatments, and
- The availability of effective alternative treatments and the relative risks and/or benefits of the treatments.

We may be unable to protect our intellectual property rights licensed from UMMS or others, our intellectual property rights may be inadequate to prevent third parties from using our technologies or developing competing products, and we may need to license additional intellectual property from others.

We have a non-exclusive license to the Mello and Fire foundational RNAi patent owned by UMMS and the Carnegie Institution of Washington, which claims various aspects of RNAi or genetic inhibition by double stranded RNA. This license continues to be available to third parties, and as such it does not provide us with

the ability to exclude others from its use or protect us from competition. Therapeutic applications of gene silencing technologies, delivery methods, and other technologies that we license from UMMS are also claimed in a number of UMMS pending patent applications, but there can be no assurance that these applications will result in any issued patents or that those patents would withstand possible legal challenges or protect RXi's technologies from competition. United States Patent and Trademark Office and patent granting authorities in other countries have upheld stringent standards for the RNAi patents that have been prosecuted so far. Consequently, pending patents that we have licensed may continue to experience long and difficult prosecution challenges and may ultimately issue with much narrower claims than those in the pending applications. We are aware of a number of issued patents covering various particular forms and compositions of RNAi-mediating molecules and therapeutic methods that we do not currently expect to use. Third parties may, however, hold or seek to obtain additional patents that could make it more difficult or impossible for us to develop products based on the gene silencing technology that we have licensed.

In addition, others may challenge the patent owned by UMMS and the Carnegie Institution of Washington or other patents that we currently license or may license in the future and, as a result, these patents could be narrowed, invalidated or rendered unenforceable, which would negatively affect our ability to exclude others from use of RNAi technologies described in these patents. There can be no assurance that these patent or other pending applications or issued patents we licensed in will withstand possible legal challenges. Moreover, the laws of some foreign countries may not protect our proprietary rights to the same extent as do the laws of the United States. Any patents issued to us or our licensors may not provide us with any competitive advantages, and there can be no assurance that the patents of others will not have an adverse effect on our ability to do business or to continue to use our technologies freely. Our efforts to enforce and maintain our intellectual property rights may not be successful and may result in substantial costs and diversion of management time. Even if our rights are valid, enforceable and broad in scope, competitors may develop products based on technology that is not covered by our licenses.

We have entered into an invention disclosure agreement with UMMS under which UMMS has agreed to disclose to us certain inventions it makes and to give us the exclusive right to negotiate licenses to the disclosed technologies. There can be no assurance, however, that any such inventions will arise, that we will be able to negotiate licenses to any inventions on satisfactory terms, or at all, or that any negotiated licenses will prove commercially successful.

We may need to license additional intellectual property rights from third parties in order to be able to complete the development or enhance the efficacy of our product candidates or avoid possible infringement of the rights of others. Additionally, many of our UMMS licenses are limited to ALS, obesity, diabetes and cancer, and in order to pursue other diseases against proprietary gene targets, we may need licenses from UMMS or other third parties that may be unavailable. To the extent that we are required to obtain multiple licenses from third parties to develop or commercialize a product candidate, the aggregate licensing fees and milestones and royalty payments made to these these parties may materially reduce our economic returns or even cause us to abandon development or commercialization of a product candidate. Accordingly, there is no assurance that we will be able to acquire any additional intellectual property rights on satisfactory terms, or at all.

In addition to our licenses, we also rely on copyright and trademark protection, trade secrets, know-how, continuing technological innovation and licensing opportunities. In an effort to maintain the confidentiality and ownership of our trade secrets and proprietary information, we require our employees, consultants, advisors and others to whom we disclose confidential information to execute confidentiality and proprietary information agreements. However, it is possible that these agreements may be breached, invalidated or rendered unenforceable, and if so, there may not be an adequate corrective remedy available. Furthermore, like many companies in our industry, we may from time to time hire scientific personnel formerly employed by other companies involved in one or more areas similar to the activities we conduct. In some situations, our confidentiality and proprietary information agreements may conflict with, or be subject to, the rights of third parties with whom our employees, consultants or advisors have prior employment or consulting relationships. Although we require our employees and consultants to maintain the confidentiality of all confidential information of previous employers, we or these individuals may be subject to allegations of trade secret misappropriation or

other similar claims as a result of their prior affiliations. Finally, others may independently develop substantially equivalent proprietary information and techniques, or otherwise gain access to our trade secrets. Our failure to protect our proprietary information and techniques may inhibit or limit our ability to exclude certain competitors from the market and execute our business strategies.

Other companies or organizations may assert patent rights that prevent us from developing our products.

RNA interference is a relatively new scientific field that has generated many different patent applications from organizations and individuals seeking to obtain important patents in the field. These applications claim many different methods, compositions and processes relating to the discovery, development, delivery and commercialization of RNAi therapeutics. Because the field is so new, very few of these patent applications have been fully processed by government patent offices around the world, and there is a great deal of uncertainty about which patents will issue, when, to whom, and with what claims. While we are not aware of any litigation, threatened litigation or challenge to our intellectual property rights, it is likely that there will be significant litigation and other proceedings, such as interference and opposition proceedings in various patent offices, relating to patent rights in the RNAi field. Others may attempt to invalidate our intellectual property rights or those of our licensors. Even if our rights, or those of our licensors, are not directly challenged, disputes among third parties could lead to the weakening or invalidation of our intellectual property rights. Any attempt by third parties to circumvent or invalidate our intellectual property rights could be costly to defend, require significant time and attention of our management and have a material adverse effect on our business.

We are dependent on technologies we license, and if we lose the right to license such technologies or we fail to license new technologies in the future, our ability to develop new products would be harmed.

We currently are dependent on licenses from third parties for our key technologies relating to fundamental RNAi technologies. Our current licenses impose, and any future licenses we enter are likely to impose, various development, funding, royalty, diligence, sublicensing, insurance and other obligations on us. If our license with respect to any of these technologies is terminated for any reason, the development of the products contemplated by the licenses would be delayed, or suspended altogether, while we seek to license similar technology or develop new non-infringing technology. The costs of obtaining new licenses are high, and many patents in the RNAi field have already been exclusively licensed to third parties, including our competitors. If any of our existing licenses is terminated, the development of the products contemplated by the licenses could be delayed or terminated and we may not be able to negotiate additional licenses on acceptable terms, if at all, which would have a material adverse effect on our business.

We are subject to potential liabilities from clinical testing and future product liability claims.

If any of our future products are alleged to be defective, they may expose us to claims for personal injury by patients in clinical trials of our products or by patients using our commercially marketed products. Even if the marketing of one or more of our products is approved by the FDA, users may claim that such products caused unintended adverse effects. We will seek to obtain clinical trial insurance for clinical trials that we conduct, as well as liability insurance for any products that we market. There can be no assurance that we will be able to obtain insurance in the amounts we seek, or at all. We anticipate that licensees who develop our products will carry liability insurance covering the clinical testing and marketing of those products. There is no assurance, however, that any insurance maintained by us or our licensees will prove adequate in the event of a claim against us. Even if claims asserted against us are unsuccessful, they may divert management's attention from our operations and we may have to incur substantial costs to defend such claims.

Any drugs we develop may become subject to unfavorable pricing regulations, third-party reimbursement practices or healthcare reform initiatives, which could have a material adverse effect on our business.

We intend to sell our products primarily to hospitals which receive reimbursement for the health care services they provide to their patients from third-party payors, such as Medicare, Medicaid and other domestic and international government programs, private insurance plans and managed care programs. Most third-party

payors may deny reimbursement if they determine that a medical product was not used in accordance with cost-effective treatment methods, as determined by the third-party payor, or was used for an unapproved indication. Third-party payors also may refuse to reimburse for experimental procedures and devices. Furthermore, because our programs are in the early stages of development, we are unable at this time to determine their cost-effectiveness and the level or method of reimbursement. Increasingly, the third-party payors who reimburse patients are requiring that drug companies provide them with predetermined discounts from list prices, and are challenging the prices charged for medical products. If the price we are able to charge for any products we develop is inadequate in light of our development and other costs, our profitability could be adversely effected.

We currently expect that any drugs we develop may need to be administered under the supervision of a physician. Under currently applicable law, drugs that are not usually self-administered may be eligible for coverage by the Medicare program if:

- They are "incidental" to a physician's services,
- They are "reasonable and necessary" for the diagnosis or treatment of the illness or injury for which they are administered according to accepted standard of medical practice,
- They are not excluded as immunizations, and
- They have been approved by the FDA.

There may be significant delays in obtaining insurance coverage for newly-approved drugs, and insurance coverage may be more limited than the purpose for which the drug is approved by the FDA. Moreover, eligibility for insurance coverage does not imply that any drug will be reimbursed in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim payments for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement may be based on payments for other services and may reflect budgetary constraints or imperfections in Medicare data. Net prices for drugs may be reduced by mandatory discounts or rebates required by government health care programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement rates. Our inability to promptly obtain coverage and profitable reimbursement rates from both government-funded and private payors for new drugs that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to develop products, and our overall financial condition.

Additionally, third-party payors are increasingly attempting to contain health care costs by limiting both coverage and the level of reimbursement for medical products and services. A number of legislative and regulatory proposals to change the healthcare system in the United States and other major healthcare markets have been proposed in recent years. These proposals have included prescription drug benefit legislation recently enacted in the United States and healthcare reform legislation enacted by certain states. Levels of reimbursement may decrease in the future, and future legislation, regulation or reimbursement policies of third-party payors may adversely affect the demand for and price levels of our products. If our customers are not reimbursed for our products, they may reduce or discontinue purchases of our products, which could have a material adverse effect on our business, financial condition and results of operations.

Some states and localities have established drug importation programs for their citizens, and federal drug import legislation has been introduced in Congress. The Medicare Prescription Drug Plan legislation, which became law in December 2003, required the Secretary of Health and Human Services to promulgate regulations for drug reimportation from Canada into the United States under some circumstances, including when the drugs are sold at a lower price than in the United States. The Secretary, however, retained the discretion not to implement a drug reimportation plan if he finds that the benefits do not outweigh the costs, and has so far declined to approve a reimportation plan. Proponents of drug reimportation may attempt to pass legislation that would directly allow reimportation under certain circumstances. Legislation or regulations

allowing the reimportation of drugs, if enacted, could decrease the price we receive for any products that we may develop and adversely affect our future revenues and prospects for profitability.

If we fail to attract, hire and retain qualified personnel, we may not be able to design, develop, market or sell our products or successfully manage our business.

We are highly dependent on our named executive officers and SAB members. The continued service of our named executive officers and SAB members is critical to our success. We have entered into employment agreements with our named executive officers, all of which can be terminated by such persons on short or no notice. The loss of any of our named executive officers or SAB members, or our inability to identify, attract, retain and integrate additional qualified key personnel, could make it difficult for us to manage our business successfully and achieve our business objectives.

Competition for skilled research, product development, regulatory and technical personnel also is intense, and we may not be able to recruit and retain the personnel we need. The loss of the services of any key research, product development, regulatory, and technical personnel, or our inability to hire new personnel with the requisite skills, could restrict our ability to develop our product candidates.

We use biological and hazardous materials and if we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research and development activities involve the controlled use of potentially harmful biological materials as well as hazardous materials, chemicals and various radioactive compounds. We cannot completely eliminate the risk of accidental contamination or injury; we could be held liable for any damages that result, and any liability could exceed our resources. We are subject to federal, state and local laws and regulations governing the use, storage, handling and disposal of these materials and specific waste products. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of biohazardous materials. The cost of compliance with these laws and regulations could be significant and may adversely affect capital expenditures to the extent we are required to procure expensive capital equipment to meet regulatory requirements.

We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of biohazardous materials. We maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials. The limits of our workers' compensation insurance are mandated by state law, and our workers' compensation liability is capped at these state-mandated limits. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate any of these laws or regulations.

Risks Relating to a Publicly Traded Company and Future Financing Needs

We may not be able to obtain sufficient financing, and may not be able to develop our product candidates.

We believe that our existing cash, cash equivalents, and potential proceeds from the SEDA should be sufficient to fund our operations through at least the first half of 2010. In the future, we will be dependent on obtaining financing from third parties in order to maintain our operations and to meet our obligations to our licensors. Before we are able to access additional capital from the SEDA, we must satisfy certain conditions, including the requirement that shares of our stock to be sold to YA Global be registered with the SEC, and there is risk of delays in our satisfying these conditions. We cannot assure that additional debt or equity or other funding will be available to us on acceptable terms, or at all. If we fail to obtain additional funding when needed, we would be forced to scale back, or terminate, our operations, or to seek to merge with or to

be acquired by another company. In the future, we will be dependent on obtaining financing from third parties in order to maintain our operations and to meet our obligations to UMMS and other licensors.

We anticipate that we will need to raise substantial amounts of money to fund a variety of future activities integral to the development of our business, which may include but are not limited to the following:

- To conduct research and development to successfully develop our RNAi technologies,
- To obtain regulatory approval for our products,
- To file and prosecute patent applications and to defend and assess patents to protect our technologies,
- To retain qualified employees, particularly in light of intense competition for qualified scientists,
- To manufacture products ourselves or through third parties,
- To market our products, either through building our own sales and distribution capabilities or relying on third parties, and
- To acquire new technologies, licenses, products or companies.

We cannot assure you that any needed financing will be available to us on acceptable terms or at all. If we cannot obtain additional financing in the future, our operations may be restricted and we may ultimately be unable to continue to develop and potentially commercialize our product candidates.

You may have difficulty evaluating our business, because we have limited history and our historical financial information may not be representative of our future results.

The historical financial information included in this annual report does not necessarily reflect the financial condition, results of operations or cash flows that we would have achieved as a separate company during the periods presented or those that we will achieve in the future. Prior to the contribution of our RNAi assets from CytRx, our RNAi research and development activities were conducted by CytRx as part of its broader operations, rather than as an independent division or subsidiary, and were primarily conducted through sponsored research arrangements rather than through internal activities. CytRx also performed various corporate functions relating to our business, as discussed above. Our historical financial information reflects allocations of indirect expenses from CytRx for these and similar functions. We believe that these allocations are comparable to the expenses we would have incurred had we operated as a separate company, although we may incur higher expenses as a separate company.

We have limited operating experience and may not be able to effectively operate.

We are a discovery-stage company with limited operating history. We will focus solely on developing and, if we obtain regulatory approval for our product candidates, commercializing therapeutic products based upon RNAi technologies, and there is no assurance that we will be able to successfully implement our business plan. While our management collectively possesses substantial business experience, there is no assurance that we will be able to manage our business effectively, or that we will be able to identify, hire and retain any needed additional management or scientific personnel to develop and implement our product development plans, obtain third-party contracts or any needed financing, or achieve the other components of our business plan.

The obligations associated with being an independent public company require significant resources and management attention.

As a publicly traded company, we are subject to the reporting requirements of the U.S. Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the Sarbanes-Oxley Act of 2002. In addition, the Exchange Act requires that we file annual, quarterly and current reports. Our failure to prepare and disclose this information in a timely manner could subject us to penalties under federal securities laws, expose us to lawsuits and restrict our ability to access financing. The Sarbanes-Oxley Act requires that we, among other things, establish and maintain effective internal controls and procedures for financial reporting and we

are presently evaluating our existing internal controls in light of the standards adopted by the Public Company Accounting Oversight Board. It is possible that we or our independent registered public accounting firm may identify significant deficiencies or material weaknesses in our internal control over financial reporting in the future. Any failure or difficulties in implementing and maintaining these controls could cause us to fail to meet the periodic reporting obligations or result in material misstatements in our financial statements.

Section 404 of the Sarbanes-Oxley Act requires annual management assessments of the effectiveness of our internal control over financial reporting, starting with our 2008 annual report. Our failure to satisfy the requirements of Section 404 on a timely basis could result in the loss of investor confidence in the reliability of our financial statements, which in turn could have a material adverse effect on our business and our common stock.

We cannot assure you that any needed financing will be available to us on acceptable terms or at all. If we cannot obtain additional financing in the future, our operations may be restricted and we may ultimately be unable to continue to develop and potentially commercialize our product candidates.

Future financing may be obtained through, and future development efforts may be paid for by, the issuance of debt or equity, which may have an adverse effect on our stockholders or may otherwise adversely affect our business.

If we raise funds through the issuance of debt or equity, any debt securities or preferred stock issued will have rights, preferences and privileges senior to those of holders of our common stock in the event of a liquidation. In such event, there is a possibility that once all senior claims are settled, there may be no assets remaining to pay out to the holders of common stock. In addition, if we raise funds through the issuance of additional equity, whether through private placements or public offerings, such an issuance would dilute your ownership in us.

The terms of debt securities may also impose restrictions on our operations, which may include limiting our ability to incur additional indebtedness, to pay dividends on or repurchase our capital stock, or to make certain acquisitions or investments. In addition, we may be subject to covenants requiring us to satisfy certain financial tests and ratios, and our ability to satisfy such covenants may be affected by events outside of our control.

We expect to continue to incur significant research and development expenses, which may make it difficult for us to attain profitability, and may lead to uncertainty about or as to our ability to continue as a going concern.

Substantial funds were expended to develop our RNAi technologies, and additional substantial funds will be required for further research and development, including pre-clinical testing and clinical trials of any product candidates, and to manufacture and market any products that are approved for commercial sale. Because the successful development of our products is uncertain, we are unable to precisely estimate the actual funds we will require to develop and potentially commercialize them. In addition, we may not be able to generate enough revenue, even if we are able to commercialize any of our product candidates, to become profitable.

In the event that we are unable to achieve or sustain profitability or to secure additional financing, we may not be able to meet our obligations as they come due, raising substantial doubts as to our ability to continue as a going concern. Any such inability to continue as a going concern may result in our common stock holders losing their entire investment. There is no guaranty that we will become profitable or secure additional financing. Our financial statements contemplate that we will continue as a going concern and do not contain any adjustments that might result if we were unable to continue as a going concern. Changes in our operating plans, our existing and anticipated working capital needs, the acceleration or modification of our expansion plans, increased expenses, potential acquisitions or other events will all affect our ability to continue as a going concern.

Risks Related to Ownership of Our Common Stock

The market price and trading volume of our common stock may be volatile.

Prior to the Distribution and the Award, there was no trading market for our common stock. The market price of our common stock could fluctuate significantly for many reasons, including the following factors:

- Announcements of regulatory developments or technological innovations by us or our competitors,
- Changes in our relationship with our licensors and other strategic partners,
- Changes in our ownership or other relationships with CytRx,
- Our quarterly operating results,
- Developments in patent or other technology ownership rights,
- Public concern regarding the safety of our products,
- Government regulation of drug pricing, and
- General changes in the economy, the financial markets or the pharmaceutical or biotechnology industries.

In addition, factors beyond our control may also have an impact on the price of our stock. For example, to the extent that other large companies within our industry experience declines in their stock price, our stock price may decline as well. In addition, when the market price of a company's common stock drops significantly, stockholders often institute securities class action lawsuits against the company. A lawsuit against us could cause us to incur substantial costs and could divert the time and attention of our management and other resources.

Future sales of our shares by CytRx, or the possibility of such sales, could adversely affect our stock price.

CytRx owns 6,268,881 shares of our common stock, or approximately 46% of our outstanding shares. We have agreed that, upon request by CytRx, we will use our best efforts to cause all of our shares issued to CytRx pursuant to the two contribution agreements we entered into in relation to our initial capitalization to be registered under the Securities Act, with certain exceptions, with all expenses incurred in connection with any such registration will be borne by us.

We also have granted CytRx what are commonly known as "piggyback" registration rights to include our shares currently owned by CytRx, or owned by CytRx in the future as a result of a dividend or distribution with respect to shares currently owned by CytRx, in other registration statements that we may file with the SEC on behalf of our company or our security holders. The availability of our shares held by CytRx and UMMS for resale publicly, as well as any actual sales of these shares, could adversely affect the market price of our shares.

If the value of our shares owned by CytRx from time to time were to exceed 40% of the value of CytRx's total assets, CytRx may be deemed an "investment company" within the meaning of the Investment Company Act of 1940 and become subject to the stringent regulations applicable to investment companies. In this event, CytRx would likely seek to promptly sell or otherwise dispose of shares of our common stock in order to avoid becoming an inadvertent investment company. Any such sales or other disposition by CytRx of our shares, or the possibility of such sales or disposition, could adversely affect the market price of our shares.

We have granted CytRx preemptive rights to acquire shares that we may sell in the future, which may impair our ability to raise funds.

Under an agreement between us, CytRx and our founding stockholders, with some exceptions, CytRx has preemptive rights to acquire a portion of any new securities sold or issued by us so as to maintain its percentage ownership of us at the time of any such sale and issuance, which is currently approximately 46%

of our outstanding shares. The exercise by CytRx of its preemptive rights may impair our ability to raise funds, or adversely affect the terms on which we are able to raise funds, as we may not be able to offer to new investors the quantity of our stock that they may desire to purchase.

CytRx's ownership of our common stock could delay or prevent a change in corporate control.

CytRx owns approximately 46% of our common stock, and has preemptive rights, as described above, to maintain its percentage ownership. CytRx has agreed with UMMS, us and our other founding stockholders to vote its shares of our common stock so that a majority of the members of our board of directors are not affiliated (as defined) with CytRx. However, by virtue of its stock ownership, CytRx may be able to significantly influence the outcome of matters required to be submitted to a vote of our stockholders, including any proposed amendments to our certificate of incorporation and approval of mergers and other significant corporate transactions. This concentration of ownership may adversely affect the market price of our common stock by:

- Delaying, deferring or preventing a change in control of our company,
- Impeding a merger, consolidation, takeover or other business combination involving our company, or
- Discouraging a potential acquirer from making a tender offer or otherwise attempting to obtain control of our company.

CytRx could unilaterally effect a change of control of our company by selling or disposing of our shares owned by it.

If CytRx were to sell or otherwise dispose of all or a significant portion of our shares owned by it to a single buyer or group of affiliated buyers, it could affect a change of control of our company without the advice or participation by our board of directors or other stockholders, since transferees of the shares owned by CytRx will not be bound by CytRx's agreements with UMMS, us and our other founding stockholders not to vote our shares owned by it for the election of a majority of our board of directors who are affiliated with CytRx.

Anti-takeover provisions of our certificate of incorporation and by-laws and provisions of Delaware law could delay or prevent a change of control that you may favor.

Anti-takeover provisions of our certificate of incorporation and by-laws and provisions of Delaware law may discourage, delay or prevent a merger or other change of control that stockholders may consider favorable, or may impede the ability of the holders of our common stock to change our management. These provisions of our certificate of incorporation and by-laws, among other things:

- Divide our board of directors into three classes, with members of each class to be elected for staggered three-year terms,
- Limit the right of stockholders to remove directors,
- Regulate how stockholders may present proposals or nominate directors for election at annual meetings of stockholders, and
- Authorize our board of directors to issue preferred stock in one or more series, without stockholder approval.

In addition, Section 203 of the Delaware General Corporation Law provides that, subject to limited exceptions, persons that acquire, or are affiliated with a person that acquires, more than 15% of the outstanding voting stock of a Delaware corporation such as our company shall not engage in any business combination with that corporation, including by merger, consolidation or acquisitions of additional shares for a three-year period following the date on which that person or its affiliate crosses the 15% stock ownership threshold. Section 203 could operate to delay or prevent a change of control of our company.

We may acquire other businesses or form joint ventures that may be unsuccessful and could adversely dilute your ownership of our company.

As part of our business strategy, we may pursue future acquisitions of other complementary businesses and technology licensing arrangements. We also may pursue strategic alliances. We have no experience with respect to acquiring other companies and limited experience with respect to the formation of collaborations, strategic alliances and joint ventures. If we were to make any acquisitions, we may not be able to integrate these acquisitions successfully into our existing business and we could assume unknown or contingent liabilities. We also could experience adverse effects on our reported results of operations from acquisition related charges, amortization of acquired technology and other intangibles and impairment charges relating to write-offs of goodwill and other intangible assets from time to time following the acquisition. Integration of an acquired company also may require management resources that otherwise would be available for ongoing development of our existing business. We may not identify or complete these transactions in a timely manner, on a cost-effective basis, or at all, and we may not realize the anticipated benefits of any acquisition, technology license or strategic alliance.

To finance acquisitions, we may choose to issue shares of our common stock as consideration, which would dilute your ownership interest in us. Alternatively, it may be necessary for us to raise additional funds through public or private financings. Additional funds may not be available on terms that are favorable to us and, in the case of equity financings, may result in dilution to our stockholders. Any future acquisitions by us also could result in large and immediate write-offs, the incurrence of contingent liabilities or amortization of expenses related to acquired intangible assets, any of which could harm our operating results.

ITEM 1B. *UNRESOLVED STAFF COMMENTS*

None.

ITEM 2. *PROPERTIES*

On September 25, 2007, we entered into a lease agreement with Newgate Properties, LLC (an affiliate of Worcester Polytechnic Institute), at 60 Prescott Street, Worcester, Massachusetts, for a term of 20 months. The facility is approximately 6,800 square feet, of which 5,600 is laboratory space used for research and development and the additional 1,200 square feet is used for general and administrative offices. On January 23, 2009, we extended our lease for an additional two years through July 31, 2011. The monthly rental fee is approximately $19,000. We believe that the space will be suitable for our current needs.

ITEM 3. *LEGAL PROCEEDINGS*

Although we are not currently involved in any legal proceedings, from time to time, we may become a party to various legal actions and complaints arising in the ordinary course of business.

ITEM 4. *SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS*

During the fourth quarter of fiscal year 2008, no matters were submitted to a vote of the security holders.

PART II

ITEM 5. *MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES*

Market Information

Our common stock has been listed on the Nasdaq Capital Market under the symbol "RXII" since March 12, 2008. Prior to that, there was no established public market for our common stock. The following

table sets forth for the periods indicated the high and low sales prices of our common stock on the Nasdaq Capital Market:

Year Ended December 31, 2008	High	Low
First Quarter (commencing on March 12, 2008)	$23.95	$6.01
Second Quarter	$10.12	$5.22
Third Quarter	$ 9.05	$6.42
Fourth Quarter	$12.25	$5.41

Holders

As of March 9, 2009, there were approximately 650 holders of record of our common stock. Because many of our shares are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of individual stockholders represented by these records.

Dividends

We have never paid any dividends and do not anticipate paying any dividends on our common stock in the foreseeable future. We expect to retain future earnings, if any, for use in our development activities and the operation of our business. The payment of any future dividends will be subject to the discretion of our board of directors and will depend, among other things, upon our results of operations, financial condition, cash requirements, prospects and other factors that our board of directors may deem relevant. Additionally, our ability to pay future dividends may be restricted by the terms of any debt financing.

Securities authorized for issuance under equity compensation plans

Information relating to our equity compensation plans will be included in our proxy statement in connection with our 2009 Annual Meeting of Stockholders, under the caption "Equity Compensation Plan Information". The relevant portion of our proxy statement is incorporated herein by reference.

Performance Graph

Because we are a smaller reporting company, we are not required to provide this information.

Recent Sales of Unregistered Securities

Set forth below is information regarding shares of common stock and preferred stock issued, and options and warrants granted, by us during the period covered by this report. Also included is the consideration, if any, received by us for such shares, options and warrants and information relating to the section of the Securities Act, or rule of the SEC under which exemption from registration was claimed.

Preferred Stock

There were no unregistered shares of preferred stock issued by us through December 31, 2008.

Common Stock

There were no unregistered shares of common stock issued by us through December 31, 2008.

Common Stock Warrants

On October 3, 2008, we licensed exclusive worldwide rights to technology for the oral delivery of RNAi therapeutics from UMMS. As consideration for this license, we agreed to pay a total license fee of $2,500,000 over a 12 month period, which we may elect to pay in cash, in equity or a combination thereof, provided that a specified amount of the license fee must be made in cash. Payments made in equity may only be made if, at the time of such payment, the shares of common stock issuable upon conversion of the warrant have been registered for resale under the Securities Act of 1933. Approximately 260,000 shares of our common stock

valued using the closing price of our common stock on October 3, 2008 could potentially be issued under this agreement. No warrants have been issued under this agreement as of March 16, 2009.

On August 7, 2008, we issued 190,000 warrants to an investment bank as consideration for investment and business advisory services. The warrants have an exercise price of $7.036 per share and expire 5 years from the date of issuance, on August 7, 2013. The warrants vested as to 94,000 shares upon issuance, and then will vest at a rate of 32,000 shares per month starting on the 90 day anniversary of issuance, and are exercisable for a period of five years. We also agreed to give the holder of the warrant unlimited "piggy back" registration rights with respect to the shares of the Company's common stock underlying the warrant in any registration statement the Company files in connection with an underwritten offering of its common stock. The fair value of these warrants has been estimated based on the Black-Scholes options pricing model. The issuance of stock warrants and the common stock issuable upon the exercise of such warrants were issued pursuant to a written compensatory plan in reliance on the exemption provided by Rule 701 promulgated under the Securities Act. All recipients either received adequate information about us or had access, through employment or other relationships, to such information.

ITEM 6. *SELECTED FINANCIAL DATA*

Because we are a smaller reporting company, we are not required to provide the information required by this Item.

ITEM 7. *MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS*

You should read the following discussion in conjunction with the RXi financial statements and the notes to financial statements included elsewhere in this annual report. This "Management's Discussion and Analysis of Financial Condition and Results of Operations" section contains forward-looking statements. Please see "Forward-Looking Statements" above for a discussion of the uncertainties, risks and assumptions associated with these statements. Our actual results and the timing of certain events could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including those discussed below and elsewhere in this annual report.

Overview

We are a discovery-stage biopharmaceutical company pursuing proprietary therapeutics based on RNA interference, or RNAi, a naturally occurring cellular mechanism that has the potential to effectively and selectively interfere with, or "silence," expression of targeted disease-associated genes. We intend to focus on certain metabolic and inflammatory diseases. By utilizing our expertise in RNAi and the RNAi technology platform that we have established, we believe we will be able to discover and develop lead compounds and move them into and through development for potential commercialization more efficiently than traditional drug development approaches.

We were formed in 2006 by CytRx and four prominent RNAi researchers, including Dr. Craig Mello, who was awarded the 2006 Nobel Prize in Medicine for his co-discovery of RNAi. From 2003 through 2006, CytRx sponsored therapeutic RNAi research at UMMS and Massachusetts General Hospital. We commenced operations in January 2007 after CytRx contributed to us its portfolio of RNAi therapeutic assets in exchange for approximately 7.04 million shares of our common stock on January 8, 2007. These assets consisted primarily of RNAi licenses and related intellectual property, and a nominal amount of equipment. The cost of the licenses had previously been expensed by CytRx as in-process research and development and was recorded in the predecessor financial statements at cost.

To date, our principal activities have consisted of recruiting an RNAi-focused management and scientific and clinical advisory team which has focused on assessing and acquiring additional RNAi technologies, performing discovery and pre-clinical research, developing clinical strategies, exploring potential development partnerships and completing our organizational activities.

We have not generated revenue to date and may not generate revenue in the foreseeable future, if ever. We expect to incur significant operating losses as we advance our product candidates through the drug development and regulatory process. In addition to increasing research and development expenses, we expect general and administrative costs to increase related to operation as a public company and as we add personnel. We will need to generate significant revenues to achieve profitability and might never do so. In the absence of product revenues, our potential sources of operational funding are expected to be the proceeds from the sale of equity, funded research and development payments and payments under collaborative agreements. We believe that our existing cash, cash equivalents, and potential proceeds from the SEDA should be sufficient to fund our operations through at least the first half of 2010. In the future, we will be dependent on obtaining financing from third parties in order to maintain our operations and to meet our obligations to UMMS and other licensors. We cannot assure that additional debt or equity or other funding will be available to us on acceptable terms, or at all. If we fail to obtain additional funding when needed, we would be forced to scale back, or terminate, our operations, or to seek to merge with or to be acquired by another company.

The Founding and Funding of RXi

On April 30, 2007, we issued approximately 3,273,000 additional shares of our common stock to CytRx at $5.19 per share, based in part, upon the advice of the third-party valuation advisor and assuming the issuance of 462,112 shares to UMMS pursuant to our license agreements with them, in exchange for CytRx's additional investment of $17.0 million. On September 25, 2007, we issued an additional 188,387 shares of common stock to CytRx at $5.19 per share to satisfy in full certain reimbursement amounts owed to CytRx by us. CytRx currently owns approximately 46% of our outstanding shares of common stock. In the event that we propose to sell or issue shares of RXi common stock in the future, CytRx will have the right to purchase a portion of such shares sufficient to maintain its percentage ownership at the time of such sale or issuance. This right will terminate on the earlier of January 8, 2012 or the first date at which CytRx owns less than 10% of our outstanding shares.

On June 24, 2008, we issued 1,073,299 shares of our common stock to institutional investors at $8.12 per share, resulting in aggregate gross proceeds of approximately $8.7 million.

Research and Development

We are currently focusing on the areas of metabolic and inflammatory diseases. In order to support the advancement of RNAi compounds in these therapeutic areas, our research programs are focused on optimizing the delivery method and technology necessary to make RNAi compounds available by local, systemic or oral administration, as appropriate for each specific disease for which we are seeking to develop an RNAi therapeutic. Since we commenced operations, research and development has comprised a significant proportion of our total operating expenses and is expected to comprise the majority of our spending for the foreseeable future.

There are risks in any new field of drug discovery that preclude certainty regarding the successful development of a product. We cannot reasonably estimate or know the nature, timing and costs of the efforts necessary to complete the development of, or the period in which material net cash inflows are expected to commence from, any product candidate. Our inability to make these estimates results from the uncertainty of numerous factors, including but not limited to:

- Our ability to advance product candidates into pre-clinical research and clinical trials;
- The scope and rate of progress of our pre-clinical program and other research and development activities;
- The scope, rate of progress and cost of any clinical trials we commence;
- The cost of filing, prosecuting, defending and enforcing patent claims and other intellectual property rights;
- Clinical trial results;
- The terms and timing of any collaborative, licensing and other arrangements that we may establish;

- The cost and timing of regulatory approvals;
- The cost of establishing clinical and commercial supplies of our product candidates and any products that we may develop;
- The cost and timing of establishing sales, marketing and distribution capabilities;
- The effect of competing technological and market developments; and
- The effect of government regulation and insurance industry efforts to control healthcare costs through reimbursement policy and other cost management strategies.

Failure to complete any stage of the development of our product candidates in a timely manner could have a material adverse effect on our operations, financial position and liquidity.

Licenses

We have entered into licensing relationships with academic institutions, research foundations and commercial entities, and may seek to enter into additional licenses with pharmaceutical and biotechnology companies. We also may enter into strategic alliances to expand our RNAi intellectual property portfolio and to potentially accelerate our development programs by gaining access to technology and funding, including equity sales, license fees and other revenues. For each product that we develop that is covered by the patents licensed to us pursuant to one of the license agreements we have entered into, including the material licenses discussed below, we are obligated to make additional payments upon the attainment of certain specified product development milestones.

University of Massachusetts Medical School and Imperial College

As part of the January 8, 2007 contribution of assets by CytRx, we became a party to a number of exclusive and non-exclusive license agreements with UMMS. The exclusive license agreements from UMMS cover potential applications of proprietary RNAi technology in the treatment of ALS, obesity, type 2 diabetes and cancer. As consideration for these licenses, CytRx made cash payments to UMMS totaling $171,000 and issued a total of approximately 1,548,000 shares of CytRx common stock at the fair market price on the date of the transaction of approximately $0.99 per share, or $1.5 million, for financial statement purposes. Pursuant to these licenses assigned from CytRx, we have assumed the obligation to pay annual license maintenance fees in an aggregate amount of $130,000. Additionally, we were assigned from CytRx a license from the Imperial College of Science, Technology & Medicine. This license provides the exclusive rights to intellectual property covering a drug screening method using RIP 140, which, according to a June 2004 study published in the *Proceedings of the National Academy of Sciences of the United States of America*, is a nuclear hormone corepressor believed to regulate fat accumulation. As consideration for the license, CytRx made cash payments to Imperial College totaling $87,000 and issued a total of 75,000 shares of CytRx common stock, valued at the market price of CytRx common stock at the date of the transaction of $1.44 per share for financial statement purposes, or $108,000. Pursuant to this license we have assumed the obligation to make royalty payments based on sales of products developed using this technology.

The drug screening technology licensed from Imperial College and the RNAi technology licensed from UMMS had not yet achieved technological feasibility at the time of their license by CytRx, had no alternative future uses and, therefore, no separate economic value and, accordingly, the total value of the consideration was expensed by CytRx as research and development for the year ended December 31, 2004. In accordance with accounting for transfers between entities under common control, such licenses were transferred onto our books and recorded with a zero cost basis.

Further, we have directly entered into one non-exclusive license agreement, three exclusive license agreements and an invention disclosure agreement with UMMS for which we paid cash of $453,000 and issued 462,112 shares of our common stock valued at $2.3 million. The invention disclosure agreement has an initial term of three years and provides the option to negotiate licenses to certain RNAi technologies discovered at UMMS. Pursuant to the four license agreements, we paid up-front fees in an aggregate amount

We have not generated revenue to date and may not generate revenue in the foreseeable future, if ever. We expect to incur significant operating losses as we advance our product candidates through the drug development and regulatory process. In addition to increasing research and development expenses, we expect general and administrative costs to increase related to operation as a public company and as we add personnel. We will need to generate significant revenues to achieve profitability and might never do so. In the absence of product revenues, our potential sources of operational funding are expected to be the proceeds from the sale of equity, funded research and development payments and payments under collaborative agreements. We believe that our existing cash, cash equivalents, and potential proceeds from the SEDA should be sufficient to fund our operations through at least the first half of 2010. In the future, we will be dependent on obtaining financing from third parties in order to maintain our operations and to meet our obligations to UMMS and other licensors. We cannot assure that additional debt or equity or other funding will be available to us on acceptable terms, or at all. If we fail to obtain additional funding when needed, we would be forced to scale back, or terminate, our operations, or to seek to merge with or to be acquired by another company.

The Founding and Funding of RXi

On April 30, 2007, we issued approximately 3,273,000 additional shares of our common stock to CytRx at $5.19 per share, based in part, upon the advice of the third-party valuation advisor and assuming the issuance of 462,112 shares to UMMS pursuant to our license agreements with them, in exchange for CytRx's additional investment of $17.0 million. On September 25, 2007, we issued an additional 188,387 shares of common stock to CytRx at $5.19 per share to satisfy in full certain reimbursement amounts owed to CytRx by us. CytRx currently owns approximately 46% of our outstanding shares of common stock. In the event that we propose to sell or issue shares of RXi common stock in the future, CytRx will have the right to purchase a portion of such shares sufficient to maintain its percentage ownership at the time of such sale or issuance. This right will terminate on the earlier of January 8, 2012 or the first date at which CytRx owns less than 10% of our outstanding shares.

On June 24, 2008, we issued 1,073,299 shares of our common stock to institutional investors at $8.12 per share, resulting in aggregate gross proceeds of approximately $8.7 million.

Research and Development

We are currently focusing on the areas of metabolic and inflammatory diseases. In order to support the advancement of RNAi compounds in these therapeutic areas, our research programs are focused on optimizing the delivery method and technology necessary to make RNAi compounds available by local, systemic or oral administration, as appropriate for each specific disease for which we are seeking to develop an RNAi therapeutic. Since we commenced operations, research and development has comprised a significant proportion of our total operating expenses and is expected to comprise the majority of our spending for the foreseeable future.

There are risks in any new field of drug discovery that preclude certainty regarding the successful development of a product. We cannot reasonably estimate or know the nature, timing and costs of the efforts necessary to complete the development of, or the period in which material net cash inflows are expected to commence from, any product candidate. Our inability to make these estimates results from the uncertainty of numerous factors, including but not limited to:

- Our ability to advance product candidates into pre-clinical research and clinical trials;
- The scope and rate of progress of our pre-clinical program and other research and development activities;
- The scope, rate of progress and cost of any clinical trials we commence;
- The cost of filing, prosecuting, defending and enforcing patent claims and other intellectual property rights;
- Clinical trial results;
- The terms and timing of any collaborative, licensing and other arrangements that we may establish;

Research and Development Expenses

Research and development costs are expensed as incurred. Included in research and development costs are wages, benefits and other operating costs, facilities, supplies, external services and overhead directly related to our Company's research and development departments as well as costs to acquire technology licenses.

Stock-Based Compensation

Prior to January 1, 2006, CytRx accounted for its stock based compensation plans under the recognition and measurement provisions of Accounting Principles Board No. 25, *"Accounting for Stock Issued to Employees"* ("APB 25") and related interpretations for all awards granted to employees. Under APB 25, when the exercise price of options granted to employees equals the market price of the common stock on the date of grant, no compensation expense is recorded. When the exercise price of options granted to employees is less than the market price of the common stock on the date of grant, compensation expense is recognized over the vesting period.

We have adopted SFAS 123(R), and compensation cost for all share-based payments, based on the grant date fair value estimated in accordance with the provisions of SFAS 123(R), is recognized as an expense over the requisite service period.

The fair value of each option grant is estimated using the Black-Scholes option-pricing model, with the following weighted average assumptions:

	2008	2007
Weighted average risk free interest rate	1.55% - 3.99%	4.50%
Weighted average volatility	101.79% - 116.74%	108.7%
Expected lives (years)	6 - 10	6 - 10
Expected dividend yield	0%	0%

Based on CytRx's historical experience, we estimated an annualized forfeiture rate of 4.0% for options granted to employees and 2.1% for options granted to senior management and no forfeiture rate for options issued to directors. Any change in actual forfeitures from our historical experience could result in a corresponding change in the amount of compensation expenses recorded in any single quarterly or annual period.

We account for equity instruments issued to non-employees in accordance with the provisions of SFAS 123(R), Emerging Issues Task Force Issue ("EITF") No. 96-18, *"Accounting for Equity Instruments that are Issued to other than Employees for Acquiring, or in Conjunction with Selling Goods or Services"* and EITF 00-18, *"Accounting Recognition for Certain Transactions involving Equity Instruments Granted to Other Than Employees,* as amended," which require that such equity instruments be recorded at their fair value on the measurement date. The measurement of share-based compensation generally is subject to periodic adjustment as the underlying equity instruments vest.

Non-employee share-based compensation charges generally are amortized over the vesting period on a straight-line basis. In certain circumstances, option grants to non-employees are immediately vested and have no future performance requirements by the non-employee and the total share-based compensation charge is recorded in the period of the measurement date.

Valuation of Common Stock

Management of CytRx determined that the aggregate fair value of the technologies and assets contributed to us was approximately $17.2 million as of January 8, 2007 based, in part, upon the advice of an independent third-party valuation advisor, engaged by management of CytRx for this purpose. The actual fair value of the contributed technologies and assets as of January 8, 2007 may have been different. Based on this valuation by CytRx, CytRx was issued a total of 7,040,318 shares, at a price of $2.45 per share. For financial reporting

purposes, we recorded the technologies and assets contributed to us at the historical cost basis of CytRx as of January 8, 2007 of $48,000.

Subsequently, on April 30, 2007, we issued 3,273,292 additional shares of our common stock to CytRx in exchange for CytRx's investment in of $17.0 million. Management of CytRx and RXi determined that the fair market value of RXi as of April 30, 2007 was approximately $45.0 million and the value of our common stock as of this date was $5.00 per share, based in part, upon the further advice of the third-party valuation advisor originally engaged by management of CytRx in connection with the January 8, 2007 contribution and assuming the issuance of 462,112 shares to UMMS pursuant to our license agreements with them. The fair market value was determined based on a combination of the reproduction cost approach discussed above, as well as the "market capitalization increase approach" and the "guidelines public company method — book value multiplier approach" discussed below.

Our common stock was registered and began trading publicly on March 12, 2008. As a result, the actual value of a common share may be materially different than the fair value per share determined using any of the prior valuations discussed above.

Impairment of Long-Lived Assets

We review long-lived assets for impairment on an annual basis, as of December 31, or on an interim basis if an event occurs that might reduce the fair value of such assets below their carrying values. An impairment loss would be recognized based on the difference between the carrying value of the asset and its estimated fair value, which would be determined based on either discounted future cash flows or other appropriate fair value methods. If our estimates used in the determination of either discounted future cash flows or other appropriate fair value methods are not accurate as compared to actual future results, we may be required to record an impairment charge.

Results of Operations

For the year ended December 31, 2008, our net loss was approximately $14,373,000, compared with a net loss of $10,990,000 for the year ended December 31, 2007. The loss increased by $3,383,000 or approximately 31%. Reasons for the variations in the losses between the years are discussed below.

Revenue

Since we are a discovery-stage biopharmaceutical company, we have not generated any revenues since inception through December 31, 2008. Accordingly, for accounting purposes we are considered a development stage company.

Research and Development Expense

	For the Years Ended December 31,	
	2008	2007
	(In thousands)	
Research and development expense	$5,105	$3,273
Research and development employee stock-based compensation expense	336	120
Research and development non-employee stock-based compensation expense	1,613	1,043
Fair value of common stock issued in exchange for licensing rights	—	2,311
Total research and development expense	$7,054	$6,747

During 2008, research and development expense consisted primarily of personnel-related costs, SAB compensation, laboratory supplies, license maintenance expenses and new technology licenses.

Total research and development expenses for the year ended December 31, 2008 were approximately $7,054,000, or 48% of our total expenses incurred. For the year ended December 31, 2007, total research and

development expenses were approximately $6,747,000 or 59% of our total expenses incurred, an increase of approximately $307,000, or 5%. Research and development expenses increased $1,832,000, or 56%, from $3,273,000 in the year ended December 31, 2007 to $5,105,000 in the year ended December 31, 2008. This increase was due to higher staff-related costs, laboratory supplies costs, and costs associated with the licensing of the GeRP oral delivery technology from UMMS during 2008, partially offset by the reduction of costs associated with the issuance of common stock in exchange for licensing rights during 2007.

During 2007, research and development expense consisted primarily of costs related to the UMMS license and invention disclosure agreements, sponsored research agreements with both UMMS and Massachusetts General Hospital, and compensation for our SAB members.

We expect to continue to devote a substantial portion of our resources to research and development expenses and that research and development expenses will increase for the foreseeable future as our discovery and development activities progress and expand.

Research and development employee stock-based compensation expense

Research and development employee stock-based compensation expense increased $216,000 in the year ended December 31, 2008, compared to the year ended December 31, 2007. This increase was due to an increase in the Black-Scholes fair value of existing common stock options as well as new common stock options issued to new employees and to certain existing employees which were valued under SFAS 123(R).

Research and Development Non-Employee Stock-Based Compensation Expense

We issued options to purchase shares of our common stock as compensation to SAB members and consultants. For financial statement purposes, we valued these shares at their fair value. Fluctuations in non-employee stock-based compensation expense resulted from variations in the number of common stock options issued, vesting schedules and the Black-Scholes fair values of common stock options granted to SAB members.

Research and development non-employee stock based compensation expenses increased $570,000, or 55%, from $1,043,000 for the year ended December 31, 2007 to $1,613,000 for the year ended December 31, 2008. The increase was due to an increase in the Black-Scholes fair value of these options and new grants issued to our founders as well as a new member of our SAB.

Fair Value of Common Stock Issued in Exchange for Licensing Rights

Fair value of common stock issued in exchange for licensing rights decreased $2,311,000 for the year ended December 31, 2008 compared to the year ended December 31, 2007. The decrease was due to a common stock grant to UMMS for a new license agreement in the year ended December 31, 2007. No similar grants were made in the year ended December 31, 2008.

General and Administrative Expense

	For the Years Ended December 31,	
	2008	2007
	(In thousands)	
General and administrative expenses	$4,874	$3,760
Common stock warrants issued for general and administrative expense	750	—
Common stock and stock options issued for general and administrative expense	1,875	931
Total general and administrative expense	$7,499	$4,691

General and administrative expenses include all administrative salaries and general corporation expenses, as well as certain expenses incurred with the formation of RXi which are directly associated with us, such as legal and accounting expenses, as well as other similar expenses.

General and administrative expenses were $7,499,000 for the year ended December 31, 2008 compared with $4,691,000 for the year ended December 31, 2007. The increase of $2,808,000 or 60%, was due to higher staff-related costs, including $1,875,000 in stock option compensation expense, $750,000 in non-cash stock warrant compensation costs and costs generally associated with being a public company, including legal, printing and other costs related to our SEC filings and investor relations, partially offset by the elimination of the allocation of indirect costs from CytRx. General and administrative expenses include compensation-related costs for our employees dedicated to general and administrative activities, legal fees, audit and tax fees, consultants and professional services and general corporation expenses.

The share-based compensation for general and administrative costs increased $944,000, or 101%, from $931,000 for the year ended December 31, 2007, to $1,875,000 for the year ended December 31, 2008. This increase was due to an increase in the Black-Scholes fair value of common stock options issued to new and existing employees and directors which were valued under SFAS 123(R).

The common stock warrants issued for general and administrative costs increased $750,000 in the year ended December 31, 2008, compared to the year ended December 31, 2007, when the expense was zero. This increase was due to the issuance of common stock warrants as compensation for certain advisory services provided to us by an investment bank.

General and administrative expense as a percentage of total expense for the years ended December 31, 2008 and 2007 was 52% and 41%, respectively, of the total expense. The relatively low general and administrative expense levels for the prior years are indicative of the fact that the research activities were performed by independent third parties, which required less managerial oversight and administrative activity during the predecessor period as compared to the successor period. Although, we expect general and administrative expense to increase for the foreseeable future as we add personnel, the percentage of general and administrative expense to total expense is expected to decrease as our discovery and development activities for RNAi therapeutics progress and expand.

From time to time, we expect to issue shares of our common stock or warrants or options to purchase shares of our common stock to consultants and other service providers in exchange for services. For financial statement purposes, we will value these shares of common stock, common stock options, and warrants at the fair value, or at the value of the services received, whichever is more reliably measurable.

Interest Income

Interest income was approximately $180,000 for the year ended December 31, 2008, compared with approximately $448,000 for the year ended December 31, 2007. This decrease was primarily due to a decline in interest rates during the twelve months ended December 31, 2008, as compared with the twelve months ended December 31, 2007. We expect to have interest income in future periods based on our current account balances and potentially from additional capital we may receive in the future.

Interest income for the year ended December 31, 2007 was $448,000 due to the interest earned on the net $15,498,000 of cash received for additional equity in 2007.

Income Taxes

There was no income tax expense for the years ended December 31, 2008 and 2007 due to the fact that we have incurred significant tax losses since we began operations. A tax benefit would have been recorded for losses however, due to the uncertainty of realizing these assets, a valuation allowance was recognized which fully offset the deferred income tax assets.

Liquidity and Capital Resources

In April 2007, we issued 3,273,292 shares of common stock (valued at approximately $5.00 per share, based in part, upon the advice of the third-party valuation advisor and assuming the issuance of 462,112 shares to UMMS pursuant to our license agreements with them) in exchange for $15.0 million in cash from CytRx and the settlement of our inter-company account payable due to CytRx of approximately $2.0 million. On

June 24, 2008, we issued 1,073,299 shares of our common stock to institutional investors at $8.12 per share resulting in aggregate gross proceeds of approximately $8.7 million. On January 30, 2009, we entered into a SEDA with YA Global, pursuant to which we may, at our option over a two-year period, periodically sell to YA Global shares of our common stock, for a total purchase price of up to $25,000,000.

We have not had any revenue since inception nor are any revenues expected for the foreseeable future; however, it will be necessary for us to fund our operations, including general and administrative expenses as well as expenditures for research and development. We believe that our existing cash, cash equivalents, and potential proceeds from the SEDA should be sufficient to fund our operations through at least the first half of 2010. In the future, we will be dependent on obtaining financing from third parties in order to maintain our operations and to meet our obligations to UMMS and other licensors. We cannot assure that additional debt or equity or other funding will be available to us on acceptable terms, or at all. If we fail to obtain additional funding when needed, we would be forced to scale back, or terminate, our operations, or to seek to merge with or to be acquired by another company.

Net Cash Flow from Operating Activities

Net cash used in operating activities was approximately $9,429,000 for the year ended December 31, 2008 compared with $6,047,000 net cash used in operating activities for the year ended December 31, 2007. The increase of approximately $3,382,000 in the use of cash resulted primarily from a net loss of $14,373,000, less the add back of non-cash items of $4,944, 000, of which $3,824,000 related to stock-based compensation, $750,000 related to stock warrant expense in exchange for services, $131,000 related to depreciation, $207,000 related to net accrued interest on short-term investments and $5,000 related to changes in current assets and liabilities.

Net cash used in operating activities was approximately $6,047,000 for the year ended December 31, 2007. This use of cash resulted primarily from a net loss of $10,990,000, less the add back of non-cash items of $2,311,000 related to common stock issued for license rights, $2,094,000 related to stock-based compensation, $36,000 related to depreciation, $172,000 related to non-cash interest earned and $674,000 related to changes in current assets and liabilities.

Net Cash Flow from Investing Activities

Net cash provided by investing activities was approximately $9,600,000 for the year ended December 31, 2008, compared with net cash used of $10,025,000 for the year ended December 31, 2007. The increase of approximately $19,625,000 in cash provided by investing activities was primarily due to the redemption of short-term investments offset by purchases of short-term investments.

Net cash used in investing activities was approximately $10,025,000 for the year ended December 31, 2007, which primarily included the purchase of United States Treasury Bills held as short-term investments in the amount of $11,757,000, the purchase of equipment and furnishings in the amount of $229,000, offset by the redemption of United States Treasury Bills held as short-term investments in the amount of $1,977,000.

Net Cash Flow from Financing Activities

Net cash provided by financing activities was $7,922,000 for the year ended December 31, 2008, compared with $17,833,000 for the year ended December 31, 2007. This decrease was primarily due to the $15,498,000 issuance of common stock in the second quarter of 2007, partially offset by an issuance of common stock in the amount of $7,918,000 to institutional investors in the second quarter of 2008.

Net cash provided by financing activities was $17,833,000 for the year ended December 31, 2007, which represented proceeds of $15,498,000 from the issuance of common stock, $2,005,000 in cash advances from CytRx, and $330,000 from the exercise of common stock options.

Recently Issued Accounting Standards

Effective January 1, 2008, the Company implemented SFAS No. 157, *"Fair Value Measurements,"* or SFAS 157, for the Company's financial assets and liabilities that are re-measured and reported at fair value at each reporting period, and are re-measured and reported at fair value at least annually using a fair value hierarchy that is broken down into three levels. The Company categorizes its cash equivalents as Level 1 investments. The valuation for Level 1 was determined based on a "market approach" using quoted prices in active markets for identical assets. Valuations of these assets do not require a significant degree of judgment. The adoption of SFAS 157 as it relates to the Company's financial assets and liabilities that are re-measured and reported at fair value at least annually did not have an impact on the Company's financial results. In accordance with FSP Nos. FAS 157-2, *"Effective date of FASB Statement No. 157,"* the Company has elected to defer implementation of SFAS 157 as it related to its non-financial assets and liabilities. The Company does not expect that the adoption of this standard will have an impact on its non-financial assets and liabilities.

In December 2007, the EITF reached a consensus on EITF No. 07-01, *Accounting for Collaborative Arrangements Related to the Development and Commercialization of Intellectual Property* or EITF 07-01. EITF 07-01 discusses the appropriate income statement presentation and classification for the activities and payments between the participants in arrangements related to the development and commercialization of intellectual property. The sufficiency of disclosure related to these arrangements is also specified. EITF 07-01 is effective for fiscal years beginning after December 15, 2008. We expect that the adoption of EITF 07-01 will have minimal, if any, impact on our financial position and results of operations. However, based upon the nature of our business, EITF 07-01 could have a material impact on our financial position and results of operations in future years.

In June 2007, the FASB ratified the consensus reached on EITF Issue No. 07-3, *"Accounting for nonrefundable Advance Payments for Goods or Services Received for Use in Future Research and Development Activities"* or EITF 07-3, which requires that nonrefundable advance payments for goods or services that will be used or rendered for future research and development activities be deferred and amortized over the period that the goods are delivered or the related services are performed, subject to an assessment of recoverability. EITF 07-3 will be effective for fiscal years beginning after December 15, 2007. The adoption of EITF 07-3 did not have an impact on our financial position and results of operation.

In February 2007, the FASB issued SFAS No. 159, *"The Fair Value Option for Financial Assets and Financial Liabilities"* or SFAS No. 159. SFAS No. 159 permits entities to choose to measure many financial assets and financial liabilities at fair value. Unrealized gains and losses on items for which the fair value option has been elected are reported in earnings. SFAS No. 159 is effective for fiscal years beginning after November 15, 2007. The adoption of SFAS No. 159 did not have an impact on our financial position and results of operation.

Off-Balance Sheet Arrangements

In connection with certain license agreement, we are required to indemnify the licensor for certain damages arising in connection with the intellectual property rights licensed under the agreement. In addition, we are a party to a number of agreements entered into in the ordinary course of business that contain typical provisions that obligate us to indemnify the other parties to such agreements upon the occurrence of certain events. These indemnification obligations are considered off-balance sheet arrangements in accordance with FASB Interpretation No. 45, "Guarantor's Accounting and Disclosure Requirements for Guarantees, Including Indirect Guarantees of Indebtedness of Others." To date, we have not encountered material costs as a result of such obligations and have not accrued any liabilities related to such obligations and have not accrued any liabilities related to such obligations in our financial statements. See Note 9 to our financial statements included in this annual report on Form 10-K for further discussion of these indemnification agreements.

On January 30, 2009, we entered into a SEDA with YA Global pursuant to which we may, at our sole and exclusive option, periodically sell to YA Global shares of our common stock at a price based on it then current market price for a total purchase price of up to $25,000,000. Advance notices may be given to YA Global once every five trading days, and advances shall not be more than $500,000. The purchase price for shares of common stock shall be 95% of the lowest volume weighted average price of the common stock during the five (5) consecutive trading days after the advance notice date. YA Global is not obligated to fund any advance

from us until such time as a registration statement which registers the resale of the shares of our common stock to be issued to YA Global is declared effective by the SEC, which has not yet occured. The term of the SEDA is two years.

We issued YA Global an aggregate of 58,398 shares of our common stock as a commitment fee in connection with the transaction. RXi has also paid to Yorkville Advisors, LLC, YA Global's general partner, a due diligence and structuring fee of $25,000. In addition, we are obligated to pay Yorkville a $500 structuring fee taken directly out of the gross proceeds of each advance.

ITEM 7A. *QUANTITATIVE AND QUALITATIVE DISCLOSURE ABOUT MARKET RISK*

Because we are a smaller reporting company, we are not required to provide the information required by this Item.

ITEM 8. *FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA*

RXi's financial information as of December 31, 2007 and 2008 and for the years then ended and for the cumulative financial information for the period from January 1, 2003 (date of inception) to December 31, 2008 have been audited by our independent registered public accounting firm, BDO Seidman, LLP.

Index to Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders
RXi Pharmaceuticals Corporation
Worcester, Massachusetts

We have audited the accompanying balance sheets of RXi Pharmaceuticals Corporation (a development stage Company) as of December 31, 2008 and 2007 and the related statements of expenses, stockholders' equity and cash flows for the years then ended and for the period from January 1, 2003 (date of inception) to December 31, 2008. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of RXi Pharmaceuticals Corporation as of December 31, 2008 and 2007 and the results of its operations and its cash flows for the years then ended and for the period from January 1, 2003 (date of inception) to December 31, 2008, in conformity with accounting principles generally accepted in the United States of America.

/s/ BDO Seidman, LLP

Boston, Massachusetts
March 13, 2009

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

BALANCE SHEETS
AS OF DECEMBER 31, 2008 AND 2007

	2008	2007
	(Amounts in thousands, except per share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 9,856	$ 1,763
Short term investments, at amortized cost	—	9,952
Prepaid expenses	73	22
Total current assets	9,929	11,737
Equipment and furnishings, net of accumulated depreciation and amortization of $158 and $26 in 2008 and 2007, respectively	414	344
Deposits	16	66
Total assets	$ 10,359	$ 12,147
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 394	$ 55
Accrued expense and other current liabilities	976	1,062
Current maturities of capital lease obligations	17	—
Due to former parent company	—	207
Total current liabilities	1,387	1,324
Capital lease obligations, net of current maturities	4	—
Total liabilities	1,391	1,324
Commitments and contingencies (Notes 9, 10 & 15)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 5,000,000 shares authorized; no shares issued and outstanding	—	—
Common stock, $0.0001 par value; 50,000,000 shares authorized; 13,763,231 and 12,684,432 shares issued and outstanding in 2008 and 2007, respectively	1	1
Additional paid-in capital	34,330	21,812
Deficit accumulated during the developmental stage	(25,363)	(10,990)
Total stockholders' equity	8,968	10,823
Total liabilities and stockholders' equity	$ 10,359	$ 12,147

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

STATEMENTS OF EXPENSES

	Year Ended December 31, 2008	Year Ended December 31, 2007	Period from January 1, 2003 (Date of Inception) to December 31, 2008
	(Amounts in thousands, except per share data)		
Expenses:			
Research and development expense	$ 5,105	$ 3,273	$ 13,909
Research and development employee stock-based compensation expense	336	120	456
Research and development non-employee stock-based compensation expense	1,613	1,043	4,023
Fair value of common stock issued in exchange for licensing rights	—	2,311	3,954
Total research and development expense	7,054	6,747	22,342
General and administrative	4,874	3,760	10,134
Fair value of common stock warrants issued for general and administrative expenses	750	—	750
General and administrative employee stock-based compensation	1,875	931	2,806
Total general and administrative expense	7,499	4,691	13,690
Total operating expenses	(14,553)	(11,438)	(36,032)
Interest income	180	448	628
Loss before provision for income taxes	(14,373)	(10,990)	(35,404)
Provision for income taxes	—	—	—
Net loss	$ (14,373)	$ (10,990)	$(35,404)
Net loss per common share:			
Basic and diluted loss per share	$ (1.09)	$ (.99)	
Weighted average common shares outstanding: basic and diluted	13,239,942	11,114,765	

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

STATEMENTS OF STOCKHOLDERS' EQUITY FOR THE PERIOD FROM APRIL 3, 2006 TO DECEMBER 31, 2008 AND PARENT COMPANY'S NET DEFICIT FOR THE PERIOD FROM DECEMBER 31, 2003 TO DECEMBER 31, 2006

Predecessor	Common Stock Shares Issued	Common Stock Amount	Additional Paid-In Capital	Deficit Accumulated During Development Stage	Parent Company's Net Deficit	Total
		(Amounts in thousands, except per share data)				
Balance at December 31, 2003	—	$—	$ —		$ (89)	$ (89)
Net loss	—	—	—		(3,272)	(3,272)
Net transactions with Parent	—	—	—		2,393	2,393
Balance at December 31, 2004	—	—	—		(968)	(968)
Net loss	—	—	—		(2,209)	(2,209)
Net transactions with Parent	—	—	—		2,727	2,727
Balance at December 31, 2005	—	—	—		(450)	(450)
Net Loss	—	—	—		(2,405)	(2,405)
Net transactions with Parent	—	—	—		2,587	2,587
Balance at December 31, 2006	—	$—	$ —		$ (268)	$ (268)
Successor						
Balance at April 3, 2006	—	$—	$ —	$ —		$ —
Issuance of common stock	1,624,278	—	2	—		2
Balance at December 31, 2006	1,624,278	—	2	—		2
Common stock issued to CytRx for contribution of RXi and other assets	7,040,318	1	47	—		48
Common stock issued for cash	3,273,292	—	15,348	—		15,348
Common stock issued to CytRx for reimbursement of expenses	188,387	—	978	—		978
Expenses incurred by CytRx for RXi	—	—	831	—		831
Common stock issued to UMMS for additional intellectual properties	462,112	—	2,311	—		2,311
Common stock issued to directors	30,000	—	150	—		150
Common stock issued upon exercise of stock options	66,045	—	331			331
Stock based compensation for directors and employees	—	—	1,048	—		1,048
Stock based compensation expense for services	—	—	766	—		766
Net loss	—	—	—	(10,990)		(10,990)
Balance at December 31, 2007	12,684,432	1	21,812	(10,990)		10,823
Issuance of common stock, net of offering costs of $796	1,073,229	—	7,918	—		7,918
Common stock issued upon exercise of stock options	5,500	—	26	—		26
Stock based compensation for directors and employees	—	—	2,211	—		2,211
Stock based compensation expense for services	—	—	1,613	—		1,613
Common stock warrant expense in exchange for services			750			750
Net loss	—	—	—	(14,373)		(14,373)
Balance at December 31, 2008	13,763,231	$ 1	$34,330	$(25,363)		$ 8,968

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

STATEMENTS OF CASH FLOWS

	Year Ended December 31, 2008	Year Ended December 31, 2007	Period from January 1, 2003 (Date of Inception) through December 31, 2008
	(Amounts in thousands, except per share data)		
Cash flows from operating activities:			
Net loss	$(14,373)	$(10,990)	$(35,404)
Adjustment to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization expense	131	36	167
Loss on disposal of equipment	8	—	8
Non-cash rent expense	29	—	29
Accretion and receipt of bond discount	207	(172)	35
Non-cash shared based payments	3,824	2,094	7,287
Fair value of common stock warrants issued in exchange for services	750	—	750
Fair value of common stock issued in exchange for licensing rights	—	2,311	3,954
Changes in assets and liabilities:			
Prepaid expenses	(51)	(15)	(73)
Accounts payable	339	(79)	394
Due to parent	(207)	—	(207)
Accrued expenses and other current liabilities	(86)	768	976
Net cash used in operating activities	(9,429)	(6,047)	(22,084)
Cash flows from investing activities:			
Purchase of short-term investments	(19,785)	(11,757)	(31,542)
Maturities of short-term investments	29,530	1,977	31,507
Cash paid for purchase of equipment and furnishings	(166)	(229)	(498)
Cash refunded (paid) for lease deposit	21	(16)	(45)
Net cash provided by (used in) investing activities	9,600	(10,025)	(578)
Cash flows from financing activities:			
Net proceeds from issuance of common stock	7,918	15,498	23,418
Net proceeds from exercise of common stock options	26	330	356
Repayments of capital lease obligations	(22)	—	(22)
Cash advances from Parent, net		2,005	8,766
Net cash provided by financing activities	7,922	17,833	32,518
Net increase in cash and cash equivalents	8,093	1,761	9,856
Cash and cash equivalents at the beginning of period	1,763	2	—
Cash and cash equivalents at end of period	$ 9,856	$ 1,763	$ 9,856
Supplemental disclosure of cash flow information:			
Cash received during the periods for interest	$ 449	$ 274	$ 723
Cash paid during the periods for interest	$ 7	$ —	$ 7
Supplemental disclosure of non-cash investing and financing activities:			
Settlement of corporate formation expenses in exchange for common stock	$ —	$ 978	$ 978
Allocation of management expenses	$ —	$ 551	$ 551
Equipment and furnishings exchanged for common stock	$ —	$ 48	$ 48
Acquisition of equipment and furnishings through accrued liabilities	$ —	$ 103	$ —
Equipment and furnishings acquired through capital lease	$ 43	$ —	$ 43
Non-cash lease deposit	$ —	$ 50	$ 50

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

1. Nature of Business

RXi Pharmaceuticals Corporation ("RXi" or the "Company") was formed by CytRx Corporation ("CytRx" or the "Former Parent") and four prominent RNAi researchers, including Craig C. Mello, Ph.D., who was awarded the 2006 Nobel Prize in Medicine for his co-discovery of RNAi. The purpose of forming RXi was to pursue the development of proprietary therapeutics based on RNAi for the treatment of human diseases. By utilizing the Company's expertise in RNAi and the RNAi technology platform the Company has developed, the Company believes it will be able to efficiently identify lead compounds and advance towards clinical development of commercially marketable compounds, primarily in partnerships with pharmaceutical and larger biotech companies. Following the formation of RXi in 2006 and before the contribution in early 2007 of various RNAi therapeutic intellectual properties and equipment and furnishings by CytRx, RXi was an inactive company with limited transactions.

In 2003, CytRx entered into several technology license agreements with University of Massachusetts Medical School (UMMS) related to RNAi technologies. CytRx subsequently entered into other RNAi-related technology agreements. Three of these sponsored research agreements were with UMMS and one of the sponsored research agreements was with Massachusetts General Hospital. As more fully described below, these assets were contributed to RXi in the first quarter of 2007.

RXi was incorporated as Argonaut Pharmaceuticals, Inc., in Delaware, on April 3, 2006 by CytRx and RXi's four scientific founders, and the Company changed its name to RXi Pharmaceuticals Corporation on November 28, 2006. From April 3, 2006 (date of incorporation) until January 8, 2007, no business was conducted at the RXi level. On January 8, 2007, RXi entered into a contribution agreement with CytRx under which CytRx assigned and contributed to RXi substantially all of its RNAi-related technologies and assets and commenced operations; these contributed assets were recorded by RXi at the historical cost basis of $48,000.

Because the RNAi activities prior to 2007 were conducted by CytRx, the financial statements of RXi for the periods through December 31, 2006 have been disaggregated, or "carved-out," of the financial statements of CytRx. These carved-out financial statements form what are referred to herein as the financial statements of the "Predecessor," and include both direct and indirect expenses. The historical direct expenses consist primarily of the various costs for technology license agreements, sponsored research agreements and fees paid to scientific advisors. Indirect expenses during this period represent expenses incurred by CytRx on behalf of RXi, including salary, benefits, rent, accounting and other general and administrative expenses that have been allocated to RXi based upon estimates of the percentage of time spent by individual CytRx employees working on RXi matters. Management believes the assumptions underlying the allocations of indirect expenses in the carve-out financial information are reasonable; however, RXi's financial position, results of operations and cash flows may have been materially different if it was operated as a stand-alone entity as of and for the periods ended December 31, 2007. RXi's financial information from January 8, 2007 is referred to in these financial statements as the financial information of the "Successor" and includes expenses incurred by RXi in its RNAi therapeutic programs, as well as an allocation of indirect expenses relating to corporate services provided by CytRx through December 31, 2007. In addition, the net intercompany activities between Predecessor and CytRx have been accumulated into a single caption entitled "Parent Company's Net Deficit."

To date, RXi's principal activities have consisted of acquiring RNAi-related assets through exclusive and non-exclusive licenses to key RNAi technologies and patent rights, initiating research and pre-clinical development activities utilizing its RNAi therapeutic platform, recruiting a RNAi-focused management and scientific/clinical advisory team, capital raising activities and conducting business development activities aimed at establishing development partnerships with pharmaceutical and larger biotech companies.

As the Company has not generated any revenues from inception through December 31, 2008, the Company is considered a development-stage company for accounting purposes. On January 30, 2009, the

Company entered into Standby Equity Distribution Agreement (the "SEDA") with YA Global Master SPV Ltd. ("YA Global") pursuant to which the Company may, at its sole and exclusive option, periodically sell to YA Global shares of RXi common stock, for a total purchase price of up to $25,000,000. The Company believes that its existing cash, cash equivalents and potential proceeds from the SEDA are sufficient to fund operations through at least the first half of 2010. In the future, the Company will be dependent on obtaining funding from third parties in order to maintain its operations. There is no guarantee that additional debt, equity or other funding will be available to the Company on acceptable terms, or at all. If the Company fails to obtain additional funding when needed, it would be forced to scale back, or terminate, its operations or to seek to merge with or to be acquired by another company.

The Company expects to incur significant operating losses for the foreseeable future while it advances its future product candidates from discovery through pre-clinical studies and clinical trials and seek regulatory approval and potential commercialization, even if the Company is collaborating with pharmaceutical and larger biotech companies. In addition to these increasing research and development expenses, the Company expects general and administrative costs to increase as it recruits additional management and administrative personnel. The Company will need to generate significant revenues to achieve profitability and may never do so.

2. Summary of Significant Accounting Policies

Use of Estimates — The preparation of financial statements in accordance with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from these estimates.

Reclassifications — Certain prior year amounts have been reclassified to conform with the current year's presentation.

Cash and Cash Equivalents — The Company considers all highly-liquid debt instruments with an original maturity of 90 days or less to be cash equivalents. Cash equivalents consist primarily of amounts invested in money market accounts.

Fair Value of Financial Instruments — The carrying amounts reported in the balance sheet for cash equivalents, short-term investments, accounts payable and accrued liabilities approximate their fair values due to their short-term nature.

Short-term Investments — The Company purchased zero coupon U.S Treasury Bills at a discount in fiscal 2007 and 2008. These securities matured during fiscal 2008. These securities are measured at amortized cost in accordance with Statement of Financial Accounting Standards (SFAS) No. 115, *"Investments in Debt Securities"*. The interest income has been amortized using the effective interest rate.

Equipment and Furnishings — Equipment and furnishings are stated at cost and depreciated using the straight-line method based on the estimated useful lives (generally three to five years for equipment and furniture) of the related assets.

Impairment of Long-Lived Assets — The Company reviews long-lived assets, including finite lived intangible assets, for impairment on an annual basis, as of December 31, or on an interim basis if an event occurs that might reduce the fair value of such assets below their carrying values. An impairment loss would be recognized based on the difference between the carrying value of the asset and its estimated fair value, which would be determined based on either discounted future cash flows or other appropriate fair value methods. The Company believes no impairment existed as of December 31, 2008.

Patents and Patent Application Costs — Although the Company believes that its patents and underlying technology have continuing value, the amount of future benefits to be derived from the patents is uncertain. Patent costs are therefore expensed as incurred.

Share-based Compensation — CytRx accounted for its stock based compensation plans under the recognition and measurement provisions of Accounting Principles Board ("APB") No. 25, *"Accounting for Stock Issued to Employees"* or APB 25, and related interpretations for all awards granted to employees prior to January 1, 2006. Under APB 25, when the exercise price of options granted to employees equals the market price of the common stock on the date of grant, no compensation expense is recorded. When the exercise price of options granted to employees is less than the market price of the common stock on the date of grant, compensation expense is recognized over the service period which is typically the vesting period. CytRx did not allocate any APB 25 stock compensation expense to the Predecessor for the years ended December 31, 2005 and 2004.

RXi adopted SFAS 123(R), *"Share-Based Payments"* using the prospective method and the guidance in the Securities and Exchange Commission's ("SEC") Staff Accounting Bulletin ("SAB") 107 relating to the adoption of SFAS 123(R). SFAS 123(R) requires the measurement and recognition of compensation expense for all share-based payment awards made to employees, non-employee directors, and consultants, including employee stock options. Stock compensation expense based on the grant date fair value estimated in accordance with the provisions of SFAS 123(R) is recognized as an expense over the requisite service period.

For stock options granted as consideration for services rendered by non-employees, the Company recognizes compensation expense in accordance with the requirements of SFAS 123(R), Emerging Issues Task Force ("EITF") Issue No. 96-18, *"Accounting for Equity Instruments that are Issued to Other Than Employees for Acquiring, or in Conjunction with Selling, Goods or Services"* and EITF 00-18 "Accounting Recognition for Certain Transactions involving Equity Instruments Granted to Other Than Employees," as amended.

Non-employee option grants that do not vest immediately upon grant are recorded as an expense over the vesting period of the underlying stock options. At the end of each financial reporting period prior to vesting, the value of these options, as calculated using the Black-Scholes option pricing model, will be re-measured using the fair value of the Company's common stock and the non-cash compensation recognized during the period will be adjusted accordingly. Since the fair market value of options granted to non-employees is subject to change in the future, the amount of the future compensation expense will include fair value re-measurements until the stock options are fully vested. The Company recognized $1.6 million and $1.0 million of stock based compensation expense related to non-employee stock options for the years ended December 31, 2008 and 2007, respectively.

Valuations — During the year ended December 31, 2007, RXi entered into a number of noncash transactions with third parties in which shares were exchanged for either intellectual properties or services. These transactions included (1) the contribution by CytRx to RXi of various technologies and assets in exchange for 7,040,000 shares of common stock on January 8, 2007, which was recorded by RXi at the historical cost basis of CytRx technologies and for these assets of $48,000, (2) the investment by CytRx in RXi of $17.0 million of cash in exchange for 3,273,000 of additional shares of common stock on April 30, 2007, (3) the contribution by UMMS to RXi of various intellectual properties in exchange for 462,000 shares of common stock on April 30, 2007, which was recorded by RXi as an in process research and development expenditure of $2,311,000, (4) the granting under the RXi Pharmaceuticals Corporation 2007 Incentive Plan ("2007 Plan") of 1,176,797 options for common stock to employees, directors and SAB members or Scientific Advisory Board members on May 23, 2007, and (5) the granting under the 2007 Plan of 105,561 options on July 11, 2007, 68,335 options on August 16, 2007, 143,000 options on October 18, 2007 and 3,000 options on November 11, 2007 for common stock to employees and 100,0000 options on January 10, 2008. To properly account for these transactions, a value needed to be determined for either the shares given up or the intellectual properties or services received, whichever was more readily determinable. Since RXi's stock was

not publicly traded, a market value for the Company's stock was not readily available. To assist in this matter, the board of directors hired an independent third party valuation firm for the purpose of valuing the transactions at January 8, 2007, April 30, 2007, August 16, 2007, and October 18, 2007.

The valuation analysis at January 8, 2007, valued the various technologies and assets contributed to RXi based upon the "reproduction cost approach." The fair market value of RXi as of April 30, 2007, August 16, 2007, October 18, 2007 and January 10, 2008 were determined based upon a combination of the reproduction cost approach used in the January 8, 2007, as well as the "market capitalization approach" and the "guidelines public company method — book value multiplier approach."

Research and Development Expenses — Research and development costs are expensed as incurred. Included in research and development costs are wages, benefits and other operating costs, facilities, supplies, external services and overhead directly related to the Company's research and development departments as well as costs to acquire technology licenses.

Income Taxes — The Company recognizes liabilities or assets for the deferred tax consequences of temporary differences between the tax basis of assets or liabilities and their reported amounts in the financial statements in accordance with SFAS No. 109, *Accounting for Income Taxes ("SFAS 109").* These temporary differences will result in taxable or deductible amounts in future years when the reported amounts of the assets or liabilities are recovered or settled. SFAS 109 requires that a valuation allowance be established when management determines that it is more likely than not that all or a portion of a deferred asset will not be realized. RXi evaluates the realizability of its net deferred income tax assets and valuation allowances as necessary, at least on an annual basis. During this evaluation, the Company reviews its forecasts of income in conjunction with other positive and negative evidence surrounding the realizability of its deferred income tax assets to determine if a valuation allowance is required. Adjustments to the valuation allowance will increase or decrease the Company's income tax provision or benefit.

In July 2006, the Financial Accounting Standards Board ("FASB") issued Interpretation No. 48, *Accounting for Uncertainty in Income Taxes*, an interpretation of FASB Statement No. 109 ("FIN No. 48"), to create a single model to address accounting for uncertainty in tax positions. FIN No. 48 clarifies the accounting for income taxes by prescribing a minimum recognition threshold in which a tax position be reached before financial statement recognition. FIN No. 48 also provides guidance on derecognition, measurement, classification, interest and penalties, accounting in interim periods, disclosure and transition. FIN No. 48 is effective for fiscal years beginning after December 15, 2006. The Company adopted FIN No. 48 as of January 1, 2007, as required. The adoption of FIN No. 48 did not have an impact on the Company's financial position and results of operations.

Concentrations of Credit Risk — Financial instruments that potentially subject the Company to significant concentrations of credit risk consist principally of cash, cash equivalents and short-term investments. The Company maintains cash balances in several accounts with one bank. These balances at times exceed federally insured limits. As of December 31, 2008, the Company's cash equivalents were invested in money market mutual funds. The Company's investment policy disallows investment in any debt securities rated less than "investment grade" by national ratings services. The Company has not experienced any losses on its deposits of cash and cash equivalents or its short-term investments.

Comprehensive Loss — The Company's comprehensive loss is equal to its net loss for all periods presented.

Indirect General and Administrative Allocations — Both the Predecessor and Successor have received services and support from CytRx. The Predecessor's operations and to a lesser extent the Successor were dependent upon CytRx's ability to perform these services and support functions. The costs associated with these services and support functions, which included some members of management, legal and accounting, have been allocated to the both the Predecessor and Successor. Indirect expenses during this period represent

expenses incurred by CytRx on behalf of RXi, including salary, benefits, rent, accounting and other general and administrative expenses that have been allocated to RXi based upon estimates of the percentage of time spent by individual CytRx employees working on RXi matters. As of December 31, 2007, these allocations ceased. Corporate expense allocations for the year ended December 31, 2007 were (in thousands):

Executive	$285
Accounting	141
Legal	125
Total	$551

Parent Company's Net Deficit — The Parent Company's Net Deficit of the Predecessor consists of CytRx's initial investment in RXi and subsequent changes in RXi's net investment resulting from RXi being an integrated part of CytRx. All disbursements for the Predecessor were made by CytRx. In addition, CytRx allocated certain indirect general and administrative expenses to both the Predecessor and Successor as disclosed in *Indirect General and Administrative Allocations* above.

3. Recent Accounting Pronouncements

In December 2007, the EITF reached a consensus on EITF No. 07-01, *"Accounting for Collaborative Arrangements Related to the Development and Commercialization of Intellectual Property,"* or EITF 07-01. EITF 07-01 discusses the appropriate income statement presentation and classification for the activities and payments between the participants in arrangements related to the development and commercialization of intellectual property. The sufficiency of disclosure related to these arrangements is also specified. EITF 07-01 is effective for fiscal years beginning after December 15, 2008. The Company expects that the adoption of EITF 07-01 will have minimal, if any, impact on its financial position and results of operations. However, based upon the nature of the Company's business, EITF 07-01 could have a material impact on its financial position and results of operations in future years.

Effective January 1, 2008, the Company implemented SFAS No. 157, *"Fair Value Measurements,"* or SFAS 157, for the Company's financial assets and liabilities that are re-measured and reported at fair value at each reporting period, and are re-measured and reported at fair value at least annually using a fair value hierarchy that is broken down into three levels. The Company categorizes its cash equivalents as Level 1 investments. The valuation for Level 1 was determined based on a "market approach" using quoted prices in active markets for identical assets. Valuations of these assets do not require a significant degree of judgment. The adoption of SFAS 157 as it relates to the Company's financial assets and liabilities that are re-measured and reported at fair value at least annually did not have an impact on the Company's financial results. In accordance with FSP No. FAS 157-2, *"Effective date of FASB Statement No. 157,"* the Company has elected to defer implementation of SFAS 157 as it relates to its non-financial assets and liabilities. The Company does not expect that the adoption of this standard will have an impact on its non-financial assets and liabilities.

In June 2007, the FASB ratified the consensus reached on EITF Issue No. 07-3, *"Accounting for nonrefundable Advance Payments for Goods or Services Received for Use in Future Research and Development Activities,"* or EITF 07-3, which requires that nonrefundable advance payments for goods or services that will be used or rendered for future research and development activities be deferred and amortized over the period that the goods are delivered or the related services are performed, subject to an assessment of recoverability. EITF 07-3 will be effective for fiscal years beginning after December 15, 2007. The adoption of EITF 07-3 did not have an impact on the Company's financial position and results of operation.

In February 2007, the FASB issued SFAS No. 159, *"The Fair Value Option for Financial Assets and Financial Liabilities,"* or SFAS No. 159. SFAS No. 159 permits entities to choose to measure many financial assets and financial liabilities at fair value. Unrealized gains and losses on items for which the fair value

option has been elected are reported in earnings. SFAS No. 159 is effective for fiscal years beginning after November 15, 2007. The adoption of SFAS No. 159 did not have an impact on the Company's financial position and results of operation.

4. Short-term Investments

The Company purchased zero coupon U.S. Treasury Bills at a discount during 2007 and Federal Home Loan Bank Notes and U.S. Treasury Bills in 2008 with staggering maturities. As of December 31, 2008, these securities have all matured. The investments were classified as held-to-maturity and under Statement of Financial Accounting Standards No. 115, *Investments in Debt Securities,* are measured at amortized cost since the Company had the intent and ability to hold these securities to maturity. The Company did not have any short-term investments as of December 31, 2008.

5. Deposits

At December 31, 2008 and 2007, the Company had $16,000 and $66,000, respectively, on deposit with its landlords related to leased facilities, all of which are classified as deposits.

6. Equipment and Furnishings, net

Prior to January 2007, CytRx outsourced all of its RNAi therapeutic research and development activities to third parties, therefore, there were no laboratory equipment or furnishings used by CytRx in the development of RNAi therapeutics. On January 8, 2007, CytRx contributed general lab equipment and furnishings to RXi. The contributed general lab equipment and furnishings were valued at approximately $48,000, which was CytRx's depreciated cost basis on the date of transfer.

Depreciation and amortization expense for the year ended December 31, 2008 and 2007 was approximately $131,000 and $36,000, respectively.

7. Capital Lease Obligations

The Company has acquired equipment under a capital lease obligation. Accordingly, the Company capitalized approximately $43,000 of equipment during the year ended December 31, 2008 and this is included in equipment and furnishings on the balance sheet. Amortization of capitalized leased equipment for the year ended December 31, 2008 was approximately $7,000. Accumulated amortization of capitalized lease equipment was approximately $7,000 at December 31, 2008. Future minimum lease payments under the capital lease are $17,000 and $4,000 for the years ending December 31, 2009 and 2010, respectively.

8. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities consist of the following (in thousands):

	For the Year Ended December 31,	
	2008	2007
Professional fees	$398	$ 397
Research and development costs	45	102
Payroll related costs	531	360
Equipment and furnishings	—	103
Rent	—	29
Excise tax	—	25
Other	2	46
Total accrued expenses and other current liabilities	$976	$1,062

9. Commitments and Contingencies

The Company acquires assets still in development and enters into research and development arrangements with third parties that often require milestone and royalty payments based on the progress of the asset through development stages. Milestone payments may be required, for example, upon approval of the product for marketing by a regulatory agency. In certain agreements, RXi is required to make royalty payments based upon a percentage of the sales. Because of the contingent nature of these payments, they are not included in the table of contractual obligations shown below. See footnote 15.

These arrangements may be material individually, and in the unlikely event that milestones for multiple products covered by these arrangements were reached in the same period, the aggregate charge to expense could be material to the results of operations. In addition, these arrangements often give RXi the discretion to unilaterally terminate development of the product, which would allow RXi to avoid making the contingent payments; however, RXi is unlikely to cease development if the compound successfully achieves clinical testing objectives. The Company's contractual obligations that will require future cash payments as of December 31, 2008 are as follows (in thousands):

Years Ending December 31,	Operating Leases(1)	Non-Cancelable Employment Agreements(2)	Subtotal	Cancelable License Agreements(3)	Total
2009	$221	$1,437	$1,659	$ 2,970	$ 4,629
2010	215	563	778	695	1,473
2011	17	150	167	1,095	1,262
2012	—	13	13	1,230	1,243
2013	—	—	—	1,980	1,980
thereafter	—	—	—	18,683	18,683
Total	$453	$2,163	$2,617	$26,653	$29,270

(1) Operating leases are primarily facility and equipment related obligations with third party vendors. Operating lease expenses during the year ended December 31, 2008 and 2007 were approximately $216,000 and $264,000, respectively.

(2) Employment agreement obligations include management contracts, as well as scientific advisory board member compensation agreements. Certain agreements, which have been revised from time to time, provide for minimum salary levels, adjusted annually at the discretion of the Compensation Committee, as well as for minimum bonuses that are payable.

(3) License agreements generally relate to the Company's obligations with UMMS associated with RNAi and, for future periods, represent minimum annual royalty and milestone payment obligations, of the total amount due $2,250,000 can be paid in equity, provided that the securities are registered for resale at the time of such payment. The Company continually assesses the progress of its licensed technology and the progress of its research and development efforts as it relates to its licensed technology and may terminate with notice to the Licensor at any time. In the event these licenses are terminated, no amounts will be due.

The Company applies the disclosure provisions of FASB Interpretation No. ("FIN") 45, "Guarantor's Accounting and Disclosure Requirements for Guarantees, Including Indirect Guarantees of Indebtedness of Others" or FIN 45, to its agreements that contain guarantee or indemnification clauses. The Company provides (i) indemnifications of varying scope and size to certain investors and other parties for certain losses suffered or incurred by the indemnified party in connection with various types of third-party claims; and (ii) indemnifications of varying scope and size to officers and directors against third party claims arising from the services they provide to us. These indemnifications give rise only to the disclosure provisions of FIN 45. To date, the Company has not incurred costs as a result of these obligations and does not expect to incur material costs in the future. Accordingly, the Company has not accrued any liabilities in its financial statements related to these indemnifications.

10. Stockholder's Equity

Preferred Stock — The Company has authorized up to 5,000,000 shares of preferred stock, $0.00001 par value per share, for issuance. The preferred stock will have such rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, as shall be determined by the Company's board of directors upon its issuance. At December 31, 2008, there were no shares of preferred stock outstanding.

Common Stock Warrants — On August 7, 2008, the Company issued 190,000 warrants to an investment bank as consideration for investment and business advisory services. The warrants have an exercise price of $7.036 per share and expire 5 years from the date of issuance, on August 7, 2013. The warrant vested as to 94,000 shares upon issuance, and then will vest at a rate of 32,000 shares per month starting on the 90 day anniversary of issuance, and is exercisable for a period of five years. The Company also agreed to give the holder of the warrant unlimited "piggy back" registration rights with respect to the shares of the Company's common stock underlying the warrant in any registration statement the Company files in connection with an underwritten offering of its common stock. The fair value of these warrants has been estimated based on the Black-Scholes options pricing model and changes in the fair value are recorded in the condensed statement of expenses in accordance with the requirements of SFAS No. 123(R), EITF Issue No. 96-18, and EITF Issue No. 00-18. Total expense related to these warrants was approximately $750,000 during the year ended December 31, 2008.

On October 3, 2008, the Company acquired the rights to license exclusive worldwide technology for the oral delivery of RNAi therapeutics. As consideration for this license, the Company agreed to pay a total license fee of $2,500,000 over a 12 month period, which can be paid in cash, in equity or a combination thereof, provided that a specified amount of the license fee must be made in its cash. Payments made in equity may only be made if, at the time of such payment, the shares of common stock issuable upon conversion of the warrant have been registered for resale under the Securities Act of 1933. No warrants have been issued under this agreement as of March 16, 2009. The Company continually assesses the progress of its research and development efforts as it relates to it licensed technology and can terminate with notice to the Licensor at any time. Accordingly, the amounts are being expensed, as payments are made. During the year ended December 31, 2008, the Company paid and expensed $250,000 under this agreement.

Private Investment in Public Equity — On June 24, 2008, the Company entered into a Securities Purchase Agreement pursuant to which RXi issued and sold to certain investors, including affiliates of Fidelity Investments, an aggregate of 1,073,299 shares of common stock in a private placement at a price of $8.12 per share. Net proceeds to the Company were approximately $7.9 million. The Company agreed to file a registration statement covering the resale of all shares issued in the private placement, with all expenses incurred in connection with such registration to be borne by the Company. The registration statement went effective in August 6, 2008.

11. Development Stage Supplemental Equity Disclosure

Summarized below are the Company's equity (common stock and common stock options) transactions since the Company's inception through December 31, 2008 (in thousands except per share data).

Type of Security	Date of Issuance	Shares of Common Stock	Dollar Amount of Consideration ($)	Price per Share or Exercise Price per Share ($)	Counter Party to Transaction	Nature of Non-Cash Consideration	Basis of Assigning Cost
Common Stock	April 3, 2006	1,624,278	2	0.002	Founders	NA	Cash
Common Stock	January 8, 2007	7.040,318	48(A)	0.007	CytRx	Contributed Assets	Predecessor Cost
Common Stock	April 30, 2007	3,273,292	15,348(B)	5.19	CytRx	NA	Cash
Common Stock	April 30, 2007	462,112	2,311	5.00	UMMS	Intellectual Properties	Independent Third Party Valuation
Common Stock	August 18, 2007	30,000	150	5.00	Directors	—	Cash
Common Stock	September 28, 2007	188,387	978	5.19	CytRx	NA	Independent Third Party Valuation
Common Stock	November 21, 2007	66,045	331	5.00	Exercise of Stock Options	NA	Cash
Common Stock	June 26, 2008	1,073,299	7,918	8.12	PIPE	NA	Net Cash
Common Stock	October 6, 2008 and November 16, 2008	5,500	26	5.00	Exercise of Stock Options	NA	Cash

(A) Transactions between related parties are accounted for at the historical cost of CytRx, with the intellectual property which was previously expensed on CytRx's books being recorded at zero cost and equipment and furnishings being recorded at $48,000.

(B) RXi received gross proceeds of $17.0 million for the issuance of the 3,273,292 shares of common stock which equals $5.19 per share. The gross proceeds were reduced by a reimbursement to CytRx of (1) $1.3 million for RXi's pro rata share of offering costs related to the April 17, 2007 private placement conducted by CytRx to fund its capital contribution to the Company and (2) $363,000 of expenses incurred on behalf of RXi for the year ended December 31, 2006. Net proceeds to RXi after these charges were $15.3 million or $4.69 a share.

12. Stock Based Compensation

RXi follows the provisions of SFAS 123(R). SFAS No. 123(R) requires the measurement and recognition of compensation expense for all share-based payment awards made to employees, non-employee directors, and consultants, including employee stock options. Stock compensation expense based on the grant date fair value estimated in accordance with the provisions of SFAS No. 123(R) is recognized as an expense over the requisite service period.

For stock options granted as consideration for services rendered by non-employees, the Company recognizes compensation expense in accordance with the requirements of SFAS No. 123(R), Emerging Issues Task Force ("EITF") Issue No. 96-18, "Accounting for Equity Instruments that are Issued to Other Than Employees for Acquiring, or in Conjunction with Selling, Goods or Services" and EITF Issue No. 00-18 "Accounting Recognition for Certain Transactions involving Equity Instruments Granted to Other Than Employees," as amended.

Non-employee option grants that do not vest immediately upon grant are recorded as an expense over the vesting period of the underlying stock options. At the end of each financial reporting period prior to vesting, the value of these options, as calculated using the Black-Scholes option pricing model, will be re-measured using the fair value of the Company's common stock and the non-cash compensation recognized during the period will be adjusted accordingly. Since the fair market value of options granted to non-employees is subject to change in the future, the amount of the future compensation expense will include fair value re-measurements until the stock options are fully vested.

The Company is currently using the Black-Scholes option-pricing model to determine the fair value of all its option grants. For options grants issued for the year ended December 31, 2008 and 2007, the following assumptions were used:

	2008	2007
Weighted average risk free interest rate	1.55% - 3.99%	4.50%
Weighted average volatility	101.79% - 116.74%	108.7%
Expected lives (years)	6 - 10	6 - 10
Expected dividend yield	0%	0%

The weighted average fair value of options granted during the years ended December 31, 2008 and 2007 was $6.37 and $3.50 per share respectively.

RXi's expected common stock price volatility assumption is based upon the volatility of a basket of comparable companies. The expected life assumptions for employee grants were based upon the simplified method provided for under SAB 107, which averages the contractual term of RXi's options of ten years with the average vesting term of three years for an average of six years. The expected life assumptions for non-employees were based upon the contractual term of the option. The dividend yield assumption of zero is based upon the fact that RXi has never paid cash dividends and presently has no intention of paying cash dividends. The risk-free interest rate used for each grant was also based upon prevailing short-term interest rates. RXi has estimated an annualized forfeiture rate of 4.0% for options granted to its employees, 2.1% for options granted to senior management and no forfeiture rate for the directors. RXi will record additional expense if the actual forfeitures are lower than estimated and will record a recovery of prior expense if the actual forfeiture rates are higher than estimated.

RXi recorded approximately $3,824,000 and $2,094,000 of stock-based compensation for the years ended December 31, 2008 and 2007, respectively. As of December 31, 2008, there was $4.2 million of unrecognized compensation cost related to outstanding options that is expected to be recognized as a component of RXi's operating expenses through 2011.

As of December 31, 2008, an aggregate of 3,750,000 shares of common stock were reserved for issuance under the RXi Pharmaceuticals Corporation 2007 Incentive Plan, including 2,223,452 shares subject to outstanding common stock options granted under this plan and 1,526,548 shares available for future grants. The administrator of the plan determines the times which an option may become exercisable. Vesting periods of options granted to date include vesting upon grant to vesting at the end of a five year period. The options will expire, unless previously exercised, no later than ten years from the grant date.

The following table summarizes the activity of the Company's stock option plan:

	Stock Options	Weighted Average Exercise Price
Outstanding — January 1, 2007	—	$ —
Granted	1,496,693	5.00
Exercised	(66,045)	5.00
Forfeited	(95,464)	5.00
Outstanding — December 31, 2007	1,335,184	5.00
Granted	899,609	7.76
Exercised	(5,500)	5.00
Forfeited	(5,841)	6.03
Outstanding — December 31, 2008	2,223,452	6.11
Exercisable — December 31, 2007	495,823	5.00
Exercisable — December 31, 2008	1,236,187	$5.65

The following table summarizes the activity for nonvested stock options:

	Stock Options	Weighted Average Grant Date Fair Value per Share
Nonvested at January 1, 2007	—	$ —
Granted	1,496,693	3.50
Vested	(495,823)	3.40
Exercised	(66,045)	3.58
Pre-vested forfeitures	(95,464)	3.58
Nonvested at December 31, 2007	839,361	3.54
Granted	899,609	6.37
Vested	(740,364)	4.94
Exercised	(5,500)	3.93
Pre-vested forfeitures	(5,841)	4.76
Nonvested at December 31, 2008	987,265	$5.15

The weighted average remaining contractual life of options outstanding and exercisable at December 31, 2008 was 8.832 years and 8.733 years, respectively. The weighted average remaining contractual life of options outstanding and exercisable at December 31, 2007 was 9.463 years and 9.416 years, respectively.

The aggregate intrinsic value of outstanding options as of December 31, 2008 is $653,974 and is negligible at December 31, 2007. The aggregate intrinsic value of exercisable options as of December 31, 2008 is $654,000 and is negligible at December 31, 2007. The aggregate intrinsic value is calculated based on the positive difference between the closing fair market value of RXi's common stock and the exercise price of the underlying options.

The aggregate intrinsic value of options exercised during 2008 was approximately $18,000 and was negligible during 2007.

13. Net Loss Per Share

The Company accounts for and discloses net loss per common share in accordance with SFAS No. 128, "Earnings per Share." Basic net loss per common share is computed by dividing net loss attributable to common stockholders by the weighted average number of common shares outstanding. Diluted net loss per common share is computed by dividing net loss attributable to common stockholders by the weighted average number of common shares that would have been outstanding during the period assuming the issuance of common shares for all potential dilutive common shares outstanding. Potential common shares consist of shares issuable upon the exercise of stock options and warrants. Because the inclusion of potential common shares would be anti-dilutive for all periods presented diluted net loss per common share is the same as basic net loss per common share.

The following table sets forth the potential common shares excluded from the calculation of net loss per common share because their inclusion would be anti-dilutive:

	December 31,	
	2008	2007
Options to purchase common stock	2,223,452	1,335,184
Warrants to purchase common stock	190,000	—
Total	2,413,452	1,335,184

14. Income Taxes

The components of federal and state income tax expense are as follows (in thousands):

	As of December 31,	
	2008	2007
Current		
Federal	$ —	$ —
State	—	—
Deferred		
Federal	(4,466)	(3,520)
State	(1,513)	(1,146)
Total deferred	(5,979)	(4,666)
Valuation allowance	5,979	4,666
Total income tax expense	$ —	$ —

The components of net deferred tax assets are as follows (in thousands):

	As of December 31,	
	2008	2007
Net operating loss carryforwards	$ 6,710	$ 3,028
Tax credit carryforwards	948	223
Non-qualified stock based compensation	2,471	512
Other	28	4
Licensing deduction deferral	1,225	899
Gross deferred tax assets	11,382	4,666
Valuation allowance	(11,382)	(4,666)
Net deferred tax asset	$ —	$ —

The provision for income taxes differs from the provision computed by applying the Federal statutory rate to net loss before income taxes as follows (in thousands):

	As of December 31,	
	2008	2007
Expected federal income tax benefit	$(4,887)	$(3,945)
Non-qualified stock compensation	186	184
Effect of change in valuation allowance	6,707	4,666
State income tax credits	(426)	(160)
State income taxes after credits	(867)	(727)
Other	(713)	7
	$ —	$ —

The Company has incurred net operating losses from inception. At December 31, 2008, the Company had domestic federal and state net operating loss carryforwards of approximately $16.7 million available to reduce future taxable income, which expire at various dates beginning in 2012 through 2028. The Company also had federal and state research and development tax credit carryforwards of approximately $600,000 and $500,000, respectively, available to reduce future tax liabilities and which expire at various dates beginning in 2017 through 2028.

Under the provisions of the Internal Revenue Code, certain substantial changes in the Company's ownership may result in a limitation on the amount of net operating loss carryforwards and research and development credit carryforwards which could be utilized annually to offset future taxable income and taxes payable.

Based on an assessment of all available evidence including, but not limited to the fact the RXi operating results have been included in CytRx consolidated U.S. Federal and State income tax return for the year ended December 31, 2007, the Company's limited operating history in its core business and lack of profitability, uncertainties of the commercial viability of its technology, the impact of government regulation and healthcare reform initiatives, and other risks normally associated with biotechnology companies, the Company has concluded that it is more likely than not that these net operating loss carryforwards and credits will not be realized and, as a result, a 100% deferred income tax valuation allowance has been recorded against these assets.

The Company adopted the Financial Accounting Standards Board's Interpretation No. 48, *"Accounting for Uncertainty in Income Taxes, an interpretation of FASB Statement No. 109"* ("FIN 48"), effective January 1,

2007. FIN 48 clarifies the accounting for uncertainty in income taxes recognized in financial statements and requires the impact of a tax position to be recognized in the financial statements if that position is more likely than not of being sustained by the taxing authority. The adoption of FIN 48 did not have any effect on the Company's financial position or results of operations.

The Company files income tax returns in the U.S. federal and Massachusetts jurisdictions. The Company is subject to tax examinations for the 2007 tax year. The Company does not believe there will be any material changes in its unrecognized tax positions over the next 12 months. The Company has not incurred any interest or penalties. In the event that the Company is assessed interest or penalties at some point in the future, they will be classified in the financial statements as general and administrative expense.

15. License Agreements

During the year ended December 31, 2007, RXi entered into a license agreement with Cold Spring Harbor Laboratory for small hairpin RNA or shRNA, for which the Company paid $50,000 and agreed to make future milestone and royalty payments upon successful development and commercialization of products, and four exclusive license agreements and an invention disclosure agreement with UMMS for which the Company paid cash of $453,000 and issued 462,112 shares of its common stock valued at $2.3 million, or $5.00 per share. For each RNAi product developed in connection with the license granted by CSHL, the possible aggregate milestone payments equal $2,650,000. The invention disclosure agreement has an initial term of three years and provides the option to negotiate licenses to certain RNAi technologies discovered at UMMS.

On August 29, 2007, RXi entered into a license agreement with TriLink Biotechnologies, Inc. for three RNAi chemistry technologies for all therapeutic RNAi applications, for which the Company paid $100,000 and agreed to pay yearly maintenance fees of $30,000, as well as future clinical milestone payments and royalty payments based on sales of therapeutic products developed from the licensed technologies. The Company expensed $30,000 and $100,000 for the years ended December 31, 2008 and 2007, respectively related to this license.

In October 2007, RXi entered into a license agreement with Dharmacon, Inc. (now part of Thermo Fisher Scientific Inc.), pursuant to which the Company obtained an exclusive license to certain RNAi sequences to a number of target genes for the development of the Company's rxRNA compounds. Further, the Company has obtained the right to license additional RNAi sequences, under the same terms, disclosed by Thermo Fisher Scientific Inc. in its pending patent applications against target genes and has received an option for exclusivity for other siRNA configurations. As consideration for this license, the Company paid an up-front fee of $150,000 and agreed to pay future clinical milestone payments and royalty payments based on sales of siRNA compositions developed in connection with the licensed technology. The Company expensed $150,000 for the year ended December 31, 2007. No amounts were expensed in 2008 related to this license.

In November 2007, RXi entered into a license agreement with Invitrogen IP Holdings, Inc. pursuant to which the Company was granted rights under four patents relating to RNA target sequences, RNA chemical modifications, RNA configurations and/or RNA delivery to cells. As consideration for this license, RXi paid an up-front fee of $250,000 and agreed to pay yearly maintenance fees of the same amount beginning in 2008. Further, the Company is obligated to pay a fee for each additional gene target added to the license as well as a fee on the first and second anniversaries on the date of which consent to add the gene target to the list of those covered by the license was granted. The Company has also been granted, for each gene target, an option to secure pre-clinical rights and/or the clinical rights, for which RXi would be required to pay additional fees. Further, the Company is required to make future clinical milestone payments and royalty payments based on sales of therapeutic products developed from the licensed technologies. The Company expensed $250,000 for the years ended December 31, 2008 and 2007 related to this license.

On October 3, 2008, the Company acquired the rights to license exclusive worldwide technology for the oral delivery of RNAi therapeutics. As consideration for this license, the Company agreed to pay a total license fee of $2,500,000 over a 12 month period, which can be paid in cash, in equity or a combination thereof, provided that a specified amount of the license fee must be made in its cash. Payments made in equity may only be made if, at the time of such payment, the shares of common stock issuable upon conversion of the warrant have been registered for resale under the Securities Act of 1933. No warrants have been issued under this agreement as of March 16, 2009. The Company continually assesses the progress of its research and development efforts as it relates to it licensed technology and may terminate with notice to the Licensor at any time. Accordingly, the amounts are being expensed, as payments are made. During the year ended December 31, 2008, the Company paid and expensed $250,000 under this agreement.

16. Related Party Transactions

On January 8, 2007, RXi entered into a Contribution Agreement with CytRx under which CytRx assigned and contributed to RXi substantially all of its RNAi-related technologies and assets. The assigned assets consisted primarily of CytRx's licenses from UMMS and from the Carnegie Institution of Washington relating to fundamental RNAi technologies, as well as equipment situated at CytRx's Worcester, Massachusetts laboratory. In connection with the contribution of the licenses and other assets, the Company assumed primary responsibility for all payments to UMMS and other obligations under the contributed licenses and assets. The Company recorded the assigned assets at CytRx's historical cost basis of $48,000 on the date of contribution and issued to CytRx 7,040,318 shares of RXi's common stock at $0.007 per share, which represented approximately 56% of the Company's issued and outstanding shares of common stock at that time.

On January 8, 2007, RXi entered into a letter agreement ("Reimbursement Agreement") with CytRx under which the Company agreed to reimburse CytRx, following the initial funding, for all organizational and operational expenses ("Formation Expenses") incurred by CytRx in connection with the Company's formation, initial operations and funding. As of April 30, 2007, the date that CytRx contributed $17,000,000 to RXi in exchange for 3,273,292 shares of the Company's common stock at approximately $5.19 per share, CytRx had advanced approximately $2,000,000 to the Company for which RXi was obligated to reimburse CytRx, and as such CytRx retained such amount from payment for the contribution as reimbursement for that advance. In addition, as part of the final settlement of the reimbursement agreement, it was agreed that RXi still owed CytRx approximately $978,000 in excess of the original $2,000,000. The additional amount owed to CytRx was settled for 188,387 additional shares of RXi common stock at approximately $5.19 per share, which was determined by negotiated terms, set in the Reimbursement Agreement and does not necessarily reflect the fair market value of the shares.

On December 27, 2007, the Company entered into a letter agreement with CytRx under which RXi and CytRx agreed to a "fee-sharing" arrangement for expenses related to the preparation of the registration statement that included the Distribution and Award prospectuses, and RXi's application for the listing of its common stock on the NASDAQ Capital Market. Pursuant to this agreement, the Company agreed to reimburse CytRx an amount equal to the sum of (i) $30,000 plus (ii) 50% of the total relevant fees and expenses paid by CytRx to certain financial services professionals. Also under this agreement CytRx agreed to reimburse the Company 50% of the total relevant fees and expenses paid by RXi to the Company's financial printer, transfer agent and legal counsel. As of December 31, 2008, all amounts under this agreement were paid in full.

On February 15, 2007, the Company entered into a letter agreement with CytRx and certain current RXi stockholders. Under the stockholders agreement, the Company agreed to grant to CytRx preemptive rights to acquire any new securities, as defined therein, that RXi propose to sell or issue so that CytRx may maintain its percentage ownership of us. The preemptive rights will become effective if CytRx owns at any time less than 50% of the Company's outstanding shares of common stock, and will expire on January 8, 2012 or such earlier time at which CytRx owns less than 10% of RXi's outstanding common stock. Under this letter

agreement, CytRx also undertakes to vote its shares of the Company's stock in the election of its directors and dispose of their shares of RXi stock in accordance with the terms of its letter agreement with UMMS described above. CytRx has further agreed in this letter agreement to approve of actions that may be adopted and recommended by RXi's board of directors to facilitate any future financing.

On April 30, 2007, the Company entered into a Registration Rights Agreement with CytRx. Under the Registration Rights Agreement, RXi agreed, with certain exception that at any time after its common stock is registered under the Exchange Act, if CytRx shall so request, to use best efforts to cause all of RXi's shares issued to CytRx pursuant to the Contribution Agreement to be registered under the Securities Act. All expenses incurred in connection with any such registration will be borne by the Company.

One of the members of RXi's board of directors is the President, Chief Executive Officer and a member of the board of directors for CytRx.

The Company's current President and Chief Executive Officer or CEO, prior to his employment by the Company, was a consultant to RXi from August 2006 until the date of his employment. This consulting contract resulted in payments to the CEO's consulting firm of approximately $229,000, of which $154,000 was recorded in the year ended December 31, 2007, in consulting fees and reimbursement in the accompanying financial statements. As the CEO is the sole owner of the consulting firm, the approximate dollar value of his interest in this consulting contract is also approximately $229,000.

The Company's former Chief Financial Officer, prior to his employment by the Company, was a consultant to CytRx, working on RXi related matters from August 2006 through April 2007. This consultancy resulted in payments to the former CFO of approximately $98,000 in consulting fees and reimbursement of which $63,000 was recorded in the year ended December 31, 2007 in the accompanying financial statements.

The Company's current Chief Scientific Officer or CSO, prior to her employment by the Company, was a consultant to RXi from January 2008 until the date of her employment. This consulting contract resulted in payments to the CSO's consulting firm of approximately $13,400 which was recorded in the year ended December 31, 2008, in consulting fees and $5,000 recorded as license expense as discussed below. As the CSO is not the sole owner of the consulting firm, the approximate dollar value of her interest in this consulting contract is approximately $9,250.

In addition, RXi and the CSO's 50% owned Corporation, Advirna LLC, are parties to an option agreement whereby the Company paid $5,000 for consideration to be granted the exclusive worldwide rights to license certain technology by paying an initial maintenance fee of $75,000 before June 12, 2009.

The Company's current Chief Intellectual Property Counsel and Vice President of Legal Counsel or IP Counsel, prior to his employment by the Company, was a consultant to RXi from September 2008 until the date of his employment. This consulting contract resulted in payments to him of approximately $5,000 which was recorded in the year ended December 31, 2008 in patent and legal fees. The approximate dollar value of his interest in this consulting contract is also approximately $5,000.

The Chairman of RXi's board of directors is a partner with TroyGould PC which has represented CytRx since 2003. Payments by CytRx to TroyGould PC for its representation of CytRx on RXi related matters and recorded in the accompanying financial statements for the year ended December 31, 2007 was $129,000. There were no payments recorded in the financial statements for the twelve months ended December 31, 2008.

On February 26, 2007, the Company entered into Scientific Advisory Board Agreements or the SAB Agreements, with four of its founders. At the time of the execution of the SAB Agreements, each of the founders were beneficial owners of more than five percent of the Company's outstanding stock. Pursuant to the SAB Agreements, on May 23, 2007, the Company granted to each of the founders a stock option under the 2007 Plan to purchase 52,832 shares of its common stock. In addition, under the SAB Agreements, the Company will grant each of the founders a stock option under the 2007 Plan to purchase 52,832 shares of its

common stock on February 26, 2008, February 26, 2009 and February 26, 2010 with a per share exercise price equal to the closing price of such stock on the public market on the date of grant unless a founder terminates a SAB Agreement without good reason (as defined) or the Company terminates a SAB Agreement with cause (as defined) in which case no further option grants will be made to the founder. If the Company's common stock is not publicly available on the dates specified above, its Board of Directors will grant the stock options to the founders at the first scheduled board meeting after such date and the per share exercise price of the options will be determined in good faith by the Company's board of directors. All options granted pursuant to the SAB Agreements are fully vested on the date of grant and have a term of ten years. The fair value of stock options granted during 2008 and 2007 under the SAB Agreement for each founder is approximately $338,000 and $175,000 which was estimated using the Black-Scholes option-pricing model as more fully discussed above under significant accounting policies and the stock based compensation footnote. Included in the accompanying financial statements for RXi for the year ended December 31, 2008 and 2007 is approximately $1,350,000 and $700,000, respectively, of expense related to the granting of these stock options.

Additionally, pursuant to a letter agreement between the Company and each founder dated as of April 30, 2007 the SAB Letters, in further consideration of the services to be rendered by the founders under the SAB Agreements, the Company granted additional stock options on May 23, 2007 under the 2007 Plan to each of the founders to purchase 26,416 shares of its common stock. Unless a founder terminates a SAB Agreement without good reason (as defined) or the Company terminates a SAB Agreement with cause (as defined), the options granted pursuant to the SAB Letters will fully vest from and after April 29, 2012 and will have a term of ten years from the date of grant. At December 31, 2008, the fair market value of stock options under the SAB Agreement for each founder is approximately $139,000, which was estimated using the Black-Scholes option-pricing model as more fully discussed above under the significant accounting policies and the stock based compensation footnote. Included in the accompanying financial statements for RXi for the year ended December 31, 2008 and 2007 is approximately $156,000 and $38,000 respectively, of expense related to these stock options.

17. Employee Benefit Plan

RXi sponsors a 401(k) retirement savings plan (the "Plan"). Participation in the Plan is available to full-time employees who meet eligibility requirements. Eligible employees may defer a portion of their salary as defined by Internal Revenue Service regulations. The Company may make matching contributions on behalf of all participants in the 401(k) Plan in an amount determined by the Company's board of directors. The Company may also make additional discretionary profit sharing contributions in amounts as determined by the board of directors, subject to statutory limitations. Matching and profit-sharing contributions, if any, are subject to a vesting schedule; all other contributions are at all times fully vested. The Company intends the 401(k) Plan, and the accompanying trust, to qualify under Sections 401(k) and 501 of the Internal Revenue Code so that contributions by employees to the 401(k) Plan, and income earned (if any) on plan contributions, are not taxable to employees until withdrawn from the 401(k) Plan, and so that the Company will be able to deduct its contributions, if any, when made. The trustee under the 401(k) Plan, at the direction of each participant, invests the assets of the 401(k) Plan in any of a number of investment options. To date, the Company has not made any matching contributions.

18. Subsequent Events

On January 15, 2009, the Company granted options to purchase 768,718 shares of common stock to employees and members of the Board of Directors and the SAB. These options had an exercise price of $4.19 per share, which represented the Company's closing stock price on that date. These options vest either quarterly or monthly over a one to four year period and expire no later than 10 years from the grant date.

On January 30, 2009, the Company entered into a SEDA with YA Global pursuant to which the Company may, at its sole and exclusive option, periodically sell to YA Global shares of its common stock for a total purchase price of up to $25,000,000. Advance notices may be given to YA Global once every five trading days, and advances shall not be more than $500,000. The purchase price for shares of common stock shall be 95% of the lowest volume weighted average price of the Common Stock during the five (5) consecutive trading days after the advance notice date. YA Global is not obligated to fund any advance from the Company until such time as a registration statement which registers the resale of the shares of its common stock to be issued to YA Global is declared effective by the SEC. The term of the SEDA is two years.

The Company issued YA Global an aggregate of 58,398 shares of its Common Stock as a commitment fee in connection with the transaction. RXi has also paid to Yorkville Advisors, LLC, YA Global's general partner, a due diligence and structuring fee of $25,000. In addition, we are obligated to pay Yorkville a $500 structuring fee taken directly out of the gross proceeds of each advance.

On January 29, 2009, the Company entered into an Investment Banking Agreement with Legend Securities, Inc. or Legend, pursuant to which Legend agreed to provide business advisory services to the Company for a period of up to six months in exchange for (i) a monthly advisory fee equal to $19,000 per month, and (ii) the issuance by the Company of warrants to purchase 142,500 shares of Common Stock at an exercise price per share equal to the average closing bid price of the Common Stock for the ten trading days ending three days prior to January 29, 2009. The Warrants will vest as to 71,250 shares upon issuance, and then at a rate of 23,750 shares per month starting on the 90 day anniversary of issuance. The Company has also agreed to give Legend unlimited "piggy back" registration rights with respect to the shares of Common Stock underlying the Warrants in any registration statement filed by the Company in connection with an underwritten offering of the Common Stock.

ITEM 9. *CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURES.*

None

ITEM 9A(T). *CONTROLS AND PROCEDURES*

Evaluation of Disclosure Controls and Procedures

Rule 13a-15(e) under the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), defines the term "disclosure controls and procedures" as those controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission rules and forms and that such information is accumulated and communicated to the company's management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Our Chief Executive Officer and Chief Financial Officer have evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined under Rules 13a-15(e) and 15d-15(e) promulgated under the Securities Exchange Act of 1934, as amended) as of the end of the period covered by this report. Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures are effective.

There have been no changes in our internal controls over financial reporting during the fourth quarter of the year ended December 31, 2008 that have materially affected, or are reasonably likely to materially affect, our internal controls over financial reporting.

Evaluation of Disclosure Controls and Procedure Management's report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted evaluations of the effectiveness of our internal control over financial reporting based on the framework in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on our evaluations under the framework in Internal Control-Integrated Framework issued by the COSO, our management concluded that our internal control over financial reporting was effective as of December 31, 2008.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

This annual report does not include an attestation report of the company's registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by the company's registered public accounting firm pursuant to temporary rules of the Securities and Exchange Commission that permit the company to provide only management's report in this annual report.

ITEM 9B. *OTHER INFORMATION*

None

PART III

ITEM 10. *DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT*

We will file with the SEC a definitive Proxy Statement, which we refer to herein as the Proxy Statement, not later than 120 days after the close of the fiscal year ended December 31, 2008. The information required by this item is incorporated herein by reference to the information contained in the Proxy Statement.

ITEM 11. *EXECUTIVE COMPENSATION*

The information required by this item is incorporated herein by reference to the information contained in the Proxy Statement.

ITEM 12. *SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.*

The information required by this item is incorporated herein by reference to the information contained in the Proxy Statement.

ITEM 13. *CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS*

The information required by this item is incorporated herein by reference to the information contained in the Proxy Statement.

ITEM 14. *PRINCIPAL ACCOUNTANT FEES AND SERVICES*

The information required by this item is incorporated herein by reference to the information contained in the Proxy Statement.

PART IV

ITEM 15. *EXHIBITS AND FINANCIAL STATEMENT SCHEDULES*

(a) (1) *Financial Statements*

See Item 8 in Part II of this annual report on Form 10-K, Financial Statements and Supplementary Data, for an index to the financial statements filed in this annual report.

(2) *Financial Statement Schedules*

Certain schedules are omitted because they are not applicable, or not required by smaller reporting companies.

(3) *Exhibits*

The Exhibits listed in the Exhibit Index immediately preceding the Exhibits are filed as a part of this annual report on Form 10-K.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

RXi PHARMACEUTICALS CORPORATION

By: /s/ *Tod Woolf*

Tod Woolf, Ph.D.
President, Chief Executive Officer and Director
(Principal Executive Officer)

Dated: March 18, 2009

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signatures	Title	Date
/s/ *Tod Woolf* Tod Woolf, Ph.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	March 18, 2009
/s/ *Stephen J. DiPalma* Stephen J. DiPalma	Chief Financial Officer (Principal Financial Officer and Accounting Officer)	March 18, 2009
/s/ *Sanford J. Hillsberg* Sanford J. Hillsberg	Director	March 18, 2009
/s/ *Mark J. Ahn* Mark J. Ahn	Director	March 18, 2009
/s/ *Stephen S. Galliker* Stephen S. Galliker	Director	March 18, 2009
/s/ *Rudolph Nisi* Rudolph Nisi	Director	March 18, 2009
/s/ *Steven A. Kriegsman* Steven A. Kriegsman	Director	March 18, 2009

EXHIBIT INDEX

Exhibit Number	Description
2.1	Contribution Agreement between CytRx Corporation and RXi Pharmaceuticals Corporation, dated January 8, 2007(1)
2.2	Contribution Agreement between CytRx Corporation and RXi Pharmaceuticals Corporation, dated April 30, 2007(1)
2.3	Reimbursement Agreement between CytRx Corporation and RXi Pharmaceuticals Corporation, dated January 8, 2007(1)
3.1	Form of Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation(1)
3.2	Form of Amended and Restated By-laws of RXi Pharmaceuticals Corporation(1)
4.1	Specimen common stock certificate(3)
4.2	Stockholders Agreement between CytRx Corporation, RXi Pharmaceuticals Corporation, the other Stockholders and the Scientific Advisory Board Members, dated February 23, 2007(1)
4.3	Exhibit A to Contribution Agreement — Registration Rights Terms between CytRx Corporation and RXi Pharmaceuticals Corporation, dated April 30, 2007(1)
4.4	Annex I to form of Subscription Agreement — Registration Rights Terms between RXi Pharmaceuticals Corporation and Stephen Galliker, Mark Ahn and Sanford Hillsberg(1)
4.5	Form of Securities Purchase Agreement between RXi Pharmaceuticals Corporation and various investors, dated June 24, 2008(5)
4.6	Amendment to Stockholders Agreement between CytRx Corporation, RXi Pharmaceuticals Corporation, the Stockholders and the Scientific Advisory Board Members, dated July 28, 2008(7)
4.7	Amendment to Exhibit A to Contribution Agreement — Registration Rights Terms between CytRx Corporation and RXi Pharmaceuticals Corporation, dated July 28, 2008(7)
10.1	Voting Agreement between CytRx Corporation and the University of Massachusetts Medical School, dated January 10, 2007(1)
10.2	Invention Disclosure Agreement between the University of Massachusetts Medical School and RXi Pharmaceuticals Corporation, dated January 10, 2007(2)
10.3	Placement Agency Agreement between RXi Pharmaceuticals Corporation, Jeffries & Company, Inc., Natixis Bleichroeder Inc., Broadpoint Securities Group, Inc. and Griffin Securities, Inc., dated June 24, 2008(5)
10.4	RXI Pharmaceuticals Corporation's Amended 2007 Incentive Plan, dated July 18, 2008(6)
10.5	Warrant No. A-1 in favor of J.P. Turner Partners, dated August 7, 2008(8)
10.6	Exclusive License Agreement (No.: UMMC 06-21-01) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.7	Exclusive License Agreement (No.: UMMC 03-68-02) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.8	Exclusive License Agreement (No.: UMMC 03-75-01) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.9	Non-Exclusive License Agreement (No.: UMMC 06-08-03) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.10	Non-Exclusive License Agreement, between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 01-36, dated April 15, 2003, as amended February 1, 2004+(2)
10.11	Exclusive License Agreement between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 02-01, dated April 15, 2003, as amended September 10, 2004+(2)
10.12	Amended and Restated Exclusive License Agreement between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 03-05, 00-37, 01-31, 03-134, 93-09 and 02-38, dated September 15, 2003, as amended September 17, 2003 and February 1, 2004+(2)
10.13	Exclusive License Agreement between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 03-17, dated April 15, 2003, as amended January 7, 2004 and February 1, 2004+(2)

Exhibit Number	Description
10.14	Exclusive License Agreement between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 03-60, dated April 15, 2003 as amended February 1, 2004+(2)
10.15	Co-Exclusive License Agreement between CytRx Corporation and the University of Massachusetts Medical School related to UMMS disclosure number 03-33, and all amendments thereto, dated May 18, 2006+(2)
10.16	License Agreement between CytRx Corporation, Imperial College Innovations Limited and Imperial College of Science and Technology, dated May 19, 2004+(2)
10.17	Employment Agreement between RXi Pharmaceuticals Corporation and Tod Woolf, Ph.D., dated February 22, 2007*(1)
10.18	Employment Agreement between RXi Pharmaceuticals Corporation and Pamela Pavco, dated March 7, 2007*(1)
10.19	Employment Agreement between RXi Pharmaceuticals Corporation and James Warren, dated May 23, 2007*(1)
10.20	Employment Agreement between RXi Pharmaceuticals Corporation and Dmitry Samarsky, dated June 25, 2007*(1)
10.21	Employment Agreement between RXi Pharmaceuticals Corporation and Stephen J. DiPalma, dated August 28, 2007*(1)
10.22	Employment Agreement between RXi Pharmaceuticals Corporation and Anastasia Khvorova, dated October 17, 2008*(9)
10.23	Employment Agreement between RXi Pharmaceuticals Corporation and Konstantinos Andrikopoulos, dated November 10, 2008*(9)
10.24	RXi Pharmaceuticals Corporation's 2007 Incentive Plan*(1)
10.25	Form of Incentive Stock Option*(1)
10.26	Form of Non-qualified Stock Option*(2)
10.27	Lease between RXi Pharmaceuticals Corporation and Newgate Properties, LLC for One Gateway Place, Worcester, Massachusetts, 01605, dated September 25, 2007(3)
10.28	Form of Subscription Agreement between RXi Pharmaceuticals Corporation and each of Mark K. Ahn, Ph.D., Stephen S. Galliker and Sanford J. Hillsberg(3)
10.29	Scientific Advisory Board Agreement between RXi Pharmaceuticals Corporation and Tariq Rana, Ph.D., dated February 26, 2007 and corresponding Letter Agreement, dated April 30, 2007(3)
10.30	Scientific Advisory Board Agreement between RXi Pharmaceuticals Corporation and Gregory Hannon, Ph.D., dated February 26, 2007 and corresponding Letter Agreement dated April 30, 2007(3)
10.31	Scientific Advisory Board Agreement between RXi Pharmaceuticals Corporation and Michael Czech, Ph.D., dated February 26, 2007 and corresponding Letter Agreement dated April 30, 2007(3)
10.32	Scientific Advisory Board Agreement between RXi Pharmaceuticals Corporation and Craig C. Mello, Ph.D., dated February 26, 2007 and corresponding Letter Agreement dated April 30, 2007(3)
10.33	Letter Agreement between CytRx Corporation and RXi Pharmaceuticals Corporation, dated December 27, 2007(3)
10.34	Patent License Agreement between RXi Pharmaceuticals Corporation and Invitrogen IP Holdings, Inc. dated November 1, 2007(4)
14.1	Code of Conduct(5)
23.1	Consent of BDO Seidman, LLP, Independent Registered Public Accounting Firm(9)
31.1	Sarbanes-Oxley Act Section 302 Certification of Tod Woolf(9)
31.2	Sarbanes-Oxley Act Section 302 Certification of Stephen J. DiPalma(9)
32.1	Sarbanes-Oxley Act Section 906 Certification of Tod Woolf and Stephen J. DiPalma(9)

(1) Previously filed as an Exhibit to the Company's Registration Statement on Form S-1 filed on October 30, 2007 (File No. 333-147009) and incorporated by reference herein

(2) Previously filed as an Exhibit to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed on November 19, 2007(File No. 333-147009) and incorporated by reference herein.

(3) Previously filed as an Exhibit to Amendment No. 2 to the Company's Registration Statement on Form S-1 filed on January 20, 2008 (File No. 333-147009) and incorporated by reference herein.

(4) Previously filed as an Exhibit to Amendment No. 3 to the Company's Registration Statement on Form S-1 filed on February 1, 2008 (File No. 333-147009) and incorporated by reference herein.

(5) Previously filed as an Exhibit to the Company's Form 8-K filed on June 26, 2008 (File No. 001-33958) and incorporated by reference herein.

(6) Previously filed as an Exhibit to the Company's Form 8-K filed on July 24, 2008 (File No. 001-33958) and incorporated by reference herein.

(7) Previously filed as an Exhibit to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed on August 4, 2008 (File No. 333-152555) and incorporated by reference herein.

(8) Previously filed as an Exhibit to the Company's Form 10-Q filed on November 14, 2008 (File No. 001-33958) and incorporated by reference herein

(9) Filed herewith

* Indicates a management contract or compensatory plan or arrangement.

\+ This exhibit was filed separately with the Commission pursuant to an application for confidential treatment. The confidential portions of the exhibit have been omitted and have been marked by an asterisk.

Board of Directors

Sanford J. Hillsberg
Chairman
Troy and Gould PC

Mark J. Ahn, Ph.D.
Professor and Chair,
Victoria University of Wellington

Stephen S. Galliker
Former CFO, Dyax Corp.

Steven A. Kriegsman
CEO, CytRx Corporation

Rudolph Nisi, M.D.
Chairman of Board of Directors, New York Westchester Square Medical Center

Tod Woolf, Ph.D.
President & Chief Executive Officer
RXi Pharmaceuticals

Scientific Advisors

Craig Mello, Ph.D., Founder, SAB Chairman
2006 Nobel Prize in Medicine for RNAi
Co-discovered RNAi and invented RNAi therapeutics
Howard Hughes Medical Institute Investigator at UMMS

Victor Ambros, Ph.D.
Professor of Molecular Medicine, UMass Medical School
Discovered the first microRNA, lin-4
Received one of the most distinguished awards for medical research, the Lasker Prize

Greg Hannon, Ph.D., Founder
HHMI Investigator at Cold Spring Harbor Laboratory
Discovered mechanism of RNAi in human cells
Developed the widely used shRNA

Tariq Rana, Ph.D., Founder
Professor & Director, Program for RNAi Biology, Burnham Institute
Discovered key parameters to stabilize RNAi
Developed RXi's Nanotransporter technology

Michael Czech, Ph.D., Founder
Professor and Chair, Program in Molecular Medicine, UMMS
American Diabetes Association's Eli Lilly Award for Diabetes
Banting Award for scientific achievement

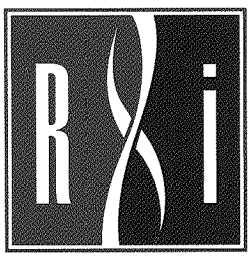
Nassim Usman, Ph.D.
CEO of Catalyst Biosciences
Held positions of CSO and COO at Sirna
Negotiated Lilly, Allergan and GSK alliances
130 patents and patent applications: Main RNAi synthesis chemistry

Robert H. Brown, Jr., M.D., Ph.D.
Chair of the Department of Neurology at UMMC
Former Professor of Neurology at Harvard Medical School
Founder of the Day Neuromuscular Lab at MGH
Identified SOD1's roles in familial ALS

Nicholas Dean, Ph.D.
Founder and CSO of Excaliard Pharmaceuticals, Inc.
Held VP positions in oncology and pharmacology at Isis
Over 100 patents and publications in RNA therapeutics
Managed $100M budget for Isis - Eli Lilly collaboration

Annual Meeting

Friday, June 5, 2009
At 10:00 AM local time
At the offices of
RXi Pharmaceuticals
Gateway Park
60 Prescott Street
Worcester, MA 01605



RXi Pharmaceuticals
Next Generation in RNAi

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