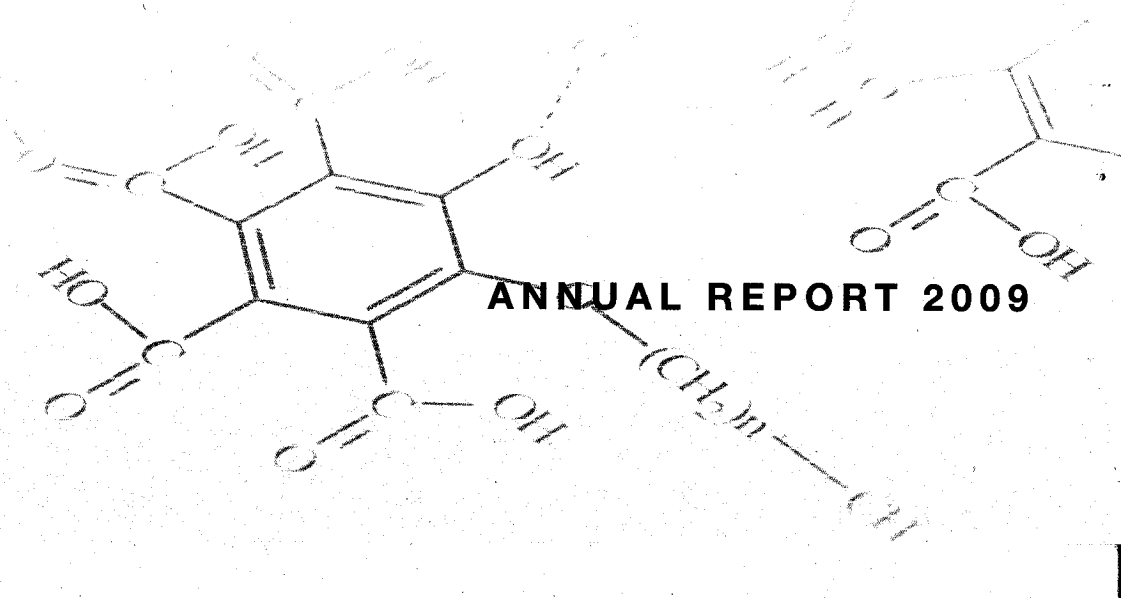
RXi Pharmaceuticals

Next Generation in RNAi™



ANNUAL REPORT 2009

CORPORATE OVERVIEW

RXi Pharmaceuticals is a discovery-stage biopharmaceutical company pursuing the development and commercialization of proprietary therapeutics based on RNA interference (RNAi) for the treatment of human diseases. RXi has a comprehensive therapeutic platform that includes both novel RNAi compounds and advanced delivery methods that can potentially be applied for local and systemic applications, against targets that may be undruggable by other modalities. RXi uses its proprietary version of RNAi compounds – rxRNA™ – that provide an advanced alternative to conventional small interfering RNAs (siRNAs) and define the next generation of RNAi technology. These include rxRNA*ori*™, rxRNA*solo*™, and *sd*-rxRNA™ (or "self delivering" RNA), which are distinct from, and potentially convey significant advantages over, classic siRNAs. RXi Pharmaceuticals believes it is well positioned to compete successfully in the RNAi-based therapeutics market with a management team that is experienced in developing RNAi products, an accomplished Scientific Advisory Board, and a strong and early, but broad, intellectual property position in RNAi chemistry and delivery.

MANAGEMENT

Noah D. Beerman, MBA
President and Chief Executive Officer

Konstantinos Andrikopoulos, Ph.D., J.D.
Vice President Legal and Chief Intellectual Property Counsel

Anastasia Khvorova, Ph.D.
Chief Scientific Officer

Pamela Pavco, Ph.D.
Vice President of Pharmaceutical Development

Dmitry Samarsky, Ph.D.
Vice President of Technology Development

Amy Tata, CPA
Principal Accounting Officer

Ramani Varanasi, MS, MBA
Vice President of Business Development

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 enables effective interference of and knockdown of particular genes within living cells through the design of RNA-derived molecules specifically targeting these genes. RNAi is regarded as a significant advancement in the scientific community, as evidenced by the award of the 2006 Nobel Prize in Medicine to the co-discoverers of RNAi, including Dr. Craig Mello, an RXi founder and the Chairman of our Scientific Advisory Board.

RXi's NEXT GENERATION rxRNA™ COMPOUNDS

Our novel RNAi compounds, referred to as rxRNA compounds, are distinct from, and we believe convey significant advantages over, classic siRNA, and offer many of the properties that are important to the clinical development of RNAi-based drugs. We have developed a number of unique forms of rxRNA compounds, all of which have been shown in our testing to be highly potent both *in vitro* and *in vivo*. These RNAi compounds include rxRNA*ori*, rxRNA*solo* and *sd*-rxRNA. Based on our research, we believe that these different, novel siRNA configurations have various advantages for therapeutic use in a wide array of indications. These advantages include high potency, increased resistance to nucleases and off-target effects, and in the case of the *sd*-rxRNA compounds, access to cells and tissues with no additional formulation required.

RXi's DELIVERY TECHNOLOGIES

We are developing novel and advanced delivery technologies that may enable the delivery of our rxRNA compounds to treat a variety of acute and chronic diseases using both local and systemic administration, potentially providing a competitive advantage in the development of many RNAi therapeutic compounds for broad unmet medical needs. Our suite of delivery technologies is comprised of delivery vehicles, which can be combined with various rxRNA compounds, as well as *sd*-rxRNA compounds, which have the unique property of entering cells and tissues to effect silencing without the need for any additional delivery vehicle. This suite of delivery technologies has broad potential applications for multiple therapeutic areas targeting both local and systemic applications.

QUICK FACTS

Ticker:
Nasdaq: RXII

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

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 SHAREHOLDERS

I am very pleased to have the opportunity to address you, our shareholders, and discuss not only a very successful 2009, but more importantly my outlook for 2010. This year promises to be a pivotal and transitional year for RXi as we evolve from a research-focused company to one distinguished by our product development accomplishments, therapeutic strategy, and corporate partnerships, and I thank you for your continued commitment and support.

I would first like to recognize the hard work, significant contributions, and outstanding commitment of Dr. Tod Woolf, our founding Chief Executive Officer, without whose efforts the company would not have progressed its RNAi therapeutic platform to where it is today. Tod transitioned to his role as an important member of our Scientific Advisory Board when I joined the company as President and Chief Executive Officer in November 2009.

The past year was one of tremendous progress for the company where we have continued to demonstrate our scientific and business leadership. We have advanced our therapeutic platform including our novel and proprietary self-delivering rxRNA (*sd*-rxRNA) compounds, established research collaborations to further explore the use of our technology in additional therapeutic areas, presented broad-based applications of these compounds at leading RNAi conferences, strengthened our intellectual property position, published robust scientific findings in peer reviewed journals, and expanded our Board of Directors and management team. I would like to take you through our key corporate highlights and scientific achievements for the year.

We have continued to demonstrate excellent progress with our proprietary RNAi therapeutics platform. This platform, which is comprised of a portfolio of unique, next generation rxRNA compounds and other advanced delivery approaches, continues to produce promising *in vitro* and *in vivo* pre-clinical results. Specifically, new data has been presented throughout the year and into 2010 including keynote and scientific presentations at several conferences, including the RNAi, MicroRNAs - 2009 - Boston Meeting; The TIDES® 2009 Conference; IBC's 2009 Oligonucleotide Therapeutics Conference; the Keystone Symposia's RNA Silencing: Mechanism, Biology and Application Conference; and the 3rd International Scar Club Meeting in Montpellier, France. These presentations demonstrated the robustness and potential for broad-based applications using our proprietary *sd*-rxRNA compounds as well as RXi's other unique RNAi based compounds and delivery approaches in diverse therapeutic areas.

Turning now to collaborations and partnerships, 2009 was an important year for the company as we entered into multiple research and feasibility agreements in a concerted effort to accelerate the development of our proprietary rxRNA technology to enable our business strategy of validating and advancing our own pipeline and establishing the foundation for broader partnerships with leading pharmaceutical and biotechnology companies. The company has established collaborations and preliminary partnerships with pharmaceutical and biotechnology companies in the dermal, respiratory, cardiovascular, and oncology therapeutic areas. In addition, we announced two collaborations with distinguished faculty members at University of Massachusetts Medical School (UMMS) in the areas of amyotrophic lateral sclerosis (Lou Gehrig's disease) and ocular disease. Under these collaborations, we are validating the clinical utility of our self-delivering RNAi compounds for these important areas of high unmet medical need. Leveraging this success in 2009, the coming year promises to be even more productive in the formation of important partnerships.

We have also continued to strengthen our intellectual property position throughout 2009. RXi filed multiple patent applications on the portfolio of next generation rxRNA compounds, acquired direct ownership of previously licensed RNAi delivery technology from Advirna LLC, and received notices of allowance on small interfering RNA sequence patents in-licensed from Thermo Fisher Scientific. We continue to aggressively enhance the strength of our robust and differentiated intellectual property for our platform including our novel *sd*-rxRNA compounds.

We have published our data in peer reviewed journals. In April 2009, we announced the publication of an article in the journal *Nature* that presents new pre-clinical data demonstrating that low dose oral administration of RNAi therapeutics resulted in a significant reduction of a systemic inflammatory response in an established mouse model of inflammation. This important work on oral delivery of RNAi compounds was published by Michael Czech, Ph.D., co-founder and Scientific Advisory Board member to RXi, and Professor and Chair of Molecular Medicine and Professor of Biochemistry and Molecular Pharmacology at UMMS. Further, an article entitled "Modified dsRNAs that are not processed by Dicer maintain potency and are incorporated into the RISC" was published in the journal *Nucleic Acids Research* in February 2010. The data expands the understanding of how chemically modified RNAi duplexes interact with key proteins involved in the silencing pathway and that longer, modified duplexes can be highly potent target gene silencers.

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"

LETTER TO OUR SHAREHOLDERS

We have also strengthened our Board of Directors and management team significantly during 2009. As part of the company's continuing effort to add deep scientific and clinical development expertise to our Board, we are very pleased to have added two new Board members during the first half of 2009, Richard Chin, M.D. and Rudolph Nisi, M.D. We also added key members to our management team - in March 2009, Ramani Varanasi joined the company as Vice President of Business Development, and I joined the company in November 2009 as President and Chief Executive Officer.

Finally, we have made excellent progress in raising capital to fuel the company's development and enable the achievement of our corporate goals. In July 2009, we completed an $8.3 million public offering, under which RXi received approximately $7.8 million in net proceeds, and as part of our continued financing and growth strategy for the company, in March 2010, we raised gross proceeds of approximately $16.2 million. As part of this offering, we used 25% of the net proceeds to repurchase 675,000 shares of our common stock held by CytRx, resulting in net proceeds to RXi of approximately $11.4 million. Importantly, this infusion of capital provides us with the necessary financing to focus on and achieve our goals for 2010 and beyond.

Now turning to 2010, I believe this year will be a pivotal and transitional year for the company as we evolve from a research-focused company to one identified by compelling product development programs, a focused therapeutic strategy, and validating corporate partnerships. As such, we have set goals that reflect the promise of our proprietary RNAi therapeutic platform and will create significant value for our company and for our shareholders. With the necessary cash in hand from our recent financing, and the collective experience of our seasoned management team and scientific advisors, we are well positioned to meet the following goals for 2010: first - selecting a product candidate to advance into development, second - refining the therapeutic focus for our unique and powerful rxRNA technology, and third - completing one or more corporate partnerships. Our entire team is focused on achieving these goals.

In conclusion, I am very pleased to be joining RXi at such an exciting time in our development and I would like to express my enthusiasm and determination for the coming year. I believe the future for the company is very bright; we have established the key ingredients to capture the promise of RNAi therapeutics and I feel privileged to be leading RXi as we endeavor to achieve our corporate goals.

Sincerely,

Noah D. Beerman
President and Chief Executive Officer

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 therapeutic platform with the potential to generate multiple RNAi therapeutic product opportunities, comprised of:
  - Key therapeutic target genes
  - Our portfolio of next generation RNAi molecules that include *sd*-rxRNA compounds, which have the unique property of entering cells and tissues to effect silencing without the need for any additional delivery vehicle, as well as multiple novel RNAi structures all of which offer distinct approaches to RNAi based therapeutic development
- Accomplished business team with significant experience in RNAi therapeutics and in building and managing emerging life science 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, broad and early intellectual property position encompassing:
  - Novel approaches to RNAi chemistry and configuration
  - Proprietary, formulation and delivery of active RNAi compounds
  - Key sequences targeting therapeutically important genes
- A focus on unmet medical needs targeting both local and systemic applications

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, 2009

-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. 001-33958

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	**01605**
(Address of principal executive offices)	*(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 has submitted electronically and posted on it corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter time that the registrant was required to submit and post such files). 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, 2009, was $34,131,897.

As of March 29, 2010, the registrant had 18,281,125 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 2010 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, 2009, are incorporated by reference into this Form 10-K.

RXi PHARMACEUTICALS CORPORATION

FORM 10-K — FISCAL YEAR ENDED DECEMBER 31, 2009

Table of Contents

All references in this Form 10-K to "RXi," the "Company," "we," "us," or "our" mean RXi Pharmaceuticals Corporation, unless we state otherwise or the context otherwise requires.

PART I

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 that has the potential to effectively and selectively interfere with, or "silence", expression of targeted disease-associated genes. It is widely accepted by the scientific community that this specific silencing can be used to potentially treat human diseases by "turning off" genes that lead to disease. While no therapeutic RNAi products have been approved for marketing to date, there has been significant growth in the field of RNAi development and potential therapeutic applications in this field. This growth is driven by the potential ability to use RNAi to rapidly develop lead compounds that specifically and selectively inhibit a target gene, many of which are undruggable by other modalities.

By utilizing our expertise in RNAi and the comprehensive RNAi therapeutic platform that we have established, we believe we will be able to discover and develop lead compounds and progress them into and through clinical development for potential commercialization more efficiently than traditional drug development approaches.

Our proprietary therapeutic 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 a number of unique forms of rxRNA compounds, all of which have been shown in our testing to be highly potent both *in vitro* and *in vivo*. These RNAi compounds include rxRNA*ori*™, rxRNAsolo™ and *sd*-rxRNA™, or "self delivering" RNA. Based on our research, we believe that these different, novel siRNA configurations have various advantages for therapeutic use. These advantages include high potency, increased resistance to nucleases and off-target effects, and in the case of the *sd*-rxRNA compounds, access to cells and tissues with no additional formulation required.
- **Advanced Delivery Technologies** that may enable the delivery of our rxRNA compounds to treat a variety of acute and chronic diseases using both local and systemic approaches, potentially providing a competitive advantage in the development of many RNAi therapeutic compounds. Our suite of delivery technologies is comprised of delivery vehicles, which can be combined with various rxRNA compounds, as well as *sd*-rxRNA compounds, which are chemically modified and have the unique property of entering cells and tissues to effect silencing without the need for any additional delivery vehicle. This suite of delivery technologies has broad potential applications for multiple therapeutic areas targeting both local and systemic applications.
  - *Local Applications.* An area of application of the RXi therapeutic platform which uses rxRNA compounds to target genes expressed in tissues that can be silenced by direct, local delivery. The numerous diseases common to tissues accessible by local delivery represent significant unmet medical needs and large market opportunities. Most of our initial targets are validated gene targets relevant in important biological pathways and are implicated in multiple diseases enabling us to leverage these targets and associated compounds across a broad array of therapeutic areas.
  - *Systemic Applications.* We have active internal efforts to advance our therapeutic platform to optimize robust systemic delivery to various tissues and organs of the body. In some cases, such as in targeting a treatment to the liver, the optimal route of administration is by systemic delivery. Efforts to improve the systemic delivery of RNAi compounds are currently ongoing, and these efforts are supported by internal activities targeting a 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, and continue to develop and validate this approach with these other potential target genes.

We intend to use our RNAi therapeutic platform and our expertise in RNAi to identify lead compounds against multiple target genes, and advance them towards pre-clinical and clinical development in therapeutic areas that address broad unmet medical needs, in both acute and chronic settings. There are many well-studied genes that have been associated with numerous diseases but have been difficult to target with conventional medicinal chemistry or traditional modalities involving both large and small molecules. We believe RNAi technology may play an important role in targeting these genes and potentially treating the related diseases and disorders. We plan to pursue select disease areas with the goal of creating multiple clinical development program opportunities, either independently or with partners through various collaborations and partnerships with academic institutions or pharmaceutical or biotechnology companies.

We believe that we have created and established 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) formulation and delivery of RNAi compounds. We have also filed patents based on our internal discoveries in the each of the areas mentioned above, which should enable us to further strengthen our intellectual property portfolio.

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 are developing a comprehensive platform that includes local, systemic and oral delivery approaches that give rise to target silencing after RNAi compound administration. We work with chemically synthesized RNAi compounds that we believe are optimized for stability and efficacy. We endow these compounds with favorable delivery profiles and properties either by covalent chemical modification or combination with appropriate formulations to achieve optimal delivery to specific target tissues.

We have an accomplished business team which includes Noah D. Beerman, MBA, President & CEO, Konstantinos Andrikopoulos, Ph.D., J.D., VP, Legal Counsel & Chief IP Counsel, Ramani Varanasi, MS, MBA, VP Business Development, Dmitry Samarsky, Ph.D., VP Technology Development, Amy B. Tata, CPA, Chief Accounting Officer, Joanne Kamens, Ph.D., Senior Director of Research Collaborations, and Donna Falcetti, MBA, Director of Operations. We have an accomplished scientific team which includes Anastasia Khvorova, Ph.D., Chief Scientific Officer, Pamela Pavco, Ph.D., VP Pharmaceutical Development, Lyn Libertine, M.D., Director of Pharmacology, and Kevin Fettes, Ph.D., Director of Chemistry.

We have an accomplished Scientific Advisory Board ("SAB") which includes Craig C. Mello, Ph.D., the Chairman of the SAB, Gregory Hannon, Ph.D., Michael Czech, Ph.D., Victor Ambros, Ph.D., Nassim Usman, Ph.D. and Tod Woolf, Ph.D. (our former Chief Executive Officer), 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 and/or developing internally. Further, certain of our SAB members periodically assist us in business-related activities, such as discussions with potential strategic partners and introductions to potential key consultants and collaborators.

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 the University of Massachusetts Medical School ("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. These assets consisted primarily of RNAi licenses and related intellectual property and a nominal amount of equipment.

To date, our principal activities have consisted of conducting discovery research and pre-clinical development activities utilizing our RNAi therapeutic platform, acquiring RNAi technologies and patent rights through exclusive, co-exclusive and non-exclusive licenses, recruiting an RNAi-focused management and scientific/clinical advisory team, capital raising activities and conducting business development activities aimed at establishing research and development partnerships with pharmaceutical and 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 payments received under partnership and collaborative agreements.

We had cash and cash equivalents of approximately $5.7 million as of December 31, 2009 and approximately $14.4 million as of March 31, 2010.

During 2009 and to date in 2010 we have entered into the following significant financing transactions:

On January 30, 2009, we entered into the Standby Equity Distribution Agreement ("SEDA") with YA Global Master SPV Ltd. ("YA Global"), pursuant to which we may, at our option over a two-year period, ending on January 30, 2011, periodically sell to YA Global shares of our common stock, for a total purchase price of up to $25.0 million. To date we have not sold any shares under the SEDA.

On August 4, 2009, we closed registered direct financing in which we sold to certain investors 2,385,715 shares of our common stock at $3.50 per share and warrants to purchase 954,286 shares of our common stock and at an exercise price of $4.50 per share (the "2009 Offering") resulting in approximately $7.8 million in net proceeds after deducting the placement agent fee and offering expenses.

On March 26, 2010 we closed a registered direct financing pursuant to which we sold to certain investors 2,700,000 shares of common stock at $6.00 per share and warrants to purchase 540,000 shares of common stock with an exercise price of $6.00 per share (the "2010 Offering"). The financing provided approximately $15.2 million in net proceeds to the Company after deducting the placement agent fee and offering expenses. Pursuant to a stock redemption agreement between us and CytRx Corporation dated March 22, 2010, we were required to use 25% of the net proceeds from the offering to repurchase from CytRx a number of shares of our common stock held by CytRx equal to 25% of the shares sold by us in the offering. We are also required to use 25% of the proceeds from the exercise of warrants issued in the offering to repurchase from CytRx a number of shares of our common stock held by CytRx equal to 25% of the shares issued upon the exercise of such warrants. As required by the agreement with CytRx, on March 29, 2010 we repurchased 675,000 shares of our common stock from CytRx for an aggregate price of approximately $3.8 million. We estimate that we will repurchase an additional 135,000 shares of our common stock from CytRx for an aggregate price of $0.8 million if all of the warrants issued in the Offering are exercised.

We have not generated any revenues since inception nor are any revenues expected for the foreseeable future. We expect to incur significant operating losses for the foreseeable future while we advance our future product candidates from discovery through pre-clinical studies and clinical trials and seek regulatory approval and potential commercialization, even if we are collaborating with other pharmaceutical and biotechnology companies. In addition to these increasing research and development expenses, we expect general and administrative costs to increase as we recruit additional management and administrative personnel.

We believe that our existing cash and cash equivalents should be sufficient to fund our operations through at least the first half of 2011. In addition, we also have available to us the SEDA which expires on January 30, 2011. In the future, we will be dependent on obtaining funding from third parties such as proceeds from the sale of equity, funded research and development payments and payments under partnership and collaborative agreements, in order to maintain our operations and meet our obligations to licensors. There is no guarantee that debt, additional 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.

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 multiple distinct approaches all of which offer novelty and potential high potency; and
  - Multiple delivery technologies, including self delivering RNAi approaches, which do not require a delivery vehicle and can be administered for various local and systemic applications.
- Accomplished scientific and business team with significant experience in RNAi therapeutics and in building and 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 formulation and delivery of active RNAi compounds, and
  - Key therapeutic target genes.
- A focus on unmet medical needs and significant market opportunity.

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 in the scientific community, 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, an RXi founder and our SAB Chairman.

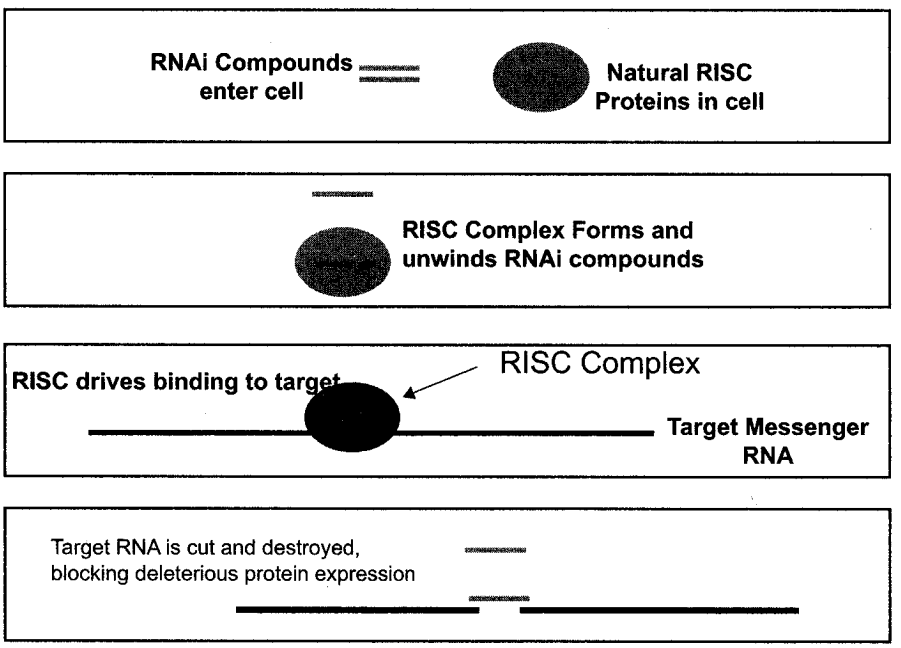
RNAi offers a novel approach to the drug development process because, as described below under "The RNAi Mechanism", RNAi compounds can potentially be designed to target any one of the thousands of human genes, many of which are undruggable by other modalities. In contrast, an article published in the 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 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. Based on our internal research and our review of certain scientific literature, we also believe that our RNAi platform may allow us to develop create therapeutics with significant potential advantages over traditional drug development methods, including:

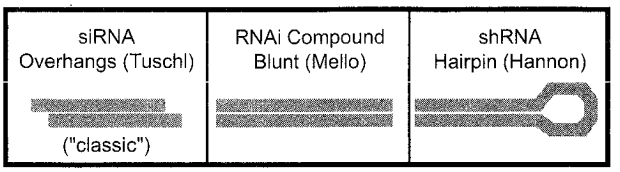
- High specificity for targeted genes,
- High potency (low doses),
- Ability to interfere with the expression of potentially any gene,
- Accelerated generation of lead compounds, and
- Low toxicity, natural mechanism of action.

RXi's RNAi Therapeutic Platform

RNAi Compound Design

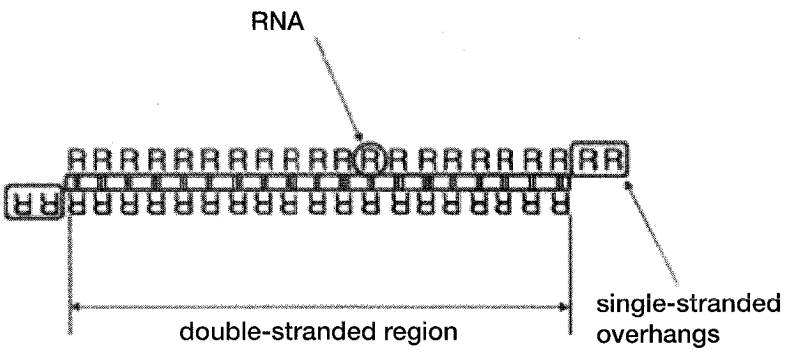
RNAi compounds are made from a strand or strands of RNA that are manufactured by a nucleic acid synthesizer. The synthesizer is programmed to assemble a strand of RNA of a particular sequence using the four kinds of nucleotide units (Adenine ("A"), Uracil ("U"), Cytidine ("C") and Guanosine ("G")) that 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 first design of RNAi compounds 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.

We believe that classic siRNAs have 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 human therapeutic agents. 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.

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. Craig Mello, an expert in the field, is an inventor of the Fire-Mello seminal family of patents ("Fire-Mello"), which we have a license to, Dr. Tod Woolf, our former 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 OnTarget Plus™, 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.

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,
- More reliable at blocking immune side effects than classic siRNA, and
- In the case of *sd*-rxRNA™, the unique ability to be 'self delivering', without the need for any additional delivery vehicle.

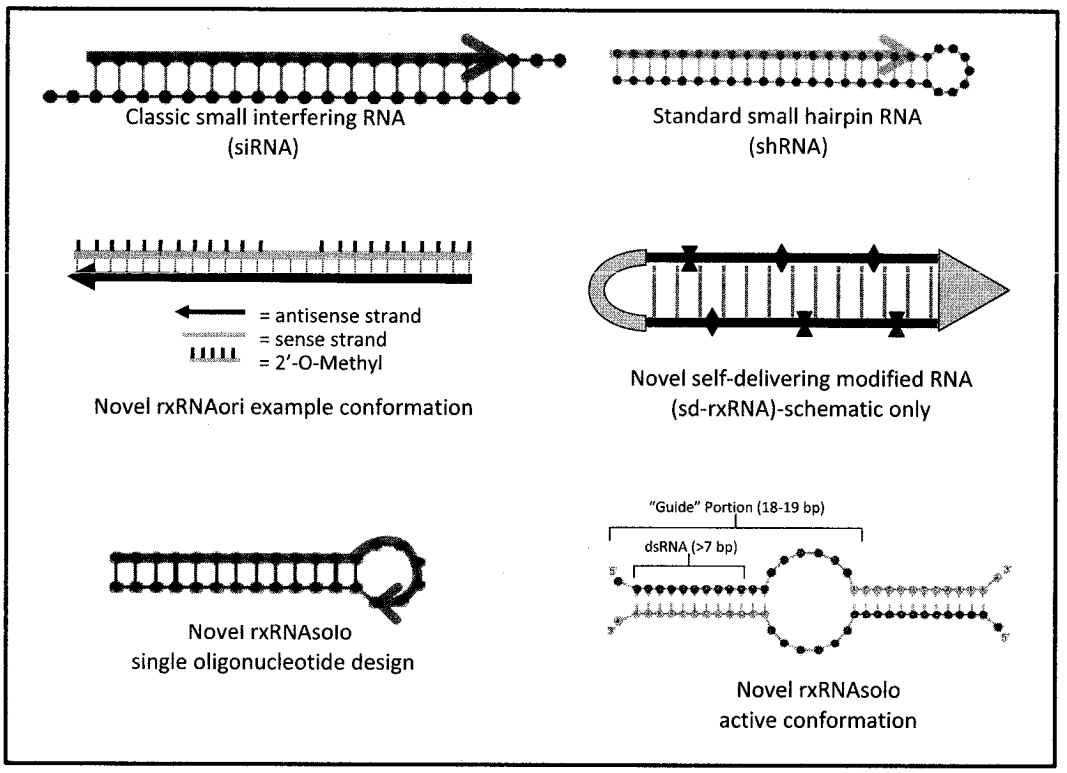
Based on our own research we have developed a variety of novel siRNA configurations with potential advantages for therapeutic use. The first of these has been termed rxRNA*ori*. This configuration has some similarities to classic siRNA in that it is composed of two, short RNA strands. We have found that by using a somewhat longer length (25 bp), removing the overhangs and using proprietary chemical modification patterns, we achieve a higher hit rate of very potent (picomolar potency) compounds in a given target sequence. These rxRNA*ori* compounds are modified to increase resistance to nucleases and to prevent off-target effects including induction of an immune response. These novel RNAi compounds are distinct from the siRNA compounds used by many other companies developing RNAi therapeutics in that they 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.

The second novel configuration has been termed rxRNA*solo* to indicate the fact that it is composed of a single RNA oligonucleotide strand. This configuration also makes use of carefully placed and selected chemical modifications to introduce properties for therapeutic use as described above. Conventional shRNA (short hairpin RNA) and siRNA compounds with duplex regions of 19-27 nucleotides are efficient substrates for RNAi machinery in mammalian cells. Efficacy of single-stranded oligonucleotides is substantially lower (by 3-4 orders of magnitude). We have developed a single-oligo (27 nt long) construct with silencing potency equal to conventional RNAi triggers. These molecules are designed to have at least 16 bases complementary to the target mRNA and are then extended at the 3′ end to allow efficient self annealing (dimerization). This new class of RNAi compounds has the potential to further reduce off-target effects and manufacturing costs and may thus offer additional advantages for use in research and therapeutic applications.

A third novel configuration has been called "*sd*-rxRNA" to indicate its novel "self-delivering" properties which do not require additional delivery vehicles for efficient cellular uptake and RISC-mediated silencing. A combination of at least three characteristics is required for activity: 1) specific, proprietary chemical modifications, 2) a precise number of chemical modifications and 3) reduction in oligonucleotide content.

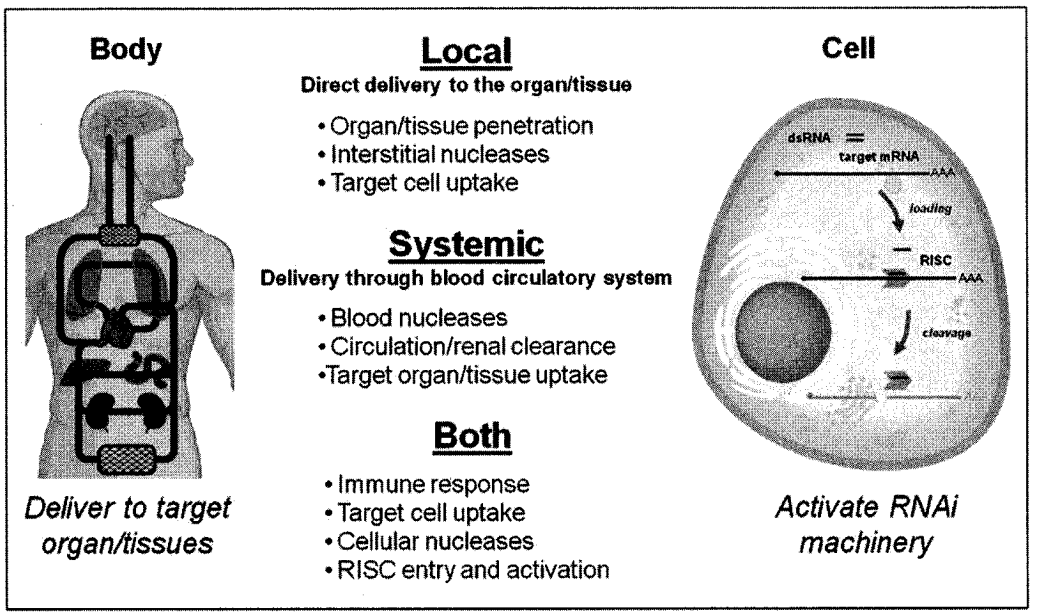
Kineteic analyses of fluorescently-labeled compounds demonstrate that efficient cellular internalization is observed within minutes of exposure. These molecules are taken up efficiently and cause target gene silencing in diverse cell types (cell lines and primary cells). This novel class of RNAi compounds may afford a broad opportunity for therapeutic development.

Figure 4 — Classic and Novel RNAi Compound Configurations



Delivery

Figure 5 — Principles and Challenges of RNAi *in vivo* Delivery



We believe both chemical modification and formulation of RNAi compounds may be utilized to develop RNA drugs suitable for therapeutic use. A series of delivery hurdles must be overcome to achieve in vivo efficacy: (1) delivery to the target tissue or organ (2) tissue penetration and distribution (3) crossing of the plasma membrane (4) intracellular trafficking to the RISC (RNAi machinery complex) (5) incorporation into and activation of the RISC. Different cell types and tissues may each require unique approaches. Three categories of tools currently exist: variation in administration route, selection of delivery vehicle, and chemical modification of the RNA compound. A combination of some or all of these is likely to be required for successful delivery.

The route by which an RNAi therapeutic is brought into contact with the body depends on the intended organ or tissue to be treated. Delivery routes can be simplified into two major categories: local (when a drug is delivered directly to the tissue of interest) or systemic (when a drug accesses the tissue of interest through the circulatory system). Local delivery may avoid some hurdles associated with systemic approaches such as circulation clearance and tissue extravasation (crossing the endothelial barrier from the blood stream). However, this approach can only be applied to a limited number of organs or tissues (e.g. skin, eye, lung, and potentially, the central nervous system).

RNAi delivery vehicles, a large and diverse group of particles (e.g. polymer-based particles, lipoplexes, other), can contribute in additional ways to successful delivery. Formulation can help prevent nuclease degradation, improve nucleotide retention in circulation and alter tissue and cell. In some cases, a formulation can result in more efficient cellular uptake and intracellular release.

RNA chemical modifications of the *sd*-rxRNA compounds, as described above, can include base, backbone and sugar modifications, as well as covalently bound moieties such as cholesterol, antibody fragments or peptides. Some of these modifications can be utilized to enhance stability, reduce immunogenicity, improve circulation properties (presumably through binding to blood transporter proteins), increase tissue access and improve uptake to cells and the RNAi machinery. A combination of chemical modifications, delivery vehicles or both might be dictated by the target organs/tissues and specific requirements for the therapeutic application, including the intended administration route.

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 platform that includes local, systemic and oral 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.

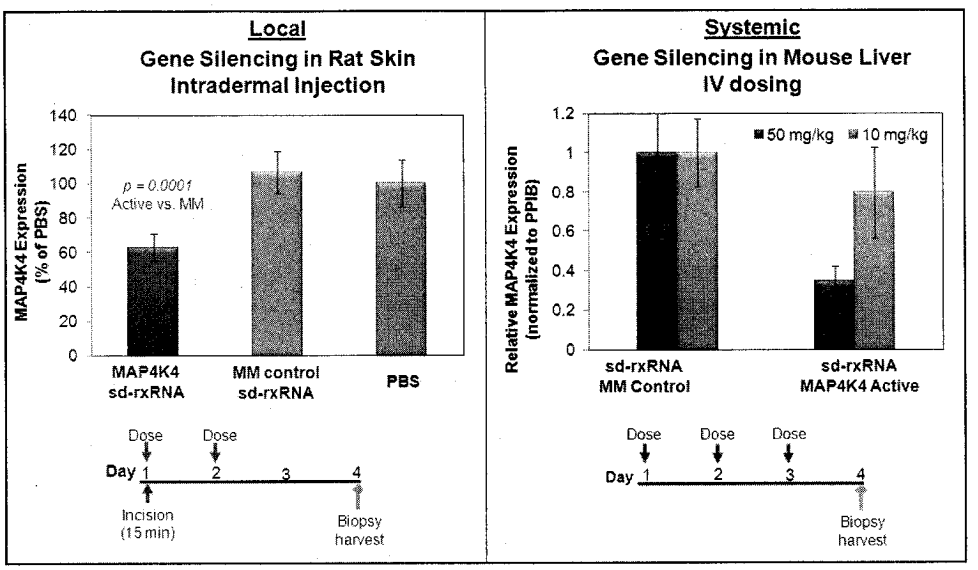
Local Delivery

sd-rxRNA molecules have unique properties which improve tissue and cell uptake. Delivery of *sd*-rxRNA by a local route of administration may avoid hurdles associated with systemic approaches such as rapid clearance from the bloodstream and inefficient extravasation (e.g. crossing the endothelial barrier from the blood stream). We have studied *sd*-rxRNA molecules in a rat model of dermal delivery. Direct application of *sd*-rxRNA with no additional delivery vehicle to the skin (incision introduced) demonstrates that target gene silencing can be measured after topical delivery. Figure 6 illustrates that direct injection of *sd*-rxRNA into the dermis layers of the skin with no additional delivery vehicle resulted in efficient uptake and significant target gene silencing. The dose levels required for these direct injection methods are small and suitable for clinical development suggesting that local delivery indications will be very accessible with the *sd*-rxRNA technology platform. Target tissues that are potentially accessible for local delivery using *sd*-rxRNA compounds include lung, eye, skin, CNS, mucosal tissues, sites of inflammation, and tumors (direct administration).

Systemic Delivery

Systemic delivery occurs when a drug accesses the tissue of interest through the circulatory system. In some cases, such as in targeting a treatment to the liver, the optimal route of delivery may be by a systemic route. We have developed a portfolio of systemic delivery solutions utilizing our RNAi therapeutic platforms. One novel approach involves the use of *sd*-rxRNA compounds. The self-delivering technology introduces properties required for *in vivo* efficacy such as cell and tissue penetration and improved blood clearance and distribution properties. Systemic delivery of these compounds to mice has resulted in gene specific inhibition with no additional delivery vehicle required as shown in Figure 6 below . In addition, we have developed novel nanotransporter formulations to aid in transport of RNAi compounds to both liver and various other target tissues in the body. These nanotransporters are chemically synthesized molecules that form nanometer-sized particles when mixed with RNAi compounds and alter the clearance, distribution and tissue penetration properties of the RNAi compounds. Delivery of RNAi compounds to the liver might be critical for the treatment of many diseases and using rxRNA in conjunction with such delivery vehicles has enabled us to demonstrate gene specific inhibition at low doses in a mouse model after intravenous, systemic delivery. Target tissues that are potentially accessible using rxRNA compounds by systemic delivery include liver, lung, adipocytes, cardiomyocytes, bone marrow, sites of inflammation, tumors, vascular endothelium, and kidney.

Figure 6: Data demonstrating *in vivo* gene silencing with sd-rxRNA in local and systemic settings



Oral Delivery

Most RNAi therapeutic products being developed today require recurring intravenous injections or other forms of administration which are not patient friendly. To address the desire for RNAi therapeutics with improved modes of administration, we are testing a novel formulation technology, Glucan Encapsulated RNAi Particles (GeRPs), that may allow our rxRNA compounds to be incorporated into orally administered pills. Early data to date suggest that the GeRP delivery system appears to be more potent than previous methods used for systemic delivery of RNAi therapeutics by intravenous injection. Additional studies will need to be conducted to clearly establish the flexibility of the GeRP system and to determine whether they 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.

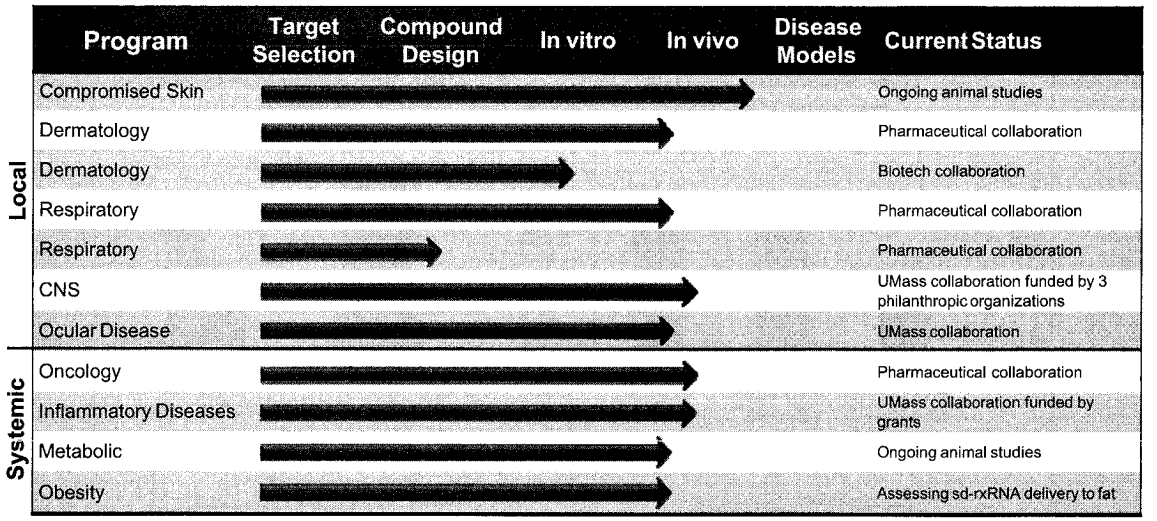
Therapeutic Programs and Markets

By utilizing our expertise in RNAi compound design and delivery, we intend to identify lead compounds for both tractable and intractable targets implicated in diseases that address broad unmet medical needs in both acute and chronic settings. The broad applicability of our RNAi therapeutic platform has the potential to enable delivery to various tissues in both a local and systemic setting. Target tissues that are potentially accessible using our rxRNA compounds in the context of a local delivery approach include lung, eye, skin, CNS, mucosal tissues, sites of inflammation, and tumors (locally). Similarly, target tissues that are potentially accessible using our rxRNA compounds in the context of a systemic delivery approach include liver, lung, adipocytes, cardiomyocytes, bone marrow, sites of inflammation, tumors, vascular endothelium, and kidney. We will continue to focus our efforts selecting targets to pursue internally, and as we identify relevant compounds, we intend to begin preclinical development in specific areas as appropriate.

Advancing RXi's Therapeutic Pipeline

Table 1 below outlines our current therapeutic pipeline. Our local and systemic programs include a combination of internal development and collaborative efforts. As we focus our internal efforts on a manageable number of diseases areas, we intend to partner with other pharmaceutical and biotechnology companies in certain disease areas.

Table 1: Advancing RXi's Therapeutic Pipeline:



Alliance Partners in Therapeutic Areas

We are actively seeking to leverage our technology platform by seeking to work with pharmaceutical and biotechnology partners in the partners' fields of interest. Our team has experience targeting genes in virtually every major therapeutic area, and based on this experience, we believe we can discover more drug candidates by working with partners than we can develop with our own resources. We are seeking 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 discover, develop and potentially commercialize RNA targeting therapeutics. The key elements of our business strategy are as follows:

- We are focused on the discovery, development and commercialization of a pipeline of RNA based therapeutics to address various diseases using our proprietary rxRNA compounds and delivery technologies. We have promising preliminary data with compounds in skin models and certain other disease areas and continue to pursue various research and development efforts to further validate and develop both the local and systemic delivery approaches using multiple in vivo model systems both internally as well as with academic, biotechnology and pharmaceutical partners.
- 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 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 all of which could be focused on specific therapeutic areas, diseases and/or targets of interest to the partner, 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 and/or acquiring novel technologies through scientific collaborations as well as through internal innovation.
- We intend to develop future RNAi technology improvements through a combination of internal efforts as well as external technology focused collaborations and partnerships 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.

- As we make progress on compounds in our internal pipeline, we may consider seeking product oriented partnerships, to help advance our pre-clinical efforts and to leverage the expertise of pharmaceutical partners, who may have the development, manufacturing and commercial capabilities that will be important for further product advancement.
- 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 12 pending patent applications, 10 of which were filed as PCTs to date, 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 2031, 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 from third parties. 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 Fire-Mello 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. (now known as Life Technologies, 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 that enable efficient therapeutic gene silencing in cells and animals, which is licensed for all therapeutic areas utilizing GeRPs; and
- methods and compositions using nanotransporters, for RNAi compound delivery which enable therapeutic gene silencing in cells and animals.

Therapeutic Targets

In addition to our internally-developed proprietary compounds against a broad range of targets that can be utilized in multiple therapeutic areas, we have exclusive, co-exclusive and non exclusive licenses from UMMS covering therapeutic targets in the area of inflammatory diseases, amyotrophic lateral sclerosis or ALS diabetes and obesity from UMMS against which we may seek to develop therapeutics for in the future.

License Agreements

University of Massachusetts Medical School

Pursuant to the Contribution Agreement dated January 8, 2007, CytRx assigned to us its rights under four exclusive license agreements, one co-exclusive license agreement and one non-exclusive license agreement 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 its 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 the assigned licenses and collaboration agreements.

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 certain licenses 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, agreed to undertake to raise working capital by a specified date, to expend a specified amount on the development of royalty-bearing products, and agreed 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 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. 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.

On October 3, 2008, we acquired co-exclusive worldwide rights to technology for the oral delivery of RNAi therapeutics from UMMS. This Agreement was amended on July 1, 2009, allowing us to extend the periods for which certain milestone Payments are due to UMMS.

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.

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.

We recently terminated a number of these UMMS licenses and still hold licenses to patents and patent applications that belong to six distinct families of patent applications from the original thirteen.

We also recently terminated the Collaboration and Invention Disclosure Agreement which CytRx had assigned to us.

Other License Agreements and Acquisitions of Intellectual Property

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 Life Technologies, 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 September 2009, we obtained an assignment and direct ownership of technology for which we had previously exercised our option to exclusively license from Advirna, LLC ("Advirna"). The acquired technology complements our internally developed *sd*-rxRNA technology platform and further strengthens our IP position in this promising field for the delivery of RNAi therapeutics.
- We recently terminated the License agreement with Imperial College Innovations Limited and Imperial College of Science and Technology that was assigned to us by CytRx in connection with the Contribution Agreement dated January 8, 2007.

As we continue to develop our own proprietary compounds, we continue to evaluate both our in-licensed portfolio as well as the field for new technologies that could be in-licensed to further enhance our intellectual property portfolio and unique position in the RNAi space.

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.

A number of medical institutions and pharmaceutical companies are seeking to develop therapeutic products using RNAi technologies. Companies working in this area include: Alnylam Pharmaceuticals, MDRNA, Cequent Pharmaceuticals, Tacere Therapeutics, Benitec, OPKO Health, Silence Therapeutics, Quark Pharmaceuticals, Rosetta Genomics, Lorus Therapeutics, Tekmira Pharmaceuticals Corporation, Calando Pharmaceuticals, Regulus Therapeutics, and Santaris Pharmaceuticals, as well as a number of large pharmaceutical companies. A number of the large pharmaceutical companies also either have in-house RNAi development programs or are collaborating with smaller biopharmaceutical companies. This competition will manifest itself in the discovery and 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 major pharmaceutical companies may be targeting the same diseases we intend to target. 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 29, 2010, we had 28 employees, 27 of whom were full-time employees and one of whom was a part-time employee. 19 of our employees are engaged in research and development and 9 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 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. When used in this Form 10-K, the words "believe," "anticipate," "expect," "estimate," "intend," "plan," "project," "will be," "will continue," "will result," "seek," "could," "may," "might" and similar expressions are intended to identify 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 and a number of clinical trials of third parties' RNAi technology has been unsuccessful. 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 using RNAi technologies, including for at least some of the disease indications we have been focusing our efforts on to date. Companies working in the RNAi area include: Alnylam Pharmaceuticals, MDRNA, Cequent Pharmaceuticals, Tacere Therapeutics, Benitec, OPKO Health, Silence Therapeutics, Quark Pharmaceuticals, Rosetta Genomics, Lorus Therapeutics, Tekmira Pharmaceuticals Corporation, Calando Pharmaceuticals, Regulus Therapeutics, and Santaris Pharmaceuticals, as well as a number of the large pharmaceutical companies. In addition, a number of companies are developing therapeutics for the same diseases we are targeting using technologies other than RNA interference, and, for some of these diseases, there are existing therapeutics being marketed currently. 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. A number of our competitors have already commenced clinical testing of RNAi product candidates and may be more advanced than are we in the process of developing products. 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.

We may not be able to establish or 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, manufacture, 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 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 that contain such requirements or any other obligations under these 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 may not be able to readily terminate any such agreements with contract partners even if such contract partners do not fulfill their obligations to us.

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 into 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 are 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 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 currently manufacture limited quantities of our product candidates for our research activities at our facility, and we have no manufacturing supply arrangements for any of our product candidates. 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.

Our current plans call for the manufacture of our rxRNA compounds and, as necessary, any delivery vehicles that may be used to deliver our rxRNA compounds by contract manufacturers offering research grade, Good Laboratory grade and Good Manufacturing Practices grade materials for preclinical studies (e.g. toxicology studies) and for clinical use. We anticipate the chemistry, manufacturing and controls for each 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 were involved in litigation or faced threatened litigation regarding or challenge to the composition or intellectual property covering such 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.

Before obtaining regulatory approval for the sale of any drug candidate, 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. 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. A failure of one or more of our pre-clinical studies or clinical trials can occur at any stage of testing. 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 United States 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,
- Third party contractors failing to comply with regulatory requirements or meet their contractual obligations to us in a timely manner,
- Our drug candidates having very different chemical and pharmacological properties in humans than in laboratory testing and interacting with human biological systems in unforeseen, ineffective or harmful ways,
- The need to suspend or terminate our clinical trials if the participants are being exposed to unacceptable health risks,
- Insufficient or inadequate supply or quality of our drug candidates or other necessary materials necessary to conduct our clinical trials,

- Effects of our drug candidates not being the desired effects or including undesirable side effects or the drug candidates having other unexpected characteristics.
- The cost of our clinical trials may be greater than we anticipate,
- 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 may use an implantable pump to deliver certain potential drug candidates to the nervous system. The drug delivery vehicles that we expect to deliver our drug candidates have not been approved by the FDA or other regulatory agencies. In addition, 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.

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. 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.

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 may be more expensive to manufacture than traditional small molecule drugs, which may make them more costly than competing small molecule drugs. Additionally, for various applications, 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 others parties, 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 Fire-Mello 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 third parties are claimed in a number of 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 our 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 and those that we own 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. Third parties may hold or seek to obtain additional patents that could make it more difficult or impossible for us to develop products based on RNAi technology without obtaining a license to such patents, which licenses may not be available on attractive terms or at all.

In addition, others may challenge the patents or patent applications that we currently license or may license in the future or that we own 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 license or that we own 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 or patents or patent application that we own.

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 other third parties that may be unavailable. There is no assurance that we will be able to acquire any additional intellectual property rights on satisfactory terms, or at all. To the extent that we are required and are able 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 parties may materially reduce our economic returns or even cause us to abandon development or commercialization of a product candidate.

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.

Our success depends upon our ability to obtain and maintain intellectual property protection for our products and technologies.

Our success will depend on our ability to obtain and maintain adequate protection of our intellectual property covering our product candidates and technologies. 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 patent applications 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. 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.

There may be patent or other intellectual property rights belonging to others that require us to alter our products, pay licensing fees or cease certain activities. If our products infringe patent or other intellectual property rights of others, the owners of those rights could bring legal actions against us claiming damages and seeking to enjoin manufacturing and marketing of the affected products. If these legal actions are successful, in addition to any potential liability for damages, we could be required to obtain a license in order to continue to manufacture or market the affected products. We may not prevail in any action brought against us, and any license required under any rights that we infringe may not be available on acceptable terms or at all. 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 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 for them. 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. 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.

Comprehensive health care reform legislation, which was recently adopted by Congress and was subsequently signed into law, could adversely affect our business and financial condition. Among other provisions, the legislation provides that a "biosimilar" product may be approved by the FDA on the basis of

analytical tests and certain clinical studies demonstrating that such product is highly similar to an existing, approved product and that switching between an existing product and the biosimilar product will not result in diminished safety or efficacy. This abbreviated regulatory approval process may result in increased competition if we are able to bring a product to market. The legislation also includes more stringent compliance programs for companies in various sectors of the life sciences industry with which we may need to comply and enhanced penalties for non-compliance with the new health care regulations. Complying with new regulations may divert management resources, and inadvertent failure to comply with new regulations may result in penalties being imposed on us.

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 Scientific Advisory Board ("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 shortnotice. 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 Our Financial Position and Capital Requirements

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 and cash equivalent should be sufficient to fund our operations through at least the first half of 2011. In the future, we will be dependent on obtaining further financing from third parties in order to maintain our operations and to meet our financial obligations. In addition, until its expiration on January 30, 2011, we also have available to us the SEDA that we entered into on January 30, 2009. However, 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 U.S. Securities and Exchange Commission ("SEC"), and there is risk of delays in our satisfying these conditions. We cannot assure that additional debt or equity or other funding to maintain our operations and to meet our obligations to our licensors will be available to us in the future 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.

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 product candidates,
- 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 financing needed for the development of our business 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.

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.

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 additional 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.

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 on Form 10-K for the year ended December 31, 2009 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. From time to time we evaluate 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. 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.

Risks Related to Ownership of Our Common Stock

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

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,
- 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 stock holders,
- 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.

Sales of our shares by CytRx could adversely affect our stock price.

As of March 30, 2010, CytRx owned 5,093,881 shares of our common stock, or approximately 28% of our outstanding shares. The availability of our shares held by CytRx for public resale on the open market, as well as any actual sales of these shares, 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 28% 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 28% 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 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 effect a potential 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 with respect to voting such shares.

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), for our facility located at 60 Prescott Street, Worcester, Massachusetts. The lease has 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 is 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. *RESERVED*

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	$23.95	$6.01
Second Quarter	$10.12	$5.22
Third Quarter	$ 9.05	$6.42
Fourth Quarter	$12.25	$5.41

Year Ended December 31, 2009	High	Low
First Quarter	$ 7.19	$2.71
Second Quarter	$ 7.57	$4.00
Third Quarter	$ 4.93	$2.44
Fourth Quarter	$ 4.84	$1.51

Holders

As of March 29, 2010, there were approximately 631 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 2010 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 during the period covered by this report.

Common Stock

There were no unregistered shares of common stock issued by us during the period covered by this report.

Options

There were no unregistered options granted by us during the period covered by this report.

Common Stock Warrants

There were no unregistered common stock warrants issued by us during the period covered by this report, except which have previously been disclosed in a Current Report on Form 8-K.

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 within the meaning of the Private Securities Litigation Reform Act of 1995. For a discussion of indicators of forward-looking statements and specific important factors that could cause actual results to differ materially from those contained in forward-looking statements, see "Risk Factors" under Part I — Item 1A of this Annual Report on Form 10-K for the fiscal year ended December 31, 2009. This Management's Discussion and Analysis of Financial Condition and Results of Operations should be read and interpreted in light of such factors.

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. It is believed that this specific silencing can be used to potentially treat human diseases by "turning off" genes that lead to disease.

We intend to use our RNAi therapeutic platform and our expertise in RNAi to identify lead compounds against multiple target genes, and advance them towards pre-clinical and clinical development in therapeutic areas that address broad unmet medical needs, in both acute and chronic settings. By utilizing our expertise in RNAi and the comprehensive RNAi therapeutic platform that we have established, we believe we will be able to discover and develop lead compounds and progress them into and through clinical development for potential commercialization more efficiently than traditional drug development approaches.

We were formed in 2006 by CytRx Corporation 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 the University of Massachusetts Medical School, or "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. 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 conducting discovery research and pre-clinical development activities utilizing our RNAi therapeutic platform, acquiring RNAi technologies and patent rights through exclusive, co-exclusive and non-exclusive licenses, recruiting an RNAi-focused management and scientific/clinical advisory team, capital raising activities and conducting business development activities aimed

at establishing research and development partnerships with pharmaceutical and larger biotechnology companies.

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 a 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 28% 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 sold 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 August 4, 2009, we sold 2,385,715 shares of our common stock to institutional investors at $3.50 per share, resulting in aggregate gross proceeds of approximately $7.8 million.

On March 26, 2010, we sold 2,700,000 shares of our common stock to institutional investors at $6.00 per share, resulting in aggregate gross proceeds of approximately $16.2 million.

Research and Development

Our research programs focus on identifying product candidates and optimizing the delivery method and technology necessary to make RNAi compounds available by local, systemic or oral administration, as appropriate for diseases for which we intend 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.

License Agreements

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 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

As part of 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 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, dated January 10, 2007 between CytRx and UMMS. 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. We also will be required to pay to UMMS a percentage of income received from any sub-licensees under these licenses and to pay expenses incurred by UMMS in prosecuting and maintaining the licensed patents.

Further, 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, retinitis, ALS, diabetes and obesity.

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.

We recently terminated a number of these UMMS licenses and still hold licenses to patents and patent applications that belong to six distinct families of patent applications from the original thirteen.

We also recently terminated the Collaboration and Invention Disclosure Agreement we had entered into in January 10, 2007, with UMMS.

We recently terminated the License agreement with Imperial College Innovations Limited and Imperial College of Science and Technology that was assigned to us by CytRx in connection with the Contribution Agreement dated January 8, 2007.

Financial Information

The financial information of RXi as of December 31, 2009 and 2008 and the cumulative financial information for the period from January 1, 2003 (date of inception) to December 31, 2009 have been audited by our independent registered public accounting firm, BDO Seidman, LLP.

Critical Accounting Policies and Estimates

Use of Estimates

Management's discussion and analysis of our financial condition and results of operations include the financial statements as of and for the years ended December 31, 2009 and 2008. The preparation of these financial statements requires management to make estimates, allocations and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. On an ongoing basis, management evaluates its estimates, including those related to impairment of long-lived assets, accrued liabilities and certain expenses. We base our estimates about the carrying values of assets and liabilities that are not readily apparent from other sources on historical experience and on other assumptions believed to be reasonable under the circumstances. Actual results may differ materially from these estimates under different assumptions or conditions. Additionally, the financial information included here may not necessarily reflect the financial position, operating results, changes in our invested equity and cash flows in the future or what they would have been had we been a separate, stand-alone entity during the periods presented.

Our significant accounting policies are summarized in the footnotes to our financial statements. We believe the following critical accounting policies involve significant judgments and estimates used in the preparation of our financial statements.

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 research and development departments as well as costs to acquire technology licenses.

Stock-Based Compensation

We follow the provisions of the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 718, *"Compensation — Stock Compensation"* ("ASC 718"), which 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 ASC 718 is recognized as an expense over the requisite service period.

For stock options granted as consideration for services rendered by non-employees, we recognize compensation expense in accordance with the requirements of FASB ASC Topic 505-50 ("ASC 505-50") *"Equity Based Payments to Non-Employees."* 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 our 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 fair value of each option grant is estimated using the Black-Scholes option-pricing model, with the following weighted average assumptions:

	2009	2008
Weighted average risk free interest rate	1.55% - 3.91%	1.55% - 3.99%
Weighted average volatility	116.72% - 122.93%	101.79% - 116.74%
Expected lives (years)	6 - 10	6 - 10
Expected dividend yield	0%	0%

Our 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 ASC 718, which averages the contractual term of our options of ten years with the average vesting term of four 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 we have never paid cash dividends and presently have no intention of paying cash dividends in the future. The risk-free interest rate used for each grant was also based upon prevailing short-term interest rates.

We have estimated an annualized forfeiture rate of 4.0% for options granted to our employees, 2.1% for options granted to senior management and no forfeiture rate for the directors. We 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.

Valuation of Common Stock

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 prior to that date.

Derivative Financial Instruments

During the normal course of business, from time to time, we issue warrants and options to vendors as consideration to perform services. We may also issue warrants as part of a debt or equity financing. We do not enter into any derivative contracts for speculative purposes.

We recognize all derivatives as assets or liabilities measured at fair value with changes in fair value of derivatives reflected as current period income or loss unless the derivatives qualify for hedge accounting and are accounted for as such. During the year ended December 31, 2009, we issued warrants to purchase 978,142 shares of common stock in connection with an equity transaction. In accordance with ASC Topic 815-40, *"Derivatives and Hedging — Contracts in Entity's Own Stock"* ("ASC 815-40"), the value of these warrants is required to be recorded as a liability, as the holders have an option to put the warrants back to us in certain events, as defined.

Results of Operations

For the year ended December 31, 2009, our net loss was approximately $18,387,000, compared with a net loss of $14,373,000 for the year ended December 31, 2008. The loss increased by $4,014,000 or approximately 28%. Reasons for the variations in the losses between the years are discussed below.

Revenue

Since we are a development-stage biopharmaceutical company, we have not generated any revenues since inception through December 31, 2009.

Research and Development Expense

	For the Years Ended December 31,	
	2009	2008
	(In thousands)	
Research and development expense	$6,728	$5,105
Research and development employee stock-based compensation expense	867	336
Research and development non-employee stock-based compensation expense	1,297	1,613
Total research and development expense	$8,892	$7,054

During 2009, research and development expense consists primarily of compensation-related costs for our employees dedicated to research and development activities and for our Scientific Advisory Board ("SAB") members as well as licensing fees, patent prosecution costs, and the cost of lab supplies used in our research and development programs. We expect to continue to devote a substantial portion of our resources to research and development expenses and we expect research and development expenses to increase as we expand our discovery and development activities for RNAi therapeutics.

Total research and development expenses for the year ended December 31, 2009 were approximately $8,892,000 or 51% of our total operating expenses incurred. For the year ended December 31, 2008, total research and development expenses were approximately $7,054,000, or 48%, of our total operating expenses incurred, an increase of approximately $1,838,000, or 26%. Research and development expenses increased $1,623,000, or 32%, from $5,105,000 in the year ended December 31, 2008 to $6,728,000 in the year ended December 31, 2009. This increase was primarily due to increases in costs associated with employee compensation, resulting from an increase in headcount as well as an increase in patent costs related to patent applications on internal discoveries.

Research and development employee stock-based compensation expense

Research and development employee stock-based compensation expense increased $531,000, or 158%, in the year ended December 31, 2009, compared with the year ended December 31, 2008. This increase was due to an increase in the number of outstanding common stock options during the year, which include new common stock options issued to new employees and to certain existing employees.

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 results 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 decreased $316,000, or 20%, from $1,613,000 for the year ended December 31, 2008 to $1,297,000 for the year ended December 31, 2009. The decrease was due to a decrease in the Black-Scholes value of the founding SAB members' 2009 annual grant compared with the value of their 2008 annual grant offset by the re-measurement of Black-Scholes fair value of the founding SAB members' original grants that vest on April 2012.

General and Administrative Expense

	For the Years Ended December 31,	
	2009	2008
	(In thousands)	
General and administrative expenses	$5,483	$4,874
Common stock warrants issued for general and administrative expense	826	750
Fair value of common stock issued in exchange for general and administrative expenses	281	—
Common stock and stock options issued for general and administrative expense	2,038	1,875
Total general and administrative expense	$8,628	$7,499

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, business development and corporate partnership opportunities and general corporate expenses.

General and administrative expenses were $8,628,000 for the year ended December 31, 2009 compared with $7,499,000 for the year ended December 31, 2008. The increase of $1,129,000, or 15%, was due to higher staff-related costs, including $2,038,000 in non-cash share-based compensation expense, and $826,000 in warrant expense related to a warrant issued for business advisory services and $281,000 in common stock issued as a commitment fee under the SEDA.

General and administrative expense as a percentage of total operating expense for the years ended December 31, 2009 and 2008 was 49% and 52%, respectively. 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 operating 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 their fair value, or at the value of the services received, whichever is more reliably measurable.

Interest Income

Interest income was negligible for the year ended December 31, 2009, compared with approximately $180,000 for the year ended December 31, 2008. This decrease was primarily due to current interest rates available to us on our cash and cash equivalents during the twelve months ended December 31, 2009, as compared with the twelve months ended December 31, 2008. The key objectives of our investment policy are to preserve principal and ensure sufficient liquidity, so our invested cash may not earn as high a level of income as longer-term or higher risk securities, which generally have less liquidity and more volatility. The interest rates available on lower risk, shorter-term investments in today's market are lower than rates available in the prior period. 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.

Other Expense

Other expenses were $862,000 for the year ended December 31, 2009. Approximately $858,000 of this expense relates to the change in fair value of warrants issued in connection with the 2009 Offering.

Income Taxes

There was no income tax expense for the years ended December 31, 2009 and 2008 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

We had cash and cash equivalents of approximately $5.7 million as of December 31, 2009 and approximately $14.4 million as of March 31, 2010.

During 2009 and to date in 2010, we have entered into the following significant financing transactions:

On January 30, 2009, we entered into the SEDA, pursuant to which we may, at our option over a two-year period, ending on January 30, 2011, periodically sell to YA Global shares of our common stock, for a total purchase price of up to $25.0 million. To date we have not sold any shares under the SEDA.

On August 4, 2009, we closed the 2009 Offering in which we sold 2,385,715 shares of our common stock and warrants to purchase 954,286 shares of our common stock and a at an exercise price of $4.50 per share resulting in approximately $7.8 million in net proceeds after deducting the placement agent fee and offering expenses.

On March 26, 2010 we closed the 2010 Offering pursuant to which we sold to certain investors 2,700,000 shares of common stock at $6.00 per share and warrants to purchase 540,000 shares of common stock with an exercise price of $6.00 per share. The financing provided approximately $15.2 million in net proceeds to the Company after deducting the placement agent fee and offering expenses. Pursuant to a stock redemption agreement between us and CytRx Corporation dated March 22, 2010, we were required to use 25% of the net proceeds from the offering to repurchase from CytRx a number of shares of our common stock held by CytRx equal to 25% of the shares sold by us in the offering. We are also required to use 25% of the proceeds from the exercise of warrants issued in the offering to repurchase from CytRx a number of shares of our common stock held by CytRx equal to 25% of the shares issued upon the exercise of such warrants. As required by the agreement with CytRx, on March 29, 2010 we repurchased 675,000 shares of our common stock from CytRx for an aggregate price of approximately $3.8 million. We estimate that we will repurchase an additional 135,000 shares of our common stock from CytRx for an aggregate price of $0.8 million if all of the warrants issued in the offering are exercised.

We have not had not generated any revenues since inception nor are any revenues expected for the foreseeable future. We expect to incur significant operating losses for the foreseeable future while we advance our future product candidates from discovery through pre-clinical studies and clinical trials and seek regulatory approval and potential commercialization, even if we are collaborating with pharmaceutical and larger biotechnology companies. In addition to these increasing research and development expenses, we expect general and administrative costs to increase as we recruit additional management and administrative personnel.

We believe that our existing cash and cash equivalents should be sufficient to fund our operations through at least the first half of 2011. In addition, we also have available to us the SEDA which expires on January 30, 2011. In the future, we will be dependent on obtaining funding from third parties such as proceeds from the sale of equity, funded research and development payments and payments under partnership and collaborative agreements, in order to maintain our operations and meet our obligations to licensors. There is no guarantee that debt, additional 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 $11,769,000 for the year ended December 31, 2009 compared with $9,429,000 net cash used in operating activities for the year ended December 31, 2008. The increase of approximately $2,340,000 resulted primarily from a net loss of $18,387,000, less the add back of non-cash items of $6,333,000, of which $4,202,000 related to stock-based compensation, $826,000 related to stock warrant expense in exchange for services, $218,000 issued as a commitment fee in connection with the SEDA, $162,000 related to depreciation and $285,000 related to changes in current assets and liabilities and $858,000 that reflects the fair value of warrants issued with the 2009 Offering.

Net Cash Flow from Investing Activities

Net cash used in investing activities was approximately $83,000 for the year ended December 31, 2009, compared with net cash provided by investing activities of $9,600,000 for the year ended December 31, 2008. The decrease of approximately $9,683,000 in cash provided by investing activities was primarily due to net redemption of short-term investments in 2008.

Net Cash Flow from Financing Activities

Net cash provided by financing activities was $7,680,000 for the year ended December 31, 2009, compared with $7,922,000 for the year ended December 31, 2008. This decrease was primarily due to net proceeds from the issuance of common stock in the amount of $7,918,000 to institutional investors in the second quarter of 2008 compared with net proceeds from the issuance of common stock in the amount of $7,714,000 to institutional investors in the third quarter of 2009.

Recently Issued Accounting Standards

In June 2009, the FASB issued Accounting Standard Update ("ASU") No. 2009-01, *Topic 105 — "Generally Accepted Accounting Principles, amendments based on Statement of Financial Accounting Standards* ("SFAS") *No. 168 — The FASB Accounting Standards Codification and the Hierarchy of Generally Accepted Accounting Principles"* and establishes only two levels of U.S. GAAP, authoritative and non-authoritative. The amendments established the FASB Accounting Standards Codification (the "Codification") as the source of authoritative accounting principles recognized by the FASB to be applied by nongovernmental entities in the preparation of financial statements in conformity with U.S. GAAP. Rules and interpretive releases of the SEC under authority of federal securities laws are also sources of authoritative U.S. GAAP for SEC registrants. On the effective date of this statement, the Codification superseded all then-existing non-SEC accounting and reporting standards. All other non-grandfathered non-SEC accounting literature not included in the Codification has become non-authoritative. This statement is effective for financial statements for interim or annual reporting periods ending after September 15, 2009. We adopted this update during the three-month period ended September 30, 2009. As the Codification was not intended to change or alter existing U.S. GAAP, the adoption of this update did not have any impact on our financial position, results of operations or cash flows.

In June 2009, the FASB ASC Topic 810 "*Amendments to FASB Interpretation No. 46(R)*", ("ASC 810"), which amends the consolidation guidance applicable to variable interest entities and is effective as of January 1, 2010. We are currently in the process of evaluating the impact of this pronouncement.

In June 2009, the FASB issued ASC Topic 860, "*Accounting for Transfers of Financial Assets*" ("ASC 860"), which eliminates the concept of a qualifying special-purpose entity, changes the requirements for derecognizing financial assets, and requires additional disclosures in order to enhance information reported to users of financial statements by providing greater transparency about transfers of financial assets, including securitization transactions, and an entity's continuing involvement in and exposure to the risks related to transferred financial assets. This statement is effective for fiscal years beginning after November 15, 2009. We are currently in the process of evaluating the impact of ASC-860.

In May 2009, FASB ASC Topic 855, "*Subsequent Events*" ("ASC 855") was issued. This statement sets forth (i) the period after the balance sheet date during which management of a reporting entity should evaluate events or transactions that may occur for potential recognition or disclosure in the financial statements, (ii) the circumstances under which an entity should recognize events or transactions occurring after the balance sheet date in its financial statements, and (iii) the disclosures that an entity should make about events or transactions that occurred after the balance sheet date. ASC 855 is effective for interim and annual periods ending after June 15, 2009. We adopted ASC 855 in the quarter ending June 30, 2009. The adoption of ASC 855 did not have any impact on our financial position, results of operations or cash flows. We have evaluated all events or transactions that occurred after the period covered by this report, up through the time of filing our annual

report on Form 10-K with the SEC. During this period that we did not have any material recognizable subsequent events other than what is disclosed in footnote 17.

In April 2009, the FASB issued the following: (i) FASB ASC Topic 820-10-65, *"Determining Fair Value When the Volume and Level of Activity for the Asset or Liability have Significantly Decreased and Identifying Transactions That Are Not Orderly"* ("ASC 820-10-65"), (ii) FASB ASC Topic 320-10-65, *"Recognition and Presentation of Other-Than-Temporary Impairment"* ("ASC 320-10-65"), and (iii) FASB ASC Topic 825-10-65, *"Interim Disclosures about Fair Value of Financial Instruments"* ("ASC 825-10-65"), which was effective for interim and annual periods ending after June 15, 2009. ASC 820-10-65 provides guidance on how to determine the fair value of assets and liabilities under ASC 820-10 in the current economic environment and reemphasizes that the objective of a fair value measurement remains an exit price. If we were to conclude that there has been a significant decrease in the volume and level of activity of the asset or liability in relation to normal market activities, quoted market values may not be representative of fair value and we may conclude that a change in valuation technique or the use of multiple valuation techniques may be appropriate. ASC 820-10-65 modifies the requirements for recognizing other-than-temporarily impaired debt securities and revise the existing impairment model for such securities, by modifying the current intent and ability indicator in determining whether a debt security is other-than-temporarily impaired. ASC 825-10-65 enhances the disclosure of instruments under the scope of ASC 820 for both interim and annual periods. We are currently evaluating these staff positions and the impact, if any, that adoption will have on our financial position and results of operation.

Effective January 1, 2009, we adopted FASB ASC Topic 815-40-15, *"Derivatives and Hedging Evaluating Whether an Instrument is Indexed to an Entity's Own Stock"* ("ASC 815-40-15"), which addresses the accounting for certain instruments as derivatives. Under ASC 815-40-15 specific guidance is provided regarding requirements for an entity to consider embedded features as indexed to the entity's own stock. See footnote 6 for the impact the adoption of ASC 815-40-15 had on our financial position, results of operations and cash flows.

In December 2007, the FASB ratified the consensus reached by the EITF on ASC Topic 808, *"Accounting for Collaborative Agreements"* ("ASC 808-10-2"), which provides the definition of a collaborative agreement and ASC 808-10-15 provides guidelines to assist an entity in determining whether or not it is a party in a collaborative agreement. ASC 808-10-45 states that costs incurred and revenues generated from transactions with third parties shall be reported in accordance with ASC Topic 605-45, *"Reporting Revenue Gross as a Principal versus Net as an Agent"*, ("ASC 808-10-50") also provides minimum disclosure requirements for an entity's collaboration agreements and transition guidance. The adoption of ASC Topic 808 did not have a material impact on our financial position, results of operations and cash flows.

In June 2007, the Emerging Issues Task Force issued ASC Topic 730-20 *"Research and Development Arrangements"* ("ASC 730-20"). ASC 730-20 addresses the diversity which exists with respect to the accounting for the non-refundable portion of a payment made by a research and development entity for future research and development activities. Under ASC 730-20, an entity would defer and capitalize non-refundable advance payments made for research and development activities until the related goods are delivered or the related services are performed subject to an assessment of recoverability. ASC 730-20 was effective for fiscal years beginning after December 15, 2007 and interim periods within those years. The adoption of ASC 730-20 did not have a material impact on our financial statements.

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 ASC Topic 460 ("ASC 460"), *"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 the 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 $25.0 million. 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 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 occurred. 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.

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, 2008 and 2009 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, 2009 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, 2009 and 2008 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, 2009. 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, 2009 and 2008 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, 2009, in conformity with accounting principles generally accepted in the United States of America.

/s/ BDO Seidman, LLP

Boston, Massachusetts
March 31, 2010

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

BALANCE SHEETS

	December 31, 2009	December 31, 2008
	(Amounts in thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 5,684	$ 9,856
Prepaid expenses	120	73
Total current assets	5,804	9,929
Equipment and furnishings, net of accumulated depreciation and amortization of $320 and $158 in 2009 and 2008, respectively	432	414
Deposits	16	16
Total assets	$ 6,252	$ 10,359
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 625	$ 394
Accrued expense and other current liabilities	1,077	976
Current maturities of capital lease obligations	52	17
Warrants potentially settleable in cash	3,721	—
Total current liabilities	5,475	1,387
Capital lease obligations, net of current maturities	36	4
Total liabilities	5,511	1,391
Commitments and contingencies (Notes 6, 8 & 14)		
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; 16,207,625 and 13,763,231 shares issued and outstanding in 2009 and 2008, respectively	2	1
Additional paid-in capital	44,489	34,330
Deficit accumulated during the developmental stage	(43,750)	(25,363)
Total stockholders' equity	741	8,968
Total liabilities and stockholders' equity	$ 6,252	$ 10,359

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

STATEMENTS OF EXPENSES

	Year Ended December 31, 2009	Year Ended December 31, 2008	Period from January 1, 2003 (Date of Inception) to December 31, 2009
	(Amounts in thousands, except share and per share data)		
Expenses:			
Research and development expense	$ 6,728	$ 5,105	$ 20,637
Research and development employee stock-based compensation expense	867	336	1,323
Research and development non-employee stock-based compensation expense	1,297	1,613	5,320
Fair value of common stock issued in exchange for licensing rights	—	—	3,954
Total research and development expense	8,892	7,054	31,234
General and administrative	5,483	4,874	15,617
Fair value of common stock warrants issued for general and administrative expenses	826	750	1,576
Fair value of common stock issued in exchange for general and administrative expenses	281	—	281
General and administrative employee stock-based compensation	2,038	1,875	4,844
Total general and administrative expense	8,628	7,499	22,318
Total operating expenses	(17,520)	(14,553)	(53,552)
Interest income (expense)	(5)	180	623
Other income (expense)	(862)	—	(862)
Loss before provision for income taxes	(18,387)	(14,373)	(53,791)
Provision for income taxes	—	—	—
Net loss	$ (18,387)	$ (14,373)	$(53,791)
Net loss per common share:			
Basic and diluted loss per share	$ (1.24)	$ (1.09)	
Weighted average common shares outstanding: basic and diluted	14,796,541	13,239,942	

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, 2009 AND PARENT COMPANY'S NET DEFICIT FOR THE PERIOD FROM DECEMBER 31, 2003 TO DECEMBER 31, 2006

	Common Stock		Additional Paid-In Capital	Deficit Accumulated During Development Stage	Parent Company's Net Deficit	Total
	Shares Issued	Amount				
	(Amounts in thousands, except share data)					
Predecessor						
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

	Common Stock		Additional Paid-In Capital	Deficit Accumulated During Development Stage	Parent Company's Net Deficit	Total
	Shares Issued	Amount				
	(Amounts in thousands, except share data)					
Issuance of common stock, net of offering costs of $796	1,073,299	—	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
Issuance of common stock, net of offering costs of $636	2,385,715	1	7,713	—		7,714
Common stock warrants issued in connection with the 2009 Offering	—	—	(2,863)	—		(2,863)
Common stock issued upon exercise of stock options	281	—	—	—		—
Common stock issued as commitment fee in connection with SEDA	58,398	—	281	—		281
Stock based compensation for directors and employees	—	—	2,906	—		2,906
Stock based compensation expense for services	—	—	1,296	—		1,296
Common stock warrant expense in exchange for services		—	826	—		826
Net loss	—	—	—	(18,387)		(18,387)
Balance at December 31, 2009	16,207,625	2	$44,489	$(43,750)		$ 741

See accompanying notes to financial statements.

RXi PHARMACEUTICALS CORPORATION
(A Development Stage Company)

STATEMENTS OF CASH FLOWS

	Year Ended December 31, 2009	Year Ended December 31, 2008	Period from January 1, 2003 (Date of Inception) through December 31, 2009
	(Amounts in thousands)		
Cash flows from operating activities:			
Net loss	$(18,387)	$(14,373)	$(53,791)
Adjustment to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization expense	162	131	329
Loss on disposal of equipment	4	8	12
Non-cash rent expense	—	29	29
Accretion and receipt of bond discount	—	207	35
Non-cash share based compensation	4,202	3,824	11,489
Fair value of common stock warrants issued in exchange for services	826	750	1,576
Fair value of common stock issued as commitment fee in connection with SEDA	281	—	281
Change in fair value of common stock warrants issued in connection with the 2009 offering	858	—	858
Fair value of common stock issued in exchange for licensing rights	—	—	3,954
Changes in assets and liabilities:			
Prepaid expenses	(47)	(51)	(120)
Accounts payable	231	339	625
Due to former parent	—	(207)	(207)
Accrued expenses and other current liabilities	101	(86)	1,077
Net cash used in operating activities	(11,769)	(9,429)	(33,853)
Cash flows from investing activities:			
Purchase of short-term investments	—	(19,785)	(31,542)
Maturities of short-term investments	—	29,530	31,507
Cash paid for purchase of equipment and furnishings	(82)	(166)	(580)
Disposal of equipment and furnishings	(1)	—	(1)
Cash refunded (paid) for lease deposit	—	21	(45)
Net cash provided by (used in) investing activities	(83)	9,600	(661)
Cash flows from financing activities:			
Net proceeds from issuance of common stock	7,714	7,918	31,132
Net proceeds from exercise of common stock options	—	26	356
Repayments of capital lease obligations	(34)	(22)	(56)
Cash advances from Parent, net			8,766
Net cash provided by financing activities	7,680	7,922	40,198
Net increase in cash and cash equivalents	(4,172)	8,093	5,684
Cash and cash equivalents at the beginning of period	9,856	1,763	—
Cash and cash equivalents at end of period	$ 5,684	$ 9,856	$ 5,684
Supplemental disclosure of cash flow information:			
Cash received during the periods for interest	1	$ 449	$ 724
Cash paid during the periods for interest	$ —	$ 7	$ 7

	Year Ended December 31, 2009	Year Ended December 31, 2008	Period from January 1, 2003 (Date of Inception) through December 31, 2009
	(Amounts in thousands)		
Supplemental disclosure of non-cash investing and financing activities:			
Settlement of corporate formation expenses in exchange for common stock	$ —	$ —	$ 978
Fair value of warrants issued in connection with common stock recorded as cost of equity	$ 2,863	$ —	$ 2,863
Allocation of management expenses	$ —	$ —	$ 551
Equipment and furnishings exchanged for common stock	$ —	$ —	$ 48
Acquisition of equipment and furnishings through accrued liabilities	$ —	$ —	$ —
Equipment and furnishings acquired through capital lease	$ 101	$ 43	$ 144
Non-cash lease deposit	$ —	$ —	$ 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 comprehensive RNAi technology platform it has established, the Company believes it will be able to discover and develop lead compounds and progress them into and through clinical development for potential commercialization more efficiently than traditional drug development approaches, primarily in partnerships with pharmaceutical and biotechnology companies.

RXi was incorporated as Argonaut Pharmaceuticals, Inc., in Delaware, on April 3, 2006. 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 conducting discovery research and pre-clinical development activities utilizing the Company's RNAi therapeutic platform, acquiring RNAi technologies and patent rights through exclusive, co-exclusive and non-exclusive licenses, recruiting an RNAi-focused management and scientific/clinical advisory team, capital raising activities and conducting business development activities aimed at establishing research and development partnerships with pharmaceutical and larger biotechnology companies.

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

The Company had cash and cash equivalents of approximately $5.7 million as of December 31, 2009 and approximately $14.4 million as of March 31, 2010.

During 2009 and to date in 2010, the Company entered into the following significant financing transactions:

On January 30, 2009, the Company entered into the SEDA, pursuant to which the Company may, at its option over a two-year period, ending on January 30, 2011, periodically sell to YA Global shares of the Company's common stock, for a total purchase price of up to $25.0 million. To date no shares have been sold under the SEDA.

On August 4, 2009, the Company closed the 2009 Offering in which it sold 2,385,715 shares of its common stock and warrants to purchase 954,286 shares of its common stock and a at an exercise price of $4.50 per share resulting in approximately $7.8 million in net proceeds after deducting the placement agent fee and offering expenses.

On March 26, 2010, the Company closed a registered direct financing (the "2010 Offering") pursuant to which it sold to certain investors 2,700,000 shares of common stock at $6.00 per share and warrants to purchase 540,000 shares of common stock with an exercise price of $6.00 per share. The financing provided approximately $15.2 million in net proceeds to the Company after deducting the placement agent fee and offering expenses. Pursuant to a stock redemption agreement between us and CytRx Corporation dated March 22, 2010, the Company is required to use 25% of the net proceeds from the offering to repurchase from CytRx a number of shares of its common stock held by CytRx equal to 25% of the shares sold by th e Company in the offering. The Company is also required to use 25% of the proceeds from the exercise of warrants issued in the offering to repurchase from CytRx a number of shares of its common stock held by CytRx equal to 25% of the shares issued upon the exercise of such warrants. As required by the agreement with CytRx, on March 31, 2010 the Company repurchased 675,000 shares of its common stock from CytRx for an aggregate price of approximately $3.8 million. The Company estimates that it will repurchase an additional 135,000 shares of its common stock from CytRx for an aggregate price of $0.8 million if all of the warrants issued in the offering are exercised.

We have not had not generated any revenues since inception nor are any revenues expected for the foreseeable future. We expect to incur significant operating losses for the foreseeable future while we advance our future product candidates from discovery through pre-clinical studies and clinical trials and seek regulatory approval and potential commercialization, even if we are collaborating with pharmaceutical and larger biotechnology companies. In addition to these increasing research and development expenses, we expect general and administrative costs to increase as we recruit additional management and administrative personnel.

We believe that our existing cash and cash equivalents should be sufficient to fund our operations through at least the first half of 2011. In addition, we also have available to us the SEDA which expires on January 30, 2011. In the future, we will be dependent on obtaining funding from third parties such as proceeds from the sale of equity, funded research and development payments and payments under partnership and collaborative agreements, in order to maintain our operations and meet our obligations to licensors. There is no guarantee that debt, additional 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 Company believes that its existing cash, is sufficient to fund operations through at least the first half of 2011. In the future, the Company will be dependent on obtaining funding from third parties such as proceeds from the sale of equity, funded research and development payments and payments under partnership and collaborative agreements, in order to maintain its operations. There is no guarantee that debt, additional 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 biotechnology 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

Uses of estimates in preparation of financial statements — 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 materially from these estimates.

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, accounts payable and accrued liabilities approximate their fair values due to their short-term nature.

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.

Depreciation and amortization expense for the year ended December 31, 2009 and 2008 was approximately $162,000 and $131,000, respectively.

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, 2009.

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 — The Company follows the provisions of the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 718, *"Compensation — Stock Compensation"* ("ASC 718"), which 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 ASC 718 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 FASB ASC Topic 505-50 ("ASC 505-50") *"Equity Based Payments to Non-Employees"*. 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 $1.3 million and $1.6 million of stock based compensation expense related to non-employee stock options for the years ended December 31, 2009 and 2008, respectively.

Derivative Financial Instruments — During the normal course of business, from time to time, the Company issues warrants and options to vendors as consideration to perform services. It may also issue warrants as part of a debt or equity financing. The Company does not enter into any derivative contracts for speculative purposes.

The Company recognizes all derivatives as assets or liabilities measured at fair value with changes in fair value of derivatives reflected as current period income or loss unless the derivatives qualify for hedge accounting and are accounted for as such. During the year ended December 31, 2009, the Company issued warrants to purchase 978,142 shares of common stock in connection with an equity transaction. In accordance with FASB ASC Topic 815-40, *"Derivatives and Hedging — Contracts in Entity's Own Stock"* ("ASC 815-40"), the value of these warrants is required to be recorded as a liability, as the holders have an option to put the warrants back to the Company in certain events, as defined.

As of December 31, 2009, the value of these warrants is approximately $3.7 million and is recorded as a current liability on the accompanying balance sheet.

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 ASC 740-10, *"Accounting for Income Taxes" ("ASC 740-10").* 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. *ASC 740-10* 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. The recognition and measurement of benefits related to the Company's tax positions requires significant judgment, as uncertainties often exist with respect to new laws, new interpretations of existing laws, and rulings by taxing authorities. Differences between actual results and RXi's assumptions or changes in the Company's assumptions in future periods are recorded in the period they become known

Concentrations of Credit Risk — Financial instruments that potentially subject the Company to significant concentrations of credit risk consist principally of cash and cash equivalents. The Company maintains cash balances in several accounts with one bank, which at times are in excess of federally insured limits. As of December 31, 2009, 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.

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.

3. Recent Accounting Pronouncements

In June 2009, the FASB issued ASC Topic 105, *"Generally Accepted Accounting Principles, amendments based on Statement of Financial Accounting Standards* ("SFAS") *No. 168 — The FASB Accounting Standards Codification and the Hierarchy of Generally Accepted Accounting Principles"*, ("ASC 105") which establishes only two levels of U.S. GAAP, authoritative and non-authoritative. The amendments established the FASB Accounting Standards Codification (the "Codification") as the source of authoritative accounting principles recognized by the FASB to be applied by nongovernmental entities in the preparation of financial statements in conformity with U.S. GAAP. Rules and interpretive releases of the SEC under authority of federal securities laws are also sources of authoritative U.S. GAAP for SEC registrants. On the effective date of this statement, the Codification superseded all then-existing non-SEC accounting and reporting standards. All other non-grandfathered non-SEC accounting literature not included in the Codification has become non-authoritative. This statement is effective for financial statements for interim or annual reporting periods ending after September 15, 2009. The Company adopted this update during the three-month period ended September 30, 2009. As the Codification was not intended to change or alter existing U.S. GAAP, the adoption of ASC 105 did not have any impact on the Company's financial position, results of operations or cash flows.

In June 2009, the FASB ASC Topic 810 *"Amendments to FASB Interpretation No. 46R"*, ("ASC 810"), which amends the consolidation guidance applicable to variable interest entities and is effective as of January 1, 2010. The Company is currently in the process of evaluating the impact of this pronouncement.

In June 2009, the FASB issued ASC Topic 860, *"Accounting for Transfers of Financial Assets"* ("ASC 860"), which eliminates the concept of a qualifying special-purpose entity, changes the requirements for derecognizing financial assets, and requires additional disclosures in order to enhance information reported to users of financial statements by providing greater transparency about transfers of financial assets, including securitization transactions, and an entity's continuing involvement in and exposure to the risks related to transferred financial assets. This statement is effective for fiscal years beginning after November 15, 2009. The Company is currently in the process of evaluating the impact of ASC-860.

In May 2009, FASB ASC Topic 855, *"Subsequent Events"* ("ASC 855") which sets forth (i) the period after the balance sheet date during which management of a reporting entity should evaluate events or transactions that may occur for potential recognition or disclosure in the financial statements, (ii) the circumstances under which an entity should recognize events or transactions occurring after the balance sheet date in its financial statements and (iii) the disclosures that an entity should make about events or transactions that occurred after the balance sheet date. ASC 855 is effective for interim and annual periods ending after June 15, 2009. The Company adopted ASC 855 in the quarter ending June 30, 2009. The adoption of ASC 855 did not have any impact on the Company's financial position, results of operations or cash flows. The Company evaluated all events or transactions that occurred after the period covered by this report, up through the time of filing this annual report on Form 10-K with the SEC. During this period the Company did not have any material recognizable subsequent events other than what is disclosed in footnote 17.

In April 2009, the FASB issued the following: (i) FASB ASC Topic 820-10-65, *"Determining Fair Value When the Volume and Level of Activity for the Asset or Liability have Significantly Decreased and Identifying Transactions That Are Not Orderly"* ("ASC 820-10-65"), (ii) FASB ASC Topic 320-10-65, *"Recognition and Presentation of Other-Than-Temporary Impairment"* ("ASC 320-10-65"), and (iii) FASB ASC Topic 825-10-65,

"Interim Disclosures about Fair Value of Financial Instruments" ("ASC 825-10-65"), which was effective for interim and annual periods ending after June 15, 2009. ASC 820-10-65 provides guidance on how to determine the fair value of assets and liabilities under ASC 820-10 in the current economic environment and reemphasizes that the objective of a fair value measurement remains an exit price. If RXI were to conclude that there has been a significant decrease in the volume and level of activity of the asset or liability in relation to normal market activities, quoted market values may not be representative of fair value and the Company may conclude that a change in valuation technique or the use of multiple valuation techniques may be appropriate. ASC 820-10-65 modifies the requirements for recognizing other-than-temporarily impaired debt securities and revises the existing impairment model for such securities, by modifying the current intent and ability indicator in determining whether a debt security is other-than-temporarily impaired. ASC 825-10-65 enhances the disclosure of instruments under the scope of ASC 820 for both interim and annual periods. The Company is currently evaluating these staff positions and the impact, if any, that adoption will have on its financial position and results of operation.

Effective January 1, 2009, the Company adopted FASB ASC Topic 815-40-15, *"Derivatives and Hedging Evaluating Whether an Instrument is Indexed to an Entity's Own Stock"* ("ASC 815-40-15"), which addresses the accounting for certain instruments as derivatives. Under ASC 815-40-15 specific guidance is provided regarding requirements for an entity to consider embedded features as indexed to the entity's own stock. See footnote 6 for the impact the adoption of ASC 815-40-15 had on the Company's financial position, results of operations and cash flows.

In December 2007, the FASB ratified the consensus reached by the EITF on ASC Topic 808, *"Accounting for Collaborative Agreements"* ("ASC 808-10-2"), which provides the definition of a collaborative agreement and ASC 808-10-15 provides guidelines to assist an entity in determining whether or not it is a party in a collaborative agreement. ASC 808-10-45 states that costs incurred and revenues generated from transactions with third parties shall be reported in accordance with ASC Topic 605-45, *"Reporting Revenue Gross as a Principal versus Net as an Agent"*, ("ASC 808-10-50") also provides minimum disclosure requirements for an entity's collaboration agreements and transition guidance. The adoption of ASC Topic 808 did not have a material impact on the Company's financial position, results of operations and cash flows.

In June 2007, the Emerging Issues Task Force issued ASC Topic 730-20 *"Research and Development Arrangements"* ("ASC 730-20"). ASC 730-20 addresses the diversity which exists with respect to the accounting for the non-refundable portion of a payment made by a research and development entity for future research and development activities. Under ASC 730-20, an entity would defer and capitalize non-refundable advance payments made for research and development activities until the related goods are delivered or the related services are performed subject to an assessment of recoverability. ASC 730-20 was effective for fiscal years beginning after December 15, 2007 and interim periods within those years. The adoption of ASC 730-20 did not have a material impact on the Company's financial statements

4. Fair Value Measurements

Effective January 1, 2008, the Company implemented FASB ASC Topic 820, *"Fair Value Measurements and Disclosures"* ("ASC 820") 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. Level inputs are as defined as follows:

Level 1 — quoted prices in active markets for identical assets or liabilities.

Level 2 — other significant observable inputs for the assets or liabilities through corroboration with market data at the measurement date.

Level 3 — significant unobservable inputs that reflect management's best estimate of what market participants would use to price the assets or liabilities at the measurement date.

The Company categorized its cash equivalents as a Level 1 hierarchy. 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 Company categorized its warrants potentially settled in cash as a Level 2 hierarchy. The warrants are measured at market value on a recurring basis and are being marked to market each quarter-end until they are completely settled. The warrants are valued using the Black-Scholes method, using assumptions consistent with our application of ASC 718. See footnote 9.

In accordance with the provisions of ASC 820 the Company has elected to defer implementation of ASC 820, as it relates to its financial assets and liabilities that are recognized and disclosed at fair value in the financial statements on a nonrecurring basis until January 1, 2010. The Company is evaluating the impact, if any, this standard will have on its financial assets and liabilities. The adoption of ASC 820, 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.

5. Deposits

At December 31, 2009 and 2008, the Company had $16,000 on deposit with its landlords related to leased facilities, all of which are classified as deposits.

6. Capital Lease Obligations

The Company acquires equipment under capital lease obligations. Accordingly, the Company capitalized approximately $100,000 and $43,000 of equipment during the accompanying years ended December 31, 2009 and 2008, respectively, and this is included in equipment and furnishings on the balance sheet. Amortization of capitalized leased equipment for the years ended December 31, 2009 and 2008 was approximately $10,000 and $7,000, respectively. Accumulated amortization of capitalized lease equipment was approximately $17,000 and $7,000 at December 31, 2009 and 2008, respectively. Future minimum lease payments under the capital lease are $52,000, $24,000 and $2,000 for the years ending December 31, 2010, 2011 and 2012, respectively.

7. Accrued Expenses and Other Current Liabilities

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

	For the Year Ended December 31,	
	2009	2008
Professional fees	$ 390	$398
Research and development costs	28	47
Payroll related costs	659	531
Total accrued expenses and other current liabilities	$1,077	$976

8. 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, 2009 are as follows (in thousands):

Years Ending December 31,	Operating Leases(1)	Non-Cancelable Employment Agreements(2)	Subtotal	Cancelable License Agreements(3)	Total
2010	$239	$1,389	$1,628	$ 2,068	$ 3,696
2011	22	198	220	875	1,095
2012		73	73	930	1,003
2013	—	—	—	1,400	1,400
2014	—	—	—	735	735
thereafter	—	—	—	13,481	13,481
Total	$261	$1,660	$1,921	$19,489	$21,410

(1) Operating leases are primarily facility and equipment related obligations with third party vendors. Operating lease expenses during the years ended December 31, 2009 and 2008 were approximately $260,000 and $216,000, 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 ASC Topic 460 ("ASC 460"), *Guarantor's Accounting and Disclosure Requirements for Guarantees, Including Indirect Guarantees of Indebtedness of Others*", 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 ASC 460. 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.

9. Stockholders' 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, 2009, 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 vested 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 ASC 718 and ASC 505-50. Total expense related to these warrants was approximately $318,000 and $750,000 during the years ended December 31, 2009 and 2008, respectively.

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 $2.5 million 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 cash. During 2009, this 12 month period was extended to a date after January 1, 2010 to be agreed upon by the parties. 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 through the date of this report. The Company continually assesses 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. Accordingly, the amounts are being expensed, as payments are made. During the year ended December 31, 2009 and 2008, the Company paid and expensed $250,000 each year under this agreement.

On January 29, 2009, the Company issued 142,500 warrants to an investment bank as consideration for investment and business advisory services. The warrants have an exercise price of $4.273 per share and expire five years from the date of issuance on January 29, 2014. The warrants vested as to 71,250 shares upon issuance, and vested at a rate of 23,750 shares per month starting on the 90 day anniversary of issuance, and are exercisable for a period of five years. The Company has also agreed to give the holder of the warrants unlimited "piggy back" registration rights with respect to the shares of Common Stock underlying the warrants in any registration statement the Company files in connection with an underwritten offering of the 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 ASC Topic 718 and ASC Topic 505-50. Total expense related to these warrants was approximately $509,000 during the year ended December 31, 2009.

In connection with the 2009 Offering, the Company issued warrants to purchase 978,142 shares of the Company's common stock. Details of the transaction can be found under the heading 2009 Registered Direct Offering below.

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 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 on August 6, 2008.

2009 Registered Direct Offering — On March 17, 2009, the Company entered into a placement agency agreement, which was subsequently amended on May 26, 2009 and July 22, 2009, with Rodman & Renshaw, LLC ("Rodman") as the exclusive placement agent, relating to a proposed offering by the Company of new securities to potential investors. On July 30, 2009, the Company entered into definitive agreements for the sale and issuance by the Company to certain investors of 2,385,715 units, with each unit consisting of one share of the Company's common stock and a warrant to purchase 0.40 of a share of common stock, at a purchase price of $3.50 per unit (the "2009 Offering"). The 2009 Offering closed on August 4, 2009. The warrants have an exercise price of $4.50 per share and are exercisable for a period beginning on February 3, 2010 until their expiration on August 3, 2014. The Company raised gross proceeds of approximately $8,350,000 in the 2009 Offering and net cash proceeds, after deducting the placement agents' fees and other offering expenses payable by the Company, of approximately $7.7 million. Total warrants issued in connection with the transaction were 954,285.

As part of the placement agency agreement, the Company issued a warrant to purchase 23,857 shares of the Company's common stock to Rodman. The warrant has an exercise price of $4.38 per share. The warrant is immediately vested and is exercisable until its expiration on August 3, 2014.

The Company follows the guidance of ASC Topic 815-40, as certain warrants issued in connection with the stock offering on August 4, 2009 were determined not to be indexed to the Company's common stock as they are potentially settleable in cash. The fair value of the warrants at the dates of issuance totaling $2,862,640 was recorded as a liability and a cost of equity and was determined by the Black-Scholes option pricing model. Due to the fact that the Company has limited trading history, the Company's expected stock volatility assumption is based on a combination of implied volatilities of similar entities whose share or option prices are publically traded. The Company used a weighted average expected stock volatility of 122.69%. The expected life assumption is based on the contract term of five years. The dividend yield of zero is based on the fact that RXi has no present intention to pay cash dividends in the future. The risk free rate of 1.72% used for the warrant is equal to the zero coupon rate in effect at the time of the grant. The increase in the fair value of the warrants from the date of issuance to December 31, 2009 of $858,000 has been included as an offset to other expense in the accompanying condensed statements of expenses for the respective period. The fair value of the warrants at December 31, 2009 of $3,721,000 is included as a current liability in the accompanying balance sheet as of that date and was determined by the Black-Scholes option pricing model. The following assumptions were used to determine the fair value as of December 31, 2009: weighted average expected stock volatility of 119.10%; an expected life of five years based on the contractual terms; a dividend yield of zero; and a risk free rate of 2.69%.

10. 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, 2009 (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
Common Stock	January 30, 2009	58,398	NA	NA		NA	Market Value
Common Stock	May 1, 2009	281	NA	4.19	Exercise of Stock Options	NA	Cash
Common Stock	August 3, 2009 and August 4, 2009	2,385,715	7,714	3.50	Register Direct	NA	Net 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.

11. Stock Based Compensation

Options to Purchase Shares of Common Stock — The Company follows the provisions ASC 718 which 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 ASC 718 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 FASB ASC Topic 505-50 ("ASC 505-50") "Equity Based Payments to Non-Employees". 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, 2009 and 2008, the following assumptions were used:

	2009	2008
Weighted average risk free interest rate	1.55% - 3.91%	1.55% - 3.99%
Weighted average volatility	116.72% - 122.93%	101.79% - 116.74%
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, 2009 and 2008 was $4.11 and $6.37 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 ASC 718, which averages the contractual term of RXi's options of ten years with the average vesting term of four 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 in the future. 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 $4,202,000 and $3,824,000 of stock-based compensation for the years ended December 31, 2009 and 2008, respectively. As of December 31, 2009, there was $4.7 million of unrecognized compensation cost related to outstanding options that is expected to be recognized as a component of RXi's operating expenses through 2013.

On November 4, 2009, as part of a plan succession in leadership, Tod Woolf, Ph.D., resigned as our President, Chief Executive Officer and a member of our Board of Directors. According to the Separation Agreement between Dr. Woolf and the Company, Dr. Woolf received in one lump sum payment his full severance equivalent to a six (6) month salary ($187,500), six (6) months acceleration of vesting of all of his outstanding unvested Stock Options as of November 4, 2009, and an offer to join the Company's Scientific Advisory Board (SAB) for 3 years (the "New Position"). In addition, and as part of the Separation Agreement, the Company agreed to extend the exercise period for all of Dr. Woolf's vested Stock Options as of November 4, 2009, to the later of: (i) a period of two (2) years from his resignation (until November 4, 2011), or (ii) ninety (90) days following the end of the term of the SAB Agreement (February 4, 2013) or such earlier date as the SAB Agreement may be terminated pursuant to the terms of the SAB Agreement provided Dr. Woolf has not violated the non-competition provisions of the SAB Agreement prior to the date of exercise (whether or not the SAB Agreement is still in effect at that time). Notwithstanding any provision of the Company's 2007 Incentive Plan, the Company also agreed that Dr. Woolf's previously awarded Stock Options shall continue to vest during his continuing role in the Company in the New Position. The option modification resulted in an incremental value of the options of approximately $153,000 of which $37,000 was expensed during 2009. The remaining $411,000 will be expensed over the remaining vesting period of approximately 3 years.

As of December 31, 2009, an aggregate of 4,750,000 shares of common stock were reserved for issuance under the RXi Pharmaceuticals Corporation 2007 Incentive Plan, including 3,630,839 shares subject to outstanding common stock options and restricted stock units granted under this plan and 1,047,335 shares available for future grants. The administrator of the plan determines the times when an option may become exercisable. Vesting periods of options granted to date include vesting upon grant to vesting at the end of a four 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, 2008	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
Granted	1,622,546	3.84
Exercised	(281)	4.19
Forfeited	(263,378)	5.05
Outstanding — December 31, 2009	3,582,339	5.16
Exercisable — December 31, 2008	1,238,187	5.65
Exercisable — December 31, 2009	2,131,298	5.42

The following table summarizes the activity for non-vested stock options:

	Stock Options	Weighted Average Grant Date Fair Value per Share
Non-vested at January 1, 2008	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
Non-vested at December 31, 2008	987,265	5.15
Granted	1,622,546	3.44
Vested	(895,111)	4.27
Exercised	(281)	3.71
Pre-vested forfeitures	(263,378)	4.07
Non-vested at December 31, 2009	1,451,041	3.94

The weighted average remaining contractual life of options outstanding and exercisable at December 31, 2009 was 8.47 years and 8.14 years, respectively. 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 aggregate intrinsic value of outstanding options as of December 31, 2009 and 2008 is $1,262,270 and $653,974, respectively. The aggregate intrinsic value of exercisable options as of December 31, 2009 and 2008 is $138,881 and $654,000, respectively. 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 2009 and 2008 was approximately $1,000 and $18,000, respectively.

Restricted Stock Units — In addition to options to purchase shares of common stock, the Company may grant restricted stock units ("RSU") as part of its compensation package. Each RSU is granted at the fair market value based on the date of grant. Vesting is determined on a grant by grant basis. As of December 31, 2009, the Company had granted a total of 48,500 RSUs with an aggregate intrinsic value of $222,000 and recognized total expense of $105,000. The RSUs vest in full on January 2, 2010.

12. Net Loss Per Share

The Company accounts for and discloses net loss per common share in accordance with FASB ASC Topic 260 "*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,	
	2009	2008
Options to purchase common stock	3,582,339	2,223,452
Restricted stock units	48,500	—
Warrants to purchase common stock	1,310,642	190,000
Total	4,941,481	2,413,452

13. Income Taxes

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

	As of December 31,	
	2009	2008
Current		
Federal	$ —	$ —
State	—	—
Deferred		
Federal	(5,533)	(4,466)
State	(2,257)	(1,513)
Total deferred	(7,789)	(5,979)
Valuation allowance	7,789	5,979
Total income tax expense	$ —	$ —

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

	As of December 31,	
	2009	2008
Net operating loss carryforwards	$ 10,348	$ 6,710
Tax credit carryforwards	753	948
Non-qualified stock based compensation	4,222	2,471
Other	74	28
Licensing deduction deferral	2,089	1,225
Gross deferred tax assets	17,486	11,382
Valuation allowance	(17,486)	(11,382)
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,	
	2009	2008
Expected federal income tax benefit	$(6,252)	$(4,887)
Non-qualified stock compensation	621	186
Effect of change in valuation allowance	6,103	6,707
State income tax credits	821	(426)
State income taxes after credits	(324)	(867)
Other	(969)	(713)
	$ —	$ —

The Company has incurred net operating losses from inception. At December 31, 2009, the Company had domestic federal and state net operating loss carryforwards of approximately $25.7 million available to reduce future taxable income, which expire at various dates beginning in 2012 through 2029. The Company also had federal and state research and development tax credit carryforwards of approximately $500,000 and $400,000, respectively, available to reduce future tax liabilities and which expire at various dates beginning in 2022 through 2029.

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 certain provisions of the *ASC 740,* effective January 1, 2007 which 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 *ASC 740-10* 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 through the 2009 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.

14. License Agreements

During the year ended December 31, 2007, RXi entered into a license agreement with Cold Spring Harbor Laboratory ("CSHL") 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. The Company also entered into 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 for each of the years ended December 31, 2009 and 2008, respectively.

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. No amounts were expensed in 2008 and 2009 related to this license.

In November 2007, RXi entered into a license agreement with Life Technologies, 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 each of the years ended December 31, 2009 and 2008 related to this license.

On October 3, 2008, the Company acquired co-exclusive rights to technology for the oral delivery of RNAi therapeutics from UMMS. 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 cash. This Agreement was amended on July 1, 2009, allowing the Company to extend the periods for which certain milestone payments are due to UMMS. 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 through the date of this report. The Company continually assesses 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. Accordingly, the amounts are being expensed, as payments are made. The Company expensed $250,000 for each of the years ended December 31, 2009 and 2008 related to this license

In September, 2009, the Company entered into a Patent and Technology Assignment Agreement with Advirna, LLC ("Advirna"), a Colorado limited liability company co-founded by RXi's Chief Scientific Officer. Pursuant to the terms of the agreement, Advirna assigned to the Company certain patent and technology rights related to chemically modified polynucleotides (the "Rights") and the Company granted to Advirna a fully paid-up license to the Rights in a specified field. Under the terms of the agreement, the Company will pay to Advirna an annual maintenance fee beginning on January 1, 2011, certain payments upon the achievement of regulatory milestones and royalty payments on the sales of certain products. In addition, the Company may terminate the agreement upon 90 days' prior written notice to Advirna and Advirna may terminate upon 90 days' prior written notice to the Company in the event the Company ceases to use reasonable efforts to research, develop, license or otherwise commercialize the Rights. If the agreement expires in accordance with its terms or is terminated by a party in the absence of a material breach or for cause in the event that the Company fails to pay Advirna certain fees, the Company will assign the Rights back to Advirna. During the years ended December 31, 2009 and 2008, the Company paid and expensed $5,000 and $75,000, respectively, under this agreement.

15. Related Party Transactions

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 proposes to sell or issue so that CytRx may maintain its percentage ownership of the Company. The preemptive rights are effective so long as CytRx owns 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 its 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 exceptions, that at any time after its common stock is registered under the Exchange Act, to use its best efforts to cause all of RXi's shares issued to CytRx pursuant to the Contribution Agreement to be registered under the Securities Act if CytRx shall so request. 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 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 Company, Advirna, 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, 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.

On February 26, 2007, the Company entered into Scientific Advisory Board Agreements (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, June 5, 2009 and June 4, 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 therein) 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 2009 and 2008 under the SAB Agreement for each founder is approximately $245,000 and $338,000 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 the years ended December 31, 2009 and 2008 is approximately $978,000 and $1,350,000, 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 therein), 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, 2009, the fair market value of stock options under the SAB Agreement for each founder is approximately $60,000 which was estimated using the Black-Scholes option-pricing model as more fully discussed above under the summary of significant accounting policies and the stock based compensation footnote. Included in the accompanying financial statements for the years ended December 31, 2009 and 2008 is approximately $73,000 and $156,000, respectively, of expense related to these stock options.

16. 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 t 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.

17. Subsequent Events

On January 14, 2010, the Company granted options to purchase 572,440 shares of common stock to employees and members of the Board of Directors. These options had an exercise price of $5.66 per share, which represented the Company's closing stock price on that date. These options vest quarterly over a one to four year period and expire no later than 10 years from the grant date.

On January 20, 2010, the Company granted 43,541 RSUs with a contingent right to receive one share of Company common stock for each restricted stock unit to certain employees. The RSUs vested on February 9, 2010.

On March 2, 2010, the Company granted an option to purchase 50,000 shares of common stock to a member of the Board of Directors. This options had an exercise price of $5.28 per share, which represented the Company's closing stock price on that date. This option vested immediately and expires no later than 10 years from the grant date.

On January 29, 2010, the Company granted warrants to purchase 250,000 shares of common stock at an exercise price of $5.66 per share in exchange for business advisory services to the Company for a period of up to twelve months. The warrants vested as to 71,250 shares upon issuance, and then will vest at a rate of 23,750 shares per month starting on the 90 day anniversary of issuance. The Company has also agreed to give "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.

On March 22, 2010, the Company entered into a placement agency agreement, with Rodman as the exclusive placement agent, relating to a proposed offering by the Company of new securities to potential investors. On March 23, 2010, the Company entered into definitive agreements for the sale and issuance by the Company to certain investors of 2,700,000 units, with each unit consisting of one share of the Company's common stock and a warrant to purchase 0.20 of a share of common stock, at a purchase price of $6.00 per unit (the "2010 Offering"). The 2010 Offering closed on March 26, 2010. The Company issued 540,000 warrants with an exercise price of $6.00 per share and that are exercisable for a period beginning on September 26, 2010 until their expiration on March 26, 2016. The Company raised gross proceeds of approximately $16.2 million in the 2010 Offering and net cash proceeds, after deducting the placement agent fees and other offering expenses payable by the Company, of approximately $15.2 million.

As part of the 2010 Offering, the Company is required to use 25% of the net proceeds from the 2010 Offering to repurchase from CytRx 675,000 shares of the Company's common stock held by CytRx ("CytRx shares"). The Company is also required to use 25% of the proceeds from the exercise of warrants issued in the 2010 Offering to repurchase from CytRx a number of CytRx Shares equal to 25% of shares issued upon the exercise of such warrants. Subject to the satisfaction of certain closing conditions, the Company is required to repurchase the CytRx Shares on March 29, 2010 and if any warrant issued in this 2010 Offering is exercised, on the first business day after the exercise of such warrant.

The Company intends to use the net proceeds remaining from the 2010 Offering, after the repurchase of the CytRx Shares for general corporate purposes.

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 Principal Accounting 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 Principal Accounting 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, 2009 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 Principal Accounting 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, 2009.

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, 2009. 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, RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE*

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/ *Noah D. Beerman*

Noah D. Beerman
President, Chief Executive Officer and Director
(Principal Executive Officer)

Dated: March 31, 2010

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/ *Noah D. Beerman* Noah D. Beerman	President, Chief Executive Officer and Director (Principal Executive Officer)	March 31, 2010
/s/ *Amy Tata* Amy Tata	Principal Accounting Officer (Principal Financial Officer and Accounting Officer)	March 31, 2010
/s/ *Sanford J. Hillsberg* Sanford J. Hillsberg	Director	March 31, 2010
/s/ *Mark J. Ahn* Mark J. Ahn	Director	March 31, 2010
/s/ *Richard Chin* Richard Chin	Director	March 31, 2010
/s/ *Stephen S. Galliker* Stephen S. Galliker	Director	March 31, 2010
/s/ *Steven A. Kriegsman* Steven A. Kriegsman	Director	March 31, 2010
/s/ *Rudolph Nisi* Rudolph Nisi	Director	March 31, 2010

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)
4.8	Form of Warrant Certificate issued to certain purchasers of the RXI Pharmaceuticals Corporation's common stock in August 2009(14)
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 June 5, 2009(13)
10.5	Warrant No. A-1 in favor of J.P. Turner Partners, dated August 7, 2008(8)
10.6	Standby Equity Distribution Agreement between RXi Pharmaceuticals Corporation and YA Global Master SPV Ltd. dated January 30, 2009(10)
10.7	Registration Rights Agreement between RXi Pharmaceuticals Corporation and YA Global Master SPV Ltd. dated January 30, 2009(10)
10.8	Form of Securities Purchase Agreement between RXi Pharmaceuticals Corporation and various investors, dated July 31, 2009(14)
10.9	Form of Common Stock Purchase Warrant dated July 31, 2009
10.10	Exclusive License Agreement (No.: UMMC 06-21-01) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.11	Exclusive License Agreement (No.: UMMC 03-68-02) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.12	Exclusive License Agreement (No.: UMMC 03-75-01) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)
10.13	Non-Exclusive License Agreement (No.: UMMC 06-08-03) between the University of Massachusetts and RXi Pharmaceuticals Corporation, dated January 10, 2007+(2)

Exhibit Number	Description
10.14	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)
10.15	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)
10.16	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)
10.17	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)
10.18	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)
10.19	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)
10.20	License Agreement between CytRx Corporation, Imperial College Innovations Limited and Imperial College of Science and Technology, dated May 19, 2004+(2)
10.21	Employment Agreement between RXi Pharmaceuticals Corporation and Pamela Pavco, dated March 7, 2007*(1)
10.22	Employment Agreement between RXi Pharmaceuticals Corporation and James Warren, dated May 23, 2007*(1)
10.23	Employment Agreement between RXi Pharmaceuticals Corporation and Dmitry Samarsky, dated June 25, 2007*(1)
10.24	Employment Agreement between RXi Pharmaceuticals Corporation and Stephen J. DiPalma, dated August 28, 2007*(1)
10.25	Employment Agreement between RXi Pharmaceuticals Corporation and Anastasia Khvorova, dated October 17, 2008*(11)
10.26	Employment Agreement between RXi Pharmaceuticals Corporation and Konstantinos Andrikopoulos, dated November 10, 2008*(11)
10.27	Employment Agreement between RXi Pharmaceuticals Corporation and Noah D. Beerman, dated November 5, 2009*(16)
10.28	Separation Agreement and General Release between RXi Pharmaceuticals Corporation and Tod Woolf, dated November 5, 2009*(16)
10.29	RXi Pharmaceuticals Corporation's 2007 Incentive Plan*(1)
10.30	Form of Incentive Stock Option*(1)
10.31	Form of Non-qualified Stock Option*(2)
10.32	Lease between RXi Pharmaceuticals Corporation and Newgate Properties, LLC for One Gateway Place, Worcester, Massachusetts, 01605, dated September 25, 2007(3)
10.33	Amendment to Lease between Xi Pharmaceuticals Corporation and Newgate Properties, LLC for One Gateway Place, Worcester, Massachusetts, 01605, dated January 23, 2009(9)
10.34	Amendment to Lease between Xi Pharmaceuticals Corporation and Newgate Properties, LLC for One Gateway Place, Worcester, Massachusetts, 01605, dated March 5, 2009(12)
10.35	Form of Subscription Agreement between RXi Pharmaceuticals Corporation and each of Mark K. Ahn, Ph.D., Stephen S. Galliker and Sanford J. Hillsberg(3)
10.36	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)

Exhibit Number	Description
10.37	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)
10.38	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)
10.39	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)
10.40	Letter Agreement between CytRx Corporation and RXi Pharmaceuticals Corporation, dated December 27, 2007(3)
10.41	Patent License Agreement between RXi Pharmaceuticals Corporation and Invitrogen IP Holdings, Inc. dated November 1, 2007(4)
10.42	Patent and Technology Assignment Agreement between RXi Pharmaceuticals Corporation and Advirna, LLC dated September 21, 2009+(15)
14.1	Code of Conduct(5)
23.1	Consent of BDO Seidman, LLP, Independent Registered Public Accounting Firm(16)
31.1	Sarbanes-Oxley Act Section 302 Certification of Noah D. Beerman(16)
31.2	Sarbanes-Oxley Act Section 302 Certification of Amy Tata(16)
32.1	Sarbanes-Oxley Act Section 906 Certification of Noah D. Beerman and Amy Tata(16)

(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) Previously filed as an Exhibit to the Company's Form 8-K filed on January 23, 2009 (File No. 001-33958) and incorporated by reference herein.

(10) Previously filed as an Exhibit to the Company's Form 8-K filed on February 5, 2009 (File No. 001-33958) and incorporated by reference herein.

(11) Previously filed as an Exhibit to the Company's Form 10-K filed on March 18, 2009 (File No. 001-33958) and incorporated by reference herein.

(12) Previously filed as an Exhibit to the Company's Form 10-Q filed on May 15, 2009 (File No. 001-33958) and incorporated by reference herein.

(13) Previously filed as an Exhibit to the Company's Form 8-K filed on June 10, 2009 (File No. 001-33958) and incorporated by reference herein.

(14) Previously filed as an Exhibit to the Company's Form 8-K filed on July 31, 2009 (File No. 001-33958) and incorporated by reference herein.

(15) Previously filed as an Exhibit to the Company's Form 10-Q filed on November 16, 2009 (File No. 001-33958) and incorporated by reference herein.

(16) 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.

SCIENTIFIC ADVISORY BOARD

Craig Mello, Ph.D., *Founder, SAB Chairman*
2006 Nobel Prize in Medicine for RNAi
Co-discovered RNAi
Howard Hughes Medical Institute (HHMI) Investigator, UMMS

Victor Ambros, Ph.D.
Professor of Molecular Medicine, UMMS
Discovered the first microRNA, lin-4
2008 Albert Lasker Award for Basic Medical Research

Michael Czech, Ph.D., *Founder*
Professor and Chair, Program in Molecular Medicine, UMMS
American Diabetes Association's Banting Medal for Scientific Achievement

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

Nassim Usman, Ph.D.
Chief Executive Officer, Catalyst Biosciences
Held positions of Chief Scientific Officer and Chief Operating Officer, Sirna
Negotiated Lilly, Allergan and GSK alliances
130 patents and patent applications: Main RNAi synthesis Chemistry

Tod Woolf, Ph.D.
Former founding Chief Executive Officer, RXi Pharmaceuticals Corporation
Co-invented and commercialized Stealth™ RNAi
Co-invented two of RPI's (Sirna-Merck) main RNA technology

BOARD OF DIRECTORS

Sanford J. Hillsberg, J.D.
Chairman of Board of Directors, RXi Pharmaceuticals Corporation
Partner, TroyGould PC

Mark J. Ahn, Ph.D.
Principal, Pukana Partners, Ltd.

Noah D. Beerman, MBA
President and Chief Executive Officer, RXi Pharmaceuticals Corporation

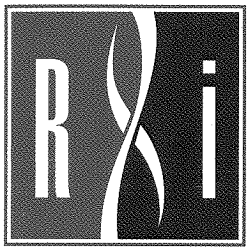
Richard Chin, M.D.
Chief Executive Officer, Institute for OneWorld Health

Stephen S. Galliker, CPA
Former Chief Financial Officer, Dyax Corp.

Steven A. Kriegsman
Chief Executive Officer, CytRx Corporation

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

Annual Meeting
Friday, June 4, 2010
10:00 AM local time
RXi Pharmaceuticals
Gateway Park
60 Prescott Street
Worcester, MA 01605



RXi Pharmaceuticals
Next Generation in RNAi

60 Prescott Street Worcester, MA 01605
Direct: 508-767-3861
Fax: 508-767-3862
Email: ir@rxipharma.com
www.rxipharma.com

NASDAQ