
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, DC 20549

**FORM S-3
REGISTRATION STATEMENT**
*UNDER
THE SECURITIES ACT OF 1933*

GALENA BIOPHARMA, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

20-8099512
(I.R.S. Employer
Identification Number)

**310 N. State Street, Suite 208
Lake Oswego, Oregon 97034
(855) 855-4253**

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

**Mark J. Ahn, Ph.D.
President and Chief Executive Officer
Galena Biopharma, Inc.
310 N. State Street, Suite 208
Lake Oswego, Oregon 97034
(855) 855-4253**

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

Copy to:
**Dale E. Short
TroyGould PC
1801 Century Park East, 16th Floor
Los Angeles, California 90067
(310) 553-4441**

Approximate date of commencement of proposed sale to the public : From time to time after the effective date of this registration statement.

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

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

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

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

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

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

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

Large accelerated filer

Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company)

Smaller reporting company

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	Amount to be registered	Proposed maximum offering price per share	Proposed maximum aggregate offering price	Amount of registration fee
Common stock, \$0.0001 par value per share	1,515,849 shares	\$1.655 ⁽¹⁾	\$2,508,731.10 ⁽¹⁾	287.50
Common stock, \$0.0001 par value per share ⁽²⁾	400,000 shares	\$0.66 ⁽³⁾	\$264,000 ⁽³⁾	30.25
Common stock, \$0.0001 par value per share ⁽²⁾	142,500 shares	\$4.273 ⁽³⁾	\$608,902.50 ⁽³⁾	69.78
Common stock, \$0.0001 par value per share ⁽²⁾	150,000 shares	\$2.10 ⁽³⁾	\$315,000 ⁽³⁾	36.10
Common stock, \$0.0001 par value per share ⁽²⁾	250,000 shares	\$5.66 ⁽³⁾	\$1,415,000 ⁽³⁾	162.16
Total			\$5,111,633.60	\$585.79

- (1) The price is estimated in accordance with Rule 457(c) under the Securities Act of 1933 solely for the purpose of calculating the registration fee and represents the average of the high and low sales prices of the common stock as reported on The NASDAQ Capital Market on June 28, 2012.
- (2) Represents shares issuable upon exercise of outstanding warrants. In accordance with Rule 416, there is also being registered hereunder such indeterminate number of additional shares of common stock as may become issuable upon exercise of the warrants to prevent dilution resulting from stock splits, stock dividends or similar transactions.
- (3) The price is estimated in accordance with Rule 457(g) under the Securities Act of 1933 solely for the purpose of calculating the registration fee and represents the exercise price of the warrants.

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

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

SUBJECT TO COMPLETION, DATED JULY 2, 2012

PROSPECTUS



2,458,349 Shares of Common Stock

This prospectus relates to outstanding shares of our common stock and shares of our common stock issuable upon exercise of outstanding warrants offered for sale by the selling security holders listed under “Selling Security holders” beginning on page 20 of this prospectus.

Of the shares offered for sale by the selling security holders, 942,500 shares are issuable upon the exercise of outstanding warrants. The warrants are exercisable during exercise periods expiring between January 29, 2014 and February 4, 2017 at exercise prices ranging from \$0.66 per share to \$5.66 per share.

We will not receive any proceeds from the sale of the shares offered by the selling security holders, except for the exercise price of the warrants held by the selling security holders to the extent they are exercised. We will pay all fees and expenses incurred in connection with the registration of the shares of common stock offered by this prospectus, and the selling security holders will pay any brokerage or underwriting commissions or discounts or other expenses relating to the sale of these shares.

The selling security holders or their donees, pledgees or other transferees may sell or otherwise transfer the shares of common stock offered by this prospectus from time to time in the public market or in privately negotiated transactions, either directly or through broker-dealers or underwriters, at fixed prices, at prevailing market prices at the time of sale, at prices relating to the prevailing market prices, at varying prices determined at the time of sale or at negotiated prices. See “Plan of Distribution” beginning on page 26 of this prospectus for more information about how the selling security holders may sell or otherwise transfer their shares of common stock.

Our common stock is traded on The NASDAQ Capital Market under the symbol “GALE.” On July 2, 2012, the closing sale price of our common stock on The NASDAQ Capital Market was \$1.63.

An investment in our common stock involves a high degree of risk. See “Risk Factors” beginning on page 7 of this prospectus supplement.

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR PASSED UPON THE ADEQUACY OR ACCURACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The date of this prospectus is _____, 2012.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed on behalf of the selling security holders with the Securities and Exchange Commission, or the “**SEC**,” to permit the selling security holders to sell the shares described in this prospectus in one or more transactions. The selling security holders and the plan of distribution of the shares being offered by them are described in this prospectus under the headings “Selling Security holders” and “Plan of Distribution,” respectively.

As permitted by the rules and regulations of the SEC, the registration statement filed by us includes additional information not contained in this prospectus. You may read the registration statement and the other reports we file with the SEC at the SEC’s web site or its offices described under the heading “Where You Can Find Additional Information” in this prospectus.

On September 26, 2011, we changed the name of our company from RXi Pharmaceuticals Corporation to Galena Biopharma, Inc. In this prospectus supplement, we sometimes refer to Galena Biopharma, Inc. as “**Galena**” and to our wholly-owned subsidiary, Aphera, Inc., as “**Aphera**.” On September 26, 2011, we also announced the contribution of our historical RNAi assets to a new subsidiary formed by us for this purpose and the proposed partial spin-off of the subsidiary referred to under “Prospectus Summary—Background of the Company and Changes in Strategic Focus” in this prospectus. Our subsidiary, which assumed the name RXi Pharmaceuticals Corporation in conjunction with the change in our name, is referred to in this prospectus as “**RXi**.” The partial spin-off of RXi was completed on April 26, 2012.

Unless the context otherwise indicates, references in this prospectus to the “**company**,” “**we**,” “**us**” or “**our**” refer (i) to Galena, Aphera and RXi, collectively, prior to the partial spin-off of RXi; and (ii) to only Galena and Aphera, together, after the partial spin-off of RXi.

You should rely only on the information that is contained in this prospectus or that is incorporated by reference into this prospectus. Neither we nor the selling security holders have authorized anyone to provide you with information that is in addition to or different from that contained in, or incorporated by reference into, this prospectus. If anyone provides you with different or inconsistent information, you should not rely on it.

The shares of common stock offered by this prospectus are not being offered in any jurisdiction where the offer or sale of such common stock is not permitted. You should not assume that the information contained in, or incorporated by reference into, this prospectus is accurate as of any date other than the date of this prospectus or, in the case of the documents incorporated by reference, the date of such documents, regardless of the date of delivery of this prospectus or any sale of the common stock offered by this prospectus. Our business, financial condition, liquidity, results of operations and prospects may have changed since those dates.

PROSPECTUS SUMMARY

This summary highlights selected information appearing elsewhere in this prospectus or incorporated by reference in this prospectus and does not contain all of the information that may be important to you or that you should consider before investing in our common stock. This prospectus includes or incorporates by reference information about the securities we are offering, as well as information regarding our business and detailed financial data. Before making an investment decision, you should read this prospectus and the information incorporated by reference herein in their entirety, including “Risk Factors” beginning on page 7 of this prospectus.

The Company

Background of the Company and Changes in Strategic Focus

Galena is a biotechnology company focused on discovering, developing and commercializing innovative therapies addressing major unmet medical needs using targeted biotherapeutics. We are pursuing the development of novel cancer therapeutics using peptide-based immunotherapy products, including our main product candidate, NeuVax™ (E75), for the treatment of breast cancer and other tumors.

NeuVax is a peptide-based immunotherapy intended to reduce the recurrence of breast cancer in low-to-intermediate HER2-positive breast cancer patients not eligible for trastuzumab (Herceptin®; Genentech/Roche). On January 19, 2012, we initiated enrollment in our Phase 3 PRESENT clinical trial for NeuVax™ (E75 peptide plus GM-CSF) vaccine in low-to-intermediate HER2 1+ and 2+ breast cancer patients in the adjuvant setting to prevent recurrence (Clinicaltrials.gov identifier NCT01479244). The PRESENT (Prevention of Recurrence in Early-Stage, Node-Positive Breast Cancer with Low to Intermediate HER2 Expression with NeuVax Treatment) study is a randomized, multicenter, multinational clinical trial that will enroll approximately 700 breast cancer patients. The trial design has been updated to include current National Comprehensive Cancer Network (“NCCN”) guidelines and has received Special Protocol Assessment, or “SPA,” concurrence from the U.S. Food and Drug Administration, or “FDA.” The Phase 2 trial of NeuVax achieved its primary endpoint of disease-free survival, or “DFS.” The FDA has agreed in the SPA that the design and planned analysis of the Phase 3 PRESENT study is adequately designed to provide the necessary data that, depending upon the outcome, could support a regulatory submission for marketing approval. We previously reported the Phase 2 trial data in which none of the Phase 3 targeted low-to-intermediate, node-positive patients treated with the optimal regimen had experienced a relapse after 36 months of treatment.

We also plan to start a Phase 2 trial comparing NeuVax in combination with trastuzumab (Herceptin®) versus trastuzumab in combination with GM-CSF in a 300-patient, randomized study in the adjuvant breast cancer setting. We previously reported Phase 2 data of sequential therapy with trastuzumab followed by HER2 vaccination in the adjuvant setting. Of 62 patients who received standard-of-care trastuzumab, the 32 who received no HER2 vaccine experienced a 12.5% breast cancer recurrence rate (4/32), which is comparable to reported rates of similarly staged and treated patients. In contrast, none (0%) of the 30 patients who received the HER2 eliciting vaccine following trastuzumab therapy experience a recurrence.

Our second product candidate, Folate Binding Protein-E39 (FBP), is a targeted vaccine, consisting of the peptides E39 and J65, aimed at preventing the recurrence of ovarian, endometrial, and breast cancers. On February 14, 2012, we announced the initiation of a Phase 1/2 clinical trial in two gynecological cancers: ovarian and endometrial adenocarcinomas. Folate binding protein has very limited tissue distribution and expression in non-malignant tissue and is over-expressed in more than 90% of ovarian and endometrial cancers, as well as in 20% to 50% of breast, lung, colorectal and renal cell carcinomas.

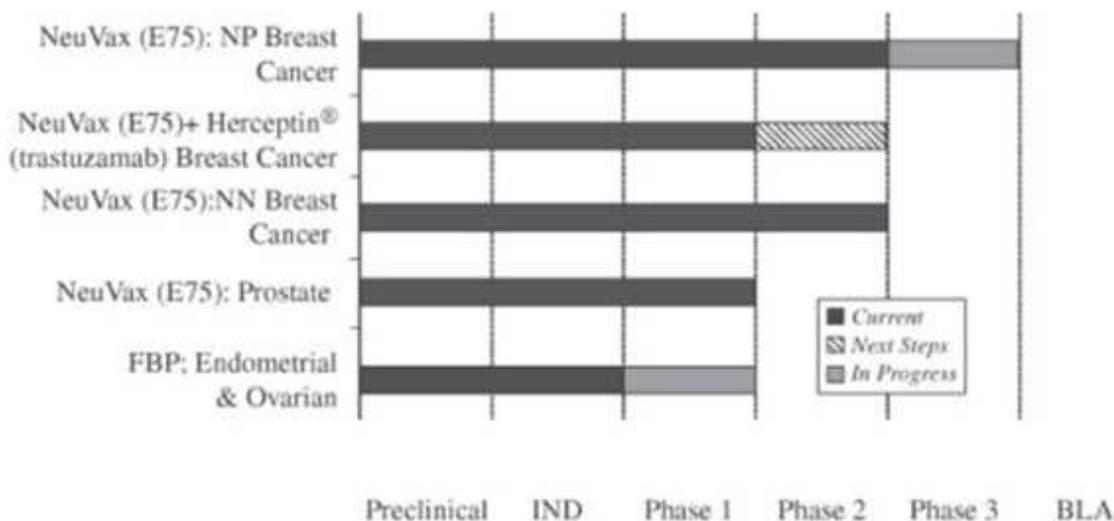
We acquired Aphera and our NeuVax product candidate in April 2011. Prior to that time, we were engaged primarily in conducting discovery research and preclinical development activities based on RNA interference, or “RNAi,” a naturally occurring cellular mechanism that has the potential to effectively and selectively interfere with, or “silence,” expression of targeted disease-associated genes. Our acquisition of Aphera followed from the determination by our board of directors to broaden our strategic direction by giving us access to a late-stage product candidate, NeuVax. In connection with our acquisition of Aphera, we reduced the scope of our RNAi activities to focus primarily on RXI-109, our lead RNAi-based product candidate at that time, while maintaining our key development alliances and core RNAi discovery and development capability. Following the Aphera acquisition, our board of directors undertook to explore strategic alternatives for our RNAi platform that would enable us to commit more resources to our later-stage oncology drug programs.

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On September 24, 2011, we contributed to a new wholly-owned subsidiary formed by us for this purpose substantially all of our RNAi-related technologies and assets and entered into a number of agreements relating to RXi’s ongoing business and operations. Our new subsidiary, which assumed the RXi name, will focus solely on developing and commercializing therapeutic products based on RNAi technologies for the treatment of human diseases, including fibrotic disease, with financing provided by two institutional investors, which we sometimes refer to as the “**RXi investors**,” pursuant to a securities purchase agreement under which the RXi investors agreed to purchase a total of \$9,500,000 of preferred stock of RXi in conjunction with the partial spin-off of RXi described below and to make bridge loans to RXi to carry on its operations between signing and closing. In the securities purchase agreement, we agreed, among other things, to undertake to distribute to our security holders a portion of our shares of common stock of RXi, which we sometimes refer to as the “**partial spin-off**” of RXi. The outstanding principal and accrued interest from the bridge loans has been converted into RXi preferred stock in conjunction with the completion of the partial spin-off of RXi and represents a portion of the \$9,500,000 total investment, which is referred to in this prospectus as the “**RXi financing**.” The partial spin-off of RXi and the RXi financing were completed on April 26, 2012 and April 27, 2012, respectively.

Our Oncology Therapeutic Programs

The chart below summarizes the current status of our oncology drug development programs, with the dark shading indicating completed stages of development and the light shading indicating development activities we intend to prioritize in the near-term:



We are developing a pipeline of immunotherapy product candidates for the treatment of various cancers based on the peptide cancer vaccines, the most advanced of which is NeuVax, which is targeted at preventing the recurrence of breast cancer. NeuVax has had positive Phase 1/2 clinical trial results for the prevention of breast cancer recurrence in patients who have had breast cancer and received the standard of care treatment (surgery, chemotherapy, radiotherapy and hormonal therapy as indicated). We recently initiated our Phase 3 PRESENT clinical trial of NeuVax for the prevention of breast cancer recurrence in early-stage low-to-intermediate HER2 breast cancer patients. For the results of a single trial to support registration for an indication, the results of the trial must be internally consistent, clinically meaningful, and statistically very persuasive. Specifically, FDA has indicated that, in general, the results from two Phase 3 studies would be required to support approval, and it would accept a single pivotal study in support of approval if the results of the trial was internally consistent, clinically meaningful and statistically very persuasive.

NeuVax is an immunotherapy that stimulates the immune system to actively seek out and selectively kill cancer cells. NeuVax directs “killer” T-cells to target and destroy cancer cells that express HER2/neu, a protein associated with epithelial tumors in breast, ovarian, pancreatic, colon, bladder and prostate cancers. NeuVax is comprised of a HER2/neu-derived peptide called E75. E75 is a nine-amino acid sequence that is immunogenic (produces an immune response) and GM-CSF is a commercially available protein that acts to stimulate and activate components of the immune system such as macrophages and dendritic cells.

NeuVax has been shown to be most effective in patients with low-to-intermediate HER2/neu expressing patients with HLA type A2+ or A3+. We believe that approximately 25,000-40,000 of the approximately 200,000 women diagnosed with breast cancer in the United States each year meet these criteria. We believe that NeuVax’s specificity provides for a highly targeted therapy to prevent breast cancer recurrence for a selected subset of breast cancer patients and we believe it will increase the chance of the patient remaining disease free following a successful treatment for these patients.

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We are also developing novel applications for NeuVax based on preclinical studies and Phase 2 clinical trials which suggest that combining NeuVax and trastuzumab (Herceptin[®]; Genentech/Roche) can increase antigen presentation by tumor cells by promoting receptor internalization and subsequent proteosomal degradation of the HER2 protein. Based on these results, in 2012 we plan to commence a randomized, multicenter Phase 2 trial in 300 patients that will compare NeuVax with trastuzumab versus trastuzumab with GM-CSF.

We intend to pursue additional therapeutic indications for NeuVax. Under our investigational new drug application, or “IND,” open protocols for the treatment of prostate cancer, ovarian cancer and bladder cancer exist for patient populations with the same general criteria for eligibility as in breast cancer (*i.e.*, early-stage disease and adjuvant treatment setting after surgery with immunologic competence). An early stage clinical study in high-risk prostate cancer confirmed the ability of the patients to mount an E75 specific immune response. We may explore whether NeuVax provides clinical benefits in other areas, such as a prophylactic vaccine against breast cancer occurrence in healthy women with a high likelihood for developing breast cancer based on genetic assays or biomarkers and a strong positive familial history of breast cancer, and in HER2 overexpressing gastric cancer. Herceptin[®] is approved for this indication, and there is a significant clinical rationale for NeuVax’s potential efficacy in this indication. We also may investigate the use of NeuVax in combination with other therapies with a view to leveraging NeuVax’s attractive safety profile and targeted mechanism of action. Clinical trials conducted on NeuVax have provided proof-of-principle data in early-stage node-negative breast cancer, although such data is preliminary and not statistically significant, since the trials were not designed to provide statistically significant efficacy data. Both the early-stage node-negative breast cancer indication and the high-risk patient indication are longer-term areas of interest that we currently expect to explore only with support from corporate partners.

Financial Condition

We had cash and cash equivalents of approximately \$8.7 million as of March 31, 2012 and approximately \$21.6 million as of May 31, 2012. We believe that our existing cash and cash equivalents should be sufficient to fund our operations through at least the second quarter of 2013.

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. We expect to continue to devote a substantial portion of our resources to research and development programs. As a result of the costs expected to be incurred in connection with our recently commenced clinical trials of NeuVax and FBP, we expect that our research and development expense will increase significantly from historic levels for the foreseeable future. We will need to generate significant revenue to achieve profitability and might never do so. In the absence of product revenue, our potential sources of operational funding are expected to be the proceeds from equity financings, funded research and development payments and payments received under partnership and collaborative agreements. There is no guarantee that additional 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.

Corporate Information

Our principal executive offices are located at 310 N. State Street, Suite 208, Lake Oswego, Oregon 97034, and our phone number is (855) 855-4253. Our website address is www.galenabiopharma.com. We do not incorporate the information on our website into this prospectus supplement, and you should not consider such information part of this prospectus.

We were incorporated as Argonaut Pharmaceuticals, Inc. in Delaware on April 3, 2006 and changed our name to RXi Pharmaceuticals Corporation on November 28, 2006. On September 26, 2011, we changed the name of our company from RXi Pharmaceuticals Corporation to Galena Biopharma, Inc., as described under “Recent Developments,” above.

The Offering

Of the shares of our common stock offered by the selling security holders under this prospectus, 1,315,849 shares were issued by us on or about February 15, 2012 to certain of the selling security holders who hold our outstanding contingent value rights or “**CVRs**.” The CVRs were granted by us in April 2011 pursuant to the contingent value rights agreement among us, Computershare Trust Company, N.A., a national banking association, Computershare Inc., a Delaware corporation, and Robert E. Kennedy, an individual, as the stockholder representative, as amended by the first amendment thereto dated as of February 15, 2012. In the first amendment to contingent value rights agreement, we agreed to file with the SEC the registration statement of which this prospectus is a part covering the 1,315,789 shares being offered for sale by these selling security holders. We also agreed in the first amendment to use our reasonable efforts to have the registration statement declared effective under the Securities Act and to maintain the effectiveness of the registration statement for a period ending on the earlier of (i) the date on which the shares may be sold without any volume limitations under Rule 144 under the Securities Act and (ii) the date on which all of the shares have been sold pursuant to the registration statement.

Of the shares of our common stock offered by the selling security holders under this prospectus, 200,000 shares were issued by us to one of the selling security holders under a financial advisory agreement entered into by us and the selling security holder on June 27, 2012. The remaining 942,500 shares being offered by certain of the selling security holders are issuable upon the exercise of outstanding warrants held by these selling security holders. The warrants were issued by us under investment banking agreements entered into by us and these selling security holders’ employer on January 29, 2009, January 24, 2010, February 5, 2011 and February 4, 2012, respectively. The warrants are exercisable during exercise periods expiring between January 29, 2012 to February 4, 2017 at exercise prices ranging from \$0.66 per share to \$5.66 per share.

See the discussions under the headings “Selling Security Holders” and “Plan of Distribution” in this prospectus for more information regarding this offering.

Issuer	Galena Biopharma, Inc.
Selling security holders	The selling security holders who are offering shares of common stock for sale under this prospectus are named under “Selling Security Holders” beginning on page 21 of this prospectus.
Shares offered	2,458,349 shares of our common stock.
Shares outstanding	67,159,754 shares (excluding treasury shares) as of June 30, 2012, excluding approximately 14,167,425 shares subject to outstanding stock options and warrants.
Use of proceeds	The selling security holders will receive all proceeds from the sale of shares under this prospectus. We will not receive any proceeds from the sale of the shares by the selling shareholders, except for the exercise price of the warrants held by the selling security holders to the extent they are exercised. We intend to use the net proceeds of any exercises of the warrants to augment our working capital and for general corporate purposes.
Trading	Our common stock is traded on The NASDAQ Capital Market under the symbol “GALE.”

The numbers of shares of common stock shown above to be outstanding before and following this offering exclude:

- 7,598,918 shares of our common stock subject to options outstanding as of June 30, 2012 having a weighted-average exercise price of \$2.02 per share;
- shares of our common stock reserved as of June 30, 2012 for issuance in connection with future awards under our 2007 Stock Incentive Plan;
- shares of our common stock reserved as of June 30, 2012 for sale under our employee stock purchase plan; and
- shares of our common stock subject to warrants outstanding as of June 30, 2012, including the warrants held by the selling security holders, having a weighted-average exercise price of \$ per share.

RISK FACTORS

Investing in our common stock involves a high degree of risk. Before making an investment decision, you should carefully consider the risks described below, together with all of the other information incorporated by reference into this prospectus, including from our most recent Annual Report on Form 10-K and subsequent Quarterly Reports on Form 10-Q. Some of these factors relate principally to our business and the industry in which we operate. Other factors relate principally to your investment in our common stock. The risks and uncertainties described below are not the only ones facing us. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also materially and adversely affect our business and operations.

If any of the matters included in the following risks were to occur, our business, financial condition, results of operations, cash flows or prospects could be materially and adversely affected. In such case, you may lose all or part of your investment.

Risks Relating to Galena’s Business and Industry

We recently changed our strategic focus, and the anticipated benefits of our new strategic focus may not be realized.

You may have difficulty evaluating our business, because we acquired Apthera only in the past year and are undertaking to partially spin off RXi. Following the recent partial spin-off of RXi, our financial statements no longer reflect the consolidated financial condition and results of operations of RXi, and we account for our partial ownership of RXi based on the cost method of accounting. For these reasons, the historical consolidated financial information incorporated by reference in this prospectus do not necessarily reflect the financial condition, results of operations or cash flows that we will achieve in the future.

There also is no assurance that we will be successful in implementing our new focus as an oncology product development pipeline company.

We are largely dependent on the success of our two leading drug candidates neither of which may receive regulatory approval or be successfully commercialized.

Our business prospects depend heavily on successfully developing and commercializing our lead product candidate, NeuVax. On May 8, 2009, we submitted an SPA for a Phase 3 clinical trial for NeuVax, but did not include required chemistry, manufacturing, and controls (“**CMC**”) information. In July 2009, FDA placed our IND application for a Phase 3 trial for NeuVax on partial clinical hold pending submission of the missing CMC information. We submitted the CMC information August 8, 2011, and the FDA removed the partial clinical hold on September 7, 2011, allowing us to proceed with the Phase 3 clinical trial. The FDA has agreed in the SPA for our Phase 3 PRESENT clinical trial of NeuVax that the design, resulting data, and planned analyses of the Phase 3 study support an acceptable regulatory submission for marketing approval. There is no assurance, however, that the Phase 3 study will be successful, that a single Phase 3 trial will support marketing approval, or that we will be able to obtain marketing approval for NeuVax or any other product candidate.

We currently generate no revenue from sales, and we may never be able to develop marketable products. Before they can be marketed, our products in development must be approved by the FDA or similar foreign governmental agencies. The process for obtaining FDA approval is both time-consuming and costly, with no certainty of a successful outcome. Before obtaining regulatory approval for the sale of any drug candidate, we must conduct extensive preclinical tests and clinical trials to demonstrate the safety and efficacy in humans of our product candidates. Although NeuVax has exhibited no serious adverse events (SAEs) associated with the drug in the Phase 1/2 clinical trial, further testing in our Phase 3 trial may undermine those determinations or unexpected side effects may arise. A failure of any preclinical study or clinical trial can occur at any stage of testing. The results of preclinical and initial clinical testing of these products may not necessarily indicate the results that will be obtained from later or more extensive testing. It also is possible to suffer significant setbacks in advanced clinical trials, even after obtaining promising results in earlier trials.

A number of different factors could prevent us from obtaining regulatory approval or commercializing our product candidates on a timely basis, or at all.

We, the FDA or other applicable regulatory authorities or an institutional review board, or “**IRB**,” which is an independent committee under the oversight of the United States Department of Health and Human Services, or “**HHS**,” that 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.

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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.

In addition, cancer vaccines are a relatively new form of therapeutic and a very limited number of such products have received regulatory approval. Therefore, the FDA or other regulatory authority may apply standards for approval of a new cancer vaccine that is different from past experience.

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

- difficulties or delays in enrolling patients in our Phase 3 PRESENT study of NeuVax or our Phase 1/2 clinical trials of FBP in conformity with required protocols or projected timelines or in our other NeuVax clinical trials;
- conditions imposed on us by the FDA, including the possibility that the FDA would require an additional Phase 3 trial of NeuVax, or comparable foreign authorities regarding the scope or design of our clinical trials;
- difficulties or delays in arranging for third parties to conduct clinical trials of our product candidates;
- problems in engaging IRBs to oversee trials or problems in obtaining or maintaining IRB approval of studies;
- 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, and the possibility that our previous Phase 2 trials were not indicative of our drug candidates' performance in larger patient populations;
- 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;
- 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;
- adverse results obtained by other companies developing similar drugs;
- modification of the drug during testing;
- changes in the FDA's requirements for our testing during the course of that testing; and
- reallocation of our limited financial and other resources to other clinical programs.

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

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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 the 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.

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 for clinical trials. Accordingly, we will be dependent upon contract manufacturers for these supplies. 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 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. Certain of our product candidates are complex molecules 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. NeuVax is administered in combination with GM-CSF, a compound marketed by Genzyme. If Genzyme were to discontinue supplying GM-CSF, we may experience delays in securing a replacement supplier.

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, to manufacture our 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, vendors and other third parties on favorable terms, if at all. Our ability to successfully negotiate such agreements will depend on, among other things, potential partners' evaluation of the superiority of our technology over competing technologies and the quality of the preclinical and clinical data that we have generated, and the perceived risks specific to developing our product candidates. In addition, we reduced the scale of our RNAi operations in connection with the partial spin-off of RXi, which could affect our ability to maintain or enter into new alliances. 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 and other obligations to maintain certain licenses. 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.

In addition, we may receive notices from third parties from time to time alleging that our technology or product candidates infringe upon the intellectual property rights of those third parties. Any assertion by third parties that our activities or product candidates infringe upon their intellectual property rights may adversely affect our ability to secure strategic partners or licensees for our technology or product candidates or our ability to secure or maintain manufacturers for our compounds.

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

Following regulatory approval of any drugs we may develop, we will remain 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 products will also be subject to periodic review and inspection by the FDA.

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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. We would continue to be subject to the FDA requirements governing the labeling, packaging, storage, advertising, promotion, recordkeeping, and submission of safety and other post-market information for all of our product candidates, even those that the FDA had approved. 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.

NeuVax and our other cancer-targeted product candidates may not achieve market acceptance. Factors that we believe will materially affect market acceptance of our product candidates include:

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

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

The biotechnology industry, including the cancer therapy vaccines market, is intensely competitive and involves a high degree of risk. We compete with other companies that have far greater experience and financial, research and technical resources than us. Potential competitors in the United States and worldwide are numerous and include pharmaceutical and biotechnology companies, educational institutions and research foundations, many of which have substantially greater capital resources, marketing experience, research and development staffs and facilities than us. Some of our competitors may develop and commercialize products that compete directly with those incorporating our technology, introduce products to market earlier than our products or on a more cost effective basis. We may be unable to effectively develop our technology or any other applications on a cost effective basis or otherwise. In addition, our technology may be subject to competition from other technology or methods developed using techniques other than those developed by traditional biotechnology methods. Our competitors compete with us in recruiting and retaining qualified scientific and management personnel as well as in acquiring technologies complementary to our technology. Our collaborators or we will face competition with respect to product efficacy and safety, ease of use and adaptability to various modes of administration, acceptance by physicians, the timing and scope of regulatory approvals, availability of resources, reimbursement coverage, price and patent position, including potentially dominant patent positions of others. An inability to successfully complete our product development could lead to us having limited prospects for establishing market share or generating revenues from our technology.

For patients with early stage breast cancer, adjuvant therapy is often given to prevent recurrence and increase the chance of long-term disease free survival. Adjuvant therapy for breast cancer can include chemotherapy, hormonal therapy, radiation therapy, or combinations thereof. In addition, the HER2 targeted drug trastuzumab (Herceptin[®]) may be given to patients with tumors with high expression of HER2 (IHC 3+).

There are a number of cancer vaccines in development for breast cancer, including but not limited to Lapuleucel-T (Dendreon), AE-37 (Antigen Express) and Stimuvax (Merck KgA). While these development candidates are aimed at a number of different targets, and AE-37 has published data in the HER2 breast cancer patient population, there is no guarantee that any of these compounds will not in the future be indicated for treatment of low to intermediate HER2 breast cancer patients and become directly competitive with NeuVax.

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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 technologies relating to our product candidates. 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.

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.

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 may be subject to allegations of trade secret misappropriation or other similar claims as a result of our employees' or consultants' 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.

There is a risk that the products incorporating our NeuVax peptide-based immunotherapy technology or otherwise marketed by us might infringe the patent, trademark or other intellectual property rights of third parties, and 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. For example, in June 2010, we received a letter from Alnylam Pharmaceuticals, Inc. claiming that we require access to Alnylam's patent and patent applications relating to RNAi and demanding that we stop engaging in unspecified alleged infringing RNAi-related activities unless we obtain a license from Alnylam. 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 manufacture, use, marketing and sales 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 undermine 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.

If we are unable to obtain regulatory exclusivity for NeuVax, our business would be adversely affected and such exclusivity may not provide sufficient protection to prevent competitors from entering our markets.

Because our intellectual property rights to the composition of matter of NeuVax expire prior to commercialization, we expect to rely substantially on data exclusivity provided under the Federal Food, Drug, and Cosmetic Act and similar laws in other countries and, to a lesser extent, on orphan drug designation, if granted for NeuVax. We are preparing to apply for Orphan Drug status for

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NeuVax that, if granted, could provide seven years or ten years of market exclusivity in the United States or the European Union, respectively. However, there is no assurance that the FDA or the European Medicines Agency, or “**EMA**,” will approve our Orphan Drug Application. We also anticipate that NeuVax will qualify for 12 years of data exclusivity, and thus other companies would be prevented from using our clinical data to support their application for regulatory approval, under the Patient Protection and Affordable Care Act; however, there can be no assurance that the 12 years of exclusivity provided for under the Patient Protection and Affordable Care Act will remain in effect, or that NeuVax will meet the qualifications of a “biological product” to receive the specified period of exclusivity.

While the orphan drug designation for NeuVax, if granted, will provide seven years of market exclusivity in the United States, we will not be able to exclude other companies from receiving market approval for the designated orphan indication beyond that timeframe. Even if we have orphan drug designation for a particular drug indication, we cannot guarantee that another company also holding orphan drug designation will not receive FDA approval for the same indication before we do. If that were to happen, our applications for that indication may not be approved until the competing company’s seven-year period of exclusivity expired. Even if we are the first to obtain FDA approval for an orphan drug indication, there are circumstances under which a competing product may be approved for the same indication during our seven-year period of marketing exclusivity, such as if the later product is shown to be clinically superior to the orphan product. Further, the seven-year marketing exclusivity would not prevent competitors from obtaining approval of the same compound for other indications or the use of other types of drugs for the same use as the orphan drug. In addition, data exclusivity does not prevent another company from completing its own clinical trials with NeuVax and obtaining regulatory approval for the same indication for which NeuVax may be approved. Consequently, we may not be able to prevent competitors from entering the market prior to the end of any applicable data exclusivity period. If we are not able to prevent competitors from entering the market with a similar product to NeuVax, our ability to achieve profits from sales of NeuVax will be dramatically limited.

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. If our products are 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, oncologists and clinics 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, was used for an unapproved indication or if they believe the cost of the product outweighs its benefits. Third-party payors also may refuse to reimburse for experimental procedures and devices. Furthermore, because our programs are still in 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 affected.

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.

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Insurers may refuse to provide insurance coverage for newly approved drugs, or insurance coverage may be delayed or be more limited than the purpose for which the drugs are 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 our new management team is not effective or 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.

Our business prospects are dependent on our management team. The loss of Dr. Ahn, our President and Chief Executive Officer, or our other executive officers, 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 we may be liable for any contamination or injury we cause.

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 may be liable for any damages that result, and any liability could exceed our resources.

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. State laws mandate the limits of our workers' compensation insurance, and our workers' compensation liability is

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capped at these state-mandated limits. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate any of these laws or regulations.

Risks Relating To 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 equivalents should be sufficient to fund our operations through at least the second quarter of 2013. 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. We cannot assure that additional 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 our Phase 3 PRESENT clinical trial of NeuVax, our Phase 1/2 clinical trials of FBP and our planned Phase 2 trial of NeuVax in combination with Herceptin[®] and other planned NeuVax trials;
- 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 technologies and product candidates, and additional substantial funds will be required for further preclinical testing and clinical trials of our 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 security holders or may otherwise adversely affect our business.

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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 a limited history and our historical financial information may not be representative of our future results.

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

We are a development-stage company with limited operating history conducting oncology drug programs. We will focus on developing and, if we obtain regulatory approval, commercializing our product candidates, and there is no assurance that we will be successful. 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 our other business objectives.

We may be unable to comply with our reporting and other requirements under federal securities laws.

As a publicly traded company, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the “**Exchange Act**,” and the Sarbanes-Oxley Act of 2002, or the “**Sarbanes-Oxley Act**.” 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.

We recently reported a material weakness in the effectiveness of our internal controls over financial reporting, and if we cannot provide reliable financial and other information, investors may lose confidence in our SEC reports.

In October 2011, our management identified a material weakness in the effectiveness of our internal control over financial reporting related to our accounting for certain outstanding stock options and warrants. As a result, we restated our unaudited condensed consolidated financial statements as of June 30, 2011. Based on this evaluation of the effectiveness of the design and operation of our disclosure controls and procedures, and because of the error described above, our management concluded that our disclosure controls and procedures over our accounting for stock options modified and for warrants potentially settleable in cash were not effective as of the end of the quarters ended June 30, and September 30, 2011. Disclosure controls and procedures generally include controls and procedures designed to ensure that information required to be disclosed by us in the reports we file with the SEC is recorded, processed, summarized and reported accurately and within the time periods specified in the SEC’s rules and forms. In the fourth quarter of 2011, we implemented additional review procedures to ensure the accuracy of our fair market value calculations to ensure that our accounting for stock options modified and for warrants potentially settleable in cash is in accordance with generally accepted accounting principles. This action was in place in connection with the preparation of our financial statements for the year ended 2011. As such, we believe that the remediation initiative was sufficient to eliminate the material weakness in internal control over financial reporting as discussed above.

Effective internal controls over financial reporting and disclosure controls and procedures are necessary for us to provide reliable financial and other reports and effectively prevent fraud. If we cannot provide reliable financial or SEC reports or prevent fraud, investors may lose confidence in our SEC reports, our operating results and the trading price of our common stock could suffer materially and we may become subject to litigation.

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Risks Relating 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 has exhibited substantial volatility recently. Between January 1, 2012 and July 2, 2012, the sale price of our common stock as reported on The NASDAQ Capital Market ranged from a low of \$0.43 to a high of \$2.93. The market price of our common stock could continue to fluctuate significantly for many reasons, including the following factors:

- reports of the results of our clinical trials regarding the safety or efficacy of our product candidates and surrogate markers;
- announcements of regulatory developments or technological innovations by us or our competitors;
- announcements of business or strategic transactions such as our planned partial spin-off of RXi and related transactions and of the progress of the partial spin-off or other strategic transactions;
- changes in our relationship with our licensors and other strategic partners;
- 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, security holders 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.

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 security holders 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 security holders to remove directors;
- regulate how security holders may present proposals or nominate directors for election at annual meetings of security holders; and
- authorize our board of directors to issue preferred stock in one or more series, without stockholder approval.

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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, including businesses in which our directors or officers may have an interest, 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 acquisitions of other complementary businesses and assets and may also pursue strategic alliances. We have limited experience in acquiring other companies and in forming such alliances. Apheria was our first acquisition. Sanford J. Hillsberg, our Chairman of the Board, was a substantial stockholder of Apheria at the time of the acquisition and had interests in the Apheria acquisition that were different from the interests of our security holders, generally. We may not be able to successfully integrate any acquisitions into our existing business, and we could assume unknown or contingent liabilities or become subject to possible stockholder claims in connection with any related-party or third-party acquisitions or other transactions. 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 of Apheria or other acquisitions. Integration of an acquired company requires management resources that otherwise would be available for ongoing development of our existing business. We may not realize the anticipated benefits of any acquisition, technology license or strategic alliance.

To finance future 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 security holders.

Risks Relating to our Ownership Interest in RXi

There are a number of risks associated with our ownership interest in RXi, including the following:

We have no control over RXi.

We currently own only approximately 32,734,235 shares of common stock of RXi and have no control over RXi's management or operations. RXi has its own board of directors and management, who are responsible for the affairs and policies of RXi and its development plans. The directors, management and other security holders of RXi may have interests that are different from ours, and RXi may engage in actions in connection with its business and operations that we believe are not in our best interests.

The value of our ownership interest in RXi will depend on RXi's success in developing and commercializing products developed based upon its RNAi technologies.

RXi will focus solely on developing and commercializing therapeutic products based on our RNAi technologies for the treatment of human diseases, including fibrotic disease, which activities are subject to significant risks and uncertainties described in RXi's filings with the SEC.

Risks Related to this Offering

We will not receive any of the proceeds of this offering.

The selling security holders will receive all proceeds from the sale of shares under this prospectus. We will not receive any proceeds from the sale of the shares offered by the selling security holders, except for the exercise price of the warrants held by the selling security holders to the extent they are exercised.

Future sales of substantial amounts of our common stock, or the possibility that such sales could occur, could adversely affect the market price of our common stock.

Substantial issuances or sales of our common stock, including shares issued upon exercise of our outstanding options, in the public market, or the perception by the market that these issuances or sales could occur, could lower the market price of our common stock or make it difficult for us to raise additional capital. As of June 30, 2012, we had 67,159,754 shares of common stock issued and outstanding (excluding treasury shares). Substantially all of these shares are available for public sale, subject in some cases to volume and other limitations or to delivery of a prospectus.

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As of June 30, 2012, we had reserved for issuance up to 7,598,918 shares of our common stock issuable upon the exercise of outstanding stock options at a weighted-average exercise price of \$2.02 per share. Subject to applicable vesting requirements, upon exercise of these options, the underlying shares may be resold into the public market. In the case of outstanding options that have exercise prices that are below the market price of our common stock from time to time, investors would experience dilution. We cannot predict if future issuances or sales of our common stock, or the availability of our common stock for issuance or sale, will harm the market price of our common stock or our ability to raise capital by offering equity securities.

Our outstanding warrants may result in dilution to our security holders.

As of June 30, 2012, we had outstanding April 2011 warrants and March 2011 warrants to purchase a total of 4,097,865 shares of common stock at a current exercise price of \$0.65 per share, which warrants contain so-called full-ratchet anti-dilution provisions that will be triggered upon an issuance by us of shares of our common stock or common stock equivalents at a price per share below the then-exercise price of the warrants, subject to some exceptions. It is possible that one or more warrant holders might object to our determination of any applicable anti-dilution adjustments.

To the extent that these anti-dilution provisions are triggered in the future, we would be required to reduce the exercise price of all of the April 2011 and March 2011 warrants on a full-ratchet basis, which would have a dilutive effect on our security holders.

We may issue preferred stock in the future, and the terms of the preferred stock may reduce the value of our common stock.

We are authorized to issue up to 5,000,000 shares of preferred stock in one or more series. Our board of directors may determine the terms of future preferred stock offerings without further action by our security holders. If we issue preferred stock, it could affect your rights or reduce the market value of our outstanding common stock. In particular, specific rights granted to future holders of preferred stock may include voting rights, preferences as to dividends and liquidation, conversion and redemption rights, sinking fund provisions, and restrictions on our ability to merge with or sell our assets to a third party.

We have never declared or paid cash dividends on our capital stock, and we do not anticipate paying cash dividends in the foreseeable future.

Our business requires significant funding. We currently plan to invest all available funds and future earnings in the development and growth of our business and do not anticipate paying any cash dividends on our common stock in the foreseeable future. As a result, capital appreciation, if any, of our common stock will be our security holders' sole source of potential gain for the foreseeable future.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the other documents we have filed with the SEC that are incorporated herein by reference contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 that involve risks and uncertainties, as well as assumptions that, if they never materialize or prove incorrect, could cause our results to differ materially from those expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including any projections of financing needs, revenue, expenses, earnings or losses from operations, or other financial items; any statements of the plans, strategies and objectives of management for future operations; any statements concerning product research, development and commercialization plans and timelines; any statements regarding safety and efficacy of product candidates; any statements of expectation or belief; and any statements of assumptions underlying any of the foregoing. All forward-looking statements attributable to us or to persons acting on our behalf are expressly qualified in their entirety by the cautionary statements and risk factors set forth under “Risk Factors” and elsewhere in this prospectus and set forth in our Form 10-K for the year ended December 31, 2011. In addition, forward-looking statements may contain the words “believe,” “anticipate,” “expect,” “estimate,” “intend,” “plan,” “project,” “will be,” “will continue,” “will result,” “seek,” “could,” “may,” “might,” or any variations of such words or other words with similar meanings.

Given these uncertainties, you should not place undue reliance on these forward-looking statements. You should read this prospectus and the documents that we reference in this prospectus with the understanding that our actual future results may be materially different from what we expect. Except as required by law, we do not undertake any obligation to update or revise any forward-looking statements contained in this prospectus and any supplements to this prospectus, whether as a result of new information, future events or otherwise.

USE OF PROCEEDS

The selling security holders will receive all proceeds from the sale of shares under this prospectus. We will not receive any proceeds from the sale of the shares offered by the selling security holders, except for the exercise price of the warrants held by the selling security holders to the extent they are exercised. We will pay all fees and expenses incurred in connection with the registration of the shares of common stock covered by this prospectus (including, without limitation, SEC filing fees, The NASDAQ Capital Market listing fees and the fees and expenses of our attorneys and accountants), and the selling security holders will pay any brokerage or underwriting commissions or discounts or other expenses relating to the sale of these shares.

We do not know whether any of the warrants will be exercised or, if any of the warrants are exercised, when they will be exercised. Also, as discussed in “Description of Securities – Warrants,” the warrants may be exercised on a cashless basis. In these circumstances, even if the warrants are exercised, we may not receive any proceeds, or the proceeds that we do receive may be significantly less than what we might expect. We estimate that the maximum net proceeds that we may receive from the exercise of the warrants, assuming all of the warrants are exercised, will be approximately \$ million, after deducting estimated offering expenses payable by us.

MARKET PRICE OF OUR COMMON STOCK AND RELATED STOCKHOLDER MATTERS

Market Information

Our common stock is listed on The NASDAQ Capital Market under the symbol “GALE. The following table sets forth, for each of the quarterly periods indicated, the range of high and low sales prices of our common stock as reported on The NASDAQ Capital Market:

	<u>High</u>	<u>Low</u>
2010		
First Quarter	\$8.99	\$3.48
Second Quarter	5.23	3.51
Third Quarter	3.02	1.70
Fourth Quarter	4.08	2.20
2011		
First Quarter	\$2.65	\$1.10
Second Quarter	1.65	0.73
Third Quarter	1.48	0.61
Fourth Quarter	1.01	0.36
2012		
First Quarter	\$1.39	\$0.43
Second Quarter	\$2.11	\$1.12
Third Quarter (through July 2, 2012)	\$1.71	\$1.56

On July 2, 2012, the closing price of our common stock reported on The NASDAQ Capital Market was \$1.63 per share. As of July 2, 2012 there were approximately 702 beneficial holders of record of our common stock. This number does not include stockholders for whom shares were held in “nominee” or “street” name.

Dividend Policy

Our board of directors sets our dividend policy. We have never paid any cash dividends on our common stock and do not intend to declare cash dividends on our common stock in the foreseeable future. We currently intend to retain all available funds and any future earnings for use in the operation and expansion of our business, but we may determine in the future to declare or pay cash dividends on our common stock. Any future determination as to the declaration and payment of dividends will be at the discretion of our board of directors and will be dependent upon our results of operations and cash flows, our financial position and capital requirements, general business conditions, legal, tax, regulatory and any contractual restrictions on the payment of dividends, and any other factors our board of directors deems relevant.

SELLING SECURITY HOLDERS

The selling security holders are offering under this prospectus a total of 2,458,349 shares of our common stock. The selling security holders consist of the holders of our outstanding contingent value rights, or “**CVRs**,” granted in April 2011 in connection with our merger acquisition of Aphera, Inc., or “**Aphera**,” and two broker-dealer and financial advisory firms (or their associates) with which we entered into investment banking and financial advisory agreements.

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Contingent Value Rights Holders

Of the shares offered by the selling security holders, 1,315,849 shares were issued by us to certain of the selling security holders who hold our outstanding CVRs. The CVRs were granted by us pursuant to the contingent value rights agreement among us, Computershare Trust Company, N.A., a national banking association, Computershare Inc., a Delaware corporation, and Robert E. Kennedy, an individual, as the stockholder representative, as amended by the first amendment thereto dated as of February 15, 2012 in a transaction exempt from registration under the Securities Act.

We entered into the contingent value rights agreement in April 2011 in connection with our merger acquisition of Aphera, Inc., or “**Aphera**.” At the closing of the Aphera merger, we issued to the former Aphera shareholders CVRs entitling them to future payments of up to \$32 million in the aggregate, which we refer to as the “**contingent consideration**,” based on the achievement of specified development and commercial milestones relating to our NeuVax product candidate acquired from Aphera. The CVRs were issued in a provable transaction exempt from registration under the Securities Act. We are entitled to pay the contingent consideration, at our election, in either cash or in shares of our common stock. On February 15, 2012, we entered into a first amendment to the contingent value rights agreement relating to the achievement of milestone #1, the enrollment of the first patient in our NeuVax PRESENT Phase 3 clinical trial. Under the amendment, we agreed to pay the \$1 million contingent consideration triggered by the achievement of milestone #1 by issuing 1,315,849 shares of our common stock, which was based on a value of \$0.76 per share, the closing price of our common stock as reported on Nasdaq on January 18, 2012, the day prior to achievement of milestone #1.

Investment Banking and Financial Advisory Agreements

Of the shares of our common stock offered by the selling security holders under this prospectus, 200,000 shares were issued by us to John Thomas Financial, or “**JTF**,” one of the selling security holders, under a financial advisory agreement entered into by us on June 27, 2012. The shares were issued in a private transaction exempt from registration under the Securities Act. The 200,000 shares being offered by JTF are held by our transfer agent for JTF’s account and will be released to JTF in twelve monthly installments of approximately 16,667 shares each over the period commencing July 2012 and ending August 2013.

The remaining shares of our common stock offered by the selling security holders are issuable upon the exercise of outstanding warrants issued by us under investment banking agreements entered into by us and Legend Securities on January 29, 2009, January 24, 2010, February 4, 2011 and February 4, 2012, respectively. The warrants were issued in private transactions exempt from registration under the Securities Act. The warrants are exercisable during exercise periods expiring between January 29, 2012 to February 4, 2017 at exercise prices ranging from \$0.66 per share to \$5.66 per share, which exercise prices were equal to the market price of our common stocks at the time of grant. See “Description of Securities – Warrants” for more information regarding the warrants held by certain of the selling security holders.

General

All of the shares being offered by the selling security holders are “restricted securities” under applicable federal and state securities laws, rules and regulations.

We are registering the shares under the Securities Act to give the selling security holders the opportunity, if they so desire, to publicly sell the shares for their own accounts in such amounts and at such times and prices as each may choose. Whether sales of shares will be made, and the timing and amount of each such sale, is within the sole discretion of each selling stockholder, and the selling security holders will act independently of us in making decisions with respect to the sale of their shares. Registration of the shares under the Securities Act does not require that any of the shares be offered or sold by the selling security holders, and there is no assurance that the selling security holders will sell any or all of the shares offered by this prospectus.

In certain circumstances, a donee, pledgee or other transferee who receives shares of common stock offered by this prospectus from a selling stockholder may become entitled to use this prospectus to sell such shares of common stock. In such event, we will file a supplement to this prospectus that amends the following table of selling security holders to include the donee, pledgee or other transferee as a selling stockholder under this prospectus.

The table below sets forth the name of each selling stockholder, the number of shares owned by each selling stockholder as of June 30, 2012, the number of shares offered by each selling stockholder under this prospectus and the number of shares of common stock that will be owned by each selling stockholder assuming that the selling stockholder sells all of the shares that are offered under this prospectus.

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The information in the table is based in part upon information that we were provided by the selling security holders, and the percentages in the table were calculated based upon 67,159,754 shares of our common stock being outstanding as of June 30, 2012. Beneficial ownership of shares is determined in accordance with SEC rules and includes voting or investment power with respect to the shares. Shares of common stock subject to options, warrants and convertible securities currently exercisable or convertible, or exercisable or convertible within 60 days after June 30, 2012, are deemed to be outstanding for purposes of computing the percentage ownership of the selling stockholder who holds the option, warrant or convertible security, but not for purposes of computing the percentage ownership of any other selling stockholder. An asterisk (*) denotes beneficial ownership of less than 1%.

Except as described in the footnotes to the table, no selling stockholder currently has, or within the three years preceding the date of this prospectus has had, any position, office or other material relationship with Galena.

Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to this Offering		Number of Shares Being Offered	Shares of Common Stock Beneficially Owned After Completion of this Offering	
	Number of Shares	Percent		Number of Shares	Percent
Contingent Value Rights Holders:					
Scott F. Alexander	27,995	*	5,951	22,044	*
Ori D. Alpert	7,566	*	1,609	5,957	*
Aphera Holding, LLC(1)	21,787	*	4,826	16,961	*
Argueso Family Trust(2)	8,715	*	1,931	6,784	*
Bailey Family Trust (DTD June 14, 1991)(3)	15,132	*	3,217	11,915	*
Robbie Bensley	28,291	*	7,077	21,214	*
Edward Glenn Beukelman, IRA Charles Schwab & Co., Inc. Account No. 1567-0537	9,953	*	2,205	7,748	*
Blackmont Capital, Inc.	8,686	*	8,686	-0-	0
L.R.E. Braaksma	3,027	*	644	2,383	*
William R. Bradford	7,262	*	1,609	5,653	*
Beth Buchanan	3,027	*	644	2,383	*
David Buchanan, Joan Buchanan (JTWROS)	2,905	*	644	2,261	*
Jeffrey D. Buchanan	2,905	*	644	2,261	*
Michael P. Cahill	7,262	*	1,609	5,653	*
Capital Ventures International(4)	252,376	*	72,376	180,000	*
Chi-Yong Chang	2,059	*	438	1,621	*
Lawrence R. Cole	3,089	*	3,089	-0-	0
Douglas A. daCosta	3,027	*	644	2,383	*
Richard Della Puca	8,715	*	1,931	6,784	*
Arild Eide	2,905	*	644	2,261	*
Jeffrey H. Eimer	3,027	*	644	2,383	*
Adrienne Elsner	37,831	*	8,042	29,789	*
Bernard W. Elsner	14,524	*	3,217	11,307	*
Susan L. Elsner	14,524	*	3,217	11,307	*
Marc Fuhrman	57,049	*	6,434	50,615	*
Contributory IRA of David Minoru Fujii, Charles Schwab & Co Inc Cust, Ira Contributory, Acct No. 7774-1748	461,535	*	98,110	363,425	*
Contributory IRA of David Minoru Fujii, Charles Schwab & Co Inc Cust, Ira Contributory, Acct No. 3500-9434	196,721	*	41,818	154,903	*
David Minoru Fujii	574,691	*	122,163	452,528	*
David Minoru Fujii, Charles Schwab & Co. Inc. Cust IRA Contributory Acct No. 3500-9434	34,756	*	7,103	26,311	*
Contributory IRA of David Minoru Fujii, Charles Schwab & Co Inc Cust, Ira Contributory, Acct No. 7774-1748	275,481	*	58,560	216,921	*

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Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to this Offering		Number of Shares Being Offered	Shares of Common Stock Beneficially Owned After Completion of this Offering	
	Number of Shares	Percent		Number of Shares	Percent
John B. Furman Defined Benefit Pension Trust(5)	2,905	*	644	2,261	*
William E. Gannon Jr.	117,787	*	25,039	92,748	*
Usha & Indira Goohya	3,027	*	644	2,383	*
Jamie J. Gorman, Jr.	6,052	*	1,287	4,765	*
Mary Ann Gray(6)	82,573	*	17,553	65,020	*
Nicholas Hartman	11,533	*	2,555	8,978	*
Robert Haskell	9,562	*	8,042	1,520	*
Blake A. Helm	10,299	*	2,252	8,047	*
Corey P. Helm	10,299	*	2,252	8,047	*
Sanford J. Hillsberg(7)	831,376	1.24%	31,966	799,410	1.19%
Home Run Swing, LLC(8)	3,480	*	740	2,740	*
Kevin C. Hoppock	10,167	*	2,252	7,915	*
Andrei Iancu	36,311	*	8,042	28,269	*
INOGO B.V.	10,593	*	2,252	8,341	*
Edward L. Jacobs	9,463	*	7,959	1,504	*
Janice Lynn Keast	1,737	*	1,737	-0-	0
Douglas R. Kennedy	755	*	161	594	*
Lauren S. Kennedy(9)	755	*	161	594	*
Peggy F. Kennedy(10)	3,027	*	644	2,383	*
Phillip B. Kennedy(11)	755	*	161	594	*
Robert E. Kennedy(12)	490,774	*	99,011	391,763	*
Stephen A. Kennedy	755	*	161	594	*
Young Don Kim	2,905	*	644	2,261	*
Robert S. King	3,052	*	649	2,403	*
Christopher J. Knauer	3,027	*	644	2,383	*
KwangDong Pharmaceuticals Co., Ltd.(13)	620,607	*	8,694	611,913	*
Lane Ventures Inc.(14)	21,070	*	21,070	-0-	0
Helen Lim	3,921	*	869	3,052	*
Keith Lim, Inc.(15)	278,677	*	8,685	269,992	*
Longtrail Advisors, LLC(16)	10,624	*	10,624	-0-	0
Luconja Investments, LLC(17)	151,323	*	32,167	119,156	*
Navid Malik	20,429	*	4,343	16,086	*
Manschot Defined Benefit Plan (18)	766	*	644	122	*
Robert H. Manschot	1,913	*	1,609	304	*
Michael McFerrin Trust(19)	37,831	*	8,042	29,789	*
Jon W. McGarity	10,531	*	2,239	8,292	*
Lorne D. McKay Jr. & Edwina J. McKay	23,239	*	5,147	18,092	*
Alia Minhas	10,542	*	2,241	8,301	*
A. Charles Morgan	21,166	*	17,802	3,364	*
David L. Morgan	3,505	*	3,499	6	*
N.P. Monteban B.V.(20)	3,027	*	644	2,383	*
F.E. Nieboer	3,027	*	644	2,383	*
Mitsuhiro Osada	1,976	*	438	1,538	*
Chandra Panchmia	13,770	*	11,581	2,189	*
Paquet Family Trust(21)	29,620	*	9,329	20,291	*
Pratik Patel	3,027	*	644	2,383	*
George E. Peoples(22)	414,677	*	84,429	330,248	*
Jeffrey S. Platt, IRA	9,562	*	8,042	1,520	*
R&I Family Trust u/a/d 3/15/90(23)	59,458	*	8,042	51,416	*
The Philippe Y. & Francoise J. Reynolds Revocable Trust - D - 5/14/2002(24)	3,027	*	644	2,383	*
Ringneck Investments LLC(25)	3,208	*	682	2,526	*
Michael Ritchey	644	*	644	-0-	0
Stuart Rogers	2,394	*	1,738	656	*
Mark S. Schubert	7,415	*	1,577	5,838	*

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Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to this Offering		Number of Shares Being Offered	Shares of Common Stock Beneficially Owned After Completion of this Offering	
	Number of Shares	Percent		Number of Shares	Percent
Mark W. Schwartz(26)	439,907	*	89,322	350,585	*
William Sentenac & Leigh Sentenac	5,809	*	1,287	4,522	*
Mukund Shah	4,085	*	869	3,216	*
Naresh T. Shah & Smita N. Shah	5,519	*	1,223	4,296	*
Risik G. Shah	7,262	*	1,609	5,653	*
Joseph Sinkule	121,411	*	71,411	50,000	*
SMD Family Limited Partnership(27)	25,726	*	5,469	20,257	*
Luke Somerlot	298	*	64	234	*
Burton K. Stopnik	957	*	805	152	*
Matthew & Heather Stopnik	2,269	*	483	1,786	*
Scott H. Stopnik	1,513	*	322	1,191	*
Joseph Telushkin(28)	116,259	*	11,259	105,000	*
Three W. Partners, LTD(29)	4,100	*	872	3,228	*
Gail Thurston	16,735	*	14,075	2,660	*
Bob Thurston	1,033	*	869	164	*
Brent Treiger	130,985	*	29,010	101,975	*
David Verseman	21,941	*	4,665	17,276	*
Weber Advantage Consulting, LLC(30)	6,995	*	2,444	4,551	*
Stephen B. Wechsler	3,631	*	805	2,826	*
Trust u/w Mark Weidman, Deceased(31)	2,952	*	628	2,324	*
Steven C. Weidman	11,727	*	2,493	9,234	*
Kimberly Weiss	5,809	*	1,287	4,522	*
Lee Weiss	1,530	*	1,287	243	*
Mark Werdyger	11,769	*	2,502	9,267	*
Steve J. Wille	21,061	*	4,665	16,396	*
Morgan Stanley Smith Barney as Custodian FBO David Wohlberg IRA	50,835	*	11,259	39,576	*
David Wohlberg	345,897	*	95,897	250,000	*
Wolens Family Trust, Keenan Wolens, Trustee(32)	58,097	*	12,867	45,230	*
Robert P. Yavel(33)	3,644	*	644	3,000	*
Zeidman Family Trust 07-06-1993(34)	4,236	*	901	3,335	*
Bernard Zicherman	2,818	*	625	2,193	*
John Thomas Financial, Inc. (35)	200,000	*	200,000	-0-	0
Legend Securities, Inc. (36)	209,625	*	209,625	0	0
John Columbia (37)	183,219	*	183,219	0	0
Thomas Wagner (37)	549,656	*	549,656	0	0

* Less than 1%

- (1) Apheria Holding, LLC is a limited liability company of which Black Powder Management L.L.C. is the Manager. Mr. Mitchell A. Saltz is the manager of Black Powder Management LLC and as such, has voting and investment control over the shares shown.
- (2) Luis R. Argueso and Gloria P. Argueso, as Trustees of the Argueso Family Trust, have voting and investment control over the shares shown.
- (3) Robert Behrens Bailey Jr. and Paige Bentley Bailey, as Trustees of the Bailey Family Trust, have voting and investment control over the shares shown.
- (4) Includes 180,000 shares underlying warrants, the terms of which limit their exercise so that the holder's beneficial ownership shall not exceed 4.99% which are not offered in this prospectus. Heights Capital Management, Inc., the authorized agent of Capital Ventures International ("CVI"), has discretionary authority to vote and dispose of the shares held by CVI and may be deemed to be the beneficial owner of the shares held by CVI. Martin Kobinger is the Investment Manager of Heights Capital Management, Inc., and as such may be deemed to have voting and investment control over CVI's shares. Mr. Kobinger disclaims beneficial ownership of such shares.

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- (5) John B. Furman, as Trustee of the John B. Furman Defined Benefit Pension Trust, has voting and investment control over the shares shown.
- (6) Mary Ann Gray was a director of Aphera until she tendered her resignation in connection with our acquisition of Aphera.
- (7) The shares beneficially owned by Mr. Hillsberg include 675,000 shares underlying stock options. Mr. Hillsberg has served as the Chairman of the Board of Directors of Galena since 2007.
- (8) Robert W. Crew, Philip Newlin, Steven Cox and Kevin Hoppock have voting and investment control over the shares shown.
- (9) Lauren S. Kennedy's spouse is Phillip B. Kennedy.
- (10) Peggy F. Kennedy's spouse is Robert F. Kennedy.
- (11) Phillip B. Kennedy's spouse is Lauren S. Kennedy.
- (12) Of the shares shown, 2,526 shares are owned of record by Ringneck Investments, LLC, of which Robert. E. Kennedy is the managing member and a 5.66% equity owner. Mr. Kennedy, whose spouse is Peggy F. Kennedy, is a CVR holder representative of Galena.
- (13) KwangDong Pharmaceuticals Co., Ltd ("KwangDong") is a corporation and Bo-Hyung Lee has voting and investment power over the shares shown. KwangDong entered into a license agreement with Aphera in June 2009, pursuant to which KwangDong was granted a license to sell NeuVax in South Korea.
- (14) Lane Ventures Inc. is a corporation and Joseph Hammer has voting and investment control over the shares shown.
- (15) Keith Lim, Inc. is a corporation and Keith Lim has voting and investment control over the shares shown.
- (16) Longtrail Advisors, LLC is a limited liability company and Ira Z. Leiderman has voting and investment control over the shares shown. Mr. Leiderman was Chairman of the Board of Aphera until he tendered his resignation in connection with our acquisition of Aphera.
- (17) Luconja Investments, LLC is a limited liability company of which Stanley A. Myers is the manager. As such, Mr. Myer has voting and investment control over the shares shown.
- (18) Manschot Defined Benefit Plan is a profit sharing plan. Robert Marshal has voting and investment control over the shares shown.
- (19) Michael McFerrin, as Trustee of the Michael McFerrin Trust, has voting and investment control over the shares shown.
- (20) N.P. Monteban is the Chief Executive Officer of N.P. Monteban B.V., and as such, Mr. Monteban has voting and investment control over the shares shown.
- (21) Donald and Valerie Paquet, as Trustees of the Paquet Family Trust, have voting and investment control over the shares shown.
- (22) Mr. Peoples was appointed as Chief Medical Advisor of RXi in connection with our acquisition of Aphera.
- (23) Richard N. Kipper, as Trustee of the R&I Family Trust u/a/d 3/15/90, has voting and investment control over the shares shown.
- (24) Philippe Y. Reyns, as Trustee of The Philippe Y. & Francoise J. Reyns Revocable Trust – D – 5/14/2002, has voting and investment control over the shares shown.
- (25) Ringneck Investments, LLC is a private limited liability company of which Robert E. Kennedy is the managing member and a 5.66% equity owner. Robert E. Kennedy, Daniel K. Newell and Chris W. Prater have voting and investment control over the shares shown.
- (26) Mr. Schwartz was appointed as Executive Vice President and Chief Operating Officer of RXi in connection with our acquisition of Aphera.
- (27) Michael J. Dupuy, the general partner of SMD Family Ltd. Partnership, has voting and investment control over the shares shown.
- (28) Of the shares shown, 50,000 are held in Mr. Telushkin's IRA account.
- (29) CMM Investments, LLC, the general partner of Three W. Partners, Ltd. ("TWP"), has discretionary authority to vote and dispose of the shares held by TWP and may be deemed to be the beneficial owner of the shares held by TWP. Chia C. Wang and Yun M. Wang, are members of CMM Investments, LLC, and as such, have voting and investment control over TWP's securities.
- (30) Weber Advantage Consulting, LLC is a limited liability company of which Kevin D. Weber is the sole member. As such, Mr. Weber has voting and investment control over the shares shown.

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- (31) Steven C. Weidman, Dina Weidman and Joshua Weidman as Trustees of the Trust u/w Mark Weidman, Deceased, have voting and investment control over the shares shown.
- (32) Orna and Keenan Wolens have voting and investment control over the shares shown.
- (33) Of the shares shown, 71,100 are held by Mr. Yavel and his spouse in a joint tenancy with right of survivorship.
- (34) Eric Zeidman and Lori Zeidman, as Trustees of the Zeidman Family Trust 07-06-1993, have voting and investment control over the shares shown.
- (35) John Thomas Financial, or JTF, is party to a financial advisory agreement dated as of June 27, 2012 with Galena under which JTF has agreed to render services to us as a corporate financial consultant. Under the agreement, we have agreed to pay JTF a monthly cash consulting fee of \$14,583 during the 12-month period from July 2012 to July 2013. We also have agreed to issue to JTF the 200,000 shares of our common stock being offered for sale by JTF under this prospectus.
- (36) Legend Securities, Inc. is party to separate one-year investment banking agreements with Galena dated January 9, 2009, January 24, 2010, February 5, 2011 and February 4, 2012, respectively, under which Legend Securities, Inc. agreed to render investment banking services to us. Under the agreements, we agreed to pay Legend Securities, Inc. a monthly cash fee of \$19,000 and to grant to Legend Securities, Inc. the warrants described in the “Description of Securities—Legend Securities, Inc. Warrants” section of this prospectus. The shares of our common stock being offered hereby by Legend Securities, Inc. and by Messrs. Columbia and Wagner are issuable upon exercise of the warrants originally granted to Legend Securities, Inc. under these investment banking agreements.
- (37) Mr. Columbia and Mr. Wagner are principals of Legend Securities, Inc. and as such may be deemed to beneficially own the shares held by Legend Securities, Inc. They disclaim such beneficial ownership. The shares shown as being offered by Messrs. Columbia and Wagner are issuable upon exercise of outstanding warrants held by them that originally were granted to Legend Securities, Inc. pursuant to the investment banking agreements described in note (38), above.

PLAN OF DISTRIBUTION

The selling security holders may, from time to time, sell or otherwise transfer any or all of the shares that are covered by this prospectus on The NASDAQ Capital Market or on any other stock exchange, market or trading facility on which the shares are traded or in private transactions. Sales of the shares may be at fixed prices, at prevailing market prices at the time of sale, at prices relating to the prevailing market prices, at varying prices determined at the time of sale or at negotiated prices.

The selling security holders may use any one or more of the following methods when selling or otherwise transferring the shares:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- privately negotiated transactions;
- short sales;
- transactions in which the broker-dealer agrees with the selling security holders to sell a specified number of the shares at a stipulated price per share;
- a combination of any such methods of sale; or
- any other method permitted by applicable law.

To the extent permitted by applicable law, the selling security holders may enter into hedging transactions. For example, the selling security holders may:

- enter into transactions involving short sales of the shares by a broker-dealer;
- sell shares short themselves and redeliver the shares to close out their short positions;

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- enter into option or other types of transactions that require the selling security holders to deliver shares to a broker-dealer, who will then resell or otherwise transfer the shares under this prospectus; or
- loan or pledge the shares to a broker-dealer, who may sell the loaned shares or, in the event of default, sell the pledged shares.

We have provided the selling security holders with copies of this prospectus. If the selling security holders use this prospectus for any sale of the shares, they will be subject to the prospectus delivery requirements of the Securities Act, including by compliance with Rule 172 under the Securities Act.

Any shares covered by this prospectus that qualify for resale in accordance with the terms and conditions of Rule 144 under the Securities Act may be sold by the selling security holders under Rule 144 rather than under this prospectus.

We will pay all fees and expenses incurred in connection with the registration of the shares of common stock covered by this prospectus (including, without limitation, SEC filing fees, the Nasdaq Capital Market listing fees and the fees and expenses of our attorneys and accountants), and the selling security holders will pay any brokerage or underwriting commissions or discounts or other expenses relating to the sale of these shares.

The selling security holders may from time to time pledge or grant a security interest in some or all of the shares covered by this prospectus and, if they default in the performance of their secured obligations, the secured parties may offer and sell such shares from time to time under this prospectus after we have filed a supplement to this prospectus that amends the list of selling security holders to include the secured parties as selling security holders under this prospectus.

The selling security holders may from time to time transfer some or all of the shares covered by this prospectus by gifts, by distributions of the shares to security holders, partners or members of selling security holders that are corporations, partnerships or limited liability companies, respectively, or by other similar distributions. In such event, the donees or other transferees of such shares may offer and sell such shares from time to time under this prospectus after we have filed a supplement to this prospectus that amends the list of selling security holders to include the donees or other transferees as selling security holders under this prospectus.

The selling security holders and any broker-dealers or agents that are involved in selling the shares covered by this prospectus may be deemed to be “underwriters” within the meaning of the Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the shares purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. The selling security holders may agree to indemnify any agent, dealer or broker-dealer that participates in transactions involving sales of shares if liabilities are imposed on that person under the Securities Act.

The selling security holders have advised us that, as of the date of this prospectus, they have not entered into any agreements or arrangements with any underwriters or broker-dealers regarding the sale of the shares that are covered by this prospectus and that there is no underwriter or coordinating broker acting in connection with a proposed sale of any such shares by any selling stockholder. If we are subsequently notified by any selling stockholder that any material arrangement has been entered into with an underwriter or a broker-dealer for the sale of any of the shares, if required by applicable law we will file a supplement to this prospectus that discusses such arrangement.

Broker-dealers engaged by the selling security holders may arrange for other broker-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the selling security holders (or, if any broker-dealer acts as agent for the purchaser of shares, from the purchaser) in amounts to be negotiated. The selling security holders do not expect these commissions and discounts to exceed what is customary in the types of transactions involved. Any profits on the resale of the shares by a broker-dealer acting as principal may be deemed to be underwriting discounts or commissions under the Securities Act.

The anti-manipulation rules of Regulation M under the Securities Exchange Act of 1934, as amended, may apply to sales of the shares covered by this prospectus and to the related activities of the selling security holders. Regulation M generally provides, among other things, that any selling stockholder engaged in the distribution of securities may not concurrently purchase such securities during the period of distribution described in Regulation M.

DESCRIPTION OF SECURITIES

The following summary of the terms of our capital stock is subject to and qualified by reference to our certificate of incorporation and bylaws, copies of which are on file with the SEC as exhibits to previous SEC filings. Please refer to “Where You Can Find More Information” below for directions on obtaining these documents.

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Common Stock

As of June 30, 2012, we were authorized to issue 125,000,000 shares of common stock and had 67,159,754 shares (excluding treasury shares) of common stock outstanding.

The holders of our common stock are entitled to one vote for each share on all matters voted on by security holders, including elections of directors, and, except as otherwise required by law or provided in any resolution adopted by our board with respect to any series of preferred stock, the holders of such shares possess all voting power. Our certificate of incorporation does not provide for cumulative voting in the election of directors. Subject to any preferential rights of any outstanding series of our preferred stock created by our board from time to time, the holders of common stock are entitled to such dividends as may be declared from time to time by our board from funds available therefore and upon liquidation are entitled to receive pro rata all assets available for distribution to such holders. Our common stock is not redeemable, and the holders of our common stock have no preemptive rights.

Preferred Stock

We also are authorized to issue up to 5,000,000 shares of preferred stock, par value \$0.0001 per share. Our board of directors, without further action by the holders of our common stock, may issue shares of our preferred stock. Our board is vested with the authority to fix by resolution the designations, preferences and relative, participating, optional or other special rights, and such qualifications, limitations or restrictions thereof, including, without limitation, redemption rights, dividend rights, liquidation preferences and conversion or exchange rights of any class or series of preferred stock, and to fix the number of classes or series of preferred stock, the number of shares constituting any such class or series and the voting powers for each class or series.

The authority possessed by our board to issue preferred stock could potentially be used to discourage attempts by third parties to obtain control of the company through a merger, tender offer, proxy contest or otherwise by making such attempts more difficult or more costly. Our board may issue preferred stock with voting rights or conversion rights that, if exercised, could adversely affect the voting power of the holders of common stock. There are no current agreements or understandings with respect to the issuance of preferred stock.

Warrants

The following summary of certain terms and provisions of the warrants held by certain of the selling security holders is not complete and is subject to, and qualified in its entirety by the provisions of the warrants, the forms of which have been filed as exhibits to the registration statement of which this prospectus is part:

Duration and Exercise Price . The warrants entitle the holders thereof to purchase up to 250,000 shares of our common stock at an exercise price of \$5.66 per share during the five-year period beginning on January 29, 2009 and expiring on January 29, 2014, to purchase up to 142,500 shares of our common stock at an exercise price of \$4.273 per share during the five-year period beginning on January 24, 2010 and expiring on January 24, 2015, to purchase up to 150,000 shares of our common stock during the period beginning on February 4, 2011 and expiring on February 4, 2016, and to purchase up to 400,000 shares of our common stock at an exercise price of \$0.66 per share during the five-year period beginning on February 4, 2012 and ending on February 4, 2017. The warrants have been issued in certificated form only.

Registration Warrant Shares . We have agreed in the warrants to grant the warrant holders so-called piggyback registration rights to include in certain registration statements filed by us under the Securities Act the shares of our common stock issuable upon exercise of the warrants. The shares of our common stock issuable upon exercise of the warrants are being registered under the registration statement of which this prospectus is a part in satisfaction of the warrant holders' piggyback registration rights.

Exercisability . The warrants will be exercisable, at the option of each holder, in whole or in part, delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our common stock purchased upon such exercise (except in the case of a cashless exercise as discussed below).

Cashless Exercise . In lieu of paying the exercise price of the warrants in cash, the warrant holders may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of common stock determined according to a formula set forth in the warrants.

Transferability . Subject to the applicable laws and restriction on transfer set forth in the warrants, the warrants may be transferred at the option of the holder upon surrender of the warrants to us together with the appropriate instruments of transfer.

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Fundamental Transactions . In the event of any fundamental transaction as described in the warrants and generally including our merger with or into a third party, sale of all or substantially all of our assets, tender offer or exchange offer, or reclassification of our common stock, then upon any subsequent exercise of the warrants, the holders will have the right to receive as alternative consideration, for each share of our common stock that would have been issuable upon such exercise immediately prior to the occurrence of such fundamental transaction, the number of shares of common stock of the successor or acquiring corporation or of our company, if it is the surviving corporation, and any additional consideration receivable upon or as a result of such transaction by a holder of the number of shares of our common stock for which the warrants are exercisable immediately prior to such event.

Rights as a Security Holder . The holders of the warrants do not have the rights or privileges of holders of our common stock, including any voting rights, until they exercise their warrants.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the General Corporation Law of the State of Delaware. This law prohibits a publicly held Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding those shares owned by persons who are directors and also officers and by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the date of the transaction, the business combination is approved by the board of directors and authorized at an annual or special meeting of security holders, and not by written consent, by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

LEGAL MATTERS

TroyGould PC, Los Angeles, California, has rendered an opinion with respect to the validity of the shares of common stock offered by this prospectus. Sanford J. Hillsberg, the Chairman of our board of directors, is an attorney with TroyGould PC. TroyGould PC owned 123,491 shares of our common stock as of June 30, 2012.

EXPERTS

The financial statements of Galena Biopharma, Inc. (formerly RXi Pharmaceuticals Corporation) as of December 31, 2011 and 2010 and for the years then ended and for the cumulative period from inception (January 1, 2003) through December 31, 2011 incorporated in this prospectus by reference to the Company's Annual Report on Form 10-K for the year ended December 31, 2011 have been so incorporated in reliance on the report of BDO USA, LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

The financial statements of Apheria, Inc. as of December 31, 2010 and 2009 and for the years then ended and for the cumulative period from inception (July 20, 2005) to December 31, 2010, incorporated by reference in this prospectus, have been so incorporated in reliance on the report of Lohman Company PLLC, independent certified public accountants, upon the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov> . The SEC's website contains reports, proxy and information statements and other information regarding issuers, such as us, that file electronically with the SEC. You may also read

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and copy any document we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Room 1580, Washington D.C. 20549. You may also obtain copies of these documents at prescribed rates by writing to the SEC. Please call the SEC at 1-800-SEC-0330 for further information on the operation of its Public Reference Room.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" into this prospectus supplement the information we have filed with the SEC. The information we incorporate by reference into this prospectus supplement is an important part of this prospectus supplement. Any statement in a document we incorporate by reference into this prospectus supplement or the accompanying prospectus will be considered to be modified or superseded to the extent a statement contained in this prospectus supplement or any other subsequently filed document that is incorporated by reference into this prospectus supplement modifies or supersedes that statement. The modified or superseded statement will not be considered to be a part of this prospectus supplement or accompanying prospectus, as applicable, except as modified or superseded.

We incorporate by reference into this prospectus supplement the information contained in the documents listed below, which is considered to be a part of this prospectus supplement:

- our Annual Report on Form 10-K for the year ended December 31, 2011 filed with the SEC on March 28, 2012;
- our Quarterly Report on Form 10-Q for the quarter ended March 31, 2012 filed with the SEC on May 14, 2012;
- our Current Reports on Form 8-K filed with the SEC on January 23, 2012, February 17, 2012, March 5, 2012, March 7, 2012, March 28, 2012 and April 4, 2012, respectively, our amended Current Report on Form 8-K/A filed with the SEC on April 4, 2012 and related amended Current Reports on Form 8-K/A filed with the SEC on April 14, 2011, May 4, 2011 and June 10, 2011, respectively, and our Current Reports on Form 8-K filed with the SEC on April 5, 2012, April 10, 2012, April 16, 2012, April 19, 2012, May 2, 2012 and May 14, 2012, respectively, our amended Current Report on Form 8-K/A filed on May 22, 2012, and our Current Reports on Form 8-K filed on May 30, 2012 and June 18, 2012, respectively;
- our Schedule 14A filed with the SEC on April 30, 2012; and
- the description of our common stock and related rights contained in our registration statement on Form 8-A (File No. 001-33958), including any amendment or report filed for the purpose of updating such description.

We also incorporate by reference into this prospectus all documents filed pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus and prior to the termination of the offering by the selling security holders; provided, however, that we are not incorporating any information furnished under Item 2.02 or Item 7.01 of any Current Report on Form 8-K we may subsequently file.

You may request a copy of the documents incorporated by reference into this prospectus, at no cost, by writing or telephoning us at the following address:

Galena Biopharma, Inc.
310 N. State Street, Suite 208
Lake Oswego, Oregon 97034
Attention: Investor Relations
Phone: (855) 855-4253

Copies of these documents are also available, without charge, through the "Investors" section of our website (www.galenabiopharma.com) as soon as reasonably practicable after they are filed with the SEC. The information contained on our website is not a part of this prospectus.

PROSPECTUS

GALENA BIOPHARMA, INC.

2,458,349 Shares of Common Stock

The date of this prospectus is _____, 2012

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 14. Other Expenses of Issuance and Distribution.

The following table sets forth the expenses to be paid in connection with the offering of securities described in this registration statement, excluding any brokerage and underwriting discounts and commissions, which will be paid by the selling security holders. All amounts shown are estimates except for the SEC registration fee.

Securities and Exchange Commission registration fee	\$ 586
Printing and engraving expenses	5,000
Legal fees and expenses	15,000
Accounting fees and expenses	10,000
Transfer agent and registrar fees	2,500
Miscellaneous expenses	1,914
Total	<u>\$35,000</u>

ITEM 15. Indemnification of Directors and Officers.

Section 145 of the Delaware General Corporation Law provides that a corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, other than an action by or in the right of the corporation, by reason of the fact that the person is or was a director, officer, employee or agent of the corporation or is or was serving at the corporation's request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses, including attorneys' fees, judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with the action, suit or proceeding if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe the person's conduct was unlawful. The power to indemnify applies to actions brought by or in the right of the corporation as well, but only to the extent of expenses, including attorneys' fees but excluding judgments, fines and amounts paid in settlement, actually and reasonably incurred by the person in connection with the defense or settlement of the action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation and except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that a court of competent jurisdiction shall determine that such indemnity is proper.

Section 145(g) of the Delaware General Corporation Law provides that a corporation shall have the power to purchase and maintain insurance on behalf of its officers, directors, employees and agents, against any liability asserted against and incurred by such persons in any such capacity.

Section 102(b)(7) of the General Corporation Law of the State of Delaware provides that a corporation may eliminate or limit the personal liability of a director to the corporation or its security holders for monetary damages for breach of fiduciary duty as a director, provided that such provision shall not eliminate or limit the liability of a director (i) for any breach of the director's duty of loyalty to the corporation or its security holders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the General Corporation Law of the State of Delaware, or (iv) for any transaction from which the director derived an improper personal benefit. No such provision shall eliminate or limit the liability of a director for any act or omission occurring prior to the date when such provision becomes effective.

Our Amended and Restated Certificate of Incorporation provides that our directors shall not be liable to the Registrant or its security holders for monetary damages for breach of fiduciary duty as a director, except to the extent that the exculpation from liabilities is not permitted under the Delaware General Corporation Law as in effect at the time such liability is determined. In addition, our Amended and Restated Certificate of Incorporation provides that we shall indemnify our directors to the fullest extent permitted by the laws of the State of Delaware. We have entered into indemnification agreements with each of our non-employee directors that provide for indemnification and expense advancement to the fullest extent permitted by the laws of the State of Delaware.

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Our Amended and Restated Certificate of Incorporation provides that we may purchase and maintain insurance policies on behalf of our directors and officers against specified liabilities for actions taken in their capacities as such, including liabilities under the Securities Act. We have obtained directors and officers' liability insurance to cover liabilities our directors and officers may incur in connection with their services to us.

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

ITEM 16. Exhibits.

The Exhibit Index that follows the signature page of this registration statement lists the exhibits that are filed with this registration statement, and such Exhibit Index is incorporated herein by reference.

ITEM 17. Undertakings.

(a) The undersigned registrant hereby undertakes:

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

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

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

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement; provided, however, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Securities and Exchange Commission by the registrant pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement. =

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

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

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness; provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

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

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act of 1933 and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act of 1933 and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Lake Oswego, State of Oregon, on July 2, 2012.

GALENA BIOPHARMA, INC.

By: /s/ Mark J. Ahn
Mark J. Ahn, Ph.D.
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Mark J. Ahn, Ph.D. as his true and lawful attorney-in-fact and agent, with full power of substitution, for him and in his name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this registration statement on Form S-3, and to sign any registration statement for the same offering covered by this registration statement that is to be effective upon filing pursuant to Rule 462(b) promulgated under the Securities Act of 1933, and all post-effective amendments thereto, and to file the same and all prospectus supplements, with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

Signature	Title	Date
<u>/s/ Mark J. Ahn</u> Mark J. Ahn, Ph.D.	President and Chief Executive Officer (Principal Financial and Accounting Officer) and Director	July 2, 2012
<u>/s/ Sanford J. Hillsberg</u> Sanford J. Hillsberg	Director	July 2, 2012
<u>/s/ Richard Chin</u> Richard Chin, M.D.	Director	July 2, 2012
<u>/s/ Stephen S. Galliker</u> Stephen S. Galliker	Director	July 2, 2012
<u>/s/ Steven S. Kriegsman</u> Steven S. Kriegsman	Director	July 2, 2012
<u>/s/ Rudolph Nisi</u> Rudolph Nisi, M.D.	Director	July 2, 2012

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The following exhibits are filed with this registration statement or are incorporated by reference as a part of this registration statement:

<u>Exhibit Number</u>	<u>Description</u>
4.1	Form of Common Stock Purchase Warrant issued in January 2009
4.2	Form of Common Stock Purchase Warrant issued in January 2010
4.3	Form of Common Stock Purchase Warrant issued in February 2011
4.4	Form of Common Stock Purchase Warrant issued in February 2012 (1).
5.1	Opinion of TroyGould PC
23.1	Consent of BDO USA, LLP
23.2	Consent of Lohman Company, PLLC

(1) Incorporated by reference to Exhibit 4.9 to the Company's Form 10-K filed on March 28, 2012 and incorporated herein by reference.

NEITHER THESE SECURITIES NOR THE SECURITIES FOR WHICH THESE SECURITIES ARE EXERCISABLE HAVE BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION OR THE SECURITIES COMMISSION OF ANY STATE IN RELIANCE UPON AN EXEMPTION FROM REGISTRATION UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), AND, ACCORDINGLY, MAY NOT BE OFFERED OR SOLD EXCEPT PURSUANT TO AN EFFECTIVE REGISTRATION STATEMENT UNDER THE SECURITIES ACT OR PURSUANT TO AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS.

RXI PHARMACEUTICALS CORPORATION

WARRANT

Warrant No. B- 1

Dated: January 29, 2009

RXi Pharmaceuticals Corporation, a Delaware corporation (the "*Company*"), hereby certifies that, for value received, Legend Securities, Inc. or its registered Permitted Transferees (together, the "*Holder*"), as registered owner of this warrant (the "*Warrant*"), is entitled to purchase from the Company up to a total of 142,500 shares (as adjusted from time to time as provided in Section 10) of Common Stock, at an exercise price equal to \$4.273 per share (as adjusted from time to time as provided in Section 10, the "*Exercise Price*"), upon such shares becoming Vested Shares, at any time and from time to time from and after the date of this Warrant (the "*Initial Exercise Date*") to and including January 29, 2014 (the "*Expiration Date*" and the period starting with the Initial Exercise Date and ending on the Expiration Date is referred to as the "*Term*"), and subject to the following terms and conditions:

1. Definitions. The capitalized terms used herein and not otherwise defined shall have the meanings set forth below:

"*Affiliate*" of any specified Person means any other person or entity directly or indirectly controlling, controlled by or under direct or indirect common control with such specified Person. For purposes of this definition, "*control*" means the power to direct the management and policies of such Person or firm, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise.

"*Commission*" means the United States Securities and Exchange Commission.

"*Common Stock*" means the common stock of the Company, \$0.0001 par value per share.

"*Eligible Market*" means any of the New York Stock Exchange, the American Stock Exchange or Nasdaq (as defined below), and any successor markets thereto.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended

“**Market Price**” shall mean (i) if the principal trading market for such securities is an exchange, the average of the last reported sale prices per share for the last ten previous Trading Days in which a sale was reported, as officially reported on any consolidated tape or (ii) if clause (i) is not applicable, the average of the closing bid price per share for the last ten previous Trading Days as set forth in the National Quotation Bureau sheet listing for such securities. Notwithstanding the foregoing, if there is no reported sales price or closing bid price, as the case may be, on any of the ten Trading Days preceding the event requiring a determination of Market Price hereunder, then the Market Price shall be determined in good faith after reasonable investigation by resolution of the Board of Directors of the Company.

“**Nasdaq**” means the Nasdaq Global Market or Nasdaq Capital Market, and any successor markets thereto.

“**Permitted Transferees**” means only Persons who are the directors, officers and employees of the Holder.

“**Person**” means any court or other federal, state, local or other governmental authority or other individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“**Trading Day**” means (a) any day on which the Common Stock is listed or quoted and traded on any Eligible Market or (b) if the Common Stock is not then quoted and traded on any Eligible Market, then a day on which trading occurs on the Nasdaq Global Market (or any successor thereto).

“**Vested Shares**” means Warrant Shares that have become vested as described in and pursuant to Section 4 hereunder.

“**Warrant Shares**” shall initially mean shares of Common Stock and in addition may include Other Securities and Substituted Property (as defined in Section 10(e)(x)) issued or issuable from time to time upon exercise of this Warrant.

2. Registration of Warrant. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the “**Warrant Register**”), in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes.

3. Registration of Transfers. The Company shall register the transfer of any portion of this Warrant in the Warrant Register, which transfer shall only be made to a Permitted Transferee and in accordance with applicable securities laws, upon surrender of this Warrant, with the Form of Assignment attached hereto as Appendix A duly completed and signed, to the Company at its address specified herein. Upon any such registration and transfer, a new warrant in substantially the form of a Warrant (any such new warrant, a “**New Warrant**”), evidencing the portion of this Warrant so transferred shall be issued to the Permitted Transferee and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the Permitted Transferee thereof shall be deemed the acceptance by such Permitted Transferee of all of the rights and obligations of a holder of a Warrant.

4. Vesting of Warrant Shares. The Warrant Shares issued hereunder shall vest completely and in favor of Legend in the following installments (the “**Installments**”) as described in this Section 4. The first Installment in the amount of 71,250 shares shall vest on the Effective Date, and each of the remaining Installments, each in the amount of 23,750 shares, shall vest on each monthly anniversary of the Effective Date following 90 days after the Effective Date unless the letter agreement between Legend Securities and the Company dated January 29, 2009 has not been terminated prior to each such date.

5. Exercise and Duration of Warrant.

(a) The Vested Shares under this Warrant shall be exercisable, either in its entirety or for a portion of the number of Vested Shares, by the registered Holder at any time and from time to time from and after the Initial Exercise Date to and including the Expiration Date. At 5:00 P.M. Boston, Massachusetts time on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value, and the Holder hereof shall have no right to purchase any additional Warrant Shares hereunder.

(b) A Holder may exercise this Warrant by delivering to the Company, in accordance with Section 13, this Warrant, together with (i) an exercise notice, in the form attached hereto as Appendix B (the “**Exercise Notice**”), appropriately completed and duly signed, and (ii) (A) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised pursuant to a Cash Exercise (as set forth in Section 5(c) below) or (B) if available pursuant to Section 5(d) below, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as set forth in Section 5(d) below), and the date such items are received by the Company is an “**Exercise Date**.” Execution and delivery of an Exercise Notice in respect of less than all of the Warrant Shares issuable upon exercise of this Warrant shall result in the cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

(c) *Cash Exercise*. In the event the Holder has elected to pay the Exercise Price in cash, it shall pay the Exercise Price by certified bank check payable to the order of the Company or by wire transfer of immediately available funds in accordance with the Company’s instructions (a “**Cash Exercise**”).

(d) *Cashless Exercise*. Notwithstanding anything contained herein to the contrary, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Exercise Price, elect instead to receive upon such exercise the “Net Number” of shares of Common Stock determined according to the following formula (a “*Cashless Exercise*”):

$$\text{Net Number} = \frac{(A * B) - (A * C)}{B}$$

For purposes of the foregoing formula,

A = the total number of shares with respect to which this Warrant is then being exercised.

B = the closing price per share of the Common Stock (as reported by Bloomberg) on the Trading Day immediately preceding the date of the Exercise Notice.

C = the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

(e) Except as otherwise provided for herein, this Warrant shall not entitle the Holder to any voting rights or other rights as a stockholder of the Company by virtue of the ownership hereof.

6. Delivery of Warrant Shares.

(a) Upon exercise of this Warrant, the Company shall promptly issue or cause to be issued and deliver or cause to be delivered to the Holder, in such name or names as the Holder may designate, a certificate for the Warrant Shares issuable upon such exercise (the “*Certificate*”) bearing no restrictive legends. The Holder, or any Person so designated by the Holder to receive the Warrant Shares, shall be deemed to have become holder of record of such Warrant Shares as of the Exercise Date.

(b) Neither these securities nor the securities for which these securities are exercisable have been registered with the Commission or the securities commission of any state in reliance upon an exemption from registration under the Securities Act of 1933 (the “*Securities Act*”), and, accordingly, may not be offered or sold except pursuant to an effective registration statement under the Securities Act or pursuant to an available exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and in accordance with applicable state securities laws. The Holder acknowledges and agrees that the Warrant may be sold only pursuant to an applicable exemption from the registration requirements of the Securities Act and that the Warrant Shares may only be sold pursuant to an effective registration statement under the Securities Act or in accordance with any applicable exemption from the registration requirements of the Securities Act.

(c) This Warrant is exercisable, either in its entirety or, from time to time, for a portion of the number of Warrant Shares. Upon surrender of this Warrant following one or more partial exercises, the Company shall issue or cause to be issued, at its expense, a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

7. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax which may be payable in respect of any transfer involved in the issue, delivery or registration of any certificates for Warrant Shares or Warrant in a name other than that of the Holder and that the Holder will be required to pay any tax with respect to cash received in lieu of fractional shares. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

8. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company, at the sole expense of the Holder (such expenses, if any imposed by the Company to be reasonable), shall issue or cause to be issued in exchange and substitution for and upon cancellation hereof, or in lieu of and in substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction and customary and reasonable indemnity, if requested by the Company.

9. Reservation of Warrant Shares. The Company covenants that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares which are then issuable and deliverable upon the exercise of this entire Warrant, free from all taxes, liens, claims, encumbrances with respect to the issuance of such Warrant Shares and will not be subject to any pre-emptive rights or similar rights (taking into account the adjustments and restrictions of Section 10 hereof). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued, fully paid and nonassessable. The Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed or quoted, as the case may be; *provided, however*, that such actions shall only require the Company's best efforts (or other specified standard) to the extent specifically provided for in this Warrant.

10. Certain Adjustments. The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this Section 10.

(a) *Stock Dividends*. If the Company, at any time while this Warrant is outstanding, pays a dividend on its Common Stock payable in additional shares of Common Stock or otherwise makes a distribution on any class of capital stock that is payable in shares of Common Stock, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the

numerator of which shall be the number of shares of Common Stock outstanding immediately prior to the opening of business on the day after the record date for the determination of stockholders entitled to receive such dividend or distribution and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after the distribution date of such dividend or distribution. Any adjustment made pursuant to this Section 10(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution; *provided, however*, that if following such record date the Company rescinds or modifies such dividend or distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such dividend or distribution) to take into account the effect of such rescinded or modified dividend or distribution on the Exercise Price pursuant to this Section 10(a).

(b) *Stock Splits*. If the Company, at any time while this Warrant is outstanding, (i) subdivides outstanding shares of Common Stock into a larger number of shares, or (ii) combines outstanding shares of Common Stock into a smaller number of shares, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment pursuant to this Section 10(b) shall become effective immediately after the effective date of such subdivision or combination.

(c) *Reclassifications*. A reclassification of the Common Stock (other than any such reclassification in connection with a merger or consolidation to which Section 10(e) applies) into shares of any other class of stock shall be deemed:

(i) a distribution by the Company to the holders of its Common Stock of such shares of such other class of stock for the purposes and within the meaning of this Section 10; and

(ii) if the outstanding shares of Common Stock shall be changed into a larger or smaller number of shares of Common Stock as part of such reclassification, such change shall be deemed a subdivision or combination, as the case may be, of the outstanding shares of Common Stock for the purposes and within the meaning of Section 10(b).

(d) *Other Distributions*. If the Company, at any time while this Warrant is outstanding, distributes to holders of Common Stock (i) evidences of its indebtedness, (ii) shares of any class of capital stock, (iii) rights or warrants to subscribe for or purchase any shares of any class of capital stock or (iv) any other asset, other than a distribution of Common Stock covered by Section 10(a), (in each case, “**Distributed Property**”), then in each such case the Exercise Price in effect immediately prior to the record date fixed for determination of stockholders entitled to receive such distribution (and the Exercise Price thereafter applicable) shall be adjusted (effective on and after such record date) to equal the product of such Exercise Price multiplied by a fraction, (A) the numerator of which shall be Market Price on such record date less the then fair market value of the Distributed Property distributed in respect of one outstanding share of Common Stock, which, if the Distributed Property is other than cash or marketable securities, shall be as determined in good faith by the Board of Directors of the Company whose determination shall be described in a board resolution, and (B) the denominator

of which shall be the Market Price on such record date; *provided, however*, that if following the record date for such distribution the Company rescinds or modifies such distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such distribution) to take into account the effect of such rescinded or modified distribution on the Exercise Price pursuant to this Section 10(d).

(e) *Fundamental Transactions*. If, at any time following the Initial Exercise Date, (i) the Company effects any merger or consolidation of the Company with or into another Person, (ii) the Company effects any sale of all or substantially all of its assets in one or a series of related transactions or (iii) there shall occur any merger of another Person into the Company whereby the Common Stock is cancelled, converted or reclassified into or exchanged for other securities, cash or property (in any such case, a “**Fundamental Transaction**”), then, as a condition to the consummation of such Fundamental Transaction, the Company shall (or, in the case of any Fundamental Transaction in which the Company is not the surviving entity, the Company shall take all reasonable steps to cause such other Person to) shall, at its election in its sole discretion:

(I) execute and deliver to the Holder of this Warrant a written instrument providing that:

(x) so long as this Warrant remains outstanding, upon the exercise hereof at any time on or after the consummation of such Fundamental Transaction and on such terms and subject to such conditions as shall be nearly equivalent as may be practicable to the provisions set forth in this Warrant, this Warrant shall be exercisable into, in lieu of Common Stock issuable upon such exercise prior to such consummation, the securities or other property (the “**Substituted Property**”) that would have been received in connection with such Fundamental Transaction by a holder of the number of shares of Common Stock into which this Warrant was exercisable immediately prior to such Fundamental Transaction, assuming such holder of Common Stock:

(A) is not a Person with which the Company consolidated or into which the Company merged or which merged into the Company or to which such sale or transfer was made, as the case may be (a “**Constituent Person**”), or an Affiliate of a Constituent Person; and

(B) failed to exercise such Holder’s rights of election, if any, as to the kind or amount of securities, cash and other property receivable in connection with such Fundamental Transaction (*provided, however*, that if the kind or amount of securities, cash or other property receivable in connection with such Fundamental Transaction is not the same for each share of Common Stock held immediately prior to such Fundamental Transaction by a Person other than a Constituent Person or an Affiliate thereof and in respect of which such rights of election shall not have been exercised (a “**Non-Electing Share**”), then, for the purposes of this Section 10(e), the kind and amount of securities, cash and other property receivable in connection with such Fundamental Transaction by each Non-Electing Share shall be deemed to be the kind and amount so receivable per share by a plurality of the Non-Electing Shares); and

(y) the rights and obligations of the Company (or, in the event of a transaction in which the Company is not the surviving Person, such other Person) and the Holder in respect of Substituted Property shall be as nearly equivalent as may be practicable to the rights and obligations of the Company and Holder in respect of Common Stock hereunder.

Such written instrument shall provide for adjustments which, for events subsequent to the effective date of such written instrument, shall be as nearly equivalent as may be practicable to the adjustments provided for in this Section 10. The above provisions of this Section 10(e) shall similarly apply to successive Fundamental Transactions, or

(II) cause to be delivered to the Holder, as soon as practicable following the closing of the Fundamental Transaction, the Substituted Property less such portion of the Substituted Property with a value (determined in good faith by the Board of Directors of the Company or the other Person in the Fundamental Transaction) equal to the aggregate Exercise Price of this Warrant.

(f) *Adjustment of Warrant Shares*. Simultaneously with any adjustment to the Exercise Price pursuant to paragraphs (a) through (d) of this Section 10, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price payable for the Warrant Shares immediately prior to such adjustment.

(g) *Calculations*. All calculations under this Section 10 shall be made to the nearest cent or the nearest 1/100th of a share, as applicable. The number of shares of Common Stock outstanding at any given time shall not include shares owned or held by or for the account of the Company, and the disposition of any such shares shall be considered an issue or sale of Common Stock.

(h) *Adjustments*. Notwithstanding any provision of this Section 10, no adjustment of the Exercise Price shall be required if such adjustment is less than \$0.01; *provided, however*, that any adjustments which by reason of this Section 10(h) are not required to be made shall be carried forward and taken into account for purposes of any subsequent adjustment required to be made hereunder.

(i) *Notice of Adjustments*. Upon the occurrence of each adjustment pursuant to this Section 10, the Company will promptly deliver to the Holder a certificate executed by the Company's Chief Financial Officer setting forth, in reasonable detail, the event requiring such adjustment and the method by which such adjustment was calculated, the adjusted Exercise Price and the adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable). The Company will retain at its office copies of all such certificates and cause the same to be available for inspection at said office during normal business hours by the Holder or any prospective purchaser of the Warrant designated by the Holder.

(j) *Notice of Corporate Events*. If the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary of the Company, (ii) authorizes, approves, enters into any agreement contemplating, or solicits stockholder approval for, any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the

Company, then the Company shall deliver to the Holder a notice describing the material terms and conditions of such transaction at least 10 calendar days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate in or vote with respect to such transaction, and the Company will take all steps reasonably necessary in order to ensure that the Holder is given the practical opportunity to exercise this Warrant prior to such time so as to participate in or vote with respect to such transaction; *provided*, *however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice.

11. Registration Rights .

(a) *General*. If at any time after the date hereof the Company proposes to register any of its Common Stock under the Securities Act in connection with the public offering of such securities for its own account or for the accounts of shareholders other than Holder, solely for cash on a form that would also permit the registration of the Warrant Shares, the Company shall, each such time, promptly give Holder written notice of such determination. Upon the written request of Holder given within fifteen (15) days after the giving of any such notice by the Company, the Company shall, subject to the limitations set forth in Section 11(e), use its best efforts to cause to be registered under the Securities Act all of the Warrant Shares that Holder has requested be registered; provided, that the Company shall have the right to postpone or withdraw any registration statement relating to an offering in which the Holder is eligible to participate under this Section 11 without any liability or obligation to the Holder under this Section 11 . For the avoidance of doubt, the Company shall not be obligated to effect any registration of Warrant Shares under this Section 11 incidental to the registration of any of its securities in connection with the Company's Registration Statement on Form S-1 filed by the Company in connection with the private placement of the Company's Common Stock in June of 2008.

(i) Other Contractual Obligations of the Company . Each exercise of all or part of the Warrant by the Holder pursuant to Section 5 herein shall serve as Holder's acknowledgment and acceptance that the Holder's rights under this Section 11 as to the Warrant Shares received as the result of such exercise are subject to the contractual obligations of the Company as of the Effective Date, including the Company's obligations to CytRx Corporation set out in the Contribution Agreement dated as of April 30, 2007 between CytRx Corporation and the Company, as amended on July 28, 2008.

(b) *Obligations of the Company* . Whenever required under this Section 11 to use its best efforts to effect the registration of any Warrant Shares, the Company shall, as expeditiously as reasonably possible:

(i) Prepare and file with the SEC a registration statement with respect to such Warrant Shares and use its best efforts to cause such registration statement to become effective, and, upon the request of the Holder, keep such registration statement effective for a period of up to one (1) year or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that (i) such one (1) year period shall be extended for a period of time equal to the period the Holder refrains from selling any securities included in such registration at the request of an underwriter of Common Stock (or other securities) of the

Company; and (ii) in the case of any registration of Warrant Shares on Form S-3 which are intended to be offered on a continuous or delayed basis, subject to compliance with applicable SEC rules, such one (1) year period shall be extended for up to ninety (90) days, if necessary, to keep the registration statement effective until all such Warrant Shares are sold.

(ii) Prepare and file with the SEC such amendments and supplements to such registration statement and the prospectus used in connection with such registration statement as may be necessary to comply with the provisions of the Securities Act with respect to the disposition of all securities covered by such registration statement.

(iii) Furnish to the Holder such numbers of copies of a prospectus, including a preliminary prospectus, in conformity with the requirements of the Securities Act, and such other documents as they may reasonably request in order to facilitate the disposition of such Warrant Shares owned by it.

(iv) Use its best efforts to register and qualify the securities covered by such registration statement under such other securities or Blue Sky laws of such jurisdictions as shall be reasonably appropriate for the distribution of the securities covered by the registration statement, provided that the Company shall not be required in connection therewith or as a condition thereto to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, and further provided that (anything in this Section 11 to the contrary notwithstanding with respect to the bearing of expenses) if any jurisdiction in which the securities shall be qualified shall require that expenses incurred in connection with the qualification of the securities in that jurisdiction be borne by shareholders, then such expenses shall be payable by the Holder to the extent required by such jurisdiction.

(v) Provide a transfer agent for the Common Stock no later than the effective date of the first registration of any Warrant Shares.

(vi) Otherwise use its best efforts to comply with all applicable rules and regulations of the SEC.

(vii) Use its best efforts to cause all such Warrant Shares to be listed on a national securities exchange (if such securities are not already so listed) and on each additional national securities exchange on which similar securities issued by the Company are then listed, if the listing of such securities is then permitted under the rules of such exchange.

(viii) Use every reasonable effort to prevent the issuance of any stop order suspending the effectiveness of such registration statement or of any order preventing or suspending the use of any preliminary prospectus and, if any such order is issued, to obtain the lifting thereof at the earliest reasonable time.

(c) *Furnish Information* . It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 11 with respect to the registration of any of the Holder's Warrant Shares that the Holder shall take such actions and furnish to the Company such information regarding itself, the Warrant Shares held by it, and the intended method of disposition of such securities, as the Company shall reasonably request and as shall be required in connection with any registration, qualification or compliance referred to in this agreement,

including, without limitation (i) in connection with an underwritten offering, enter into an appropriate underwriting agreement containing terms and provisions then customary in agreements of that nature, (ii) enter into such custody agreements, powers of attorney and related documents at such time and on such terms and conditions as may then be customarily required in connection with such offering and (iii) distribute the Warrant Shares only in accordance with and in the manner of the distribution contemplated by the applicable registration statement and prospectus. In addition, the Holder shall promptly notify the Company of any request by the Commission or any state securities commission or agency for additional information or for such registration statement or prospectus to be amended or supplemented.

(d) *Registration Expenses.* All expenses (excluding underwriters' discounts and commissions) incurred in connection with any registration pursuant to this Section 11 including, without limitation, any additional registration and qualification fees and any additional fees and disbursements of counsel to the Company that result from the inclusion of securities held by the Holder in such registration, shall be borne by the Company whether or not the registration statement to which such registration expenses relate becomes effective.

(e) *Underwriting Requirements .*

(i) In connection with any offering under this Section 11 involving an underwriting of shares being issued by the Company, the Company shall not be required to include any Warrant Shares in such underwriting unless the Holder accepts the terms of the underwriting as agreed upon between the Company and the underwriters selected by it, and then only in such quantity as will not, in the sole discretion of the underwriters, jeopardize the success of the offering by the Company. If the total amount of securities that the Holder requests to be included in an underwritten offering under this Section 11 exceeds the amount of securities that the underwriters reasonably believe compatible with the success of the offering, the Company may exclude some or all of the Warrant Shares from such registration and underwriting.

(ii) With respect to any underwritings of shares to be registered under this Section 11, the Company shall have the right to designate the managing underwriter or underwriters.

(f) *Delay of Registration .* The Holder shall not have any right to take any action to restrain, enjoin, or otherwise delay any registration as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 11.

(g) *Indemnification .* In the event any Warrant Shares are included in a registration statement under this Section 11 :

(i) To the extent permitted by law, in connection with any registration statement in which Warrant Shares are included, the Company will indemnify and hold harmless the Holder and its officers, directors and stockholders, legal counsel and accountants for the Holder, any underwriter (as defined in the Securities Act) for the Holder and each person, if any, who controls the Holder or underwriter within the meaning of the Securities Act or the 1934 Act, against any losses, claims, damages or liabilities, joint or several, to which they may become subject under the Securities Act or otherwise, insofar as such losses, claims, damages or

liabilities (or actions in respect thereof) arise out of or are based on (i) any untrue or alleged untrue statement of any material fact contained in such registration statement, including, without limitation, any prospectus or final prospectus contained therein or any amendments or supplements thereto, (ii) the omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading or (iii) any violation by the Company of any rule or regulation promulgated under the Securities Act applicable to the Company and relating to action or inaction required of the Company in connection with any such registration; and will promptly reimburse the Holder, and any underwriter, controlling person or other aforementioned person for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability, or action, provided, however, that the indemnity agreement contained in this Section 11(g)(i) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Company (which consent shall not be unreasonably withheld or delayed) nor shall the Company be liable to the Holder, or any underwriter, controlling person or other aforementioned person in any such case for any such loss, claim, damage, liability or action to the extent that it (i) arises out of or is based upon an untrue statement or alleged untrue statement or omission or alleged omission made in connection with such registration statement, preliminary prospectus, final prospectus, or amendments or supplements thereto, in reliance upon and in conformity with written information furnished to the Company expressly for use in connection with such registration by or on behalf of the Holder, or any underwriter, controlling person or other aforementioned person, (ii) is caused by the failure of the Holder to deliver a copy of the final prospectus relating to such Warrant Shares, as then amended or supplemented, in connection with a purchase, if the Company had previously furnished copies thereof to the Holder or (iii) is caused by the Holder's disposition of Warrant Shares during any period during which the Holder is obligated to discontinue any disposition of Warrant Shares under Section 11(j).

(ii) To the extent permitted by law, the Holder will indemnify and hold harmless the Company, each of its directors, each of its officers who has signed the registration statement, each person, if any, who controls the Company within the meaning of the Securities Act, and any underwriter (within the meaning of the Securities Act) for the Company against any losses, claims, damages or liabilities to which the Company or any such director, officer, controlling person or underwriter may become subject, under the Securities Act or otherwise, insofar as such losses, claims, damages or liabilities (or actions in respect thereto) arise out of or are based upon (i) any untrue statement or alleged untrue statement of any material fact contained in such registration statement, including any prospectus or final prospectus contained therein or any amendments or supplements thereto or (ii) the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with written information relating to and furnished to the Company by the Holder expressly for use in connection with such registration; and will promptly reimburse the Company or any such director, officer, controlling person or underwriter for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability or action; provided, however, that the indemnity agreement contained in this Section 11(g)(ii) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Holder

(which consent shall not be unreasonably withheld or delayed) and provided further that the Holder shall not have any liability under this Section 11(g)(ii) in excess of the net proceeds actually received by the Holder in the relevant public offering.

(iii) Promptly after receipt by an indemnified party under this Section 11(g) of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 11(g), notify the indemnifying party in writing of the commencement thereof and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly noticed, to assume the defense thereof with counsel mutually satisfactory to the parties. The failure to notify an indemnifying party promptly of the commencement of any such action, if prejudicial to his ability to defend such action, shall relieve such indemnifying party of any liability to the indemnified party under this Section 11(g), but the omission so to notify the indemnifying party will not relieve him of any liability that he may have to any indemnified party otherwise than under this Section 11(g).

(iv) If the indemnification provided for in this Section 11(g) is required by its terms but is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party under Section 11(g)(i) or Section 11(g)(ii) in respect of any losses, claims, damages, liabilities or expenses referred to herein, then each applicable indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of any losses, claims, damages, liabilities or expenses referred to herein in such proportion as is appropriate to reflect the relative fault of the Company and the Holder in connection with the statements or omissions described in such Section 11(g)(i) or Section 11(g)(ii) which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative fault of the Company and the Holder shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Holder and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in this Section 11(g), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 11(g)(iii) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 11(g)(iv); provided, however, that no additional notice shall be required with respect to any action for which notice has been given under Section 11(g)(iii) for purposes of indemnification. The Company and the Holder agree that it would not be just and equitable if contribution pursuant to this Section 11(g) were determined solely by pro rata allocation or by any other method of allocation which does not take account of the equitable considerations referred to in this paragraph. Notwithstanding the provisions of this Section 11(g)(iv), the Holder shall not be required to contribute an amount in excess of the net proceeds actually received by the Holder in the relevant public offering. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation.

(h) *Payment of Expenses* . The Company shall pay all reasonable expenses of the Holder (including the reasonable expenses of legal counsel for such Holder) incurred in connection with each registration of Warrant Shares requested pursuant to this Section 11, other than underwriting discount and commission, if any, and applicable transfer taxes, if any.

(i) *No Transfer of Registration Rights* . The registration rights and obligations of the Holder under this Exhibit with respect to any Warrant Shares may not be transferred to any third party other than any acquirer of all or substantially all of the assets or outstanding shares of stock of the Holder or any entity that merges with or into the Holder.

(j) *Future Events* . If the Holder is at the time participating in a registration of Warrant Shares requested pursuant to this Section 11, the Company will notify the Holder of the occurrence of any of the following events of which the Company is actually aware, and when so notified, the Holder will immediately discontinue any disposition of Warrant Shares until notified by the Company that such event is no longer applicable:

(i) the issuance by the Commission or any state securities commission or agency of any stop order suspending the effectiveness of the registration statement or the initiation of any proceedings for that purpose (in which case the Company will make reasonable efforts to obtain the withdrawal of any such order or the cessation of any such proceedings); or

(ii) the existence of any fact which makes untrue any material statement made in the registration statement or prospectus or any document incorporated therein by reference or which requires the making of any changes in the registration statement or prospectus or any document incorporated therein by reference in order to make the statements therein not misleading (in which case the Company will make reasonable efforts to amend the applicable document to correct the deficiency).

(k) *Termination of Rights*. The rights of the Holder pursuant to this Section 11 shall terminate and be of no further force and effect on the earlier of (i) the date that all Warrant Shares have been sold by the Holder or (ii) the date that all Warrant Shares may be sold in any three month period pursuant to Rule 144(b) promulgated under the Securities Act of 1933, as amended.

12. Fractional Shares . The Company shall not be required to issue or cause to be issued fractional Warrant Shares on the exercise of this Warrant. If any fraction of a Warrant Share would, except for the provisions of this Section 12, be issuable upon exercise of this Warrant, the Company shall make a cash payment to the Holder equal to (a) such fraction multiplied by (b) the Market Price on the Exercise Date of one full Warrant Share.

13. Remedies . The Company stipulates that the remedies at law of the Holder of this Warrant in the event of any default or threatened default by the Company in the performance of or compliance with any of the terms of this Warrant are not and will not be adequate, and that such terms may be specifically enforced by a decree for the specific performance of any agreement contained herein or by an injunction against a violation of any of the terms hereof or otherwise.

14. Notices. Any and all notices or other communications or deliveries hereunder (including without limitation any Exercise Notice) shall be in writing and shall be mailed by certified mail, return receipt requested, or by a nationally recognized courier service or delivered (in person or by facsimile), against receipt to the party to whom such notice or other communication is to be given. Any notice or other communication given by means permitted by this Section 14 shall be deemed given at the time of receipt thereof. The address for such notices or communications shall be as set forth below:

If to the Company: Tod Woolf
 Chief Executive Officer
 RXi Pharmaceuticals Corporation
 60 Prescott Street
 Worcester, Massachusetts 01605
 Fax: 508-767-3862

If to the Holder: Legend Securities, Inc.
 Attention: Salvatore C. Caruso
 39 Broadway Suite 740
 New York, NY 10006
 Phone: 212-344-5747
 Fax: 212-898-1224

Or such other address as is provided to such other party in accordance with this Section 14.

15. Warrant Agent. The Company shall serve as warrant agent under this Warrant. Upon a prompt written notice to the Holder, the Company may appoint a new warrant agent. Any Person into which any new warrant agent may be merged, any Person resulting from any consolidation to which any new warrant agent shall be a party or any Person to which any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

16. Miscellaneous.

(a) This Warrant may not be assigned by the Holder except to a Permitted Transferee. This Warrant may not be assigned by the Company, except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the parties hereto and their respective permitted successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder and their permitted successors and assigns.

(b) The Company will not, by amendment of its governing documents or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or

any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such action as may be necessary or appropriate in order to protect the rights of the Holder against impairment. Without limiting the generality of the foregoing, the Company (i) will not increase the par value of any Warrant Shares above the amount payable therefor upon exercise thereof, and (ii) will take all such action as may be reasonably necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares on the exercise of this Warrant, free from all taxes, liens, claims and encumbrances and (iii) will not close its shareholder books or records in any manner which interferes with the timely exercise of this Warrant.

(c) This Warrant shall be governed by and construed and enforced in accordance with the laws of the Commonwealth of Massachusetts. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and Federal courts sitting in the City of Boston, Massachusetts, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding that it is not personally subject to the jurisdiction of any such court or that such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Warrant and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. **THE PARTIES HEREBY WAIVE ALL RIGHTS TO A TRIAL BY JURY.**

(d) Neither party shall be deemed in default of any provision of this Warrant, to the extent that performance of its obligations or attempts to cure a breach hereof are delayed or prevented by any event reasonably beyond the control of such party, including, without limitation, war, hostilities, acts of terrorism, revolution, riot, civil commotion, national emergency, strike, lockout, unavailability of supplies, epidemic, fire, flood, earthquake, force of nature, explosion, embargo, or any other Act of God, or any law, proclamation, regulation, ordinance, or other act or order of any court, government or governmental agency, *provided* that such party gives the other party written notice thereof promptly upon discovery thereof and uses reasonable efforts to cure or mitigate the delay or failure to perform.

(e) The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(f) In case any one or more of the provisions of this Warrant shall be deemed invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby and the parties will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK,
SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

RXI PHARMACEUTICALS CORPORATION

By: /s/ Tod Woolf
Tod Woolf, CEO

Acknowledged and Agreed:

/s/ Salvatore C. Caruso

Salvatore C. Caruso

APPENDIX A

FORM OF ASSIGNMENT

(to be completed and signed only upon transfer of Warrant)

FOR VALUE RECEIVED, the undersigned hereby sells, assigns and transfers unto Legend Securities, Inc. the right represented by the within Warrant to purchase 142,500 shares of Common Stock of RXi Pharmaceuticals Corporation to which the within warrant relates and appoints _____ attorney to transfer said right on the books of RXi Pharmaceuticals Corporation with full power of substitution in the premises.

Dated: _____

(Signature must conform in all respects to name of Holder as specified on face of the Warrant)

Address of Transferee:

Legend Securities, Inc.

Attention: Salvatore C. Caruso

39 Broadway Street Suite 740

New York, NY 10006

In the presence of:

APPENDIX B

FORM OF EXERCISE NOTICE

(To be executed by the Holder to exercise the right to purchase shares of Common Stock under the foregoing Warrant)

To: RXi Pharmaceuticals Corporation

The undersigned is the Holder of Warrant No. [] (the "Warrant") issued by RXi Pharmaceuticals Corporation, a Delaware corporation (the "Company"). Capitalized terms used herein and not otherwise defined have the respective meanings set forth in the Warrant.

1. The Warrant is currently exercisable to purchase a total of _____ Warrant Shares.
2. The undersigned Holder hereby exercises its right to purchase _____ Warrant Shares pursuant to the Warrant.
3. The Holder intends that payment of the Exercise Price shall be made as:
 - a. A "Cash Exercise" with respect to _____ Warrant Shares; and/or
 - b. A "Cashless Exercise" with respect to _____ Warrant Shares.
4. In the event that the Holder has elected a Cash Exercise with respect to some or all of the Warrant Shares to be issued pursuant hereto, the Holder shall pay the sum of \$ _____ to the Company in accordance with the terms of the Warrant.
5. Pursuant to this exercise, the Company shall deliver to the Holder _____ Warrant Shares in accordance with the terms of the Warrant
6. Following this exercise, the Warrant shall be exercisable to purchase a total of _____ Warrant Shares.

Dated: _____

Name of Holder:

(Print) _____

By: _____

Title: _____

(Signature must conform in all respects to name of Holder as specified on face of the Warrant)

NEITHER THESE SECURITIES NOR THE SECURITIES FOR WHICH THESE SECURITIES ARE EXERCISABLE HAVE BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION OR THE SECURITIES COMMISSION OF ANY STATE IN RELIANCE UPON AN EXEMPTION FROM REGISTRATION UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), AND, ACCORDINGLY, MAY NOT BE OFFERED OR SOLD EXCEPT PURSUANT TO AN EFFECTIVE REGISTRATION STATEMENT UNDER THE SECURITIES ACT OR PURSUANT TO AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS.

RXI PHARMACEUTICALS CORPORATION

WARRANT

Warrant No. 2010-1

Effective Date: January 14, 2010

RXi Pharmaceuticals Corporation, a Delaware corporation (the "*Company*"), hereby certifies that, for value received, Legend Securities, Inc., or its registered Permitted Transferees (together, the "*Holder*"), as registered owner of this warrant (the "*Warrant*"), is entitled to purchase from the Company up to a total of 250,000 shares (as adjusted from time to time as provided in Section 10) of Common Stock, at an exercise price equal to \$5.66 per share (as adjusted from time to time as provided in Section 10, the "*Exercise Price*"), upon such shares becoming Vested Shares, at any time and from time to time from and after the date of this Warrant (the "*Initial Exercise Date*") to and including January 14, 2015 (the "*Expiration Date*" and the period starting with the Initial Exercise Date and ending on the Expiration Date is referred to as the "*Term*"), and subject to the following terms and conditions:

1. Definitions. The capitalized terms used herein and not otherwise defined shall have the meanings set forth below:

"*Affiliate*" of any specified Person means any other person or entity directly or indirectly controlling, controlled by or under direct or indirect common control with such specified Person. For purposes of this definition, "*control*" means the power to direct the management and policies of such Person or firm, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise.

"*Commission*" means the United States Securities and Exchange Commission.

"*Common Stock*" means the common stock of the Company, \$0.0001 par value per share.

"*Eligible Market*" means any of the New York Stock Exchange, the American Stock Exchange or Nasdaq (as defined below), and any successor markets thereto.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended

“**Market Price**” shall mean (i) if the principal trading market for such securities is an exchange, the average of the last reported sale prices per share for the last ten previous Trading Days in which a sale was reported, as officially reported on any consolidated tape or (ii) if clause (i) is not applicable, the average of the closing bid price per share for the last ten previous Trading Days as set forth in the National Quotation Bureau sheet listing for such securities. Notwithstanding the foregoing, if there is no reported sales price or closing bid price, as the case may be, on any of the ten Trading Days preceding the event requiring a determination of Market Price hereunder, then the Market Price shall be determined in good faith after reasonable investigation by resolution of the Board of Directors of the Company.

“**Nasdaq**” means the Nasdaq Global Market or Nasdaq Capital Market, and any successor markets thereto.

“**Permitted Transferees**” means only Persons who are the directors, officers and employees of the Holder.

“**Person**” means any court or other federal, state, local or other governmental authority or other individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“**Trading Day**” means (a) any day on which the Common Stock is listed or quoted and traded on any Eligible Market or (b) if the Common Stock is not then quoted and traded on any Eligible Market, then a day on which trading occurs on the Nasdaq Global Market (or any successor thereto).

“**Vested Shares**” means Warrant Shares that have become vested as described in and pursuant to Section 4 hereunder.

“**Warrant Shares**” shall initially mean shares of Common Stock and in addition may include Other Securities and Substituted Property (as defined in Section 10(e)(x)) issued or issuable from time to time upon exercise of this Warrant.

2. Registration of Warrant. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the “**Warrant Register**”), in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes.

3. Registration of Transfers. The Company shall register the transfer of any portion of this Warrant in the Warrant Register, which transfer shall only be made to a Permitted Transferee and in accordance with applicable securities laws, upon surrender of this Warrant, with the Form of Assignment attached hereto as Appendix A duly completed and signed, to the Company at its address specified herein. Upon any such registration and transfer, a new warrant in substantially the form of a Warrant (any such new warrant, a “**New Warrant**”), evidencing the portion of this Warrant so transferred shall be issued to the Permitted Transferee and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the Permitted Transferee thereof shall be deemed the acceptance by such Permitted Transferee of all of the rights and obligations of a holder of a Warrant.

4. Vesting of Warrant Shares. The Warrant Shares issued hereunder shall vest completely and in favor of Legend in the following installments (the “**Installments**”) as described in this Section 4. The first Installment in the amount of 62,500 shares shall vest on the Effective Date of the Investment Banking Agreement, and the three remaining Installments, each in the amount of 62,500 shares, shall vest on each quarterly anniversary of the Effective Date of the Investment Banking Agreement following unless the letter agreement between Legend Securities and the Company dated February 1, 2010 has been terminated prior to each such date.

5. Exercise and Duration of Warrant.

(a) The Vested Shares under this Warrant shall be exercisable, either in its entirety or for a portion of the number of Vested Shares, by the registered Holder at any time and from time to time from and after the Initial Exercise Date to and including the Expiration Date. At 5:00 P.M. Boston, Massachusetts time on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value, and the Holder hereof shall have no right to purchase any additional Warrant Shares hereunder.

(b) A Holder may exercise this Warrant by delivering to the Company, in accordance with Section 13, this Warrant, together with (i) an exercise notice, in the form attached hereto as Appendix B (the “**Exercise Notice**”), appropriately completed and duly signed, and (ii) (A) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised pursuant to a Cash Exercise (as set forth in Section 5(c) below) or (B) if available pursuant to Section 5(d) below, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as set forth in Section 5(d) below), and the date such items are received by the Company is an “**Exercise Date**.” Execution and delivery of an Exercise Notice in respect of less than all of the Warrant Shares issuable upon exercise of this Warrant shall result in the cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

(c) *Cash Exercise*. In the event the Holder has elected to pay the Exercise Price in cash, it shall pay the Exercise Price by certified bank check payable to the order of the Company or by wire transfer of immediately available funds in accordance with the Company’s instructions (a “**Cash Exercise**”).

(d) *Cashless Exercise* . Notwithstanding anything contained herein to the contrary, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Exercise Price, elect instead to receive upon such exercise the “Net Number” of shares of Common Stock determined according to the following formula (a “ *Cashless Exercise* ”):

$$Net\ Number = \frac{(A * B) - (A * C)}{B}$$

For purposes of the foregoing formula,

A = the total number of shares with respect to which this Warrant is then being exercised.

B = the closing price per share of the Common Stock (as reported by Bloomberg) on the Trading Day immediately preceding the date of the Exercise Notice.

C = the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

(e) Except as otherwise provided for herein, this Warrant shall not entitle the Holder to any voting rights or other rights as a stockholder of the Company by virtue of the ownership hereof.

6. Delivery of Warrant Shares .

(a) Upon exercise of this Warrant, the Company shall promptly issue or cause to be issued and deliver or cause to be delivered to the Holder, in such name or names as the Holder may designate, a certificate for the Warrant Shares issuable upon such exercise (the “ *Certificate* ”) bearing no restrictive legends. The Holder, or any Person so designated by the Holder to receive the Warrant Shares, shall be deemed to have become holder of record of such Warrant Shares as of the Exercise Date.

(b) Neither these securities nor the securities for which these securities are exercisable have been registered with the Commission or the securities commission of any state in reliance upon an exemption from registration under the Securities Act of 1933 (the “ *Securities Act* ”), and, accordingly, may not be offered or sold except pursuant to an effective registration statement under the Securities Act or pursuant to an available exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and in accordance with applicable state securities laws. The Holder acknowledges and agrees that the Warrant may be sold only pursuant to an applicable exemption from the registration requirements of the Securities Act and that the Warrant Shares may only be sold pursuant to an effective registration statement under the Securities Act or in accordance with any applicable exemption from the registration requirements of the Securities Act.

(c) This Warrant is exercisable, either in its entirety or, from time to time, for a portion of the number of Warrant Shares. Upon surrender of this Warrant following one or more partial exercises, the Company shall issue or cause to be issued, at its expense, a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

7. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax which may be payable in respect of any transfer involved in the issue, delivery or registration of any certificates for Warrant Shares or Warrant in a name other than that of the Holder and that the Holder will be required to pay any tax with respect to cash received in lieu of fractional shares. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

8. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company, at the sole expense of the Holder (such expenses, if any imposed by the Company to be reasonable), shall issue or cause to be issued in exchange and substitution for and upon cancellation hereof, or in lieu of and in substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction and customary and reasonable indemnity, if requested by the Company.

9. Reservation of Warrant Shares. The Company covenants that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares which are then issuable and deliverable upon the exercise of this entire Warrant, free from all taxes, liens, claims, encumbrances with respect to the issuance of such Warrant Shares and will not be subject to any pre-emptive rights or similar rights (taking into account the adjustments and restrictions of Section 10 hereof). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued, fully paid and nonassessable. The Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed or quoted, as the case may be; *provided, however*, that such actions shall only require the Company's best efforts (or other specified standard) to the extent specifically provided for in this Warrant.

10. Certain Adjustments. The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this Section 10.

(a) *Stock Dividends*. If the Company, at any time while this Warrant is outstanding, pays a dividend on its Common Stock payable in additional shares of Common Stock or otherwise makes a distribution on any class of capital stock that is payable in shares of Common Stock, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the

numerator of which shall be the number of shares of Common Stock outstanding immediately prior to the opening of business on the day after the record date for the determination of stockholders entitled to receive such dividend or distribution and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after the distribution date of such dividend or distribution. Any adjustment made pursuant to this Section 10(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution; *provided, however*, that if following such record date the Company rescinds or modifies such dividend or distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such dividend or distribution) to take into account the effect of such rescinded or modified dividend or distribution on the Exercise Price pursuant to this Section 10(a).

(b) *Stock Splits*. If the Company, at any time while this Warrant is outstanding, (i) subdivides outstanding shares of Common Stock into a larger number of shares, or (ii) combines outstanding shares of Common Stock into a smaller number of shares, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment pursuant to this Section 10(b) shall become effective immediately after the effective date of such subdivision or combination.

(c) *Reclassifications*. A reclassification of the Common Stock (other than any such reclassification in connection with a merger or consolidation to which Section 10(e) applies) into shares of any other class of stock shall be deemed:

(i) a distribution by the Company to the holders of its Common Stock of such shares of such other class of stock for the purposes and within the meaning of this Section 10; and

(ii) if the outstanding shares of Common Stock shall be changed into a larger or smaller number of shares of Common Stock as part of such reclassification, such change shall be deemed a subdivision or combination, as the case may be, of the outstanding shares of Common Stock for the purposes and within the meaning of Section 10(b).

(d) *Other Distributions*. If the Company, at any time while this Warrant is outstanding, distributes to holders of Common Stock (i) evidences of its indebtedness, (ii) shares of any class of capital stock, (iii) rights or warrants to subscribe for or purchase any shares of any class of capital stock or (iv) any other asset, other than a distribution of Common Stock covered by Section 10(a), (in each case, “**Distributed Property**”), then in each such case the Exercise Price in effect immediately prior to the record date fixed for determination of stockholders entitled to receive such distribution (and the Exercise Price thereafter applicable) shall be adjusted (effective on and after such record date) to equal the product of such Exercise Price multiplied by a fraction, (A) the numerator of which shall be Market Price on such record date less the then fair market value of the Distributed Property distributed in respect of one outstanding share of Common Stock, which, if the Distributed Property is other than cash or marketable securities, shall be as determined in good faith by the Board of Directors of the Company whose determination shall be described in a board resolution, and (B) the denominator

of which shall be the Market Price on such record date; *provided, however*, that if following the record date for such distribution the Company rescinds or modifies such distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such distribution) to take into account the effect of such rescinded or modified distribution on the Exercise Price pursuant to this Section 10(d).

(e) *Fundamental Transactions*. If, at any time following the Initial Exercise Date, (i) the Company effects any merger or consolidation of the Company with or into another Person, (ii) the Company effects any sale of all or substantially all of its assets in one or a series of related transactions or (iii) there shall occur any merger of another Person into the Company whereby the Common Stock is cancelled, converted or reclassified into or exchanged for other securities, cash or property (in any such case, a “**Fundamental Transaction**”), then, as a condition to the consummation of such Fundamental Transaction, the Company shall (or, in the case of any Fundamental Transaction in which the Company is not the surviving entity, the Company shall take all reasonable steps to cause such other Person to) shall, at its election in its sole discretion:

(I) execute and deliver to the Holder of this Warrant a written instrument providing that:

(x) so long as this Warrant remains outstanding, upon the exercise hereof at any time on or after the consummation of such Fundamental Transaction and on such terms and subject to such conditions as shall be nearly equivalent as may be practicable to the provisions set forth in this Warrant, this Warrant shall be exercisable into, in lieu of Common Stock issuable upon such exercise prior to such consummation, the securities or other property (the “**Substituted Property**”) that would have been received in connection with such Fundamental Transaction by a holder of the number of shares of Common Stock into which this Warrant was exercisable immediately prior to such Fundamental Transaction, assuming such holder of Common Stock:

(A) is not a Person with which the Company consolidated or into which the Company merged or which merged into the Company or to which such sale or transfer was made, as the case may be (a “**Constituent Person**”), or an Affiliate of a Constituent Person; and

(B) failed to exercise such Holder’s rights of election, if any, as to the kind or amount of securities, cash and other property receivable in connection with such Fundamental Transaction (*provided, however*, that if the kind or amount of securities, cash or other property receivable in connection with such Fundamental Transaction is not the same for each share of Common Stock held immediately prior to such Fundamental Transaction by a Person other than a Constituent Person or an Affiliate thereof and in respect of which such rights of election shall not have been exercised (a “**Non-Electing Share**”), then, for the purposes of this Section 10(e), the kind and amount of securities, cash and other property receivable in connection with such Fundamental Transaction by each Non-Electing Share shall be deemed to be the kind and amount so receivable per share by a plurality of the Non-Electing Shares); and

(y) the rights and obligations of the Company (or, in the event of a transaction in which the Company is not the surviving Person, such other Person) and the Holder in respect of Substituted Property shall be as nearly equivalent as may be practicable to the rights and obligations of the Company and Holder in respect of Common Stock hereunder.

Such written instrument shall provide for adjustments which, for events subsequent to the effective date of such written instrument, shall be as nearly equivalent as may be practicable to the adjustments provided for in this Section 10. The above provisions of this Section 10(e) shall similarly apply to successive Fundamental Transactions, or

(II) cause to be delivered to the Holder, as soon as practicable following the closing of the Fundamental Transaction, the Substituted Property less such portion of the Substituted Property with a value (determined in good faith by the Board of Directors of the Company or the other Person in the Fundamental Transaction) equal to the aggregate Exercise Price of this Warrant.

(f) *Adjustment of Warrant Shares.* Simultaneously with any adjustment to the Exercise Price pursuant to paragraphs (a) through (d) of this Section 10, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price payable for the Warrant Shares immediately prior to such adjustment.

(g) *Calculations.* All calculations under this Section 10 shall be made to the nearest cent or the nearest 1/100th of a share, as applicable. The number of shares of Common Stock outstanding at any given time shall not include shares owned or held by or for the account of the Company, and the disposition of any such shares shall be considered an issue or sale of Common Stock.

(h) *Adjustments.* Notwithstanding any provision of this Section 10, no adjustment of the Exercise Price shall be required if such adjustment is less than \$0.01; *provided, however*, that any adjustments which by reason of this Section 10(h) are not required to be made shall be carried forward and taken into account for purposes of any subsequent adjustment required to be made hereunder.

(i) *Notice of Adjustments.* Upon the occurrence of each adjustment pursuant to this Section 10, the Company will promptly deliver to the Holder a certificate executed by the Company's Chief Financial Officer setting forth, in reasonable detail, the event requiring such adjustment and the method by which such adjustment was calculated, the adjusted Exercise Price and the adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable). The Company will retain at its office copies of all such certificates and cause the same to be available for inspection at said office during normal business hours by the Holder or any prospective purchaser of the Warrant designated by the Holder.

(j) *Notice of Corporate Events.* If the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary of the Company, (ii) authorizes, approves, enters into any agreement contemplating, or solicits stockholder approval for, any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the

Company, then the Company shall deliver to the Holder a notice describing the material terms and conditions of such transaction at least 10 calendar days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate in or vote with respect to such transaction, and the Company will take all steps reasonably necessary in order to ensure that the Holder is given the practical opportunity to exercise this Warrant prior to such time so as to participate in or vote with respect to such transaction; *provided*, *however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice.

11. Registration Rights .

(a) *General*. If at any time after the date hereof the Company proposes to register any of its Common Stock under the Securities Act in connection with the public offering of such securities for its own account or for the accounts of shareholders other than Holder, solely for cash on a form that would also permit the registration of the Warrant Shares, the Company shall, each such time, promptly give Holder written notice of such determination. Upon the written request of Holder given within fifteen (15) days after the giving of any such notice by the Company, the Company shall, subject to the limitations set forth in Section 11(e), use its best efforts to cause to be registered under the Securities Act all of the Warrant Shares that Holder has requested be registered; provided, that the Company shall have the right to postpone or withdraw any registration statement relating to an offering in which the Holder is eligible to participate under this Section 11 without any liability or obligation to the Holder under this Section 11 . For the avoidance of doubt, the Company shall not be obligated to effect any registration of Warrant Shares under this Section 11 incidental to the registration of any of its securities in connection with the Company's Registration Statement on Form S-1 filed by the Company in connection with the private placement of the Company's Common Stock in June of 2008.

(i) Other Contractual Obligations of the Company . Each exercise of all or part of the Warrant by the Holder pursuant to Section 5 herein shall serve as Holder's acknowledgment and acceptance that the Holder's rights under this Section 11 as to the Warrant Shares received as the result of such exercise are subject to the contractual obligations of the Company as of the Effective Date, including the Company's obligations to CytRx Corporation set out in the Contribution Agreement dated as of April 30, 2007 between CytRx Corporation and the Company, as amended on July 28, 2008.

(b) *Obligations of the Company* . Whenever required under this Section 11 to use its best efforts to effect the registration of any Warrant Shares, the Company shall, as expeditiously as reasonably possible:

(i) Prepare and file with the SEC a registration statement with respect to such Warrant Shares and use its best efforts to cause such registration statement to become effective, and, upon the request of the Holder, keep such registration statement effective for a period of up to one (1) year or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that (i) such one (1) year period shall be extended for a period of time equal to the period the Holder refrains from selling any securities included in such registration at the request of an underwriter of Common Stock (or other securities) of the

Company; and (ii) in the case of any registration of Warrant Shares on Form S-3 which are intended to be offered on a continuous or delayed basis, subject to compliance with applicable SEC rules, such one (1) year period shall be extended for up to ninety (90) days, if necessary, to keep the registration statement effective until all such Warrant Shares are sold.

(ii) Prepare and file with the SEC such amendments and supplements to such registration statement and the prospectus used in connection with such registration statement as may be necessary to comply with the provisions of the Securities Act with respect to the disposition of all securities covered by such registration statement.

(iii) Furnish to the Holder such numbers of copies of a prospectus, including a preliminary prospectus, in conformity with the requirements of the Securities Act, and such other documents as they may reasonably request in order to facilitate the disposition of such Warrant Shares owned by it.

(iv) Use its best efforts to register and qualify the securities covered by such registration statement under such other securities or Blue Sky laws of such jurisdictions as shall be reasonably appropriate for the distribution of the securities covered by the registration statement, provided that the Company shall not be required in connection therewith or as a condition thereto to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, and further provided that (anything in this Section 11 to the contrary notwithstanding with respect to the bearing of expenses) if any jurisdiction in which the securities shall be qualified shall require that expenses incurred in connection with the qualification of the securities in that jurisdiction be borne by shareholders, then such expenses shall be payable by the Holder to the extent required by such jurisdiction.

(v) Provide a transfer agent for the Common Stock no later than the effective date of the first registration of any Warrant Shares.

(vi) Otherwise use its best efforts to comply with all applicable rules and regulations of the SEC.

(vii) Use its best efforts to cause all such Warrant Shares to be listed on a national securities exchange (if such securities are not already so listed) and on each additional national securities exchange on which similar securities issued by the Company are then listed, if the listing of such securities is then permitted under the rules of such exchange.

(viii) Use every reasonable effort to prevent the issuance of any stop order suspending the effectiveness of such registration statement or of any order preventing or suspending the use of any preliminary prospectus and, if any such order is issued, to obtain the lifting thereof at the earliest reasonable time.

(c) *Furnish Information* . It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 11 with respect to the registration of any of the Holder's Warrant Shares that the Holder shall take such actions and furnish to the Company such information regarding itself, the Warrant Shares held by it, and the intended method of disposition of such securities, as the Company shall reasonably request and as shall be required in connection with any registration, qualification or compliance referred to in this agreement,

including, without limitation (i) in connection with an underwritten offering, enter into an appropriate underwriting agreement containing terms and provisions then customary in agreements of that nature, (ii) enter into such custody agreements, powers of attorney and related documents at such time and on such terms and conditions as may then be customarily required in connection with such offering and (iii) distribute the Warrant Shares only in accordance with and in the manner of the distribution contemplated by the applicable registration statement and prospectus. In addition, the Holder shall promptly notify the Company of any request by the Commission or any state securities commission or agency for additional information or for such registration statement or prospectus to be amended or supplemented.

(d) *Registration Expenses.* All expenses (excluding underwriters' discounts and commissions) incurred in connection with any registration pursuant to this Section 11 including, without limitation, any additional registration and qualification fees and any additional fees and disbursements of counsel to the Company that result from the inclusion of securities held by the Holder in such registration, shall be borne by the Company whether or not the registration statement to which such registration expenses relate becomes effective.

(e) *Underwriting Requirements .*

(i) In connection with any offering under this Section 11 involving an underwriting of shares being issued by the Company, the Company shall not be required to include any Warrant Shares in such underwriting unless the Holder accepts the terms of the underwriting as agreed upon between the Company and the underwriters selected by it, and then only in such quantity as will not, in the sole discretion of the underwriters, jeopardize the success of the offering by the Company. If the total amount of securities that the Holder requests to be included in an underwritten offering under this Section 11 exceeds the amount of securities that the underwriters reasonably believe compatible with the success of the offering, the Company may exclude some or all of the Warrant Shares from such registration and underwriting.

(ii) With respect to any underwritings of shares to be registered under this Section 11, the Company shall have the right to designate the managing underwriter or underwriters.

(f) *Delay of Registration .* The Holder shall not have any right to take any action to restrain, enjoin, or otherwise delay any registration as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 11.

(g) *Indemnification .* In the event any Warrant Shares are included in a registration statement under this Section 11 :

(i) To the extent permitted by law, in connection with any registration statement in which Warrant Shares are included, the Company will indemnify and hold harmless the Holder and its officers, directors and stockholders, legal counsel and accountants for the Holder, any underwriter (as defined in the Securities Act) for the Holder and each person, if any, who controls the Holder or underwriter within the meaning of the Securities Act or the 1934 Act, against any losses, claims, damages or liabilities, joint or several, to which they may become subject under the Securities Act or otherwise, insofar as such losses, claims, damages or

liabilities (or actions in respect thereof) arise out of or are based on (i) any untrue or alleged untrue statement of any material fact contained in such registration statement, including, without limitation, any prospectus or final prospectus contained therein or any amendments or supplements thereto, (ii) the omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading or (iii) any violation by the Company of any rule or regulation promulgated under the Securities Act applicable to the Company and relating to action or inaction required of the Company in connection with any such registration; and will promptly reimburse the Holder, and any underwriter, controlling person or other aforementioned person for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability, or action, provided, however, that the indemnity agreement contained in this Section 11(g)(i) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Company (which consent shall not be unreasonably withheld or delayed) nor shall the Company be liable to the Holder, or any underwriter, controlling person or other aforementioned person in any such case for any such loss, claim, damage, liability or action to the extent that it (i) arises out of or is based upon an untrue statement or alleged untrue statement or omission or alleged omission made in connection with such registration statement, preliminary prospectus, final prospectus, or amendments or supplements thereto, in reliance upon and in conformity with written information furnished to the Company expressly for use in connection with such registration by or on behalf of the Holder, or any underwriter, controlling person or other aforementioned person, (ii) is caused by the failure of the Holder to deliver a copy of the final prospectus relating to such Warrant Shares, as then amended or supplemented, in connection with a purchase, if the Company had previously furnished copies thereof to the Holder or (iii) is caused by the Holder's disposition of Warrant Shares during any period during which the Holder is obligated to discontinue any disposition of Warrant Shares under Section 11(j).

(ii) To the extent permitted by law, the Holder will indemnify and hold harmless the Company, each of its directors, each of its officers who has signed the registration statement, each person, if any, who controls the Company within the meaning of the Securities Act, and any underwriter (within the meaning of the Securities Act) for the Company against any losses, claims, damages or liabilities to which the Company or any such director, officer, controlling person or underwriter may become subject, under the Securities Act or otherwise, insofar as such losses, claims, damages or liabilities (or actions in respect thereto) arise out of or are based upon (i) any untrue statement or alleged untrue statement of any material fact contained in such registration statement, including any prospectus or final prospectus contained therein or any amendments or supplements thereto or (ii) the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with written information relating to and furnished to the Company by the Holder expressly for use in connection with such registration; and will promptly reimburse the Company or any such director, officer, controlling person or underwriter for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability or action; provided, however, that the indemnity agreement contained in this Section 11(g)(ii) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Holder

(which consent shall not be unreasonably withheld or delayed) and provided further that the Holder shall not have any liability under this Section 11(g)(ii) in excess of the net proceeds actually received by the Holder in the relevant public offering.

(iii) Promptly after receipt by an indemnified party under this Section 11(g) of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 11(g), notify the indemnifying party in writing of the commencement thereof and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly noticed, to assume the defense thereof with counsel mutually satisfactory to the parties. The failure to notify an indemnifying party promptly of the commencement of any such action, if prejudicial to his ability to defend such action, shall relieve such indemnifying party of any liability to the indemnified party under this Section 11(g), but the omission so to notify the indemnifying party will not relieve him of any liability that he may have to any indemnified party otherwise than under this Section 11(g).

(iv) If the indemnification provided for in this Section 11(g) is required by its terms but is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party under Section 11(g)(i) or Section 11(g)(ii) in respect of any losses, claims, damages, liabilities or expenses referred to herein, then each applicable indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of any losses, claims, damages, liabilities or expenses referred to herein in such proportion as is appropriate to reflect the relative fault of the Company and the Holder in connection with the statements or omissions described in such Section 11(g)(i) or Section 11(g)(ii) which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative fault of the Company and the Holder shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Holder and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in this Section 11(g), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 11(g)(iii) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 11(g)(iv); provided, however, that no additional notice shall be required with respect to any action for which notice has been given under Section 11(g)(iii) for purposes of indemnification. The Company and the Holder agree that it would not be just and equitable if contribution pursuant to this Section 11(g) were determined solely by pro rata allocation or by any other method of allocation which does not take account of the equitable considerations referred to in this paragraph. Notwithstanding the provisions of this Section 11(g)(iv), the Holder shall not be required to contribute an amount in excess of the net proceeds actually received by the Holder in the relevant public offering. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation.

(h) *Payment of Expenses* . The Company shall pay all reasonable expenses of the Holder (including the reasonable expenses of legal counsel for such Holder) incurred in connection with each registration of Warrant Shares requested pursuant to this Section 11, other than underwriting discount and commission, if any, and applicable transfer taxes, if any.

(i) *No Transfer of Registration Rights* . The registration rights and obligations of the Holder under this Exhibit with respect to any Warrant Shares may not be transferred to any third party other than any acquirer of all or substantially all of the assets or outstanding shares of stock of the Holder or any entity that merges with or into the Holder.

(j) *Future Events* . If the Holder is at the time participating in a registration of Warrant Shares requested pursuant to this Section 11, the Company will notify the Holder of the occurrence of any of the following events of which the Company is actually aware, and when so notified, the Holder will immediately discontinue any disposition of Warrant Shares until notified by the Company that such event is no longer applicable:

(i) the issuance by the Commission or any state securities commission or agency of any stop order suspending the effectiveness of the registration statement or the initiation of any proceedings for that purpose (in which case the Company will make reasonable efforts to obtain the withdrawal of any such order or the cessation of any such proceedings); or

(ii) the existence of any fact which makes untrue any material statement made in the registration statement or prospectus or any document incorporated therein by reference or which requires the making of any changes in the registration statement or prospectus or any document incorporated therein by reference in order to make the statements therein not misleading (in which case the Company will make reasonable efforts to amend the applicable document to correct the deficiency).

(k) *Termination of Rights*. The rights of the Holder pursuant to this Section 11 shall terminate and be of no further force and effect on the earlier of (i) the date that all Warrant Shares have been sold by the Holder or (ii) the date that all Warrant Shares may be sold in any three month period pursuant to Rule 144(b) promulgated under the Securities Act of 1933, as amended.

12. Fractional Shares . The Company shall not be required to issue or cause to be issued fractional Warrant Shares on the exercise of this Warrant. If any fraction of a Warrant Share would, except for the provisions of this Section 12, be issuable upon exercise of this Warrant, the Company shall make a cash payment to the Holder equal to (a) such fraction multiplied by (b) the Market Price on the Exercise Date of one full Warrant Share.

13. Remedies . The Company stipulates that the remedies at law of the Holder of this Warrant in the event of any default or threatened default by the Company in the performance of or compliance with any of the terms of this Warrant are not and will not be adequate, and that such terms may be specifically enforced by a decree for the specific performance of any agreement contained herein or by an injunction against a violation of any of the terms hereof or otherwise.

14. Notices. Any and all notices or other communications or deliveries hereunder (including without limitation any Exercise Notice) shall be in writing and shall be mailed by certified mail, return receipt requested, or by a nationally recognized courier service or delivered (in person or by facsimile), against receipt to the party to whom such notice or other communication is to be given. Any notice or other communication given by means permitted by this Section 14 shall be deemed given at the time of receipt thereof. The address for such notices or communications shall be as set forth below:

If to the Company: Noah Beerman
Chief Executive Officer
RXi Pharmaceuticals Corporation
60 Prescott Street
Worcester, Massachusetts 01605
Fax: 508-767-3862

If to the Holder: Legend Securities, Inc.
Attention: Salvatore C. Caruso
39 Broadway Suite 740
New York, NY 10006
Phone: 212-344-5747 ext 231
Fax: 212-898-1224

Or such other address as is provided to such other party in accordance with this Section 14.

15. Warrant Agent. The Company shall serve as warrant agent under this Warrant. Upon a prompt written notice to the Holder, the Company may appoint a new warrant agent. Any Person into which any new warrant agent may be merged, any Person resulting from any consolidation to which any new warrant agent shall be a party or any Person to which any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

16. Miscellaneous.

(a) This Warrant may not be assigned by the Holder except to a Permitted Transferee. This Warrant may not be assigned by the Company, except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the parties hereto and their respective permitted successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder and their permitted successors and assigns.

(b) The Company will not, by amendment of its governing documents or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or

any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such action as may be necessary or appropriate in order to protect the rights of the Holder against impairment. Without limiting the generality of the foregoing, the Company (i) will not increase the par value of any Warrant Shares above the amount payable therefor upon exercise thereof, and (ii) will take all such action as may be reasonably necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares on the exercise of this Warrant, free from all taxes, liens, claims and encumbrances and (iii) will not close its shareholder books or records in any manner which interferes with the timely exercise of this Warrant.

(c) This Warrant shall be governed by and construed and enforced in accordance with the laws of the Commonwealth of Massachusetts. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and Federal courts sitting in the City of Boston, Massachusetts, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding that it is not personally subject to the jurisdiction of any such court or that such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Warrant and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. **THE PARTIES HEREBY WAIVE ALL RIGHTS TO A TRIAL BY JURY.**

(d) Neither party shall be deemed in default of any provision of this Warrant, to the extent that performance of its obligations or attempts to cure a breach hereof are delayed or prevented by any event reasonably beyond the control of such party, including, without limitation, war, hostilities, acts of terrorism, revolution, riot, civil commotion, national emergency, strike, lockout, unavailability of supplies, epidemic, fire, flood, earthquake, force of nature, explosion, embargo, or any other Act of God, or any law, proclamation, regulation, ordinance, or other act or order of any court, government or governmental agency, *provided* that such party gives the other party written notice thereof promptly upon discovery thereof and uses reasonable efforts to cure or mitigate the delay or failure to perform.

(e) The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(f) In case any one or more of the provisions of this Warrant shall be deemed invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby and the parties will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK,
SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

RXI PHARMACEUTICALS CORPORATION

By: /s/ Noah D. Beerman
Noah D. Beerman, President & CEO

Acknowledged and Agreed:

/s/ Salvatore C. Caruso
Salvatore C. Caruso, Legend Securities, Inc.

APPENDIX A

FORM OF ASSIGNMENT

(to be completed and signed only upon transfer of Warrant)

FOR VALUE RECEIVED, the undersigned hereby sells, assigns and transfers unto Legend Securities the right represented by the within Warrant to purchase 250,000 shares of Common Stock of RXi Pharmaceuticals Corporation to which the within warrant relates and appoints _____ attorney to transfer said right on the books of RXi Pharmaceuticals Corporation with full power of substitution in the premises.

Dated: _____

(Signature must conform in all respects to name of Holder as specified on face of the Warrant)

Address of Transferee:

Legend Securities, Inc.

Attention: Salvatore C. Caruso

39 Broadway, Suite 740

New York, NY 10006

In the presence of:

NEITHER THESE SECURITIES NOR THE SECURITIES FOR WHICH THESE SECURITIES ARE EXERCISABLE HAVE BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION OR THE SECURITIES COMMISSION OF ANY STATE IN RELIANCE UPON AN EXEMPTION FROM REGISTRATION UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), AND, ACCORDINGLY, MAY NOT BE OFFERED OR SOLD EXCEPT PURSUANT TO AN EFFECTIVE REGISTRATION STATEMENT UNDER THE SECURITIES ACT OR PURSUANT TO AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS.

RXi PHARMACEUTICALS CORPORATION

WARRANT

Warrant No. 2011-1

Effective Date: February 1, 2011

RXi Pharmaceuticals Corporation, a Delaware corporation (the "*Company*"), hereby certifies that, for value received, Legend Securities, Inc., or its registered Permitted Transferees (together, the "*Holder*"), as registered owner of this warrant (the "*Warrant*"), is entitled to purchase from the Company up to a total of 150,000 shares (as adjusted from time to time as provided in Section 10) of Common Stock, at an exercise price equal to \$2.10 per share (as adjusted from time to time as provided in Section 10, the "*Exercise Price*"), upon such shares becoming Vested Shares, at any time and from time to time from and after the date of this Warrant (the "*Initial Exercise Date*") to and including February 1, 2016 (the "*Expiration Date*" and the period starting with the Initial Exercise Date and ending on the Expiration Date is referred to as the "*Term*"), and subject to the following terms and conditions:

1. Definitions. The capitalized terms used herein and not otherwise defined shall have the meanings set forth below:

"*Affiliate*" of any specified Person means any other person or entity directly or indirectly controlling, controlled by or under direct or indirect common control with such specified Person. For purposes of this definition, "*control*" means the power to direct the management and policies of such Person or firm, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise.

"*Commission*" means the United States Securities and Exchange Commission.

"*Common Stock*" means the common stock of the Company, \$0.0001 par value per share.

"*Eligible Market*" means any of the New York Stock Exchange, the American Stock Exchange or Nasdaq (as defined below), and any successor markets thereto.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended

“**Market Price**” shall mean (i) if the principal trading market for such securities is an exchange, the average of the last reported sale prices per share for the last ten previous Trading Days in which a sale was reported, as officially reported on any consolidated tape or (ii) if clause (i) is not applicable, the average of the closing bid price per share for the last ten previous Trading Days as set forth in the National Quotation Bureau sheet listing for such securities. Notwithstanding the foregoing, if there is no reported sales price or closing bid price, as the case may be, on any of the ten Trading Days preceding the event requiring a determination of Market Price hereunder, then the Market Price shall be determined in good faith after reasonable investigation by resolution of the Board of Directors of the Company.

“**Nasdaq**” means the Nasdaq Global Market or Nasdaq Capital Market, and any successor markets thereto.

“**Permitted Transferees**” means only Persons who are the directors, officers and employees of the Holder.

“**Person**” means any court or other federal, state, local or other governmental authority or other individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“**Trading Day**” means (a) any day on which the Common Stock is listed or quoted and traded on any Eligible Market or (b) if the Common Stock is not then quoted and traded on any Eligible Market, then a day on which trading occurs on the Nasdaq Global Market (or any successor thereto).

“**Vested Shares**” means Warrant Shares that have become vested as described in and pursuant to Section 4 hereunder.

“**Warrant Shares**” shall initially mean shares of Common Stock and in addition may include Other Securities and Substituted Property (as defined in Section 10(e)(x)) issued or issuable from time to time upon exercise of this Warrant.

2. Registration of Warrant. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the “**Warrant Register**”), in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes.

3. Registration of Transfers. The Company shall register the transfer of any portion of this Warrant in the Warrant Register, which transfer shall only be made to a Permitted Transferee and in accordance with applicable securities laws, upon surrender of this Warrant, with the Form of Assignment attached hereto as Appendix A duly completed and signed, to the Company at its address specified herein. Upon any such registration and transfer, a new warrant in substantially the form of a Warrant (any such new warrant, a “**New Warrant**”), evidencing the portion of this Warrant so transferred shall be issued to the Permitted Transferee and a New Warrant evidencing the remaining portion of this Warrant not so transferred, if any, shall be issued to the transferring Holder. The acceptance of the New Warrant by the Permitted Transferee thereof shall be deemed the acceptance by such Permitted Transferee of all of the rights and obligations of a holder of a Warrant.

4. Vesting of Warrant Shares. The Warrant Shares issued hereunder shall vest completely and in favor of Legend in the following installments (the “**Installments**”) as described in this Section 4. The first Installment in the amount of 37,500 shares shall vest on the Effective Date of the Investment Banking Agreement, and the three remaining Installments, each in the amount of 37,500 shares, shall vest on each quarterly anniversary of the Effective Date of the Investment Banking Agreement following unless the letter agreement between Legend Securities and the Company dated February 1, 2011 has been terminated prior to each such date.

5. Exercise and Duration of Warrant.

(a) The Vested Shares under this Warrant shall be exercisable, either in its entirety or for a portion of the number of Vested Shares, by the registered Holder at any time and from time to time from and after the Initial Exercise Date to and including the Expiration Date. At 5:00 P.M. Boston, Massachusetts time on the Expiration Date, the portion of this Warrant not exercised prior thereto shall be and become void and of no value, and the Holder hereof shall have no right to purchase any additional Warrant Shares hereunder.

(b) A Holder may exercise this Warrant by delivering to the Company, in accordance with Section 13, this Warrant, together with (i) an exercise notice, in the form attached hereto as Appendix B (the “**Exercise Notice**”), appropriately completed and duly signed, and (ii) (A) payment of the Exercise Price for the number of Warrant Shares as to which this Warrant is being exercised pursuant to a Cash Exercise (as set forth in Section 5(c) below) or (B) if available pursuant to Section 5(d) below, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as set forth in Section 5(d) below), and the date such items are received by the Company is an “**Exercise Date**.” Execution and delivery of an Exercise Notice in respect of less than all of the Warrant Shares issuable upon exercise of this Warrant shall result in the cancellation of the original Warrant and issuance of a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

(c) *Cash Exercise*. In the event the Holder has elected to pay the Exercise Price in cash, it shall pay the Exercise Price by certified bank check payable to the order of the Company or by wire transfer of immediately available funds in accordance with the Company’s instructions (a “**Cash Exercise**”).

(d) *Cashless Exercise* . Notwithstanding anything contained herein to the contrary, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Exercise Price, elect instead to receive upon such exercise the “Net Number” of shares of Common Stock determined according to the following formula (a “*Cashless Exercise* ”):

$$Net\ Number = \frac{(A * B) - (A * C)}{B}$$

For purposes of the foregoing formula,

A = the total number of shares with respect to which this Warrant is then being exercised.

B = the closing price per share of the Common Stock (as reported by Bloomberg) on the Trading Day immediately preceding the date of the Exercise Notice.

C = the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

(e) Except as otherwise provided for herein, this Warrant shall not entitle the Holder to any voting rights or other rights as a stockholder of the Company by virtue of the ownership hereof.

6. Delivery of Warrant Shares .

(a) Upon exercise of this Warrant, the Company shall promptly issue or cause to be issued and deliver or cause to be delivered to the Holder, in such name or names as the Holder may designate, a certificate for the Warrant Shares issuable upon such exercise (the “*Certificate* ”) bearing no restrictive legends. The Holder, or any Person so designated by the Holder to receive the Warrant Shares, shall be deemed to have become holder of record of such Warrant Shares as of the Exercise Date.

(b) Neither these securities nor the securities for which these securities are exercisable have been registered with the Commission or the securities commission of any state in reliance upon an exemption from registration under the Securities Act of 1933 (the “*Securities Act* ”), and, accordingly, may not be offered or sold except pursuant to an effective registration statement under the Securities Act or pursuant to an available exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and in accordance with applicable state securities laws. The Holder acknowledges and agrees that the Warrant may be sold only pursuant to an applicable exemption from the registration requirements of the Securities Act and that the Warrant Shares may only be sold pursuant to an effective registration statement under the Securities Act or in accordance with any applicable exemption from the registration requirements of the Securities Act.

(c) This Warrant is exercisable, either in its entirety or, from time to time, for a portion of the number of Warrant Shares. Upon surrender of this Warrant following one or more partial exercises, the Company shall issue or cause to be issued, at its expense, a New Warrant evidencing the right to purchase the remaining number of Warrant Shares.

7. Charges, Taxes and Expenses. Issuance and delivery of certificates for shares of Common Stock upon exercise of this Warrant shall be made without charge to the Holder for any issue or transfer tax, transfer agent fee or other incidental tax or expense in respect of the issuance of such certificates, all of which taxes and expenses shall be paid by the Company; *provided, however*, that the Company shall not be required to pay any tax which may be payable in respect of any transfer involved in the issue, delivery or registration of any certificates for Warrant Shares or Warrant in a name other than that of the Holder and that the Holder will be required to pay any tax with respect to cash received in lieu of fractional shares. The Holder shall be responsible for all other tax liability that may arise as a result of holding or transferring this Warrant or receiving Warrant Shares upon exercise hereof.

8. Replacement of Warrant. If this Warrant is mutilated, lost, stolen or destroyed, the Company, at the sole expense of the Holder (such expenses, if any imposed by the Company to be reasonable), shall issue or cause to be issued in exchange and substitution for and upon cancellation hereof, or in lieu of and in substitution for this Warrant, a New Warrant, but only upon receipt of evidence reasonably satisfactory to the Company of such loss, theft or destruction and customary and reasonable indemnity, if requested by the Company.

9. Reservation of Warrant Shares. The Company covenants that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares which are then issuable and deliverable upon the exercise of this entire Warrant, free from all taxes, liens, claims, encumbrances with respect to the issuance of such Warrant Shares and will not be subject to any pre-emptive rights or similar rights (taking into account the adjustments and restrictions of Section 10 hereof). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued, fully paid and nonassessable. The Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed or quoted, as the case may be; *provided, however*, that such actions shall only require the Company's best efforts (or other specified standard) to the extent specifically provided for in this Warrant.

10. Certain Adjustments. The Exercise Price and number of Warrant Shares issuable upon exercise of this Warrant are subject to adjustment from time to time as set forth in this Section 10.

(a) *Stock Dividends*. If the Company, at any time while this Warrant is outstanding, pays a dividend on its Common Stock payable in additional shares of Common Stock or otherwise makes a distribution on any class of capital stock that is payable in shares of Common Stock, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the

numerator of which shall be the number of shares of Common Stock outstanding immediately prior to the opening of business on the day after the record date for the determination of stockholders entitled to receive such dividend or distribution and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after the distribution date of such dividend or distribution. Any adjustment made pursuant to this Section 10(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution; *provided, however*, that if following such record date the Company rescinds or modifies such dividend or distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such dividend or distribution) to take into account the effect of such rescinded or modified dividend or distribution on the Exercise Price pursuant to this Section 10(a).

(b) *Stock Splits*. If the Company, at any time while this Warrant is outstanding, (i) subdivides outstanding shares of Common Stock into a larger number of shares, or (ii) combines outstanding shares of Common Stock into a smaller number of shares, then in each such case the Exercise Price shall be multiplied by a fraction, (A) the numerator of which shall be the number of shares of Common Stock outstanding immediately before such event and (B) the denominator of which shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment pursuant to this Section 10(b) shall become effective immediately after the effective date of such subdivision or combination.

(c) *Reclassifications*. A reclassification of the Common Stock (other than any such reclassification in connection with a merger or consolidation to which Section 10(e) applies) into shares of any other class of stock shall be deemed:

(i) a distribution by the Company to the holders of its Common Stock of such shares of such other class of stock for the purposes and within the meaning of this Section 10; and

(ii) if the outstanding shares of Common Stock shall be changed into a larger or smaller number of shares of Common Stock as part of such reclassification, such change shall be deemed a subdivision or combination, as the case may be, of the outstanding shares of Common Stock for the purposes and within the meaning of Section 10(b).

(d) *Other Distributions*. If the Company, at any time while this Warrant is outstanding, distributes to holders of Common Stock (i) evidences of its indebtedness, (ii) shares of any class of capital stock, (iii) rights or warrants to subscribe for or purchase any shares of any class of capital stock or (iv) any other asset, other than a distribution of Common Stock covered by Section 10(a), (in each case, “**Distributed Property**”), then in each such case the Exercise Price in effect immediately prior to the record date fixed for determination of stockholders entitled to receive such distribution (and the Exercise Price thereafter applicable) shall be adjusted (effective on and after such record date) to equal the product of such Exercise Price multiplied by a fraction, (A) the numerator of which shall be Market Price on such record date less the then fair market value of the Distributed Property distributed in respect of one outstanding share of Common Stock, which, if the Distributed Property is other than cash or marketable securities, shall be as determined in good faith by the Board of Directors of the Company whose determination shall be described in a board resolution, and (B) the denominator

of which shall be the Market Price on such record date; *provided, however*, that if following the record date for such distribution the Company rescinds or modifies such distribution, the Exercise Price shall be appropriately adjusted (as of the date that the Company effectively rescinds or modifies such distribution) to take into account the effect of such rescinded or modified distribution on the Exercise Price pursuant to this Section 10(d).

(e) *Fundamental Transactions*. If, at any time following the Initial Exercise Date, (i) the Company effects any merger or consolidation of the Company with or into another Person, (ii) the Company effects any sale of all or substantially all of its assets in one or a series of related transactions or (iii) there shall occur any merger of another Person into the Company whereby the Common Stock is cancelled, converted or reclassified into or exchanged for other securities, cash or property (in any such case, a “**Fundamental Transaction**”), then, as a condition to the consummation of such Fundamental Transaction, the Company shall (or, in the case of any Fundamental Transaction in which the Company is not the surviving entity, the Company shall take all reasonable steps to cause such other Person to) shall, at its election in its sole discretion:

(I) execute and deliver to the Holder of this Warrant a written instrument providing that:

(x) so long as this Warrant remains outstanding, upon the exercise hereof at any time on or after the consummation of such Fundamental Transaction and on such terms and subject to such conditions as shall be nearly equivalent as may be practicable to the provisions set forth in this Warrant, this Warrant shall be exercisable into, in lieu of Common Stock issuable upon such exercise prior to such consummation, the securities or other property (the “**Substituted Property**”) that would have been received in connection with such Fundamental Transaction by a holder of the number of shares of Common Stock into which this Warrant was exercisable immediately prior to such Fundamental Transaction, assuming such holder of Common Stock:

(A) is not a Person with which the Company consolidated or into which the Company merged or which merged into the Company or to which such sale or transfer was made, as the case may be (a “**Constituent Person**”), or an Affiliate of a Constituent Person; and

(B) failed to exercise such Holder’s rights of election, if any, as to the kind or amount of securities, cash and other property receivable in connection with such Fundamental Transaction (*provided, however*, that if the kind or amount of securities, cash or other property receivable in connection with such Fundamental Transaction is not the same for each share of Common Stock held immediately prior to such Fundamental Transaction by a Person other than a Constituent Person or an Affiliate thereof and in respect of which such rights of election shall not have been exercised (a “**Non-Electing Share**”), then, for the purposes of this Section 10(e), the kind and amount of securities, cash and other property receivable in connection with such Fundamental Transaction by each Non-Electing Share shall be deemed to be the kind and amount so receivable per share by a plurality of the Non-Electing Shares); and

(y) the rights and obligations of the Company (or, in the event of a transaction in which the Company is not the surviving Person, such other Person) and the Holder in respect of Substituted Property shall be as nearly equivalent as may be practicable to the rights and obligations of the Company and Holder in respect of Common Stock hereunder.

Such written instrument shall provide for adjustments which, for events subsequent to the effective date of such written instrument, shall be as nearly equivalent as may be practicable to the adjustments provided for in this Section 10. The above provisions of this Section 10(e) shall similarly apply to successive Fundamental Transactions, or

(II) cause to be delivered to the Holder, as soon as practicable following the closing of the Fundamental Transaction, the Substituted Property less such portion of the Substituted Property with a value (determined in good faith by the Board of Directors of the Company or the other Person in the Fundamental Transaction) equal to the aggregate Exercise Price of this Warrant.

(f) *Adjustment of Warrant Shares*. Simultaneously with any adjustment to the Exercise Price pursuant to paragraphs (a) through (d) of this Section 10, the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased or decreased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the increased or decreased number of Warrant Shares shall be the same as the aggregate Exercise Price payable for the Warrant Shares immediately prior to such adjustment.

(g) *Calculations*. All calculations under this Section 10 shall be made to the nearest cent or the nearest 1/100th of a share, as applicable. The number of shares of Common Stock outstanding at any given time shall not include shares owned or held by or for the account of the Company, and the disposition of any such shares shall be considered an issue or sale of Common Stock.

(h) *Adjustments*. Notwithstanding any provision of this Section 10, no adjustment of the Exercise Price shall be required if such adjustment is less than \$0.01; *provided, however*, that any adjustments which by reason of this Section 10(h) are not required to be made shall be carried forward and taken into account for purposes of any subsequent adjustment required to be made hereunder.

(i) *Notice of Adjustments*. Upon the occurrence of each adjustment pursuant to this Section 10, the Company will promptly deliver to the Holder a certificate executed by the Company's Chief Financial Officer setting forth, in reasonable detail, the event requiring such adjustment and the method by which such adjustment was calculated, the adjusted Exercise Price and the adjusted number or type of Warrant Shares or other securities issuable upon exercise of this Warrant (as applicable). The Company will retain at its office copies of all such certificates and cause the same to be available for inspection at said office during normal business hours by the Holder or any prospective purchaser of the Warrant designated by the Holder.

(j) *Notice of Corporate Events*. If the Company (i) declares a dividend or any other distribution of cash, securities or other property in respect of its Common Stock, including, without limitation, any granting of rights or warrants to subscribe for or purchase any capital stock of the Company or any subsidiary of the Company, (ii) authorizes, approves, enters into any agreement contemplating, or solicits stockholder approval for, any Fundamental Transaction or (iii) authorizes the voluntary dissolution, liquidation or winding up of the affairs of the

Company, then the Company shall deliver to the Holder a notice describing the material terms and conditions of such transaction at least 10 calendar days prior to the applicable record or effective date on which a Person would need to hold Common Stock in order to participate in or vote with respect to such transaction, and the Company will take all steps reasonably necessary in order to ensure that the Holder is given the practical opportunity to exercise this Warrant prior to such time so as to participate in or vote with respect to such transaction; *provided*, *however*, that the failure to deliver such notice or any defect therein shall not affect the validity of the corporate action required to be described in such notice.

11. Registration Rights .

(a) *General* . If at any time after the date hereof the Company proposes to register any of its Common Stock under the Securities Act in connection with the public offering of such securities for its own account or for the accounts of shareholders other than Holder, solely for cash on a form that would also permit the registration of the Warrant Shares, the Company shall, each such time, promptly give Holder written notice of such determination. Upon the written request of Holder given within fifteen (15) days after the giving of any such notice by the Company, the Company shall, subject to the limitations set forth in Section 11(e), use its best efforts to cause to be registered under the Securities Act all of the Warrant Shares that Holder has requested be registered; provided, that the Company shall have the right to postpone or withdraw any registration statement relating to an offering in which the Holder is eligible to participate under this Section 11 without any liability or obligation to the Holder under this Section 11 . For the avoidance of doubt, the Company shall not be obligated to effect any registration of Warrant Shares under this Section 11 incidental to the registration of any of its securities in connection with the Company's Registration Statement on Form S-1 filed by the Company in connection with the private placement of the Company's Common Stock in June of 2008.

(i) Other Contractual Obligations of the Company . Each exercise of all or part of the Warrant by the Holder pursuant to Section 5 herein shall serve as Holder's acknowledgment and acceptance that the Holder's rights under this Section 11 as to the Warrant Shares received as the result of such exercise are subject to the contractual obligations of the Company as of the Effective Date, including the Company's obligations to CytRx Corporation set out in the Contribution Agreement dated as of April 30, 2007 between CytRx Corporation and the Company, as amended on July 28, 2008.

(b) *Obligations of the Company* . Whenever required under this Section 11 to use its best efforts to effect the registration of any Warrant Shares, the Company shall, as expeditiously as reasonably possible:

(i) Prepare and file with the SEC a registration statement with respect to such Warrant Shares and use its best efforts to cause such registration statement to become effective, and, upon the request of the Holder, keep such registration statement effective for a period of up to one (1) year or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that (i) such one (1) year period shall be extended for a period of time equal to the period the Holder refrains from selling any securities included in such registration at the request of an underwriter of Common Stock (or other securities) of the

Company; and (ii) in the case of any registration of Warrant Shares on Form S-3 which are intended to be offered on a continuous or delayed basis, subject to compliance with applicable SEC rules, such one (1) year period shall be extended for up to ninety (90) days, if necessary, to keep the registration statement effective until all such Warrant Shares are sold.

(ii) Prepare and file with the SEC such amendments and supplements to such registration statement and the prospectus used in connection with such registration statement as may be necessary to comply with the provisions of the Securities Act with respect to the disposition of all securities covered by such registration statement.

(iii) Furnish to the Holder such numbers of copies of a prospectus, including a preliminary prospectus, in conformity with the requirements of the Securities Act, and such other documents as they may reasonably request in order to facilitate the disposition of such Warrant Shares owned by it.

(iv) Use its best efforts to register and qualify the securities covered by such registration statement under such other securities or Blue Sky laws of such jurisdictions as shall be reasonably appropriate for the distribution of the securities covered by the registration statement, provided that the Company shall not be required in connection therewith or as a condition thereto to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, and further provided that (anything in this Section 11 to the contrary notwithstanding with respect to the bearing of expenses) if any jurisdiction in which the securities shall be qualified shall require that expenses incurred in connection with the qualification of the securities in that jurisdiction be borne by shareholders, then such expenses shall be payable by the Holder to the extent required by such jurisdiction.

(v) Provide a transfer agent for the Common Stock no later than the effective date of the first registration of any Warrant Shares.

(vi) Otherwise use its best efforts to comply with all applicable rules and regulations of the SEC.

(vii) Use its best efforts to cause all such Warrant Shares to be listed on a national securities exchange (if such securities are not already so listed) and on each additional national securities exchange on which similar securities issued by the Company are then listed, if the listing of such securities is then permitted under the rules of such exchange.

(viii) Use every reasonable effort to prevent the issuance of any stop order suspending the effectiveness of such registration statement or of any order preventing or suspending the use of any preliminary prospectus and, if any such order is issued, to obtain the lifting thereof at the earliest reasonable time.

(c) *Furnish Information* . It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 11 with respect to the registration of any of the Holder's Warrant Shares that the Holder shall take such actions and furnish to the Company such information regarding itself, the Warrant Shares held by it, and the intended method of disposition of such securities, as the Company shall reasonably request and as shall be required in connection with any registration, qualification or compliance referred to in this agreement,

including, without limitation (i) in connection with an underwritten offering, enter into an appropriate underwriting agreement containing terms and provisions then customary in agreements of that nature, (ii) enter into such custody agreements, powers of attorney and related documents at such time and on such terms and conditions as may then be customarily required in connection with such offering and (iii) distribute the Warrant Shares only in accordance with and in the manner of the distribution contemplated by the applicable registration statement and prospectus. In addition, the Holder shall promptly notify the Company of any request by the Commission or any state securities commission or agency for additional information or for such registration statement or prospectus to be amended or supplemented.

(d) *Registration Expenses.* All expenses (excluding underwriters' discounts and commissions) incurred in connection with any registration pursuant to this Section 11 including, without limitation, any additional registration and qualification fees and any additional fees and disbursements of counsel to the Company that result from the inclusion of securities held by the Holder in such registration, shall be borne by the Company whether or not the registration statement to which such registration expenses relate becomes effective.

(e) *Underwriting Requirements .*

(i) In connection with any offering under this Section 11 involving an underwriting of shares being issued by the Company, the Company shall not be required to include any Warrant Shares in such underwriting unless the Holder accepts the terms of the underwriting as agreed upon between the Company and the underwriters selected by it, and then only in such quantity as will not, in the sole discretion of the underwriters, jeopardize the success of the offering by the Company. If the total amount of securities that the Holder requests to be included in an underwritten offering under this Section 11 exceeds the amount of securities that the underwriters reasonably believe compatible with the success of the offering, the Company may exclude some or all of the Warrant Shares from such registration and underwriting.

(ii) With respect to any underwritings of shares to be registered under this Section 11, the Company shall have the right to designate the managing underwriter or underwriters.

(f) *Delay of Registration .* The Holder shall not have any right to take any action to restrain, enjoin, or otherwise delay any registration as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 11.

(g) *Indemnification .* In the event any Warrant Shares are included in a registration statement under this Section 11 :

(i) To the extent permitted by law, in connection with any registration statement in which Warrant Shares are included, the Company will indemnify and hold harmless the Holder and its officers, directors and stockholders, legal counsel and accountants for the Holder, any underwriter (as defined in the Securities Act) for the Holder and each person, if any, who controls the Holder or underwriter within the meaning of the Securities Act or the 1934 Act, against any losses, claims, damages or liabilities, joint or several, to which they may become subject under the Securities Act or otherwise, insofar as such losses, claims, damages or

liabilities (or actions in respect thereof) arise out of or are based on (i) any untrue or alleged untrue statement of any material fact contained in such registration statement, including, without limitation, any prospectus or final prospectus contained therein or any amendments or supplements thereto, (ii) the omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading or (iii) any violation by the Company of any rule or regulation promulgated under the Securities Act applicable to the Company and relating to action or inaction required of the Company in connection with any such registration; and will promptly reimburse the Holder, and any underwriter, controlling person or other aforementioned person for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability, or action, provided, however, that the indemnity agreement contained in this Section 11(g) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Company (which consent shall not be unreasonably withheld or delayed) nor shall the Company be liable to the Holder, or any underwriter, controlling person or other aforementioned person in any such case for any such loss, claim, damage, liability or action to the extent that it (i) arises out of or is based upon an untrue statement or alleged untrue statement or omission or alleged omission made in connection with such registration statement, preliminary prospectus, final prospectus, or amendments or supplements thereto, in reliance upon and in conformity with written information furnished to the Company expressly for use in connection with such registration by or on behalf of the Holder, or any underwriter, controlling person or other aforementioned person, (ii) is caused by the failure of the Holder to deliver a copy of the final prospectus relating to such Warrant Shares, as then amended or supplemented, in connection with a purchase, if the Company had previously furnished copies thereof to the Holder or (iii) is caused by the Holder's disposition of Warrant Shares during any period during which the Holder is obligated to discontinue any disposition of Warrant Shares under Section 11(j).

(ii) To the extent permitted by law, the Holder will indemnify and hold harmless the Company, each of its directors, each of its officers who has signed the registration statement, each person, if any, who controls the Company within the meaning of the Securities Act, and any underwriter (within the meaning of the Securities Act) for the Company against any losses, claims, damages or liabilities to which the Company or any such director, officer, controlling person or underwriter may become subject, under the Securities Act or otherwise, insofar as such losses, claims, damages or liabilities (or actions in respect thereto) arise out of or are based upon (i) any untrue statement or alleged untrue statement of any material fact contained in such registration statement, including any prospectus or final prospectus contained therein or any amendments or supplements thereto or (ii) the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with written information relating to and furnished to the Company by the Holder expressly for use in connection with such registration; and will promptly reimburse the Company or any such director, officer, controlling person or underwriter for any legal or other expenses reasonably incurred by them in connection with investigating or defending any such loss, claim, damage, liability or action; provided, however, that the indemnity agreement contained in this Section 11(g)(ii) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability or action if such settlement is effected without the consent of the Holder

(which consent shall not be unreasonably withheld or delayed) and provided further that the Holder shall not have any liability under this Section 11(g)(ii) in excess of the net proceeds actually received by the Holder in the relevant public offering.

(iii) Promptly after receipt by an indemnified party under this Section 11(g) of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 11(g), notify the indemnifying party in writing of the commencement thereof and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly noticed, to assume the defense thereof with counsel mutually satisfactory to the parties. The failure to notify an indemnifying party promptly of the commencement of any such action, if prejudicial to his ability to defend such action, shall relieve such indemnifying party of any liability to the indemnified party under this Section 11(g), but the omission so to notify the indemnifying party will not relieve him of any liability that he may have to any indemnified party otherwise than under this Section 11(g).

(iv) If the indemnification provided for in this Section 11(g) is required by its terms but is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party under Section 11(g)(i) or Section 11(g)(ii) in respect of any losses, claims, damages, liabilities or expenses referred to herein, then each applicable indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of any losses, claims, damages, liabilities or expenses referred to herein in such proportion as is appropriate to reflect the relative fault of the Company and the Holder in connection with the statements or omissions described in such Section 11(g)(i) or Section 11(g)(ii) which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative fault of the Company and the Holder shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Holder and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in this Section 11(g), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 11(g)(iii) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 11(g)(iv); provided, however, that no additional notice shall be required with respect to any action for which notice has been given under Section 11(g)(iii) for purposes of indemnification. The Company and the Holder agree that it would not be just and equitable if contribution pursuant to this Section 11(g) were determined solely by pro rata allocation or by any other method of allocation which does not take account of the equitable considerations referred to in this paragraph. Notwithstanding the provisions of this Section 11(g)(iv), the Holder shall not be required to contribute an amount in excess of the net proceeds actually received by the Holder in the relevant public offering. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation.

(h) *Payment of Expenses* . The Company shall pay all reasonable expenses of the Holder (including the reasonable expenses of legal counsel for such Holder) incurred in connection with each registration of Warrant Shares requested pursuant to this Section 11, other than underwriting discount and commission, if any, and applicable transfer taxes, if any.

(i) *No Transfer of Registration Rights* . The registration rights and obligations of the Holder under this Exhibit with respect to any Warrant Shares may not be transferred to any third party other than any acquirer of all or substantially all of the assets or outstanding shares of stock of the Holder or any entity that merges with or into the Holder.

(j) *Future Events* . If the Holder is at the time participating in a registration of Warrant Shares requested pursuant to this Section 11, the Company will notify the Holder of the occurrence of any of the following events of which the Company is actually aware, and when so notified, the Holder will immediately discontinue any disposition of Warrant Shares until notified by the Company that such event is no longer applicable:

(i) the issuance by the Commission or any state securities commission or agency of any stop order suspending the effectiveness of the registration statement or the initiation of any proceedings for that purpose (in which case the Company will make reasonable efforts to obtain the withdrawal of any such order or the cessation of any such proceedings); or

(ii) the existence of any fact which makes untrue any material statement made in the registration statement or prospectus or any document incorporated therein by reference or which requires the making of any changes in the registration statement or prospectus or any document incorporated therein by reference in order to make the statements therein not misleading (in which case the Company will make reasonable efforts to amend the applicable document to correct the deficiency).

(k) *Termination of Rights* . The rights of the Holder pursuant to this Section 11 shall terminate and be of no further force and effect on the earlier of (i) the date that all Warrant Shares have been sold by the Holder or (ii) the date that all Warrant Shares may be sold in any three month period pursuant to Rule 144(b) promulgated under the Securities Act of 1933, as amended.

12. Fractional Shares . The Company shall not be required to issue or cause to be issued fractional Warrant Shares on the exercise of this Warrant. If any fraction of a Warrant Share would, except for the provisions of this Section 12, be issuable upon exercise of this Warrant, the Company shall make a cash payment to the Holder equal to (a) such fraction multiplied by (b) the Market Price on the Exercise Date of one full Warrant Share.

13. Remedies . The Company stipulates that the remedies at law of the Holder of this Warrant in the event of any default or threatened default by the Company in the performance of or compliance with any of the terms of this Warrant are not and will not be adequate, and that such terms may be specifically enforced by a decree for the specific performance of any agreement contained herein or by an injunction against a violation of any of the terms hereof or otherwise.

14. Notices . Any and all notices or other communications or deliveries hereunder (including without limitation any Exercise Notice) shall be in writing and shall be mailed by

certified mail, return receipt requested, or by a nationally recognized courier service or delivered (in person or by facsimile), against receipt to the party to whom such notice or other communication is to be given. Any notice or other communication given by means permitted by this Section 14 shall be deemed given at the time of receipt thereof. The address for such notices or communications shall be as set forth below:

If to the Company: Mark J. Ahn
Chief Executive Officer
RXi Pharmaceuticals Corporation
60 Prescott Street
Worcester, Massachusetts 01605
Fax: 888-552-7581

If to the Holder: Legend Securities, Inc.
Attention: Salvatore C. Caruso
45 Broadway 32nd Floor
New York, NY 10006
Phone: 212-344-5747 ext 231
Fax: 212-898-1224

Or such other address as is provided to such other party in accordance with this Section 14.

15. Warrant Agent. The Company shall serve as warrant agent under this Warrant. Upon a prompt written notice to the Holder, the Company may appoint a new warrant agent. Any Person into which any new warrant agent may be merged, any Person resulting from any consolidation to which any new warrant agent shall be a party or any Person to which any new warrant agent transfers substantially all of its corporate trust or shareholders services business shall be a successor warrant agent under this Warrant without any further act. Any such successor warrant agent shall promptly cause notice of its succession as warrant agent to be mailed (by first class mail, postage prepaid) to the Holder at the Holder's last address as shown on the Warrant Register.

16. Miscellaneous.

(a) This Warrant may not be assigned by the Holder except to a Permitted Transferee. This Warrant may not be assigned by the Company, except to a successor in the event of a Fundamental Transaction. This Warrant shall be binding on and inure to the benefit of the parties hereto and their respective permitted successors and assigns. Subject to the preceding sentence, nothing in this Warrant shall be construed to give to any Person other than the Company and the Holder any legal or equitable right, remedy or cause of action under this Warrant. This Warrant may be amended only in writing signed by the Company and the Holder and their permitted successors and assigns.

(b) The Company will not, by amendment of its governing documents or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such

terms and in the taking of all such action as may be necessary or appropriate in order to protect the rights of the Holder against impairment. Without limiting the generality of the foregoing, the Company (i) will not increase the par value of any Warrant Shares above the amount payable therefor upon exercise thereof, and (ii) will take all such action as may be reasonably necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares on the exercise of this Warrant, free from all taxes, liens, claims and encumbrances and (iii) will not close its shareholder books or records in any manner which interferes with the timely exercise of this Warrant.

(c) This Warrant shall be governed by and construed and enforced in accordance with the laws of the Commonwealth of Massachusetts. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and Federal courts sitting in the City of Boston, Massachusetts, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding that it is not personally subject to the jurisdiction of any such court or that such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Warrant and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. **THE PARTIES HEREBY WAIVE ALL RIGHTS TO A TRIAL BY JURY.**

(d) Neither party shall be deemed in default of any provision of this Warrant, to the extent that performance of its obligations or attempts to cure a breach hereof are delayed or prevented by any event reasonably beyond the control of such party, including, without limitation, war, hostilities, acts of terrorism, revolution, riot, civil commotion, national emergency, strike, lockout, unavailability of supplies, epidemic, fire, flood, earthquake, force of nature, explosion, embargo, or any other Act of God, or any law, proclamation, regulation, ordinance, or other act or order of any court, government or governmental agency, *provided* that such party gives the other party written notice thereof promptly upon discovery thereof and uses reasonable efforts to cure or mitigate the delay or failure to perform.

(e) The headings herein are for convenience only, do not constitute a part of this Warrant and shall not be deemed to limit or affect any of the provisions hereof.

(f) In case any one or more of the provisions of this Warrant shall be deemed invalid or unenforceable in any respect, the validity and enforceability of the remaining terms and provisions of this Warrant shall not in any way be affected or impaired thereby and the parties will attempt in good faith to agree upon a valid and enforceable provision which shall be a commercially reasonable substitute therefor, and upon so agreeing, shall incorporate such substitute provision in this Warrant.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK,
SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Company has caused this Warrant to be duly executed by its authorized officer as of the date first indicated above.

RXI PHARMACEUTICALS CORPORATION

By: /s/ Mark J. Ahn

Mark J. Ahn, President & CEO

Acknowledged and Agreed:

/s/ Salvatore C. Caruso

Salvatore C. Caruso, Legend Securities, Inc.

APPENDIX A

FORM OF ASSIGNMENT

(to be completed and signed only upon transfer of Warrant)

FOR VALUE RECEIVED, the undersigned hereby sells, assigns and transfers unto Legend Securities the right represented by the within Warrant to purchase 150,000 shares of Common Stock of RXi Pharmaceuticals Corporation to which the within warrant relates and appoints _____ attorney to transfer said right on the books of RXi Pharmaceuticals Corporation with full power of substitution in the premises.

Dated: _____

(Signature must conform in all respects to name of Holder as specified on face of the Warrant)

Address of Transferee:

Legend Securities, Inc.

Attention: Salvatore C. Caruso

45 Broadway, 32nd Floor

New York, NY 10006

In the presence of:

APPENDIX B

NOTICE OF EXERCISE

TO: RXI PHARMACEUTICALS CORPORATION

(1) The undersigned hereby elects to purchase _____ Warrant Shares of the Company pursuant to the terms of the attached Warrant (only if exercised in full), and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

(2) Payment shall take the form of (check applicable box):

in lawful money of the United States; or

[if permitted] the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 2(c), to exercise this Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the cashless exercise procedure set forth in subsection 2(c).

(3) Please issue a certificate or certificates representing said Warrant Shares in the name of the undersigned or in such other name as is specified below:

The Warrant Shares shall be delivered to the following DWAC Account Number or by physical delivery of a certificate to:

[SIGNATURE OF HOLDER]

Name of Investing Entity: _____

Signature of Authorized Signatory of Investing Entity : _____

Name of Authorized Signatory: _____

Title of Authorized Signatory: _____

Date: _____

TroyGould PC
1801 Century Park East, 16th Floor
Los Angeles, California 90067

July 2, 2012

Galena Biopharma, Inc.
310 State Street
Lake Oswego, Oregon 97034

Ladies and Gentlemen:

We have acted as counsel to Galena Biopharma, Inc., a Delaware corporation (the “Company”), in connection with a Registration Statement on Form S-3 (the “Registration Statement”), to be filed with the Securities and Exchange Commission (the “Commission”) on or about the date of this opinion letter, and including a prospectus that forms a part of the Registration Statement (the “Prospectus”), covering the offering of an aggregate of up to 1,515,849 outstanding shares (the “Issued Shares”) of common stock of the Company, par value \$0.0001 per share (“Common Stock”), and an aggregate of up to 942,500 shares (the “Warrant Shares”) of Common Stock issuable upon exercise of outstanding warrants of the Company described therein (the “Warrants”), held by the selling security holders named in the Registration Statement. The Issued Shares and the Warrant Shares are collectively referred to herein as the “Shares.” This opinion letter is furnished to you at your request and in connection with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act of 1933, as amended (the “Securities Act”).

In connection with this opinion letter, we have examined and relied upon originals or copies of: (1) the Registration Statement, including the Prospectus; (2) the Company’s Amended and Restated Certificate of Incorporation; (3) the Company’s Amended and Restated Bylaws; (4) the forms of the Warrants, (5) resolutions of the Company’s Board of Directors pertaining to the Registration Statement, the Warrants, the Shares and related matters; and (6) such other documents, corporate records, and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. We have also reviewed such matters of law as we considered necessary or appropriate as a basis for the opinion expressed below.

With your permission, we have made and relied upon the following assumptions, without any independent investigation or inquiry by us, and our opinion expressed below is subject to, and limited and qualified by the effect of, such assumptions: (1) all corporate records furnished to us by the Company are accurate and complete; (2) the Registration Statement to be filed by the Company with the Commission will be identical to the form of the document that we have reviewed; (3) all statements as to factual matters that are contained in the Registration Statement (including the exhibits to the Registration Statement) and in the documents that are incorporated by reference into the Registration Statement are accurate and complete; and (4) with respect to documents that we reviewed in connection with this opinion letter, all documents submitted to us as originals are authentic, all documents submitted to us as certified, facsimile, or photostatic copies conform to the originals of documents, and such original documents are authentic; the signatures on all documents are genuine; and all natural persons who have executed any of the documents have the legal capacity to do so.

The law covered by our opinion expressed below is limited to the internal corporate laws of the State of Delaware. We neither express nor imply any opinion with respect to any other laws or the laws of any other jurisdiction. Although we are not admitted to practice law in the State of Delaware, we have made such review and inquiries as we consider necessary to render the opinion expressed below to the extent that it involves the laws of Delaware.

We undertake no, and hereby disclaim any, obligation to advise you of any change in any matter set forth herein, whether based on a change in laws, a change in any fact relating to the company, or any other circumstance. This opinion letter is limited to the matters expressly stated herein, and no opinions are to be inferred or may be implied beyond the opinion expressly set forth below. Without limiting the generality of the foregoing, we neither express nor imply any opinion regarding the contents of the Registration Statement or the Prospectus, other than as expressly stated below with respect to the Shares.

Based upon and subject to the foregoing, we are of the opinion that the Issued Shares are, and the Warrant Shares, when sold and issued upon exercise of the Warrants in accordance with the terms thereof, will be, validly issued, fully paid, and non-assessable.

Galena Biopharma, Inc.
July 2, 2012
Page 2 of 2

This opinion letter is rendered to you solely in connection with the transactions contemplated by the Registration Statement and may not be relied upon for any other purpose. We consent to the filing with the Commission of this opinion letter as Exhibit 5.1 to the Registration Statement and further consent to the reference made to us in the Prospectus under the caption "Legal Matters." In giving such consent, we do not thereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ TroyGould PC

TROYGOULD PC

Consent of Independent Registered Public Accounting Firm

Galena Biopharma, Inc.
310 N. State Street, Suite 208
Lake Oswego, Oregon 97034

Ladies and Gentlemen:

We hereby consent to the incorporation by reference in the Prospectus constituting a part of this Registration Statement of our report dated March 28, 2012, relating to the financial statements of Galena Biopharma, Inc., appearing in the Company's Annual Report on Form 10-K for the year ended December 31, 2011.

We also consent to the reference to us under the caption "Experts" in the Prospectus.

/s/ BDO USA, LLP
Boston, Massachusetts

June 29, 2012

Consent of Independent Auditors

We consent to the incorporation by reference in the Registration Statement on Form S-3 of Galena Biopharma, Inc. (formerly, RXi Pharmaceuticals Corporation and herein the “Company”) of our report dated April 11, 2011, related to the financial statements of Aphera, Inc. as of and for the years ended December 31, 2010 and 2009 and for the period from July 20, 2005 (date of inception) to December 31, 2010, appearing in Item 9.01 of the Current Report on Form 8-K/A of the Company dated April 14, 2011.

We also consent to the reference to us under the caption “Experts.”

/s/ Lohman Company, PLLC
Mesa, Arizona
July 2, 2012