

RXi Pharmaceuticals Corp
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Registration Nos. 333-227173 and 333-227617

PROSPECTUS

3,725,714 Units (each Unit consisting of one share of Common Stock and one Warrant to purchase one share of Common Stock)

17,702,858 Pre-funded Units (each Pre-funded Unit consisting of one Pre-funded Warrant to Purchase one share of Common Stock and one Warrant to purchase one share of Common Stock)

17,702,858 Shares of Common Stock Underlying the Pre-funded Warrants and

21,428,572 Shares of Common Stock Underlying the Warrants

We are offering 3,725,714 units (each unit consisting of one share of common stock and one warrant to purchase one share of our common stock) at a public offering price of \$0.70 per unit. Each warrant included in the units has a per share exercise price of \$0.70.

We are also offering to those purchasers whose purchase of units in this offering would result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding common stock following the consummation of this offering, the opportunity to purchase, in lieu of the number of units that would result in ownership in excess of 4.99% of our outstanding common stock, pre-funded units (each pre-funded unit consisting of one pre-funded warrant to purchase one share of our common stock and one warrant to purchase one share of our common stock) at a public offering price equal to the price per unit being sold to the public in this offering minus \$0.01. Each pre-funded warrant included in the pre-funded units will have a per share exercise price of \$0.01. The pre-funded warrants contained in the pre-funded units will be exercisable immediately and may be exercised at any time until the pre-funded warrants are exercised in full. Each warrant included in the pre-funded units

has a per share exercise price of \$0.70. The warrants to purchase one share of our common stock contained in the units and pre-funded units will be exercisable beginning on the date of issuance and will expire on the seventh anniversary of the date of issuance.

For each pre-funded unit we sell, the number of units we are offering will be decreased on a one-for-one basis. The units and pre-funded units have no stand-alone rights and will not be certificated or issued as stand-alone securities. The shares of common stock, pre-funded warrants and warrants comprising such units are immediately separable and will be issued separately in this offering.

Our common stock is listed on The Nasdaq Capital Market under the symbol "RXII". The closing price of our common stock on September 28, 2018, as reported by Nasdaq, was \$1.17 per share. We do not intend to apply for listing of the pre-funded warrants or the warrants on any securities exchange or other trading system.

There is no established public trading market for the pre-funded warrants or warrants, and we do not expect a market to develop. Without an active trading market, the liquidity of the pre-funded warrants and warrants will be limited.

You should read this prospectus, together with additional information described under the headings "Incorporation of Certain Information by Reference" and "Where You Can Find More Information," carefully before you invest in our securities.

Investing in our securities involves a high degree of risk. Before making any investment in these securities, you should consider carefully the risks and uncertainties described in the section entitled “Risk Factors” beginning on page 4 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense. The securities are not being offered in any jurisdiction where the offer is not permitted.

	Per Unit	Per Pre-Funded Unit	Total
Public offering price	\$0.7000	\$ 0.6900	\$ 15,000,000
Underwriting discount ⁽¹⁾	\$0.0525	\$ 0.0525	\$ 1,125,000
Proceeds, before expenses, to us	\$0.6475	\$ 0.6375	\$ 13,875,000

In addition, we have agreed to pay the underwriter a management fee in the amount of 1% of the aggregate offering price paid, to issue warrants to the underwriter in an amount equal to 7.5% of the aggregate number of shares underlying the units and pre-funded units, and to reimburse the underwriter for certain expenses. See ⁽¹⁾ “Underwriting” for additional information.

Sole Book-Running Manager

H.C. Wainwright & Co.

The date of this prospectus is October 1, 2018

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about this prospectus

We have not authorized anyone to provide you with information other than that contained or incorporated by referenced in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for and can provide no assurance as to the reliability of, any other information that others may give to you. We are offering to sell, and seeking offers to buy, securities only in jurisdictions where offers and sales are permitted. The information contained or incorporated by reference in this prospectus or any free writing prospectus is accurate only as of its date, regardless of its time of delivery or any sale of our securities. Our business, financial condition, results of operations, and prospects may have changed since that date.

This prospectus contains or incorporates by reference summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed or have been incorporated by reference as exhibits to the registration statement of which this prospectus forms a part, and you may obtain copies of those documents as described in this prospectus under the headings “Incorporation of Certain Information by Reference” and “Where you Can Find More Information.”

No action is being taken in any jurisdiction outside the United States to permit an offering of our securities or possession or distribution of this prospectus in that jurisdiction. Persons who come into possession of this prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus applicable to that jurisdiction.

Prospectus Summary

*The following summary highlights certain information contained elsewhere in this prospectus and the documents incorporated by reference herein. This summary provides an overview of selected information and does not contain all of the information you should consider in making your investment decision. Therefore, you should read the entire prospectus and the documents incorporated by reference herein carefully before investing in our securities. Investors should carefully consider the information set forth under “**Risk Factors**” beginning on page 4 of this prospectus and the financial statements and other information incorporated by reference in this prospectus. In this prospectus, unless otherwise noted, (1) the term “RXi” refers to RXi Pharmaceuticals Corporation and our subsidiary, MirImmune, LLC and (2) the terms “Company,” “we,” “us,” and “our” refer to the ongoing business operations of RXi and MirImmune, LLC, whether conducted through RXi or MirImmune, LLC.*

Overview

RXi Pharmaceuticals Corporation is a biotechnology company developing the next generation of immuno-oncology therapeutics based on its self-delivering RNAi (“**sd-rxRNA**”) therapeutic platform. The Company’s sd-rxRNA compounds do not require a delivery vehicle to penetrate the cell and are designed to “silence,” or down-regulate, the expression of a specific gene that may be over-expressed in a disease condition. We believe that this provides RXi with a distinct advantage in adoptive cell transfer therapy, the Company’s initial focus and approach to immuno-oncology.

Prior to RXi’s acquisition of MirImmune Inc. in January 2017, the Company’s principal activities consisted of the preclinical and clinical development of the Company’s sd-rxRNA compounds and topical immunotherapy agent in the areas of dermatology and ophthalmology. In January 2018, after a thorough review of its business operations, development programs and financial resources, the Company made a strategic decision to focus solely on immuno-oncology to accelerate growth and support a potential return on investment for its stockholders. The Company’s business strategy focuses on the development of immuno-oncology therapeutics utilizing our proprietary sd-rxRNA technology. The Company intends to seek a partner and/or out-licensee for each of its dermatology and ophthalmology franchises, including RXI-109 and Samcyprone™, to continue their development. The goal of any such transaction would be to allow the Company to monetize these preclinical and clinical assets to further fund ongoing and future development work in our immuno-oncology programs and extend our financial runway.

For additional information about the Company, please refer to other documents we have filed with the Securities and Exchange Commission and that are incorporated by reference into this prospectus, as listed under the heading “Incorporation of Certain Information by Reference.”

Corporate Information

RXi was incorporated in the state of Delaware in 2011. Our executive offices are located at 257 Simarano Drive, Suite 101, Marlborough, MA 01752, and our telephone number is (508) 767-3861. The Company's website address is <http://www.rxipharma.com>. Our website and the information contained on that site, or connected to that site, is not part of or incorporated by reference into this prospectus.

THE OFFERING

Units offered by us: 3,725,714 units consisting of one share of our common stock and one warrant to purchase one share of our common stock.

Pre-funded units offered by us: We are also offering to those purchasers whose purchase of units in this offering would result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding common stock following the consummation of this offering, the opportunity to purchase, in lieu of the number of units that would result in ownership in excess of 4.99% of our outstanding common stock, pre-funded units. Each pre-funded unit consists of one pre-funded warrant to purchase one share of our common stock and one warrant to purchase one share of our common stock. The purchase price of each pre-funded unit will equal the price per unit being sold to the public in this offering minus \$0.01. Each pre-funded warrant included in the pre-funded units will have a per share exercise price of \$0.01. The pre-funded warrants contained in the pre-funded units will be exercisable immediately and may be exercised at any time until the pre-funded warrants are exercised in full. This offering also relates to the shares of common stock issuable upon exercise of any pre-funded warrants contained in the pre-funded units sold in this offering. For each pre-funded unit we sell, the number of units we are offering will be decreased on a one-for-one basis. Because we will issue warrants as part of each unit or pre-funded unit, the number of warrants sold in this offering will not change as a result of a change in mix of the units and pre-funded units sold. We offered 17,702,858 pre-funded units in this offering.

Warrants offered by us: We are offering warrants to purchase 21,428,572 shares of our common stock. Each unit and pre-funded unit includes a warrant to purchase one share of our common stock. Each warrant included in the units and pre-funded units has a per share exercise price of \$0.70. The warrants will be exercisable beginning on the date of issuance and expire on the seventh anniversary of the date of issuance.

Offering price: The public offering price is \$0.70 per unit and \$0.69 per pre-funded unit.

Common stock outstanding after this offering: 25,789,138 shares assuming all of the pre-funded warrants issued in this offering are exercised and assuming none of the warrants issued in this offering are exercised⁽¹⁾⁽²⁾.

Use of proceeds: We estimate that the net proceeds from this offering will be approximately \$13.3 million, after deducting the underwriter discounts and commissions and estimated offering expenses payable by us. We intend to use substantially all of the net proceeds from this offering primarily towards the development of the Company's immuno-oncology program, for other research and development activities and for general working capital. See "Use of Proceeds" for a more complete description of the intended use of proceeds from this offering.

Risk factors: You should read the “Risk Factors” section beginning on page 4 of this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our securities.

Nasdaq Capital Market symbol: Our common stock is listed on The Nasdaq Capital Market under the symbol “RXII.” We do not intend to apply for listing of the pre-funded warrants or warrants on any securities exchange or nationally recognized trading system.

The number of shares of common stock to be outstanding after this offering is based on 4,360,566 shares of
(1) common stock outstanding as of June 30, 2018. The number of shares of our common stock to be outstanding after this offering excludes the following:

- 53,180 shares of common stock issuable upon the exercise of stock options outstanding, having a weighted average exercise price of \$181.63 per share;
- 2,616,283 shares of common stock issuable upon the exercise of warrants outstanding, having a weighted average exercise price of \$8.46 per share;
- An aggregate of 696,800 shares of common stock reserved for future issuance under our 2012 Long-Term Incentive Plan; and
- An aggregate of 448,872 shares of common stock reserved for future issuance under our Employee Stock Purchase Plan.

Except as otherwise indicated, the number of shares of common stock presented in this prospectus excludes: (i) no
(2) exercises of the 21,428,572 warrants issued in this offering and (ii) no exercises of the 1,607,143 warrants issued to the underwriter in connection with this offering.

RISK FACTORS

Investing in our securities involves a high degree of risk. Before investing in our securities, you should carefully consider the risks, uncertainties and assumptions described below, discussed under the heading “Risk Factors” included in our most recent Annual Report on Form 10-K for the year ended December 31, 2017, as revised or supplemented by subsequent filings, which are on file with the Securities and Exchange Commission and are incorporated herein by reference, and which may be amended, supplemented or superseded from time to time by other reports we file with the Securities and Exchange Commission in the future. Our business, financial condition, results of operations and future growth prospects could be materially and adversely affected by any of these risks. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment.

Risks Related to this Offering

We have broad discretion in how we use the net proceeds of this offering, and we may not use these proceeds effectively or in ways with which you agree.

Our management will have broad discretion as to the application of the net proceeds of this offering and could use them for purposes other than those contemplated at the time of this offering. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not increase the market price of our common stock.

The offering price was set by our Board of Directors and does not necessarily indicate the actual or market value of our common stock.

Our Board of Directors approved the offering price and other terms of this offering after considering, among other things: the number of shares authorized in our certificate of incorporation; the current market price of our common stock; trading prices of our common stock over time; the volatility of our common stock; our current financial condition and the prospects for our future cash flows; the availability of and likely cost of capital of other potential sources of capital; and market and economic conditions at the time of the offering. The offering price is not intended to bear any relationship to the book value of our assets or our past operations, cash flows, losses, financial condition, net worth or any other established criteria used to value securities. The offering price may not be indicative of the fair value of the common stock.

Because the public offering price of our common stock included in the units or issuable upon exercise of the warrants or pre-funded warrants is substantially higher than the net tangible book value per share of our outstanding common stock following this offering, new investors will experience immediate and substantial dilution.

The public offering price of our common stock included in the units or issuable upon exercise of the warrants or pre-funded warrants is substantially higher than the net tangible book value per share of our common stock immediately following this offering based on the total value of our tangible assets less our total liabilities. Therefore, if you purchase shares of our common stock, included in the units or issuable upon exercise of the warrants or pre-funded warrants in this offering, you will experience immediate and substantial dilution. See the section entitled “Dilution” beginning on page 8 of this prospectus for a more detailed discussion of the dilution you will incur if you purchase common stock in this offering.

There is no public market for the pre-funded warrants and warrants.

There is no established public trading market for the pre-funded warrants or the warrants in this offering, and we do not expect a market to develop. In addition, the pre-funded warrants and the warrants are not listed, and we do not intend to apply for listing of the pre-funded warrants and the warrants on any securities exchange or trading system. Without an active market, the liquidity of the pre-funded warrants and the warrants is limited, and investors may be unable to liquidate their investments in the pre-funded warrants and the warrants.

A pre-funded warrant or warrant does not entitle the holder to any rights as common stockholders until the holder exercises the pre-funded warrant or warrant for shares of our common stock.

Until you acquire shares of our common stock upon exercise of your pre-funded warrants or warrants, the pre-funded warrants or warrants will not provide you any rights as a common stockholder. Upon exercise of your pre-funded warrants or warrants, you will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs on or after the exercise date.

The pre-funded warrants and the warrants in this offering are speculative in nature.

Neither the pre-funded warrants nor the warrants in this offering confer any rights of common stock ownership on its holders, such as voting rights or the right to receive dividends, but rather merely represent the right to acquire shares of common stock at a fixed price, as the case may be, and, with respect to the warrants, during a fixed period of time. Specifically, commencing on the date of issuance, holders of the pre-funded warrants may exercise their right to acquire common stock and pay an exercise price of \$0.01 per share at any time until the pre-funded warrants are exercised in full. Commencing on the date of issuance, holders of the warrants may exercise their right to acquire common stock and pay an exercise price of \$0.70 per share of common stock. The warrants will be exercisable beginning on the date of issuance and expire on the seventh anniversary of the date of issuance.

Moreover, following this offering, the market value of the pre-funded warrants and the warrants, if any, is uncertain and there can be no assurance that the market value of the pre-funded warrants or the warrants will equal or exceed their imputed offering price. There can also be no assurance that the market price of the common stock will ever equal or exceed the exercise price of the warrants, and consequently, whether it will ever be profitable for holders of the warrants to exercise the warrants.

Cautionary Note Regarding Forward-Looking Statements

This prospectus contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements can be identified by words such as “intends,” “believes,” “anticipates,” “indicates,” “plans,” “expects,” “suggests,” “may,” “should,” “potential,” “designed to,” “will” and similar references, although not all forward-looking statements contain these words. Forward-looking statements are neither historical facts nor assurances of future performance. These statements are based only on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict and many of which are outside of our control. Risks that could cause actual results to vary from expected results expressed in our forward-looking statements include, but are not limited to:

- our ability to obtain sufficient financing to develop our product candidates;
 - expected ongoing significant research and development expenses without a current source of revenue, which may lead to uncertainty as to our ability to continue as a going concern;
 - dilution that could be caused by future financing transactions or future issuances of capital stock in strategic transactions;
- our strategic focus on immuno-oncology;
- the novel and unproven approach associated with our RNAi technology;
- our limited experience as a company in immuno-oncology;
 - identifying and developing product candidates, including whether we are able to commence clinical trials in humans or obtain approval for our product candidates;
 - our dependence on the success of our product candidates, which may not receive regulatory approval or be successfully commercialized;
 - factors could prevent us from obtaining regulatory approval or commercializing our product candidates on a timely basis, or at all;
- FDA regulation of our therapeutics;
- our reliance on in-licensed technologies and the potential need for additional intellectual property rights in the future;
- our ability protect our intellectual property rights and the adequacy of our intellectual property rights;
 - competitive risks, including the risks associated with competing against companies in the immuno-oncology space with significantly greater resources;
- our reliance on third parties for the manufacture of our clinical product candidates;
- potential product liability claims;
 - pricing regulations, third-party reimbursement practices or healthcare reform initiatives;
- our ability to attract, hire and retain qualified personnel;
- effectiveness of our internal control over financial reporting; and
- volatility of our common stock.

Our actual results and financial condition may differ materially from those indicated in the forward-looking statements as a result of the foregoing factors, as well as those identified in this prospectus under the heading “Risk Factors” and in

other filings the Company periodically makes with the Securities and Exchange Commission. Therefore, you should not rely unduly on any of these forward-looking statements. Forward-looking statements contained in this prospectus speak as of the date hereof and the Company does not undertake to update any of these forward-looking statements to reflect a change in its views or events or circumstances that occur after the date of this report.

Use of Proceeds

We estimate that the net proceeds to us from this offering will be approximately \$13.3 million, based on the public offering price of \$0.70 per unit of and \$0.69 per pre-funded unit, and the sale of 3,725,714 units and 17,702,858 pre-funded units in this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and including proceeds of \$0.01 per pre-funded unit warrant from the assumed exercise of all the pre-funded warrants issued pursuant to this offering and excluding the proceeds, if any, from the exercise of warrants issued pursuant to this offering.

These estimates exclude the proceeds, if any, from the exercise of warrants in this offering. If all of the warrants sold in this offering were to be exercised in cash at the exercise price of \$0.70 per unit, we would receive additional proceeds of approximately \$15 million. However, the warrants contain a cashless exercise provision that permit exercise of the warrants on a cashless basis at any time where there is no effective registration statement under the Securities Act covering the issuance of the underlying shares. We cannot predict when or if these warrants will be exercised or whether they will be exercised for cash. It is possible that these warrants may be exercised solely on a cashless basis.

We intend to use the net proceeds from this offering to fund the development of the Company's immuno-oncology program, for other research and development activities and for general working capital needs. We may also use a portion of the net proceeds to acquire or invest in complementary businesses, products and technologies or to fund the development of any such complementary businesses, products or technologies that we may acquire in a stock-based acquisition. We have no current plans for any such acquisitions.

Price Range of Common Stock

Our common stock is listed on The Nasdaq Capital Market under the symbol “RXII.” On January 8, 2018, we effected a 1-for-10 reverse stock split. The share prices in the table below are shown on a post-split basis. The following table shows the high and low per share sale prices of our common stock for the periods indicated:

	High	Low
2016		
First Quarter	\$39.97	\$26.00
Second Quarter	32.70	12.60
Third Quarter	26.70	17.04
Fourth Quarter	29.30	7.00
2017		
First Quarter	\$11.20	\$6.00
Second Quarter	8.50	5.10
Third Quarter	7.69	4.70
Fourth Quarter	7.70	3.20
2018		
First Quarter	\$6.76	\$2.51
Second Quarter	5.16	1.90
Third Quarter (through September 28, 2018)	2.36	1.12

On September 28, 2018, the last reported sale price of our common stock on The Nasdaq Capital Market was \$1.17 per share.

As of August 30, 2018, there were approximately 63 holders of record of our common stock. Because many of our shares are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of individual stockholders represented by these holders of record.

dividend policy

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

Dilution

Our net tangible book value as of June 30, 2018, was \$3.3 million, or \$0.75 per share of common stock. Net tangible book value per share represents total tangible assets less total liabilities, divided by the number of shares of common stock outstanding. After giving effect to our sale of 3,725,714 units at the offering price of \$0.70 per unit and the sale of 17,702,858 pre-funded units at a public offering price of \$0.69, and after deducting the underwriting fees and estimated offering expenses payable by us, assuming the exercise of all pre-funded warrants and including proceeds of \$0.01 per pre-funded warrant from the assumed exercise of all the pre-funded warrants issued pursuant to this offering and excluding any proceeds received upon exercise of warrants issued pursuant to this offering, our net tangible book value as of June 30, 2018, would have been \$16.6 million, or \$0.64 per share. This represents an immediate decrease in net tangible book value of \$0.11 per share to existing stockholders and an immediate dilution in net tangible book value of \$0.06 per share to purchasers of common stock in this offering.

The following table illustrates this per-share dilution:

Public offering price per share of common stock included in a unit	\$0.70
Net tangible book value per share as of June 30, 2018	\$0.75
Decrease per share attributable to this offering	\$(0.11)
As adjusted net tangible book value per share after giving effect to this offering	\$0.64
Dilution per share to investors in this offering	\$0.06

The number of shares of common stock outstanding used in the calculations above is based on 4,360,566 shares outstanding as of June 30, 2018, and excludes:

53,180 shares of common stock issuable upon the exercise of stock options outstanding, having a weighted average exercise price of \$181.63 per share;

2,616,283 shares of common stock issuable upon the exercise of warrants outstanding, having a weighted average exercise price of \$8.46 per share;

an aggregate of 696,800 shares of common stock reserved for future issuance under our 2012 Long-Term Incentive Plan; and

an aggregate of 448,872 shares of common stock reserved for future issuance under our Employee Stock Purchase Plan.

Except as otherwise indicated, the number of shares of common stock presented in this prospectus excludes: (i) no exercises of the 21,428,572 warrants issued in this offering and (ii) no exercises of the 1,607,143 warrants issued to the underwriter in connection with this offering.

Furthermore, we may choose to raise additional capital through the sale of equity or convertible debt securities due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. New investors will experience further dilution if any of our outstanding options or warrants are exercised, new options are issued and exercised under our equity incentive plans or we issue additional shares of common stock, other equity securities or convertible debt securities in the future.

Description of SECURITIES we are offering

Units

We are offering 3,725,714 units, with each unit consisting of one share of common stock and one warrant to purchase one share of our common stock. We are also offering to those purchasers, whose purchase of units in this offering would result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding common stock following the consummation of this offering, the opportunity to purchase, in lieu of units that would result in ownership in excess of 4.99% of our outstanding common stock, pre-funded units. Each pre-funded unit consists of one pre-funded warrant to purchase one share of common stock and one warrant to purchase one share of our common stock. For each pre-funded unit we sell, the number of units we are offering will be decreased on a one-for-one basis. The shares of common stock accompanying warrants included in each unit will be issued separately, and the pre-funded warrants to purchase one share of common stock and the accompanying warrants included in each pre-funded unit will be issued separately. Units or pre-funded units will not be issued or certificated. We are registering the shares of common stock included in the units and the shares of common stock issuable from time to time upon exercise of the pre-funded warrants included in the pre-funded units and the warrants included in the units and the pre-funded units offered hereby. We offered 17,702,858 pre-funded units in this offering.

Description of Warrants

The material terms and provisions of the warrants being issued in this offering are summarized below. The following description is subject to, and qualified in its entirety by, the form of warrant, which has been filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions set forth in the form of warrant.

Exercise Price. The initial exercise price is \$0.70 per share of common stock. The exercise price is subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock.

Exercisability. The warrants are exercisable at any time after the date of issuance, and at any time up to the date that is seven years from the date of issuance, at which time any unexercised warrants will expire and cease to be exercisable. The warrants will be exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and by payment in full in immediately available funds for the number of shares of common stock purchased upon such exercise. If a registration statement registering the issuance of the shares of common stock underlying the warrants under the Securities Act of 1933, as amended, is not then effective or available, the holder may only exercise the warrant through a cashless exercise, in whole or in part, in which case the holder would receive

upon such exercise the net number of shares of common stock determined according to the formula set forth in the warrant. No fractional shares of common stock will be issued in connection with the exercise of a warrant. In lieu of fractional shares, we will either pay the holder an amount in cash equal to the fractional amount multiplied by the exercise price or round up to the next whole share.

Exercise Limitation. A holder will not have the right to exercise any portion of the warrant if the holder (together with its affiliates) would beneficially own in excess of 4.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the warrant. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99%, provided that any increase in such percentage shall not be effective until 61 days after such notice to us.

Transferability. Subject to applicable laws, the warrants may not be offered for sale, sold, transferred or assigned without our consent. There is currently no trading market for the warrants and a trading market is not expected to develop.

Fundamental Transactions. In the event of a fundamental transaction, as described in the warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, or our consolidation or merger with or into another person, the holders of the warrants will instead be entitled to receive upon exercise of the warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the warrants immediately prior to such fundamental transaction. In addition, in certain circumstances, upon a fundamental transaction, the holder will have the right to require us to repurchase its common warrants at their fair value using the Black Scholes option pricing formula; provided, however, such holder may not require us or our successor entity to repurchase the common warrants for the Black Scholes value solely in connection with a fundamental transaction that is not approved by our board of directors, and therefore not within our control.

Exchange Listing. We do not plan to apply to list the warrants on The Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

Rights as a Stockholder. Except as otherwise provided in the warrants or by virtue of such holder's ownership of shares of our common stock, the holder of a warrant does not have the rights or privileges of a holder of our common stock, including any voting rights, until the holder exercises the warrant.

Description of Pre-Funded Warrants

The material terms and provisions of the pre-funded warrants being issued in this offering are summarized below. The following description is subject to, and qualified in its entirety by, the form of pre-funded warrant, which has been filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions set forth in the form of pre-funded warrant.

Purchasers whose purchase of units in this offering would result in the purchase, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding common stock following the consummation of this offering, may purchase, in lieu of the number of units that would result in ownership in excess of 4.99% of our outstanding common stock, pre-funded units (each pre-funded unit consisting of one pre-funded warrant to purchase one share of our common stock and one warrant to purchase one share of our common stock) at a public offering price equal to the price per unit being sold to the public in this offering minus \$0.01. Each pre-funded warrant included in the pre-funded units will have a per share exercise price of \$0.01. Thus, the purchaser is essentially paying the purchase price for a unit at closing of the offering, but is not deemed to beneficially own the shares of common stock included in the units until the purchaser exercises the pre-funded warrant. Once purchased, the purchase price of the pre-funded warrants is not refundable. While the pre-funded warrants permit waiver of provisions by us and the holder of the pre-funded warrants, this would not affect the pre-funding as that is the purchase price of the instrument which is paid at the time of closing and becomes part of our proceeds received from this offering. In addition, the pre-funded warrants are perpetual and do not have an expiration date.

Exercise Price. The initial exercise price is \$0.01 per share of common stock. The exercise price is subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock.

Exercisability. The pre-funded warrants will be immediately exercisable and may be exercised at any time until the pre-funded warrants are exercised in full. The pre-funded warrants will be exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and by payment in full in immediately available funds for the number of shares of common stock purchased upon such exercise. If a registration statement registering

the issuance of the shares of common stock underlying the pre-funded warrants under the Securities Act of 1933, as amended, is not then effective or available, the holder may only exercise the pre-funded warrant through a cashless exercise, in whole or in part, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the pre-funded warrant. No fractional shares of common stock will be issued in connection with the exercise of a pre-funded warrant. In lieu of fractional shares, we will either pay the holder an amount in cash equal to the fractional amount multiplied by the exercise price or round up to the next whole share.

Exercise Limitation. A holder will not have the right to exercise any portion of the pre-funded warrant if the holder (together with its affiliates) would beneficially own in excess of 4.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrants. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99%, provided that any increase in such percentage shall not be effective until 61 days after such notice to us.

Transferability. Subject to applicable laws, the pre-funded warrants may not be offered for sale, sold, transferred or assigned without our consent. There is currently no trading market for the pre-funded warrants and a trading market is not expected to develop.

Fundamental Transactions. In the event of a fundamental transaction, as described in the pre-funded warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, or our consolidation or merger with or into another person, the holders of the pre-funded warrants will instead be entitled to receive upon exercise of the pre-funded warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the pre-funded warrants immediately prior to such fundamental transaction.

Exchange Listing. We do not plan to apply to list the pre-funded warrants on The Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

Rights as a Stockholder. Except as otherwise provided in the pre-funded warrants or by virtue of such holder's ownership of shares of our common stock, the holder of a pre-funded warrant does not have the rights or privileges of a holder of our common stock, including any voting rights, until the holder exercises the pre-funded warrant.

Underwriting

We have entered into an underwriting agreement dated October 1, 2018, with H.C. Wainwright & Co., LLC as the underwriter of this offering. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriter and the underwriter has agreed to purchase from us, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, 3,725,714 units and 17,702,858 pre-funded units. The public offering price shown on the cover page of this prospectus was determined by negotiation between us and the underwriter at the time of pricing and may be at a discount to the current market price.

A copy of the underwriting agreement has been filed as an exhibit to the registration statement of which this prospectus is part. The securities we are offering are being offered by the underwriter subject to certain conditions specified in the underwriting agreement.

We have been advised by the underwriter that it proposes to offer the securities directly to the public at the public offering price set forth on the cover page of this prospectus. Any securities sold by the underwriter to securities dealers will be sold at the public offering price less a selling concession not in excess of \$0.0315 per unit or pre-funded unit.

The underwriting agreement provides that the underwriter's obligation to purchase the securities we are offering is subject to conditions contained in the underwriting agreement. The underwriter is obligated to purchase and pay for all of the securities offered by this prospectus.

No action has been taken by us or the underwriter that would permit a public offering of our securities in any jurisdiction where action for that purpose is required. None of our securities included in this offering may be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sales of any of the securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons who receive this prospectus are advised to inform themselves about and to observe any restrictions relating to this offering of the securities and the distribution of this prospectus. This prospectus is neither an offer to sell nor a solicitation of any offer to buy the securities in any jurisdiction where that would not be permitted or legal.

The underwriter has advised us that it does not intend to confirm sales to any accounts over which it exercises discretionary authority.

Underwriting Discount, Commissions and Expenses

We have agreed to pay an underwriter discount of 7.5% of the aggregate gross proceeds raised in this offering.

The following table summarizes the public offering price, underwriting discounts and commissions and proceeds, before expenses to us.

	Per Unit	Per Pre-Funded Unit	Total
Public offering price	\$0.7000	\$ 0.6900	\$15,000,000
Underwriting discounts and commissions	\$0.0525	\$ 0.0525	\$1,125,000
Proceeds, before expenses, to us	\$0.6475	\$ 0.6375	\$13,875,000

We estimate the total expenses payable by us for this offering to be approximately \$1,700,000, which amount includes (i) the underwriting discounts and commissions of \$1,125,000 based upon the public offering price of \$0.70 per unit and \$0.69 per pre-funded unit, (ii) a management fee in the amount of \$150,000 which represents 1.0% of the aggregate offering price, (iii) a \$40,000 non-accountable expense allowance payable to the underwriter, (iv) reimbursement of the accountable expenses of the underwriter equal to \$100,000, including the legal fees of the underwriter being paid by us, and (v) other estimated expenses of approximately \$290,000 which includes legal, accounting, printing costs and various fees associated with the registration and listing of our shares.

Underwriter Warrants

We have agreed to issue to the underwriter warrants to purchase 1,607,143 shares of our common stock. The underwriter warrants will have a term of five years from the effective date of the registration statement and an exercise price per share equal to \$0.875. Pursuant to FINRA Rule 5110(g), the underwriter warrants and any shares issued upon exercise of the underwriter warrants shall not be sold, transferred, assigned, pledged, or hypothecated, or be the subject of any hedging, short sale, derivative, put or call transaction that would result in the effective economic disposition of the securities by any person for a period of 180 days immediately following the date of effectiveness or commencement of sales of this offering, except the transfer of any security: (i) by operation of law or by reason of our reorganization; (ii) to any FINRA member firm participating in the offering and the officers or partners thereof, if all securities so transferred remain subject to the lock-up restriction set forth above for the remainder of the time period; (iii) if the aggregate amount of our securities held by the underwriter or related persons do not exceed 1% of the securities being offered; (iv) that is beneficially owned on a pro rata basis by all equity owners of an investment fund, provided that no participating member manages or otherwise directs investments by the fund and the participating members in the aggregate do not own more than 10% of the equity in the fund; or (v) the exercise or conversion of any security, if all securities remain subject to the lock-up restriction set forth above for the remainder of the time period.

Right of First Refusal

We have also agreed, subject to certain conditions, to give the underwriter a twelve-month right of first refusal from the closing date of any securities offering consummated during the term of our engagement with the underwriter, to act as a lead book-running manager, lead underwriter or lead placement agent in any financing involving an underwriter or placement agent following the closing date of this offering. In addition, we will pay the underwriter a cash fee as provided under our engagement agreement with them equal to the underwriting discount percentage in this offering in the event that the offering contemplated hereby does not close and any investor contacted by the underwriter in connection with this offering (other than certain insider investors) purchases securities from us at any time between the termination of the offering and nine months after the date of termination or expiration of the offering.

Determination of Offering Price

Our common stock is listed on The Nasdaq Capital Market under the symbol "RXII". The closing price of our common stock on September 28, 2018, as reported by Nasdaq, was \$1.17 per share. We do not intend to apply for listing of the pre-funded warrants or the warrants on any securities exchange or other trading system.

The actual offering price of the securities we are offering will be negotiated between us and the underwriter based on the trading of our common stock prior to the offering, among other things, and may be at a discount to the current market price.

Lock-up Agreements

Pursuant to certain “lock-up” agreements, our executive officers and directors have agreed, subject to certain exceptions, not to offer, pledge, sell, contract to sell or otherwise transfer or dispose of, directly or indirectly, any shares or any securities convertible into or exercisable or exchangeable for shares, whether currently owned or subsequently acquired, without the prior written consent of the underwriter, for a period of 90 days from the date of effectiveness of the underwriting agreement. Pursuant to the underwriting agreement, we and our subsidiaries have agreed, subject to certain exceptions, not to issue, enter into any agreement to issue or announce the issuance or proposed issuance of any shares of common stock or common stock equivalents for a period of 90 days from the purchase and sale of securities by the underwriters and the Company, respectively, under the underwriting agreement.

Stabilization, Short Positions and Penalty Bids

The underwriter may engage in syndicate covering transactions, stabilizing transactions and penalty bids or purchases for the purpose of pegging, fixing or maintaining the price of our common stock:

Syndicate covering transactions involve purchases of shares of common stock in the open market after the distribution has been completed in order to cover syndicate short positions. Such a naked short position would be closed out only by buying shares in the open market. A naked short position is more likely to be created if the underwriter is concerned that after pricing there could be downward pressure on the price of the shares in the open market that could adversely affect investors who purchase in this offering.

Stabilizing transactions permit bids to purchase shares of common stock so long as the stabilizing bids do not exceed a specified maximum and are engaged in for the purpose of preventing or retarding a decline in the market price of the shares of common stock while this offering is in progress.

Penalty bids permit the underwriter to reclaim a selling concession from a syndicate member when the securities originally sold by the syndicate member are purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These syndicate covering transactions, stabilizing transactions and penalty bids may have the effect of raising or maintaining the market prices of our securities or preventing or retarding a decline in the market prices of our securities. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. Neither we nor the underwriter make any representation or prediction as to the effect that the transactions described above may have on the price of our common stock. These transactions may be effected on The Nasdaq Capital Market, in the over-the-counter market or on any other trading market and, if commenced, may be discontinued at any time.

In connection with this offering, the underwriter also may engage in passive market making transactions in our common stock in accordance with Regulation M during a period before the commencement of offers or sales of shares of our common stock in this offering and extending through the completion of the distribution. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specific purchase limits are exceeded. Passive market making may stabilize the market price of the securities at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

Neither we nor the underwriter make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the prices of our securities. In addition, neither we nor the

underwriter make any representation that the underwriter will engage in these transactions or that any transactions, once commenced, will not be discontinued without notice.

Indemnification

We have agreed to indemnify the underwriter against certain liabilities, including certain liabilities arising under the Securities Act, or to contribute to payments that the underwriter may be required to make for these liabilities.

Other Relationships

The underwriter and its affiliates have engaged in, and may in the future engage in, investment banking and other commercial dealings in the ordinary course of business with us or our affiliates. They have received, or may in the future receive, customary fees and commissions for these transactions.

Legal Matters

Certain legal matters relating to the issuance of the securities offered by this prospectus will be passed upon for us by Gibson, Dunn & Crutcher LLP, San Francisco, California. Certain legal matters in connection with this offering will be passed upon for the underwriter by Zysman, Aharoni, Gayer and Sullivan & Worcester LLP, New York, New York.

Experts

The consolidated financial statements as of December 31, 2017 and 2016 and for each of the two years in the period ended December 31, 2017 incorporated by reference in this prospectus have been so incorporated in reliance on the report of BDO USA, LLP, an independent registered public accounting firm (the report on the financial statements contains an explanatory paragraph regarding the Company's ability to continue as a going concern), given on the authority of said firm as experts in auditing and accounting.

Where You Can Find More Information

We are required to file annual, quarterly and special reports, proxy statements and other information with the Securities and Exchange Commission (the "SEC"). You may read and copy any document filed by us at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the public reference room. Our filings with the SEC are also available to the public at the SEC's Internet web site at <http://www.sec.gov>.

We have filed a registration statement, of which this prospectus is a part, covering the securities offered hereby. As allowed by SEC rules, this prospectus does not include all of the information contained in the Registration Statement and the included exhibits, financial statements and schedules. You are referred to the Registration Statement, the included exhibits, financial statements and schedules for further information. This prospectus is qualified in its entirety by such other information.

We are subject to the information and periodic reporting requirements of the Exchange Act and, in accordance therewith, file periodic reports, proxy statements and other information with the SEC. Such periodic reports, proxy statements and other information are available for inspection and copying at the public reference room and website of the SEC referred to above. We maintain a website at www.rxipharma.com. The reference to our website address does not constitute incorporation by reference of the information contained on our website, and you should not consider the

contents of our website in making an investment decision with respect to our securities.

incorporation of certain information by reference

The SEC allows us to “incorporate by reference” the information we have filed with them, which means that we can disclose important information to you by referring you to those documents. The information we incorporate by reference is an important part of this prospectus, and information that we file later with the SEC will automatically update and supersede this information. The documents we are incorporating by reference are:

- Our Annual Report on Form 10-K for the year ended December 31, 2017, filed with the SEC on March 26, 2018;

- Our Quarterly Report on Form 10-Q for the period ended March 31, 2018 that we filed with the SEC on May 10, 2018 and our Quarterly Report on Form 10-Q for the period ended June 30, 2018 that we filed with the SEC on August 14, 2018;

- Our Quarterly Reports on Form 10-Q/A for the periods ended March 31, 2017, June 30, 2017 and September 30, 2017 that we filed with the SEC on March 26, 2018;

- Our Current Reports on Form 8-K, filed with the SEC on January 5, 2018, January 24, 2018, March 26, 2018, March 27, 2018, March 29, 2018, April 11, 2018, May 10, 2018, June 1, 2018, June 8, 2018, August 14, 2018, August 21, 2018 and September 4, 2018;

- Our Proxy Statement on DEF 14A, filed with the SEC on April 26, 2018; and;

- The description of our common stock contained in our registration statement on Form 8-A12B filed with the SEC on February 7, 2014, including any amendment or report filed for the purpose of updating such description.

All documents we file with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, except as to any portion of any report or document that is not deemed filed under such provisions, (1) on or after the date of filing of the registration statement containing this prospectus and prior to the effectiveness of the registration statement and (2) on or after the date of this prospectus until the earlier of the date on which all of the securities registered hereunder have been sold or the registration statement of which this prospectus is a part has been withdrawn, shall be deemed incorporated by reference in this prospectus and to be a part of this prospectus from the date of filing of those documents and will be automatically updated and, to the extent described above, supersede information contained or incorporated by reference in this prospectus and previously filed documents that are incorporated by reference in this prospectus.

Nothing in this prospectus shall be deemed to incorporate information furnished but not filed with the SEC pursuant to Item 2.02, 7.01 or 9.01 of Form 8-K.

Upon written or oral request, we will provide without charge to each person, including any beneficial owner, to whom a copy of the prospectus is delivered a copy of any or all of the reports or documents incorporated by reference herein (other than exhibits to such documents, unless such exhibits are specifically incorporated by reference herein). You may request a copy of these filings, at no cost, by writing or telephoning us at the following address: RXi Pharmaceuticals Corporation, 257 Simarano Drive, Suite 101, Marlborough, Massachusetts 01752 Attention: Investor Relations, telephone: (508) 767-3861. We maintain a website at <http://www.rxipharma.com>. You may access our definitive proxy statements on Schedule 14A, annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and periodic amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act with the SEC free of charge at our website as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC. The information contained in, or that can be accessed through, our website is not incorporated by reference in, and is not part of, this prospectus. We have not authorized any one to provide you with any information that differs from that contained in this prospectus. Accordingly, you should not rely on any information that is not contained in this prospectus. You should not assume that the information in this prospectus is accurate as of any date other than the date of the front cover of this prospectus.

RXi Pharmaceuticals Corporation

3,725,714 Units (each Unit consisting of one share of Common Stock and one Warrant to purchase one share of Common Stock)

17,702,858 Pre-funded Units (each Pre-funded Unit consisting of one Pre-funded Warrant to Purchase one share of Common Stock and one Warrant to purchase one share of Common Stock)

17,702,858 Shares of Common Stock Underlying the Pre-funded Warrants and

21,428,572 Shares of Common Stock Underlying the Warrants

PROSPECTUS

October 1, 2018

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