

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

POST-EFFECTIVE AMENDMENT No. 1 to

FORM S-1  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

**RXi PHARMACEUTICALS CORPORATION**

*(Exact name of Registrant as specified in its charter)*

**Delaware**  
*(State or other jurisdiction of  
incorporation or organization)*

**2834**  
*(Primary Standard Industrial  
Classification Code Number)*

**45-3215903**  
*(I.R.S. Employer  
Identification Number)*

**257 Simarano Drive, Suite 101  
Marlborough, Massachusetts 01752  
(508) 767-3861**

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

**Geert Cauwenbergh, Dr. Med. Sc.  
President**

**RXi Pharmaceuticals Corporation  
257 Simarano Drive, Suite 101  
Marlborough, Massachusetts 01752  
(508) 767-3861**

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

*Copies to:*

**Ryan A. Murr  
Gibson, Dunn & Crutcher LLP  
555 Mission Street, Suite 3000  
San Francisco, CA 94105  
Telephone: (415) 393-8373  
Facsimile: (415) 374-8430**

**Oded Har-Even  
Robert V. Condon III  
Zysman, Aharoni, Gayer and Sullivan &  
Worcester LLP  
1633 Broadway, 32<sup>nd</sup> Floor  
New York, NY 10019  
Telephone: (212) 660-5003  
Facsimile: (212) 660-3001**

**Approximate date of commencement of proposed sale to the public:**  
As soon as practicable after the effective date of this Registration Statement.

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, 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, please 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.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) 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.  333-227173

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

Large accelerated filer   
Non-accelerated filer

Accelerated filer   
Smaller reporting company   
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

**This Registration Statement shall become effective upon filing with the Securities and Exchange Commission in accordance with Rule 462(d) under the Securities Act of 1933, as amended.**

#### EXPLANATORY NOTE

This Post-Effective Amendment No. 1 to Form S-1 Registration Statement (333-227173) is filed pursuant to Rule 462(d) of the Securities Act of 1933, as amended (the "Securities Act"), solely to add exhibits to the previously effective Registration Statement by removing the previously filed Exhibit 5.1 and replacing it with Exhibit 5.1 filed herewith in order to reflect an increase in the number of securities covered by the legal opinion of Gibson, Dunn & Crutcher LLP. Accordingly, this Post-Effective Amendment No. 1 consists only of a facing page, this explanatory note and Part II Item 16(a) of the Registration Statement on Form S-1 setting forth the exhibits to the Registration Statement. This Post-Effective Amendment No. 1 does not modify any other part of the Registration Statement. Pursuant to Rule 462(d) under the Securities Act, this Post-Effective Amendment No. 1 shall become effective immediately upon filing with the Securities and Exchange Commission. The contents of the Registration Statement are hereby incorporated by reference.

**PART II**  
**Information Not Required in Prospectus**

**ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES**

**Financial Statement Schedules**

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

**Exhibits**

Exhibit Number	Description	Incorporated by Reference Herein	
		Form	Date
1.1	<a href="#">Form of Underwriting Agreement.</a>	Registration Statement on Form S-1 (File No. 333-227173)	September 28, 2018
2.1	<a href="#">Asset Purchase Agreement, dated March 1, 2013, between RXi Pharmaceuticals Corporation and OPKO Health, Inc. +</a>	Quarterly Report on Form 10-Q (File No. 000-54910)	May 15, 2013
2.2	<a href="#">Stock Purchase Agreement, dated January 6, 2017, by and among RXi Pharmaceuticals Corporation, RXi Merger Sub, LLC, Mirlimmune Inc., certain shareholders named therein and Alexey Wolfson, Ph.D., in his capacity as Sellers' Representative.</a>	Current Report on Form 8-K (File No. 001-36304)	January 10, 2017
3.1	<a href="#">Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Amendment No. 4 to the Registration Statement on Form S-1 (File No. 333-177498)	February 7, 2012
3.2	<a href="#">Certificate of Designations, Preferences and Rights of Series A Convertible Preferred Stock of RXi Pharmaceuticals Corporation.</a>	Amendment No. 4 to the Registration Statement Form S-1 (File No. 333-177498)	February 7, 2012
3.3	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 000-54910)	July 22, 2013
3.4	<a href="#">Certificate of Designations, Preferences and Rights of Series A-1 Convertible Preferred Stock of RXi Pharmaceuticals Corporation.</a>	Quarterly Report on Form 10-Q (File No. 000-54910)	August 14, 2013
3.5	<a href="#">Certificate of Increase, filed with the Secretary of State of the State of Delaware on January 24, 2014.</a>	Current Report on Form 8-K (File No. 000-54910)	January 24, 2014
3.6	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Registration Statement on Form S-1 (File No. 333-203389)	April 13, 2015
3.7	<a href="#">Certificate Eliminating the Series A Convertible Preferred Stock from the Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Quarterly Report on Form 10-Q (File No. 001-36304)	November 12, 2015

3.8	<a href="#">Certificate Eliminating the Series A-1 Convertible Preferred Stock from the Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Quarterly Report on Form 10-Q (File No. 001-36304)	November 12, 2015
3.9	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 001-36304)	April 15, 2016
3.10	<a href="#">Certificate of Designation of Preferences, Rights and Limitations of Series B Convertible Preferred Stock of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 001-36304)	December 21, 2016
3.11	<a href="#">Certificate of Designation of Preferences, Rights and Limitations of Series C Convertible Preferred Stock of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 001-36304)	January 10, 2017
3.12	<a href="#">Certificate Eliminating the Series B Convertible Preferred Stock from the Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Quarterly Report on Form 10-Q (File No. 001-36304)	November 8, 2017
3.13	<a href="#">Certificate Eliminating the Series C Convertible Preferred Stock from the Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Quarterly Report on Form 10-Q (File No. 001-36304)	November 8, 2017
3.14	<a href="#">Certificate of Amendment to the Amended and Restated Certificate of Incorporation of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 001-36304)	January 5, 2018
3.15	<a href="#">Amended and Restated Bylaws of RXi Pharmaceuticals Corporation.</a>	Current Report on Form 8-K (File No. 001-36304)	June 9, 2017
4.1	<a href="#">Form of Warrant.</a>	Amendment No. 1 to the Registration Statement on Form S-1 (File No. 333-203389)	May 21, 2015
4.2	<a href="#">Form of Warrant.</a>	Amendment No. 3 to the Registration Statement on Form S-1 (File No. 333-214199)	December 14, 2016
4.3	<a href="#">Form of Warrant.</a>	Current Report on Form 8-K (File No. 333-214199)	April 11, 2018
4.4	<a href="#">Form of Placement Agent Warrant.</a>	Current Report on Form 8-K (File No. 333-214199)	April 11, 2018
4.5	<a href="#">Form of Warrant.</a>	Registration Statement on Form S-1 (File No. 333-227173)	September 28, 2018
4.6	<a href="#">Form of Pre-Funded Warrant.</a>	Registration Statement on Form S-1 (File No. 333-227173)	September 28, 2018
5.1	Opinion of Gibson, Dunn & Crutcher LLP regarding the securities being registered.*		

10.1	<a href="#">Patent and Technology Assignment Agreement between RXi Pharmaceuticals Corporation (formerly RNCS, Inc.) and Advima, LLC, effective as of September 24, 2011.</a>	Registration Statement on Form S-1 (File No. 333-177498)	October 25, 2011
10.2	<a href="#">RXi Pharmaceuticals Corporation 2012 Long Term Incentive Plan.**</a>	Registration Statement on Form S-8 (File No. 333-227013)	August 24, 2018
10.3	<a href="#">Form of Restricted Stock Unit Award under the Company's 2012 Long Term Incentive Plan.**</a>	Amendment No. 2 to the Registration Statement on Form S-1 (File No. 333-177498)	December 29, 2011
10.4	<a href="#">Form of Incentive Stock Option Award under the Company's 2012 Long Term Incentive Plan, as amended.**</a>	Registration Statement on Form S-1 (File No. 333-191236)	September 18, 2013
10.5	<a href="#">Form of Non-Qualified Stock Option Award under the Company's 2012 Long Term Incentive Plan, as amended.**</a>	Registration Statement on Form S-1 (File No. 333-191236)	September 18, 2013
10.6	<a href="#">RXi Pharmaceuticals Corporation Employee Stock Purchase Plan.**</a>	Registration Statement on Form S-8 (File No. 333-227013)	August 24, 2018
10.7	<a href="#">Form of Indemnification Agreement.**</a>	Amendment No. 3 to the Registration Statement on Form S-1 (File No. 333-177498)	January 23, 2012
10.8	<a href="#">Employment Agreement, dated April 27, 2012, between RXi Pharmaceuticals Corporation and Geert Cauwenbergh, Dr. Med. Sc.**</a>	Current Report on Form 8-K (File No. 333-177498)	May 3, 2012
10.9	<a href="#">Employment Agreement, dated January 6, 2017, between RXi Pharmaceuticals Corporation and Alexey Eliseev, Ph.D.**</a>	Annual Report on Form 10-K (File No. 001-36304)	March 30, 2017
10.10	<a href="#">Non-Competition Agreement, dated January 6, 2017, between RXi Pharmaceuticals Corporation and Alexey Eliseev, Ph.D.**</a>	Annual Report on Form 10-K (File No. 001-36304)	March 30, 2017
10.11	<a href="#">Employment Agreement, dated April 24, 2017, between RXi Pharmaceuticals Corporation and Gerrit Dispersyn, Dr. Med. Sc.**</a>	Post-effective Amendment No. 1 to the Registration Statement on Form S-1 (File No. 333-214199)	May 4, 2017
10.12	<a href="#">Lease Agreement dated December 17, 2013 between RXi Pharmaceuticals Corporation and 257 Simarano Drive, LLC, Brighton Properties, LLC, Robert Stubblebine 1, LLC and Robert Stubblebine 2, LLC.</a>	Current Report on Form 8-K (File No. 000-54910)	December 20, 2013

10.13	<a href="#">Registration Rights Agreement, dated August 8, 2017, between RXi Pharmaceuticals Corporation and Lincoln Park Capital Fund, LLC.</a>	Current Report on Form 8-K (File No. 001-36304)	August 9, 2017
10.14	<a href="#">Purchase Agreement, dated August 8, 2017, between RXi Pharmaceuticals Corporation and Lincoln Park Capital Fund, LLC.</a>	Registration Statement on Form S-1 (File No. 333-220062)	August 18, 2017
10.15	<a href="#">Securities Purchase Agreement, dated April 9, 2018, by and between the Company and the Purchasers therein.</a>	Current Report on Form 8-K (File No. 333-214199)	April 11, 2018
23.1	Consent of BDO USA, LLP, an Independent Registered Public Accounting Firm.	Registration Statement on Form S-1 (File No. 333-227173)	September 14, 2018
23.2	Consent of Gibson, Dunn & Crutcher LLP.*	Included in Exhibit 5.1	
24.1	<a href="#">Powers of Attorney.</a>	Registration Statement on Form S-1 (File No. 333-227173)	August 31, 2018

\* Filed herewith.

\*\* Indicates a management contract or compensatory plan or arrangement.

+ Confidential treatment has been requested or granted for certain portions which have been blanked out in the copy of the exhibit filed with the Securities and Exchange Commission. The omitted information has been filed separately with the Securities and Exchange Commission.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant has duly caused this Registration Statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in Marlborough, Massachusetts, on October 2, 2018.

### RXi PHARMACEUTICALS CORPORATION

By: /s/ Geert Cauwenbergh  
Geert Cauwenbergh, Dr. Med. Sc.  
President, Chief Executive Officer and acting Chief Financial Officer

### Power of Attorney

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.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Geert Cauwenbergh</u> Geert Cauwenbergh, Dr. Med. Sc.	President, Chief Executive Officer, Acting Chief Financial Officer and Director (Principal Executive Officer and Principal Financial Officer)	October 2, 2018
<u>/s/ Caitlin Kontulis</u> Caitlin Kontulis	Senior Director of Finance and Secretary (Principal Accounting Officer)	October 2, 2018
<u>*</u> Robert J. Bitterman	Director	October 2, 2018
<u>*</u> Keith L. Brownlie	Director	October 2, 2018
<u>*</u> H. Paul Dorman	Director	October 2, 2018
<u>*</u> Jonathan E. Freeman, Ph.D.	Director	October 2, 2018
<u>*</u> Curtis A. Lockshin, Ph.D.	Director	October 2, 2018

\*By: /s/ Geert Cauwenbergh  
Geert Cauwenbergh, Dr. Med. Sc.  
Attorney-in-fact

October 2, 2018

RXi Pharmaceuticals Corporation  
257 Simarano Drive, Suite 101  
Marlborough, Massachusetts 01752

Re: *RXi Pharmaceuticals Corporation*  
*Registration Statement on Form S-1*

Ladies and Gentlemen:

We have examined the Registration Statement on Form S-1, as amended (the "Registration Statement"), of RXi Pharmaceuticals Corporation, a Delaware corporation (the "Company"), filed with the Securities and Exchange Commission (the "Commission") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), in connection with the offering by the Company of: (a) 3,725,714 Units (the "Units"), with each Unit consisting of one share of the Company's common stock, par value \$0.0001 per share (the "Common Stock") and one warrant to purchase one share of Common Stock (the "Warrants"); (b) 17,702,858 Pre-Funded Units (the "Pre-Funded Units"), with each Pre-Funded Unit consisting of one Pre-Funded Warrant to purchase one share of Common Stock (the "Pre-Funded Warrant") and one Warrant; (c) 21,428,572 shares of Common Stock issuable upon exercise of the Warrants (the "Warrant Shares"); and (d) 17,702,858 shares of Common Stock issuable upon exercise of the Pre-Funded Warrants (the "Pre-Funded Warrant Shares").

In arriving at the opinion expressed below, we have examined originals, or copies certified or otherwise identified to our satisfaction as being true and complete copies of the originals, of specimen common stock certificates, and such other documents, corporate records, certificates of officers of the Company and of public officials and other instruments as we have deemed necessary or advisable to enable us to render the opinions set forth below. In our examination, we have assumed without independent investigation the genuineness of all signatures, the legal capacity and competency of all natural persons, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as copies.

Based upon the foregoing, and subject to the assumptions, exceptions, qualifications and limitations set forth herein, we are of the opinion that: (i) the shares of Common Stock included in the Units, when issued against payment therefor as set forth in the Registration Statement, will be validly issued, fully paid and non-assessable; (ii) the Warrant Shares, when issued upon exercise of the Warrants, will be validly issued, fully paid and non-assessable; (iii) the Pre-Funded Warrant Shares, when issued upon exercise of the Pre-Funded Warrants against payment therefor as set forth in the Registration Statement, will be validly issued, fully paid and non-assessable; (iv) the Warrants and the Pre-Funded Warrants, when issued as set forth in the Registration Statement, will be legal, valid and binding obligations of the Company, enforceable against the Company in accordance with their terms; and (v) the Units and the Pre-Funded Units, when issued against payment thereof as set forth in the Registration Statement, will be validly issued, fully paid and non-assessable.



The opinions expressed above are subject to the following additional exceptions, qualifications, limitations and assumptions:

A. We render no opinion herein as to matters involving the laws of any jurisdiction other than the State of New York and the United States of America and, for purposes of clauses (i), (ii) and (iii), the Delaware General Corporation Law. We are not admitted to practice in the State of Delaware; however, we are generally familiar with the Delaware General Corporation Law as currently in effect and have made such inquiries as we consider necessary to render the opinions contained in clauses (i), (ii) and (iii) above. This opinion is limited to the effect of the current state of the laws of the State of New York, the United States of America and, to the limited extent set forth above, the laws of the State of Delaware and the facts as they currently exist. We assume no obligation to revise or supplement this opinion in the event of future changes in such laws or the interpretations thereof or such facts.

B. The opinion in clause (iv) above is subject to: (a) the effect of any bankruptcy, insolvency, reorganization, moratorium, arrangement or similar laws affecting the rights and remedies of creditors' generally, including without limitation the effect of statutory or other laws regarding fraudulent transfers or preferential transfers, and (b) general principles of equity, including without limitation concepts of materiality, reasonableness, good faith and fair dealing and the possible unavailability of specific performance, injunctive relief or other equitable remedies regardless of whether enforceability is considered in a proceeding in equity or at law.

We consent to the filing of this opinion as an exhibit to the Registration Statement, and we further consent to the use of our name under the caption "Legal Matters" in the Registration Statement and the prospectus that forms a part thereof. In giving these consents, 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.

Very truly yours,

/s/ GIBSON, DUNN & CRUTCHER