



DIVISION OF  
CORPORATION FINANCE

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

January 10, 2012

Via E-mail

Dr. Mark J. Ahn, Ph.D.  
President  
RXi Pharmaceuticals Corporation  
60 Prescott Street  
Worcester, MA 01605

**Re: RXi Pharmaceuticals Corporation  
Amendment No. 2 to Form S-1  
Filed December 29, 2011  
File No. 333-177498**

Dear Dr. Ahn:

We have reviewed your amended registration statement and response letter each filed on December 29, 2011 and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by amending your registration statement and providing the requested information. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any further amendments to your registration statement and the information you provide in response to these comments, we may have additional comments.

General

1. Please revise your filing to complete the missing disclosure concerning share numbers and the disclosure concerning your stock split. Please also revise your Exhibit 3.1 to include the complete certificate of incorporation, as filed with the Secretary of State of Delaware.

Financial Statements

Notes to Financial Statements

12. Subsequent Events, page F-30

2. Please refer to your response to comment 11. You state on page F-24 with respect to the thirteen month warrants and the five year warrants issued in the March 2011 offering that the fair value of the remaining 2,550,000 warrants totaling \$1,790,000 was recorded as a derivative liability in RXI's financial statements. You state on page F-25 with respect to the April 2011 offering, including the warrants issued in exchanged for the March 2011 warrants, that a portion of the liability was allocated to RXI based on the expected offering proceeds. Based on the disclosure in the filing and your response you allocated 100% of the warrant liability relating to the remaining March warrants (after the exchange) to RXI and 50% of the warrant liability for the April issuance, including the March exchange warrants to RXI. We note that RXI had a cash balance of \$6.891 million at December 31, 2010 and that cash used in the nine months ending September 30, 2011 was \$6.469 million which resulted in a cash balance of \$422,000 at September 30, 2011. As it is not clear that any of the offering proceeds were allocated to the historical operations of RXI, please tell us why you believe it is appropriate to record the derivative relating to the March and April 2011 offerings in the historical financial statements of RXI. We note in the Statement of Cash Flows that Galena contributed \$369,000 to RXI in the nine months ended September 30, 2011. Please tell us if that contribution was part of the agreement to loan up to \$1.5 million to RXI as part of the spin-off.

Exhibit 5.1

3. Please expand this opinion to disclose the number of shares of common stock included in this opinion. Please also confirm that this amount is consistent with the amount of securities being registered on this registration statement.
4. Please revise this opinion to remove assumptions (3) and (4) contained in the last paragraph of the first page of this opinion. See Section II.B.3.a of Staff Legal Bulletin 19.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Act of 1933 and all applicable Securities Act rules require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

Notwithstanding our comments, in the event you request acceleration of the effective date of the pending registration statement please provide a written statement from the company acknowledging that:

- should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;
- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and
- the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

Please refer to Rules 460 and 461 regarding requests for acceleration. We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. Please allow adequate time for us to review any amendment prior to the requested effective date of the registration statement.

You may contact James Peklenk at (202) 551-3661 or Mary Mast at (202) 551-3613 if you have questions regarding comments on the financial statements and related matters. Please contact Jennifer Riegel, Special Counsel, at (202) 551- 3575 or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Jennifer Riegel for

Jeffrey Riedler  
Assistant Director

cc: Dale E. Short, Esq.  
TroyGould PC  
1801 Century Park East, Suite 1600  
Los Angeles, CA 90067-2367