



DIVISION OF  
CORPORATION FINANCE

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

November 10, 2010

Noah D. Beerman  
Chief Executive Officer  
RXi Pharmaceuticals Corporation  
60 Prescott Street  
Worcester, Massachusetts 01605

**Re: RXi Pharmaceuticals Corporation  
Form 10-K for the Fiscal Year Ended December 31, 2009  
Filed March 31, 2010  
Schedule 14A filed April 23, 2010  
Form 10-Q for the Quarterly Period Ended March 31, 2010  
Filed May 17, 2010  
File No. 001-33958**

Dear Mr. Beerman:

We have reviewed your filings 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 within ten business days by providing the requested information, by amending your filing or by advising us when you will provide the requested response. 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 the information you provide in response to these comments and any amendment, we may have additional comments.

Form 10-K for the fiscal year ended December 31, 2009

Item 1. Business, page 1

1. Please file a copy of your in-license agreement with Dr. Michael Czech, as discussed at the bottom of page 1 under the subheading "Systemic Applications." Alternatively, please provide us with an analysis supporting your determination that the agreement is not material to the company.

Intellectual Property and Proprietary Rights, page 13

2. Please provide draft disclosure to be included in your next Form 10-K which indicates the expiration years of each material patent held by the company, including those relating to

your license agreement with the University of Massachusetts Medical School.

Schedule 14A filed April 23, 2010

Board Leadership Structure and Role in Risk Oversight, page 28

3. Please provide draft disclosure to be included in your next proxy statement describing the risk oversight function of the board of directors as required by Item 407(h) of Regulation S-K.

Form 10-Q for the Quarterly Period Ended March 31, 2010

4. Please amend your Form 10-Q for the quarterly period ended March 31, 2010 to file the Stock Redemption Agreement between the company and CytRx dated March 22, 2010 as an exhibit to the filing.

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 Exchange Act of 1934 and all applicable Exchange 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.

In responding to our comments, please provide a written statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

Please contact Laura Crotty at (202) 551-3563 or myself at (202) 551-3715 with any questions.

Sincerely,

Jeffrey P. Riedler  
Assistant Director