



DIVISION OF
CORPORATION FINANCE

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

June 11, 2012

Via E-mail

Geert Cauwenbergh, Dr. Med. Sc.
President
RXi Pharmaceuticals Corporation
60 Prescott Street
Worcester, Massachusetts 01605

**Re: RXi Pharmaceuticals Corporation
Registration Statement on Form S-1
Filed May 18, 2012
File No. 333-181534**

Dear Dr. Cauwenbergh:

We have reviewed your registration statement and have the following comment. In our comment, we 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 comment applies to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to this comment, we may have additional comments.

FORM S-1

1. Please provide us with your basis for determining that the transaction is appropriately characterized as a transaction that is eligible to be made under Rule 415(a)(1)(i) rather than a primary offering. In your analysis, please address the following among any other relevant factors:
 - The number of selling stockholders and the percentage of the overall offering made by each stockholder;
 - The amount of shares involved;
 - The date on which and the manner in which each selling stockholder received the shares and/or the overlying securities;

- The relationship of each selling stockholder with the company, including an analysis of whether the selling stockholder is an affiliate of the company;
- Any relationships among the selling stockholders;
- The discount at which the selling stockholders will purchase the common stock underlying the preferred stock upon conversion;
- Whether or not any of the selling stockholders is in the business of buying and selling securities; and
- Whether under all the circumstances it appears that the selling stockholders are acting as a conduit for the company.

Alternatively, please name the selling stockholders as underwriters and register the offering on a registration statement for which you are eligible to conduct a primary offering consistent with Rule 415. Please see our Compliance and Disclosure Interpretation 612.09 available at <http://www.sec.gov/divisions/corpfin/guidance/securitiesactrules-interps.htm> for further guidance.

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 comment, 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

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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.

Please contact Nandini Acharya at (202) 551-3495, 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: Via E-mail
Ryan A. Murr, Esq.
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San Francisco, California 94111-4006