



DIVISION OF  
CORPORATION FINANCE

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

October 28, 2010

David P. Perry  
President and Chief Executive Officer  
Anacor Pharmaceuticals, Inc.  
1020 East Meadow Circle  
Palo Alto, CA 94303-4230

**Re: Anacor Pharmaceuticals, Inc.  
Amendment No. 2 to  
Registration Statement on Form S-1  
Filed October 26, 2010  
File No. 333-169322**

Dear Mr. Perry:

We have reviewed your registration statement and have the following comment. 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.

Our Collaboration with Eli Lilly and Company, page 5

1. We note your response to our prior comment 2 and reissue the comment. Your disclosure about the upper range of your potential royalties remains unchanged. The phrase "low double-digit" could be interpreted to be low teens, low twenties, low thirties, etc. Please revise your disclosure to provide a more narrow range of your maximum potential royalties.

David P. Perry  
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You may contact Vanessa Robertson at (202) 551-3649 or Melissa Rocha at (202) 551-3854 if you have questions regarding comments on the financial statements and related matters. Please contact Sebastian Gomez Abero at (202) 551-3578 or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey P. Riedler  
Assistant Director

Cc: Mark B. Weeks  
Michael E. Tenta  
Cooley LLP  
3175 Hanover Street  
Palo Alto, CA 94304-1130