



DIVISION OF
CORPORATION FINANCE

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

October 21, 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. 1 to
Registration Statement on Form S-1
Filed October 13, 2010
File No. 333-169322**

Dear Mr. Perry:

We have reviewed your registration statement and have the following comments. 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 amendment to your registration statement and the information you provide in response to these comments, we may have additional comments.

Our Lead Topical Antifungal AN2690 for Onychomycosis, page 2

1. We note your response to our prior comment seven and reissue the comment. We appreciate the differences you highlight regarding the company's Phase 2 trials and the Phase 3 trials of the potentially competing products. Nevertheless we believe that since you disclose the efficacy of the potentially competing products, you should disclose the efficacy ranges for AN2690 in the Summary section. Your concerns about different endpoints and lengths of trails can be explained in the disclosure.

Our collaboration with Eli Lilly and Company, page 5

2. We note your response to our prior comment 10. Please revise your disclosure to provide a more narrow range of potential royalties (for example, high single digits to low teens, high single digits to low twenties, etc.).

AN2898 for Psoriasis and Atopic Dermatitis, page 83

3. Please disclose the date when you, or any of your collaborators, submitted an initial new drug application with the FDA for AN2898 for psoriasis and atopic dermatitis. To the

David P. Perry
Anacor Pharmaceuticals, Inc.
October 21, 2010
Page 2

extent you have not submitted an IND to the FDA, please disclose when you anticipate submitting an IND or, in the alternative, disclose the reason why you are not required to submit the IND.

Compensation Discussion and Analysis, page 107
Cash Incentive Bonuses, page 109

4. We note the expanded disclosure in response to our previous comment 18. Please expand your disclosure of corporate goals to quantify the minimum cash balance at year-end that was required to meet that corporate goal. Please also disclose what was the liquidity objective for the company that had a 25% weighting.

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