



DIVISION OF
CORPORATION FINANCE

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

May 29, 2012

Via E-mail

Mr. Keith R. Leonard, Jr.
President and Chief Executive Officer
KYTHERA Biopharmaceuticals, Inc.
27200 West Agoura Road, Suite 200
Calabasas, CA 91301

**Re: KYTHERA Biopharmaceuticals, Inc.
Registration Statement on Form S-1
Filed May 17, 2012
File No. 333-181476**

Dear Mr. Leonard:

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

Registration Statement on Form S-1

Management's Discussion and Analysis of Financial Condition and Results of Operations

Financial Overview

Research and Development Expenses, page 57

1. Please refer to your response to comment 13. Please revise your disclosure to include the amount incurred from inception through March 31, 2012 rather than January 1, 2009 through March 31, 2012 related to the development of ATX-101. In addition, please clarify in your disclosure that the company does not utilize a formal time allocation system to capture expenses on a project by project basis.

Business
Overview, page 80

2. Please refer to your response to comment 21. Although you state in your response letter that you have amended your registration statement to explain the term “validated” for lay readers, we cannot find such explanation in your filing. Please amend your filing to describe the term “validated” as it describes clinician and patient reported scales used to measure product efficiency.

Notes to Financial Statements
2. Summary of Significant Accounting Policies
Comprehensive Loss, page F-14

3. Please revise your disclosure to clarify that comprehensive gains and losses are now reflected in the Statements of Operations and Comprehensive Loss.

7. Commitments, Collaborations and Contingencies
Collaboration Arrangements
Bayer, page F-24

4. Please refer to your response to comment 41. Please revise your disclosure to clarify that the regulatory and commercialization contingent payments do not meet the definition of milestones since they are based solely on Bayer’s performance and therefore the milestone method will not be applied to those milestones.

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

Mr. Keith R. Leonard, Jr.
KYTHERA Biopharmaceuticals, Inc.
May 29, 2012
Page 3

- 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 Vanessa Robertson at (202) 551-3649 or Joel Parker at (202) 551-3651 if you have questions regarding comments on the financial statements and related matters. Please contact Rose Zukin at (202) 551-3239, Daniel Greenspan at (202) 551-3623, or me at (202) 551-3710 with any other questions.

Sincerely,

/s/ Daniel Greenspan for

Jeffrey P. Riedler
Assistant Director

cc: Brian Cuneo
Latham & Watkins LLP
140 Scott Drive
Menlo Park, CA 94025