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

DIVISION OF
CORPORATION FINANCE

May 3, 2012

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.
Confidential Draft Registration Statement on Form S-1
Submitted April 6, 2012
CIK No. 0001436304

Dear Mr. Leonard:

We have reviewed your confidential draft 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 providing the requested information and either submitting an amended confidential draft registration statement or filing your registration statement on EDGAR. 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 your amended confidential draft registration statement or filed registration statement, we may have additional comments.

Confidential Draft Registration Statement on Form S-1

1. Please note that our comments on your request for confidential treatment of exhibits to your draft registration statement will be provided under separate cover.

Prospectus Cover Page

2. Since you appear to qualify as an "emerging growth company," as defined in the Jumpstart Our Business Startups Act ("the Act"), please disclose on your prospectus cover page that you are an emerging growth company, and revise your prospectus to provide the following additional disclosures:

    - Describe how and when a company may lose emerging growth company status;

- A brief description of the various exemptions that are available to you, such as exemptions from Section 404(b) of the Sarbanes-Oxley Act of 2002 and Section 14A(a) and (b) of the Securities Exchange Act of 1934; and
- Your election under Section 107(b) of the Act:
    - If you have elected to opt out of the extended transition period for complying with new or revised accounting standards pursuant to Section 107(b) of the Act, include a statement that the election is irrevocable; or
    - If you have elected to use the extended transition period for complying with new or revised accounting standards under Section 102(b)(1) of the Act, provide a risk factor explaining that this election allows you to delay the adoption of new or revised accounting standards that have different effective dates for public and private companies until those standards apply to private companies. Please state in your risk factor that, as a result of this election, your financial statements may not be comparable to companies that comply with public company effective dates. Include a similar statement in your critical accounting policy disclosures in MD&A.

In addition, consider describing the extent to which any of these exemptions are available to you as a Smaller Reporting Company.

Prospectus Summary, page 1

3. In an appropriate place in your prospectus summary, please briefly discuss your license agreement with the Los Angeles Biomedical Research Institute, through which you acquired exclusive worldwide rights to key intellectual property for the active ingredient in ATX-101.

4. Please expand your discussion of the Phase II clinical studies for ATX-101 on page 4 of your summary to briefly address any adverse injection site reactions reported during the study.

5. We note that both here and in your Business section you state that ATX-101 has been observed to be safe in clinical studies conducted to date. Please be advised that the determination of product safety is within the purview of the FDA or comparable regulatory body in jurisdictions outside the United States and the company may not substitute its own judgment or conclusions about product safety for the applicable regulatory authority. Therefore, please revise your disclosure to remove use of the word "safe" where it may presuppose a finding of product safety for ATX-101 by the appropriate regulatory authority. Similarly, please revise your statement on page 80 that ATX-101 has been observed to be "effective" in prior clinical studies, as product efficacy is a judgment rendered by the FDA or foreign counterparts as the basis for marketing approval.

6. Please revise your statements on page 4 and 75 that "ATX-101 is approved for commercial use in territories licensed to Bayer" to make it clear that ATX-101 has not yet been approved for commercial use.

Risk Factors, page 10

"We will require substantial additional financing to achieve our goals . . .," page 10

7. Please expand this risk factor to quantify your current working capital, your existing cash and cash equivalents, and the amount of your credit facility.

"We are substantially dependent on the success of our only product candidate . . .," page 12

8. To the extent that you have been materially impacted by any of the bulleted points, you should specifically describe these instances instead of providing a generic reference.

"Clinical drug development involves a lengthy and expensive process . . .," page 15

9. To the extent that you have encountered any material delays with your clinical trials, or have been forced to suspend or terminate one or more trials, please revise to describe such events.

"Many of our key suppliers are single-source suppliers. . . .," page 20

10. To the extent that you have experienced any problems with your suppliers or manufacturers such as those described in this risk factor, please revise to describe those problems.

"We rely on third parties to conduct all our preclinical studies . . .," page 21

11. To the extent that you have experienced any problems with the third parties who conduct your preclinical studies and clinical trials such as those described in this risk factor, please revise to describe those problems.

"If product liability lawsuits are brought against us…" page 24

12. Please confirm to us that the rates you pay for product liability insurance covering your clinical trials will not increase and the scope of such coverage will not be reduced, or revise your disclosure accordingly.

Management's Discussion and Analysis of Financial Condition and Results of Operations
Financial Overview
Research and Development Expenses, page 54

13. Please revise your disclosure to include the costs incurred to date for ATX-101.

Critical Accounting Policies and Significant Judgments and Estimates
Clinical Trial Accruals, page 57

14. Please revise your disclosure to state whether adjustments to prior period estimates have been material for each period presented and if so please quantify the amounts.

Stock Based Compensation
Fair Value Estimate, page 59

15. Please revise your disclosure to clarify that you had the assistance of an independent third-party valuation similar to your disclosure on page F-19.

Contemporaneous Valuations, page 60

16. Please revise your disclosure to include the amount of the discount taken for lack of marketability for each valuation. Please include a discussion of the evidence that supports the amount of the discount selected.

17. Please revise your disclosure to present the intrinsic value of outstanding vested and unvested options as of the most recent balance sheet date based on the estimated IPO price.

18. We may have additional comments on your accounting for stock compensation and related disclosure once you have disclosed an estimated offering price. Please provide quantitative and qualitative disclosures explaining the difference between the estimated offering price and the fair value of each equity issuance.

Recent Accounting Pronouncements, page 73

19. Please note that you are required to retrospectively apply the new accounting pronouncement related to the presentation of OCI for fiscal years, and interim periods within those years, beginning after December 15, 2011. Please revise your disclosure here and on page F-14 accordingly.

Business, page 74

Overview, page 74

20. Please revise to quantify the "steady rise in demand for aesthetic procedures over more than a decade" described on page 74 and the "significant rate" of growth in the facial aesthetics market outside the United States and Canada, referenced on page 76.

21. Some of your disclosure includes scientific or statistical jargon or terms of art that may be unfamiliar to lay readers. Where appropriate, please expand your disclosure to include explanations of terminology so that it may be understood by average investors. Portions of your registration statement that include such terminology include:

    - Your description of sodium deoxycholate as "a well-characterized endogenous compound;"
    - The use of the term "pivotal" to describe the Phase III trials of ATX-101; and
    - The term "validated" to describe the clinician and patient reported scales used to measure product efficacy

Our Drug Candidate: ATX-101, page 80

Nonclinical Program, page 80

Clinical Development Program, page 81

22. If you have submitted an Investigational New Drug application to the FDA, please disclose this fact and state when you filed this application.

23. On pages 80-82, you describe your preclinical and clinical studies. Please expand your discussion to disclose when you began and completed each phase.

24. Please refer to Figures 1-4 on pages 83-86. Much of the description intended to give context to the data reflected in the graphs makes use of highly technical statistical terminology that may not be readily understood by the lay reader. Therefore, please revise Figures 1-4 to explain, in simple terms, the meaning and significance of:

    - "Least Square Mean from Baseline;"
    - "p" values;
    - "modified Intent to Treat (mITT);"
    - "Analysis of Covariance (ANCOVA);"
    - "n = 129;"
    - in Figures 1, 2 and 4, the units of measurement along the y-axis; and
    - in Figures 3 and 4, "Last Observation Carried Forward"

Strategic Relationships, page 93

ATX-101 Collaboration with Bayer Outside of the United States and Canada, page 93

25. In the Risk Factors section on page 23, you indicate that if certain competing products are approved for the reduction of localized fat reduction and sold outside the United States and Canada by a third party, your royalty rate for sales of ATX-101 by Bayer will be significantly reduced. Please expand your disclosure in the Business section to describe the range of royalty rates that will be payable to you if this occurs.

Los Angeles BioMedical Research Institute, page 94

26. We note that your exclusive license with LA Biomed requires the payment of certain development and performance milestones, including a milestone payment of $0.5 million upon receipt of marketing approval of ATX-101. Please expand your disclosure to provide the total aggregate milestones that may be payable to LA Biomed under the license agreement.

Manufacturing, page 95

27. Please expand your disclosure on pages 95 and 96 to describe the material terms of the agreements with Pfizer and Hospira. Your disclosure should include discussion of any contingent payment provisions, and the term and termination provisions.

Intellectual Property, page 96

28. You indicate that your issued patents expire on dates ranging from 2025 to 2032. As you have over 70 issued and allowed patents, please expand your disclosure to discuss the specific dates of expiration for your most significant patents.

29. You state that you have patents issued or allowed in countries that include Australia, Hong Kong, Israel, Mexico, New Zealand, San Marino and South Africa. If you have material patents granted in any other foreign jurisdictions, please expand your disclosure to name such jurisdictions.

Management, page 105

30. Please expand your disclosure of the following individuals to provide a more complete description of their business experience, pursuant to Item 401(e)(1) of Regulation S-K:

    - Dr. Lichtsteiner from August 2008 to September 2009; and
    - Mr. Turner from 2006 to the present.

Limitation on Liability and Indemnification Matters, page 115

31. Please add a risk factor that addresses the risk to your business and financial condition of the provisions in your amended and restated certificate of incorporation that limit the liability of your directors, and require you to indemnify your directors and officers to the fullest extent permitted under Delaware law.

Executive Compensation, page 118

Narrative Disclosure to Summary Compensation Table, page 118

32. You indicate on page 119 that named executive officers are eligible to receive certain payments if the officer resigns for "good reason." Please briefly describe what constitutes "good reason" for purposes of payment.

2011 Cash Incentive Plan, page 119

33. You refer to the product development and individual leadership development goals of Mr. Smither and Dr. Walker on page 120, the achievement of which "had a material impact on the total cash incentive award payable" to each officer. Please briefly expand your disclosure to describe these product development and individual leadership development goals for each officer and how each goal was weighted, if applicable. To the extent that any of the goals were quantitative, your disclosure should also be quantitative.

34. Please disclose the percentage achievement that the board of directors determined for each of Mr. Leonard, Mr. Smither and Dr. Walker with respect to corporate performance measures.

Principal Stockholders, page 133

35. Please disclose the identity of the individual(s) with voting and dispositive power over the shares held by beneficial owner Fidelity Contrafund.

Statements of Redeemable Convertible Preferred Stock and Stockholders' Equity, page F-5

36. Please provide separate captions for common stock and additional paid-in capital in accordance with paragraph 30 of Rule 5.02 of Regulation S-X, or tell us why your presentation is appropriate.

2. Summary of Significant Accounting Policies

Redeemable Convertible Preferred Stock Warrants, page F-10

37. Please revise your disclosure to clarify that upon the consummation of an initial public offering the warrants automatically become exercisable for shares of common stock similar to your disclosure on page 65 and also in Exhibit 4.4. Please clarify in the disclosure that upon such conversion the warrants will be classified as a component of equity and no longer subject to re-measurement.

Other Income, page F-12

38. Please revise your policy for grants received from the government to clarify when other income is recognized. Please explain why it was appropriate to record the full amount received under the Qualified Therapeutic Discovery Credit Program in 2010.

7. Commitments, Collaborations and Contingencies, page F-22

39. Please expand your disclosure to include the length of and termination provisions for all of your material supply agreements.

Collaboration Agreements, page F-22

40. Please expand your disclosure to include the length of and termination provisions for all of your agreements.

Bayer, page F-22

41. Please revise your disclosure to describe each milestone and the related contingent consideration for your Bayer agreement in addition to the $15.8 million milestone payment in connection with the conclusion of Bayer's European Phase III clinical trials for ATX-101 which you expect to receive in the second quarter of 2012. Refer to ASC 605-28-50-2b.

42. Please expand your disclosure to include the amount recognized as an offset to research and development expenses for all periods presented.

Los Angeles Biomedical Research, F-23

43. Please tell us why it is appropriate to defer the non-royalty sublicense fees. Please reference the authoritative literature used in reaching your conclusion.

General

Please supplementally provide us with any written materials that you or anyone authorized to do so on your behalf provide in reliance on Section 5(d) of the Securities Act to potential investors that are qualified institutional buyers or institutional accredited investors. Similarly, please supplementally provide us with any research reports about you that are published or distributed in reliance upon Section 2(a)(3) of the Securities Act of 1933 added by Section 105(a) of the Jumpstart Our Business Startups Act by any broker or dealer that is participating or will participate in your offering.

Please submit your amended confidential draft registration statement and any associated correspondence in a text searchable PDF file on a CD/DVD or in paper to:

Draft Registration Statement
U.S. Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549

Please use your Central Index Key, or CIK number, in your correspondence to us about your submission. If you did not have one when you submitted your confidential draft registration statement, we assigned one to you. You will need your CIK number to make your initial filing on EDGAR and you must take a number of steps to prepare for that filing. Following the procedures set forth in Section 3.3.1.1, of the EDGAR Filer Manual – Volume I at http://www.sec.gov/info/edgar/edgarfm-vol1-v12.pdf, you must:

- Submit a request to us to convert your EDGAR status from a paper to an electronic filer if we generated the CIK number for you.

- Request access codes and passwords to file your registration statement on the EDGAR system. If you already had a CIK number when you submitted your confidential draft, we used that number and you should confirm that you have your access codes available for filing.

  If you need new or replacement EDGAR access codes and passwords, we suggest that you complete the process to obtain them well in advance of your targeted filing date. Please call the Division's Filer Support team at 202-551-8900 (choose option number four) if you have questions about this process. If you do call, please make sure to tell us that we have already assigned a CIK number to your company and have that number available.

- Make any necessary changes to your contact information and business and mailing addresses in EDGAR prior to making your initial filing so we can contact you about your filing.

When you publicly file your confidential draft registration statement and amendments on EDGAR in accordance with Section 106(a) of the JOBS Act, please:

- Attach each submission, including exhibits, to your initial registration statement as a separate Exhibit 99 document and clearly identify each confidential submission attached as an Exhibit 99 document (e.g., "Confidential Draft # 1")**.** Do not attach submissions marked to show changes from earlier submissions.

- Submit each item of correspondence you sent to us in connection with your confidential draft submissions, including your responses to our comments, as a separate "CORRESP" submission on EDGAR.

  As you prepare correspondence to us in connection with your confidential draft registration statement, please keep in mind that we will expect you to submit that same correspondence on EDGAR so that we may publicly post filing review correspondence in accordance with our December 1, 2011 policy (SEC Staff to Release Filing Review Correspondence Earlier). If you intend to use Rule 83 (17 CFR 200.83) to request confidential treatment of information in the correspondence you submit on EDGAR, please properly mark that information in each of your confidential submissions to us so we do not repeat or refer to that information in our comment letters to you.

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: Mark V. Roeder, Esq.
Latham & Watkins LLP
140 Scott Drive
Menlo Park, CA 94025