



DIVISION OF  
CORPORATION FINANCE

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

July 27, 2015

Via E-mail

Joshua R. Disbrow  
Chief Executive Officer  
Aytu BioScience, Inc.  
373 Inverness Parkway  
Suite 200  
Englewood, Colorado 80112

**Re: Aytu BioScience, Inc.  
Registration Statement on Form S-1  
Filed July 1, 2015  
File No. 333-205414**

Dear Mr. Disbrow:

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.

General

1. We note that in August 2014 Tramadol was classified by the Drug Enforcement Administration as a Schedule IV Controlled Substance and it would appear likely that Zertane would in turn receive the same classification. Please describe the likelihood of this designation and its implications in the Summary and in more detail as an independent risk factor. Also disclose how Zertane as a Schedule IV Controlled Substances would be regulated in the Regulation section.

Prospectus Summary  
Company Overview, page 2

2. Please indicate here and in your Business section how and when you acquired the RedoxSYS System.
3. Please remove the reference to the global market for the prevention and treatment for prostate cancer here and wherever else it appears in your filing, as it is not relevant to the projection for the diagnosis and screening segment that you also cite. Please also remove the projection to the global urological disorders market in your second paragraph, as this information is not relevant to either your marketed product or your product development efforts.
4. Where you discuss the projected size of the premature ejaculation market please specify which market you are referring to, e.g. global, North American, U.S., etc.
5. We note your statement on page 3 that you hold method-of-use patents for Zertane. Please indicate whether you developed these patents or whether you licensed or acquired them from a third-party. If so, please identify the third party in your disclosure.

Products, page 3

6. Please indicate here when ProstaScint received FDA approval.
7. Please state here that the RedoxSYS System must receive 510(k) clearance by the FDA prior to being marketed for clinical use in the United States.

Product Pipeline, page 5

8. Please briefly explain more fully the significance of using the Section 505(b)(2) regulatory pathway for the development of Zertane, including the need for fewer clinical trials and more expedited approval, as you have done in your risk factor on page 17.
9. Please explain the description of Zertane's active ingredient, tramadol hydrochloride, as "well characterized."
10. Please note here that you have not yet submitted an Investigational New Drug Application for Zertane and will not until at least the second half of 2015.

Risk Factors

Risks Related to Product Development, Regulatory Approval and Commercialization

“Favorable results in the prior clinical trials of Zertane outside of the United States may not be predictive . . .,” page 13

11. Please include the definition of premature ejaculation you used in your Phase 2 trial in your risk factor in order to explain how your enrollment for it differed from that of the Phase 3 trial and, if it is not self-evident, explain how it was broader than the definition used for Phase 3.
12. Please also amend this risk factor to note that you have not been involved in any of the clinical trials performed to date on Zertane and that you have relied on the data collected by a previous partner of your majority shareholder in determining the course of future development. Please identify this former partner here and wherever else you reference it in your disclosure.

“We face substantial competition from companies with considerably more resources and experience than we have . . .,” page 20

13. Please amend this risk factor to include examples of the companies and their products and/or product candidates that you believe may be competitive with yours. In particular, you should note here that Promescent, an over-the-counter topical spray for the treatment of premature ejaculation, received FDA approval in 2013.

“Our products and product candidates may cause undesirable side effects . . .,” page 22

14. Please amend this risk factor to include examples of the adverse effects identified in the clinical tests performed on Zertane to date and those associated with the use of its active ingredient.

“We face intense competition from established and new companies in the in-vitro diagnostics field,” page 26

15. This risk factor is substantially similar to the one concerning competition on page 20. Please merge them into a single risk factor in order to avoid repetition in your disclosure.

Risks Related to Our Organization, Structure and Operation

“Ampio controls us, including having the ability to control the election of our directors . . .,” page 31

16. This risk factor is substantially similar to the third one on page 37. Please merge them into a single risk factor in order to avoid repetition.

Management's Discussion and Analysis of Financial Condition and Results of Operations  
Results of Operations  
Research and Development, page 46

17. Please disclose the costs incurred during each period presented and to date for the RedoxSYS system and Zertane separately.

Business  
Business Overview, page 53

18. Where you discuss ProstaScint on page 53, please explain the terms "radiopharmaceutical" and "radioimmunoscinigraphy."

Zertane, page 59

19. In your table summarizing the clinical tests performed on Zertane to date, your "Enrollment" column reflects numbers that do not appear to match the number of actual subjects. For example, in the two Phase 1 trials the column indicates that 0 and 4 subjects were enrolled, respectively, while the "Noteworthy Findings" column suggests that at least 13 and 7 subjects were enrolled. Further, the last Phase 3 trial you describe on page 62 indicates that there were 399 subjects enrolled but the Enrollment column states only 56 subjects. Please review this disclosure with a view toward eliminating any discrepancies.

Manufacturing, page 81

20. Please indicate whether the supply agreement with the manufacturer of tramadol hydrochloride referred to here is the contract with Ethylpharm you describe on pages 76-77. If it is not, please file this agreement as an exhibit and also amend this disclosure to identify the manufacturer and state the material provisions of this agreement.

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
- 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 Scot Foley at (202) 551-3383 or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Jeffrey P. Riedler

Jeffrey P. Riedler  
Assistant Director

cc: W. David Mannheim, Esq.  
Alexander M. Donaldson, Esq.  
Wyrick Robbins Yates & Ponton LLP  
4701 Lake Boone Trail, Suite 300  
Raleigh, North Carolina 27607