



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

DIVISION OF
CORPORATION FINANCE

Mail Stop 4720

December 31, 2015

Via E-mail

Walter Klemp
Chief Executive Officer
Moleculin Biotech, Inc.
2575 West Bellfort, Suite 333
Houston, Texas 77054

**Re: Moleculin Biotech, Inc.
Draft Registration Statement on Form S-1
Submitted December 4, 2015
CIK No. 0001659617**

Dear Mr. Klemp:

We have reviewed your 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 draft registration statement or publicly 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 draft registration statement or filed registration statement, we may have additional comments.

Table of Contents, page i

1. You state you have not independently verified any of the market and industry data used throughout your prospectus, and that the accuracy and completeness of such information is not guaranteed. In order to eliminate any inference that you are not liable for all of the information in your registration statement, please delete this statement or include a statement specifically acknowledging your liability for information that appears in your registration statement that was obtained from third party sources.

Prospectus Summary, page 1

2. Please explain, in layman's terms, the meaning of "anthracycline."

Risks Related to Our Business, page 3

3. Please include a bullet point referencing the possibility of side effects in your product candidates, noting that the most recent Phase I/II clinical trial of Annamycin caused two fatalities due to tumor lysis, as stated on pages 2 and 16.
4. Please include a bullet point that addresses your lack of product liability insurance for your clinical trials.

Risk Factors, page 11

5. Please include a risk factor addressing the related-party nature of your pending merger with Moleculin LLC. In particular, because of your affiliation with Moleculin, the transaction by definition will not be conducted on an arm's-length basis. This raises the possibility, therefore, that the parties may agree on terms that are less favorable to the company than in an arms-length negotiation.

"We face competition from other biotechnology and pharmaceutical companies . . .," page 18

6. Please amend your disclosure here and on page 51 to identify your likely principal competitors and their products and/or product candidates that you believe may compete with your own products.

"Annamycin does not have composition of matter patent protection," page 18

7. Please revise the heading and body of this risk factor to clarify that Annamycin is not covered by any existing patent protection, including composition of matter.

"The intellectual property rights we have licensed from MD Anderson are subject to the rights of the U.S. government," page 18

8. Please specify the basis for your belief that no funding agreements currently exist between MD Anderson and the U.S. government that would impact your rights to the WP 1066 and WP1122 portfolios.

"Our acting chief executive officer and our chief operating officer are currently working for us on a part-time basis," page 20

9. Please revise to provide the approximate number of weekly hours your CEO and COO devote to your operations. Please also disclose whether you expect the CEO and the COO to continue to work part-time for you following the IPO.

Use of Proceeds, page 25

10. Please amend this disclosure to list the approximate percentage of offering proceeds you intend to allocate toward each of the purposes listed in the second paragraph of this section. Please also indicate:

- The amount of funds you believe will be necessary to complete the Phase II clinical trial for Annamycin and how far you expect to progress in the trial with the proceeds from this offering, assuming that the minimum, and alternatively, maximum funds are received.
- Please indicate the extent to which you contemplate using offering proceeds to pay down existing debt or to satisfy other obligations, such as your installment payments to MD Anderson for past due fees, discussed on page F-18.

Capitalization, page 28

11. You state on page 8 that 6,661,000 shares of common stock to be outstanding after this offering does not give effect to the [1],924,557 shares of common stock upon the conversion of \$450,000 in principal amount of our outstanding bridge notes, while you state here that such number gives effect to the conversion. Please resolve this discrepancy.

12. Please tell us why you did not reflect the following transaction in the number of shares of common stock to be outstanding after this offering, given that these transactions have/would have occurred by the time the offering closes:

- 629,000 shares issuable upon the execution of the HPI agreement; and
- The automatic conversion of \$200,000 bridge notes issued after September 30, 2015.

Unaudited Pro Forma Combined Financial Information

Note 2 – Preliminary purchase price allocation, page 34

13. Please disclose the method and the significant assumptions you will use to estimate the fair value of the intangible assets you will acquire.

Note 3 – Pro Forma Adjustments, page 36

14. While you provide this pro forma information to reflect the acquisition of Moleculin, you also adjust for some transactions that are triggered by the IPO. Tell us why it is appropriate to reflect the conversion of convertible notes payable by MBI and the repayment of notes payable by Moleculin, as well as eliminating associated interest expense on the pro forma statements of operations.

15. Please revise to reflect, if true, that the note explaining the pro forma adjustment for Moleculin's convertible notes payable and related interest are covered under note (h) with the issuance of 1,000,000 MBI common shares, rather than under (f).
16. Refer to the note (i) of your pro forma adjustment note. Please tell us why you do not reflect MD Anderson's forfeiture to receive common units of Moleculin on your pro forma combined balance sheet. Furthermore, explain why you show this liability as assumed in the acquisition of Moleculin in your purchase price allocation table on page 35, when such liability no longer exists.

Management's Discussion and Analysis of Financial Condition and Results of Operations
Critical Accounting Policies and Significant Judgments and Estimates, page 38

17. Please describe how you estimate the fair value of your common stock underlying the convertible notes payable. In addition, provide us an analysis explaining the reasons for the differences between the recent valuations of your common stock leading up to the IPO and the estimated offering price.

Components of our Results of Operations and Financial Condition, page 39

18. While MBI's activities may have been limited since its incorporation, please provide a discussion for its results of operations and financial condition. For example, we believe an explanation of expenses incurred to date will assist the investors in understanding your activities to date. In addition, disclose the costs incurred during each period presented and to date for each of your product candidates. If you do not maintain any research and development costs by project, disclose that fact and explain why you do not maintain and evaluate research and development costs by project and provide other quantitative or qualitative disclosure that indicates the amount of your resources being used on each of your projects.

Business, page 43

19. We note that Callisto Pharmaceuticals, Inc., a prior developer of Annamycin, decided to suspend further development of Annamycin for acute leukemia on or before December 31, 2008. In its public filings, Callisto stated that the clinical data did not support further clinical evaluation of Annamycin as a single agent treatment for relapsed or refractory adult acute leukemia patients. Accordingly:
 - Please clarify in your disclosure whether the prior clinical trials you discuss on page 45 were conducted by or on behalf of Callisto. If so, please explain:
 - how it is possible to reconcile Callisto's assessment of efficacy with your statements that Annamycin demonstrated efficacy in those trials;
 - how you are defining efficacy; and

- whether statistical significance was demonstrated in the trials you cite
- Please also clarify how long it has been since the prior Phase I and Phase I/II studies you cite were conducted and how long clinical development of Annamycin for the treatment of adult relapsed or refractory acute leukemia has been inactive.
- Please provide the basis for your belief, stated on page 46, that prior drug development activity was terminated for “financial” reasons.

Corporate History, page 43

20. Please provide a succinct discussion that clarifies the transactional history and common relationships among Houston Pharmaceuticals, Inc., IntertechBio Corporation, Moleculin, MBI, Callisto, AnnaMed, MD Anderson, and your officers and major shareholders.
21. Please discuss the terms of your agreement with AnnaMed to acquire the development rights to Annamycin and provide the agreement as an exhibit to your draft registration statement.
22. Please add sections in your disclosure that address:
 - your agreements with Houston Pharmaceuticals, Inc., including disclosure of the material terms regarding Houston Pharmaceutical’s termination of rights to the WP1066 Portfolio and your ongoing negotiations regarding the co-development agreement.
 - the terms of the merger between Moleculin and MBI.

Please also provide these agreements as exhibits to your draft registration statement to the extent they have been executed.

Our License Agreements, page 50

23. Please disclose the extent of any legacy license obligations to which you are subject as a result of your acquisition of the Annamycin development project from AnnaMed. If there are license agreements associated with such obligations, please disclose the material terms and provide these agreements as exhibits to your draft registration statement.
24. Please revise this section to disclose, for each license agreement, the amount of upfront payments, milestone payments, royalty rates and minimum royalties. We note your disclosure of some of this information on pages F-10 and F-18. In addition, please disclose the extent to which you are required to issue equity to MD Anderson upon the occurrence of milestone events.

25. Please disclose the material terms of MD Anderson's right to terminate each of the license agreements.
26. Please provide each license agreement with MD Anderson as an exhibit to your draft registration statement.
27. Please describe the material terms of the Patent and Technology Development and License Agreement with Dermin and provide this agreement as an exhibit to your draft registration statement.

Management, page 58

28. Please disclose Mr. Klemp's business activities during the period prior to July 2015 and following his time as CEO of Zeno Corporation.

Relationships and Related Party Transactions, page 63

29. In each case in this section where you have disclosed the existence of an affiliation between an individual and an entity, please also disclose the specific nature of the individual's affiliation with the respective entity.
30. Please disclose the shares of your common stock that Messrs. Priebe, Klemp and Picker will each receive as a result of your merger with Moleculin.

Notes to Financial Statements

Note 1 – Description of business and Summary of Significant Accounting Policies

Nature of Business, page F-7

31. Please disclose the significant rights and obligations underlying the licenses relating to Annamycin and WP1122. Your obligations may include annual maintenance fees, milestone payments, royalties, and minimum research expense requirements.

Note 7 – Subsequent Events, page F-9

32. Please tell what you received in exchange for assuming IntertechBio Corporation's liability and why it is appropriate to classify related repayment as prepaid expenses.

Moleculin, LLC.

Audited Financial Statements

Statement of Cash Flows, page F-13

33. Please tell us why you believe the \$232,300 cash received from other receivable should be classified as an operating activity.

Notes to Financial Statements

Note 1 – Description of Business and Summary of Significant Accounting Policies, page F-25

34. Please disclose how you account for the agreements under which you grant rights to your technology in exchange for the licensee's grant funding to pay for development costs. Cite the relevant accounting literature to support your accounting.

Other Comments

35. Please supplementally provide us with copies of all written communications, as defined in Rule 405 under the Securities Act, that you, or anyone authorized to do so on your behalf, present to potential investors in reliance on Section 5(d) of the Securities Act, whether or not they retain copies of the communications.
36. Please confirm that the graphics included in your registration statement are the only graphics you will use in your prospectus. If those are not the only graphics, please provide any additional graphics prior to their use for our review.

You may contact Keira Nakada at (202) 551-3659 or Lisa Vanjoske at (202) 551-3614 if you have questions regarding comments on the financial statements and related matters. Please contact Scot Foley at (202) 551-3383, Daniel Greenspan at (202) 551-3623 or me at (202) 551-3675 with any other questions.

Sincerely,

/s/ Daniel Greenspan for

Suzanne Hayes
Assistant Director
Office of Healthcare and Insurance

cc: Cavas S. Pavri
Schiff Hardin LLP
100 N. 18th, Suite 300
Philadelphia, PA 19103