Cooley LLP

December 29, 2014

U.S. Securities and Exchange Commission
Division of Corporate Finance
100 F Street, N.E.
Washington D.C. 20549
Attn: Jeffrey P. Riedler, Assistant Director

RE: Flex Pharma, Inc.
Amendment No. 1 to Draft Registration Statement on Form S-1
Submitted December 8, 2014
CIK No. 0001615219

Dear Mr. Riedler:

On behalf of Flex Pharma, Inc. (the "***Company***"), we are submitting this letter and the following information in response to comments received from the staff (the "***Staff***") of the Securities and Exchange Commission (the "***Commission***") by letter, dated December 19, 2014, regarding the Company's Amendment No. 1 to Draft Registration Statement on Form S-1 (the "***Amended Draft Registration Statement***") submitted December 8, 2014. We are also filing the initial public filing of the Registration Statement on Form S-1 (the "***Registration Statement***"). We are sending the Staff a hard copy of this letter and the Registration Statement, including a version of the Registration Statement that is marked to show changes to the Amended Draft Registration Statement.

Set forth below are the Company's responses to the Staff's comments. The numbering of the paragraphs below corresponds to the numbering of the comments received from the Staff, which for your convenience we have incorporated into this response letter in italics. Page references in the text of this response letter correspond to the page numbers of the Registration Statement. Capitalized terms used in this letter but otherwise not defined herein shall have the meanings assigned to such terms in the Registration Statement.

Prospectus Summary
Product Development, page 2

1. *Please modify your description of the company throughout the prospectus to remove all references to the company being a "biopharmaceutical company" when you have no pharmaceuticals currently undergoing clinical trials and no definitive plans to do so. Further, remove the drug products appearing in the table entitled "Drug Product Candidates Development Plans" on page 4 and elsewhere in the prospectus. The development of your product as a drug is too uncertain at this time to give it such prominence. We note, however, that it is appropriate for you to discuss possible plans to pursue a drug pathway in the text after you discuss your ongoing efforts to develop the product as a dietary supplement.*

   Response: The Company respectfully acknowledges the Staff's comment. In response to the Staff's comment, the Company has revised the disclosure on pages 1, 5, 11, 34, 36, 53, 62, 65, 69 and F-7 of the Registration Statement to remove the description of the Company being a "biopharmaceutical company." Further, in response to the Staff's comments, the Company has revised the table entitled "Drug Product Candidate Development Plans" on pages 4, 5, 66 and 77 of the Registration Statement. In particular, the Company's consumer product development plans are now listed first because the Company believes its consumer product will be its first product commercialized, and the Company has removed the future development plans column from the pre-clinical drug product candidates development plans section of the table.

Risk Factors

Clinical development involves…, page 16

2. *In the first sentence of the second paragraph of the risk factor on page 16, you now state that you "are currently developing drug product candidates for the treatment of nocturnal leg cramps and spasms associated with severe neuromuscular conditions." You should eliminate this sentence and any similar disclosure throughout the prospectus. The studies you are planning will test the product in its dietary supplement form and you have not yet made the decision to pursue the development of your product as a drug which will require reformulation and more rigorous clinical study. It is acceptable to say that you may develop the product as a drug in the future pending the results of your planned proof-of-concept study.*

   Response: In response to the Staff's comments, the Company has revised the disclosure on pages 16 and 69 of the Registration Statement.

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Please fax any additional comment letters concerning the Amended Registration Statement to (617) 937-2400 and direct any questions or comments concerning the Amended Registration Statement or this response letter to the undersigned at (617) 937-2316.

Sincerely,

/s/ Marc A. Recht

Marc A. Recht

cc: Christoph Westphal, Flex Pharma, Inc.
Robert Hadfield, Flex Pharma, Inc.