



DIVISION OF
CORPORATION FINANCE

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

May 23, 2012

Via Email

Mr. Richard Brajer
Chief Executive Officer
LipoScience, Inc.
2500 Sumner Boulevard
Raleigh, NC 27616

**Re: LipoScience, Inc.
Amendment to Registration Statement on Form S-1
Filed April 27, 2012
File No. 333-175102**

Dear Mr. Brajer:

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.

Prospectus Summary

1. Please provide us with copies of the 2008 joint consensus statement by the American Diabetes Association and the 2011 recommendations by the National Lipid Association.

Risk Factors, page 12

2. We note your disclosure on page 27 and elsewhere that you voluntarily withdrew your 510(k) premarket notification to the Federal Drug Administration to resolve "issues" identified by the FDA with respect to your submission. With a view to clarifying disclosure, please advise us of the issues and provide us with the basis for your belief that you will be able to be cleared by the FDA in 2013.

Dilution, page 41

3. We note your disclosure that, as of December 31, 2011, you had a deficit in net tangible book value of \$(41.6) million, or approximately \$(11.91) per share of common stock. Please confirm our understanding that you include deferred offering costs in your calculation of net tangible book value and, if so, tell us why you include these assets that cannot be sold separately from all other assets of the business.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 45

4. We note your disclosure on pages 46 and 49 regarding your "direct distribution channel" and the 11.3% decrease in average selling price due to "a continuing shift in channel mix toward clinical laboratory customers." Please revise to further clarify in quantitative and qualitative terms the makeup of your channel customers. Your revised disclosure should further clarify material trends, events and uncertainties with respect to the channel mix and customers. See comment 18 of our letter dated July 20, 2011.
5. We note that the full \$6 million is owed on the term loan and the revolving line of credit is "scheduled to expire in May 2012." Please revise to further clarify and update your liquidity condition and your internal and external sources of liquidity.

Business, page 78

Research and Development, page 89

6. We note the reference to your recent patent license agreement with the Cleveland Clinic and your belief that a recent discovery may lead to new diagnostic tests and approaches to the treatment of heart diseases. Please revise here and elsewhere as appropriate to address the material terms of this agreement and your research and development activities as it relates to new diagnostic tests. Also, please file the patent license agreement or advise.

Supply Agreements, page 91

7. We note your disclosure on page 91 regarding the supply agreement negotiations with Agilent. Please provide an updated timeframe for completing these negotiations and confirm that the agreement will be filed under Item 601(b)(10) of Regulation S-K.

Index to Financial Statements, page F-1

8. Please update your financial statements, as applicable, pursuant to Rule 3-12 of Regulation S-X.

Notes to Financial Statements, page F-7

10. Stock Option and Equity Incentive Plans, page F-28

9. We note the weighted average exercise price of \$1.83 for the 731,100 stock options granted in fiscal 2011. We further note on page 59 that the exercise prices of these options were between \$3.34 and \$4.77. Please explain to us how you arrived at the weighted average exercise price of \$1.83 for these options or revise as necessary.

16. Quarterly Results of Operations (unaudited), page F-37

10. We note that the sum of certain amounts in your quarterly results of operations do not reconcile to the respective amounts in your fiscal 2010 and 2011 statements of operations on page F-4. Please revise your quarterly results of operations as necessary, or provide a footnote to explain the reason(s) for such differences.

Other

11. Please note that we are considering your telephonic question and disclosure relating to your “emerging growth company” status.

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.

You may contact Steve Lo at (202) 551-3394 or John Archfield at (202) 551-3315 if you have questions regarding comments on the financial statements and related matters. Please contact Jay Williamson at (202) 551-3393 or Jim Lopez at (202) 551-3536 with any other questions.

Sincerely,

/s/ James Lopez (for)

John Reynolds
Assistant Director