



DIVISION OF
CORPORATION FINANCE

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

January 16, 2014

Via E-mail

Pratik Shah, Ph.D.
President and Chief Executive Officer
Auspex Pharmaceuticals, Inc.
3366 N. Torrey Pines Court, Suite 225
San Diego, California 92037

**Re: Auspex Pharmaceuticals, Inc.
Amendment No. 1 to Registration Statement on Form S-1
Filed January 10, 2014
File No. 333-193013**

Dear Dr. Shah:

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.

Capitalization, Page 45

1. Please expand your pro forma disclosures throughout the filing to explain why assuming that the convertible preferred stock will be converted into common stock is factually supportable. Your disclosure on F-20 indicates that automatic conversion occurs only if the price per share in an underwritten public offering exceeds \$2.59. Refer to rule 11-02(b)(6) of Regulation S-X.
2. The Capitalization section discloses that outstanding convertible preferred stock will convert into 68,790,302 shares of common stock upon the closing of the offering on a pro forma basis, while disclosures elsewhere indicates that it will convert into 64,790,302 shares of common stock. Please explain to us the reason for this difference, and revise your pro forma disclosure accordingly.

Business

Planned Clinical Development of SD-809 in Additional Indications, page 85

3. We note on page 85 that you are planning a Phase 2/3 clinical trial of SD-809 for the treatment of drug-induced tardive dyskinesia for which you anticipate scheduling a pre-IND meeting with the FDA in early 2014. Please update your disclosure to the extent that you have scheduled or met with the FDA for a pre-IND meeting to discuss SD-809 for the treatment of drug-induced tardive dyskinesia.

Principal Stockholders, page 134

4. We note on page 136 that the percentage ownership information in the security ownership table excludes the share that may be acquired pursuant to stock options granted on January 10, 2014, all of which are subject to a right of repurchase by the company as of March 1, 2014. We also note on page 113 that these options vest over a one or four year period in some instances. Please revise your disclosure to include those shares that may be acquired pursuant to such stock options if the beneficial owner has the right to acquire beneficial ownership as specified in Rule 13d-3(d)(1) under the Exchange Act.

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

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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 Scott Wuenschell at (202) 551-3467 or Mark Brunhofer at (202) 551-3638 if you have questions regarding comments on the financial statements and related matters. Please contact Matthew Jones at (202) 551-3786 or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Jeffrey P. Riedler

Jeffrey P. Riedler
Assistant Director

cc: Frederick Muto, Esq.
Cooley LLP
4401 Eastgate Mall
San Diego, California 92121