



DIVISION OF
CORPORATION FINANCE

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

February 18, 2015

Via E-mail

John D. Mendlein, Ph.D.
Chief Executive Officer and Executive Chairman
aTyr Pharma, Inc.
3545 John Hopkins Court, Suite #250
San Diego, CA 92121

**Re: aTyr Pharma, Inc.
Amendment No. 1 to Draft Registration Statement on Form S-1
Submitted February 2, 2015
CIK No. 0001339970**

Dear Dr. Mendlein:

We have reviewed your amended draft registration statement and have the following comment.

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 comment applies 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 this comment and your amended draft registration statement or filed registration statement, we may have additional comments.

Prospectus Summary, page 1

1. We note on page 95 that you believe data from your Fc fusion experiments may produce data that will provide iModFc molecules for you to explore. We also note on page 96 that you are continuing to investigate potential therapeutic Physiocrines that may have the potential to inhibit inflammation in both the lung and the liver. As you do not have a drug candidate for your programs identified by the arrows labeled "iModFc non-RMIC," "Liver," or "Lung." Please eliminate these programs from the pipeline table on pages 2 and 80.

John D. Mendlein, Ph.D.
aTyr Pharma, Inc.
February 18, 2015
Page 2

You may contact 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, Bryan Pitko at (202) 551-3203 or me at (202) 551-3715 with any other questions.

Sincerely,

/s/ Bryan J. Pitko for

Jeffrey P. Riedler
Assistant Director

cc: Kingsley L. Taft
Maggie L. Wong
Mitzi Chang
Goodwin Procter LLP
3 Embarcadero Center, 24th Floor
San Francisco, CA 94111