June 18, 2024

VIA EDGAR

U.S. Securities and Exchange Commission
Division of Corporation Finance
Office of Life Sciences
100 F Street, N.E.
Washington, D.C. 20549
Attn: Lynn Dicker
Kevin Kuhar

Re: aTyr Pharma, Inc.
Form 10-K for fiscal Year Ended December 31, 2023
File No. 001-37378

Dear Lynn Dicker and Kevin Kuhar:

We are writing in response to the comment received from the staff (the "***Staff***") of the Securities and Exchange Commission (the "***Commission***") by letter dated June 6, 2024 with respect to the above-referenced filing of aTyr Pharma, Inc. (the "***Company***"). For your convenience, we have repeated the Staff's comment before the Company's response below.

Form 10-K for Fiscal Year Ended December 31, 2023
Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations Research and Development Expenses, page 68

1. *We note from the pipeline table on page 6 that you have multiple products in clinical development for several indications. Please revise future filings to disclose the costs incurred during each period presented for each of your key research and development product candidates. If you do not track your research and development costs by project, disclose that fact and explain why you do not maintain and evaluate research and development costs by project. Also, revise to provide other quantitative and qualitative disclosures that give more transparency as to the type of research and development expenses incurred (i.e., by nature or type of expense) which should reconcile to total research and development expenses on your Statements of Operations*.

We acknowledge the Staff's comment and respectfully advise the Staff that we currently track the majority of our product candidate costs for efzofitimod, our only product candidate in clinical development, which drives the majority of our total research and development ("***R&D***") expense. For efzofitimod, we primarily outsource our clinical development efforts, including work with clinical research organizations to administer clinical trials, as well as contracted development and manufacturing organizations to manufacture the drug product needed to conduct the clinical trials and other studies to support the advancement of the product candidate. These external expenses are substantially higher than the expenses we incur on our other product candidates which are all in preclinical development, and we believe tracking R&D expenses for our preclinical product

candidates would not materially enhance an investor's understanding of our total R&D expenses. Further, the nature of the internal expenses incurred to advance candidates through preclinical development is primarily personnel expenses and laboratory supply expenses. We do not fully track or allocate these internal expenses between preclinical product candidates because the expenses can often be shared between candidates. Additionally, we incur other shared expenses to support our R&D efforts such as facilities expenses, and these expenses are not allocated to efzofitimod or the preclinical product candidates. Finally, our non-cash R&D expenses such as depreciation and stock-based compensation are not tracked or allocated between product candidates and are shared among all product candidates.

Given that the majority of our R&D expenses are for efzofitimod, which we track, and that we do not fully track and allocate external and internal R&D expenses for our other preclinical product candidates or for certain shared R&D expenses, we intend to enhance our tabular disclosures of R&D expenses in our future periodic reports as shown below. Additionally, we will continue to provide narrative disclosure about the material drivers affecting period-over-period changes in R&D expenses.

The following table summarizes our results of operations for the [ ] months ended [ ] and [ ] (in thousands):

	[ ] Months Ended [ ]		
	2024	**2023**	**Change**
Research and development expenses:			
Efzofitimod expenses	$ —	$ —	$ —
Preclinical development and other shared research and development expenses	—	—	—
Non-cash expenses (depreciation and stock-based compensation)	—	—	—
Total research and development expenses	$ —	$ —	$ —

* * * * *

The Company respectfully requests the Staff's assistance in completing the review of the Company's response as soon as possible. Please advise us if we can provide any further information or assistance to facilitate your review. Please direct any further comments or questions regarding this response letter to me at (858) 731-8389.

Sincerely,

aTyr Pharma, Inc.

By: /s/ Jill M. Broadfoot
Jill M. Broadfoot
Chief Financial Officer

cc: Sanjay S. Shukla, M.D., M.S.
Chief Executive Officer
aTyr Pharma, Inc.

Nancy E. Denyes
General Counsel
aTyr Pharma, Inc.

Charles J. Bair
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Nicholaus E. Johnson
Cooley LLP