

November 15, 2023

EDGAR CORRESPONDENCE

U.S. Securities and Exchange Commission
Division of Corporation Finance
Office of Life Sciences
100 F Street, N.E.
Washington, D.C. 20549
Attn: Laura Crotty and Dillon Hagius

Re: Aeglea BioTherapeutics, Inc.
Registration Statement on Form S-1
Filed on August 7, 2023
File No. 333-273769

Ladies and Gentlemen:

On behalf of Aeglea BioTherapeutics, Inc. (the “*Company*” or “*Aeglea*”), this letter responds to the comments of the staff of the Securities and Exchange Commission Division of Corporation Finance (the “*Staff*”) contained in your letter, dated October 20, 2023 (the “*Comment Letter*”) regarding the above-referenced Registration Statement on Form S-1 (the “*Amended Registration Statement*”), which was originally filed on Form S-3 on August 7, 2023. The Staff’s comments are set forth below, followed by the Company’s responses following our call with Staff on November 9, 2023. For ease of reference, the heading and numbered paragraphs below correspond to the heading and numbered comments in the Comment Letter. The Company’s responses are set forth in ordinary type beneath the Staff comment, which is set out in bold type. References are made to the Company’s Amendment No. 1 to the Amended Registration Statement (“*Amendment No. 1*”).

General

- We note the representation in Section 2.4 of the Agreement and Plan of Merger, filed on June 23, 2023 as exhibit 2.1 to Aeglea’s Form 8-K, that Spyre’s holders were required to consent to the merger. We further note your Form S-1 seeks to registers the resale of securities issued and issuable to Spyre’s security holders as consideration for the merger. Please revise to identify all former affiliates of Spyre reselling pursuant to this Form S-1 as underwriters and fix a selling price for the duration of their offering. See Securities Act Rule 145(c).**

In response to the Staff’s comment, the Company has removed all former affiliates of Spyre from the selling stockholder table in Amendment No. 1. Specifically, the Company has removed as selling stockholders Fairmount Healthcare Fund L.P., Fairmount Healthcare Fund II L.P., Fairmount Healthcare Co-Invest L.P., Paragon Therapeutics, Inc., Parapyre Holding LLC and

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Spyre Advisors LLC, which were the only former affiliates of Spyre listed as selling security holders in the Registration Statement (including both shares acquired as merger consideration and shares purchased for cash from the Company in the concurrent private placement).¹ Additionally, the Company has elected to remove Cameron Turtle, Ph.D. as a selling stockholder from the Registration Statement. Dr. Turtle was not an affiliate of Spyre at the time of the merger, but is currently an officer of the Company and was a consultant of Spyre at the time of the merger. None of the remaining selling stockholders set forth in Amendment No. 1 were officers, directors or greater-than-10% holders of Spyre capital stock at the time of the Spyre stockholder vote or as of the consummation of the merger with Aeglea.

2. Please revise to remove all incorporation by reference from the Form S-1 and file a complete prospectus with your amendment. See General Instruction VII.D.1.b to Form S-1.

In response to the Staff's comment, the Company has amended the Amended Registration Statement by removing all information previously incorporated by reference and has filed a complete prospectus with Amendment No. 1.

Thank you for your consideration of this response. If you have any questions regarding the response set forth above, please do not hesitate to call me at (415) 393-8373 or Branden Berns at (415) 393-4631.

Sincerely,

/s/ Ryan A. Murr

Ryan A. Murr

cc: Thomas Kim, Gibson, Dunn & Crutcher LLP
Brian Lane, Gibson, Dunn & Crutcher LLP
Cameron Turtle, Aeglea BioTherapeutics, Inc.
Scott Burrows, Aeglea BioTherapeutics, Inc.
Heidy King-Jones, Aeglea BioTherapeutics, Inc.

¹ For purposes of this response, we have defined "affiliates" of Spyre at the time of the merger as all officers, directors and holders of at least 10% of the issued and outstanding capital stock of Spyre. As Fairmount and entities controlled by Fairmount or under common control with Fairmount owned approximately 93% of Spyre at the time of the merger, these Fairmount-affiliated entities were in "control" of Spyre for purposes of affiliate status under Rule 405 under the Securities Act. No parties remaining listed as selling stockholders are controlled by Fairmount or under common control with Fairmount.