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From synaptic input to muscle contraction: arm muscle cells of *Octopus vulgaris* show unique neuromuscular junction and excitation–contraction coupling properties

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Review timeline
Original submission: 5 June 2019
Revised submission: 30 July 2019
Final acceptance: 5 August 2019

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Review History

RSPB-2019-1278.R0 (Original submission)

Review form: Reviewer 1

Recommendation
Accept as is

Scientific importance: Is the manuscript an original and important contribution to its field?
Excellent

General interest: Is the paper of sufficient general interest?
Excellent

Quality of the paper: Is the overall quality of the paper suitable?
Good

Is the length of the paper justified?
Yes

Should the paper be seen by a specialist statistical reviewer?
No

Do you have any concerns about statistical analyses in this paper? If so, please specify them explicitly in your report.
No

It is a condition of publication that authors make their supporting data, code and materials available - either as supplementary material or hosted in an external repository. Please rate, if applicable, the supporting data on the following criteria.

Is it accessible?
N/A

Is it clear?
N/A

Is it adequate?
N/A

Do you have any ethical concerns with this paper?
No

Comments to the Author
The present manuscript is an important step in better understanding how the flexible muscular hydrostat system of an octopus works. The authors combine functional and morphological data to help understand how this system is controlled and operated.
While the paper is scientifically amazing its style and language need some work and editing by native speakers.

Review form: Reviewer 2

Recommendation
Accept with minor revision (please list in comments)

Scientific importance: Is the manuscript an original and important contribution to its field?
Excellent

General interest: Is the paper of sufficient general interest?
Excellent

Quality of the paper: Is the overall quality of the paper suitable?
Excellent

Is the length of the paper justified?
Yes

Should the paper be seen by a specialist statistical reviewer?
No

Do you have any concerns about statistical analyses in this paper? If so, please specify them explicitly in your report.
No

It is a condition of publication that authors make their supporting data, code and materials available - either as supplementary material or hosted in an external repository. Please rate, if applicable, the supporting data on the following criteria.

Is it accessible?
Yes

Is it clear?
Yes

Is it adequate?
Yes

Do you have any ethical concerns with this paper?
No

Comments to the Author
This is a fine paper addressing the neuromuscular physiology of cephalopod muscle. It is quite well written and informative, and the results are technically well acquired. The only quibble I have is that the authors are so wrapped up with the octopus as an "intelligent" animal that they seem to only wish to compare it with mammals and arthropods in terms of physiology and behavior. It would be appropriate here to briefly review the previous literature, on molluscan neuromuscular physiology and structure. It is, after all, more germane to a comparative work. In particular, there is a body of work on pelecypods and gastropods that ought to be consulted. Indeed, gastropods are the sister group to cephalopods and there are many resemblances. The authors might look at Gilloteaux, Z. Zellforsch. 124, 204-216 (1972) for commonalities, and the review Heyer and Kater, AMER. ZOOL., 13:247-270 (1973), could be a useful place to start. I think that without that, the vertebrate and arthropod comparisons don't have significant impact beyond "gee-whiz". The case is claimed that cephalopods have a unique neuromuscular system, but the evidence is certainly incomplete. And it came from somewhere.

Decision letter (RSPB-2019-1278.R0)

16-Jul-2019

Dear Dr Zullo

I am pleased to inform you that your Review manuscript RSPB-2019-1278 entitled "From synaptic input to muscle contraction: arm muscle cells of Octopus vulgaris show unique neuromuscular junction and E-C coupling properties" has been accepted for publication in Proceedings B. Congratulations!

The referee(s) do not recommend any further changes. Therefore, please proof-read your manuscript carefully and upload your final files for publication. Because the schedule for publication is very tight, it is a condition of publication that you submit the revised version of your manuscript within 7 days. If you do not think you will be able to meet this date please let me know immediately.

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All supplementary materials accompanying an accepted article will be treated as in their final form. They will be published alongside the paper on the journal website and posted on the online figshare repository. Files on figshare will be made available approximately one week before the accompanying article so that the supplementary material can be attributed a unique DOI. Please see: https://royalsociety.org/journals/authors/author-guidelines/

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Once again, thank you for submitting your manuscript to Proceedings B and I look forward to receiving your final version. If you have any questions at all, please do not hesitate to get in touch.

Sincerely,
Professor John Hutchinson, Editor
mailto:proceedingsb@royalsociety.org

Associate Editor Board Member: 1
Comments to Author:
Your manuscript has now been reviewed by two external reviewers. Both agree the research is very interesting and of high quality. When revising the manuscript, please take Reviewer 2's comment into strong consideration by making sure to expand your comparative framework to mollusks more broadly. Please also review the text for clarity and grammatical consistency.

Reviewer(s)' Comments to Author:

Referee: 1

Comments to the Author(s)
The present manuscript is an important step in better understanding how the flexible muscular hydrostat system of an octopus works. The authors combine functional and morphological data to help understand how this system is controlled and operated.
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Referee: 2

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Author's Response to Decision Letter for (RSPB-2019-1278.R0)

See Appendix A.

Decision letter (RSPB-2019-1278.R1)

05-Aug-2019

Dear Dr Zullo

I am pleased to inform you that your manuscript entitled "From synaptic input to muscle

contraction: arm muscle cells of Octopus vulgaris show unique neuromuscular junction and E-C coupling properties" has been accepted for publication in Proceedings B. Congratulations!!

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Thank you for your fine contribution. On behalf of the Editors of the Proceedings B, we look forward to your continued contributions to the Journal.

Sincerely,

Professor John Hutchinson
Editor, Proceedings B
mailto: proceedingsb@royalsociety.org

Appendix A

Dear Prof. John Hutchinson

We want to thank the Reviewers for their comments. As a response to Associate Editor Board Member: 1 and Referee: 2 Comments to the Author(s) we added a new section of broad comparison the octopus neuromuscular system of the arm to those other mollusks emphasizing the large diversity that is found in other mollusks neuromuscular system (paragraph starts at page 11 line 28). In addition, we revised the section that compares the octopus arm neuromuscular system to those of vertebrate and arthropods explaining why the comparison to these systems is more relevant for understanding the functional implication of our findings. We think this give an instructive bottom-up view on the organization of motor control of flexible arms (Page 12 line 5).

We also revised the entire text for spelling and grammar slips.

We thank you for the appreciation of our work and for your support.

Sincerely

Nir Nesher

Letizia Zullo