

Review of: "Modelling Skeletal Muscle Motor Unit Recruitment Contributions To Contractile Function: Part 2 — Total (aerobic + anaerobic) ATP Turnover"

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Potential competing interests: No potential competing interests to declare.

"Modelling Skeletal Muscle Motor Unit Recruitment Contributions to Contractile Function: Part 2 - Total (aerobic + anaerobic) ATP Turnover".

This research aimed to expand the understanding of the energetics of skeletal muscle contractions through modeling the total ATP turnover (totATPto = aerobic + anaerobic) of different muscle fiber types and motor units. This research has addressed a critical gap in the existing literature by developing a comprehensive model for quantifying totATPto in skeletal muscle at the muscle fiber level and motor unit level, while also accounting for metabolic differences between the divergent muscle fiber types. The scarcity of research in this area highlights the need for further investigations. The results provide valuable insight into totATPto, from single motor units to overall totATPto under varying conditions of motor unit recruitment and contraction frequencies.

While these findings provide valuable insights and are particularly relevant when compared to prior studies and provide a foundation for future research, the manuscript requires extensive improvements for clarity and readability. The major critiques and suggestions are outlined below:

Major Critiques and Suggestions:

1. The statement, "The purpose of this research was to extrapolate prior measured and ... resulting in estimates for cellular totATPto," should be moved to the beginning of the abstract for better clarity and emphasis on the study objective.
2. Introduction: The introduction should include a clear statement of the purpose of this manuscript, along with an explanation of why this research is necessary.
3. In the sentence, "This study did not investigate or calculate data ... anATPto equaling 88.35 mmol×L-1 muscle water," it is unclear whether you are referring to the present study or the study by Spriet et al. (3). Please clarify this point.
4. In the statement, "Results revealed that the muscle ... 109.34 mmol×L-1 muscle water," the method for calculating resting ATP is not adequately explained. Please provide a clear explanation of how this value was derived.
5. The paragraph stating, "Although prior research completed calculations ... for totATPto will be much larger than anATPto," requires appropriate references to support the claims made.
6. Methods: Including a flow diagram would be beneficial for readers, particularly in understanding the different steps

involved in the methods, especially for modeling both fiber type and motor unit ATP.

7. Figure 3: The figure presents cumulative totATPto for:

a. 80 - 20% ST to FT expression, b) 60 - 40%, c) 40 - 60%, and d) 20 - 80%.

To improve clarity, ensure that this information is included within the respective sub-figures, as it is currently difficult to differentiate between the conditions. Additionally, standardizing the Y-axis range across all sub-figures would facilitate visual comparison. At present, the sub-figures are too similar, making it hard to distinguish them.

Minor Typographical Errors:

Correct the typographical errors in the whole manuscript

e.g., 'Fibre' should be corrected to 'Fiber' and 'Referencesw' should be corrected to 'References'.