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The Effect of Swimming Exercise on Memory Impairment and Inflammatory Cytokines Caused by Lipopolysaccharide Injection in Male Rats

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1. Round 1

1.1 Reviewer 1

Date: 13 July 2024

Reviewer:

In the introduction, while you highlight that “the precise mechanisms by which exercise reduces inflammatory factors remain somewhat unclear,” it would strengthen the manuscript to briefly mention specific studies that have attempted to elucidate these mechanisms, even if inconclusive, to contextualize the gap your study addresses (e.g., paragraph 2, line 5).

The description of the memory behavioral tests lacks detail regarding the specific criteria for evaluating performance. Including the scoring system or the specific metrics used to assess memory in the T-maze, Y-maze, and novel object recognition tests would enhance reproducibility (e.g., Methods and Materials, Memory Behavioral Tests).

The statistical methods section should clarify whether post-hoc tests were conducted following the ANOVA to identify specific group differences. This is important for readers to understand how significance was determined across groups (e.g., Data Analysis, paragraph 1).

In Table 1, the reported values are means and standard deviations, but it would improve clarity to include the exact sample size (n) for each group in the table or in the legend. This would provide better context for the reported statistical results (e.g., Findings and Results, Table 1).

Authors revised the manuscript and uploaded the updated document.

1.2 Reviewer 2

Date: 14 July 2024

Reviewer:

The introduction should explicitly state the hypothesis being tested. Currently, the study's aim is clear, but the hypothesis that swimming will mitigate LPS-induced memory impairment and inflammation could be more prominently articulated (e.g., paragraph 3, end).

The choice of NMRI mice as a model is not fully justified. A brief rationale explaining why this particular strain was chosen, considering its relevance to neuroinflammatory studies, would be beneficial (e.g., Methods and Materials, paragraph 1).

In the swimming protocol description, the explanation of water depth changes and the rationale behind these specific increments is unclear. It would be useful to explain why these specific depths were chosen and how they correlate with stress levels or exercise intensity (e.g., Methods and Materials, Swimming Exercise Protocol).

The methods section does not clearly describe the conditions under which the control animals were kept. It would be helpful to include a statement about the conditions of the non-exercise group during the time the other groups were swimming (e.g., Methods and Materials, Control Group 1).

In the results section, it is mentioned that “there is a significant difference in the levels of TNFα and IL1 among at least one group.” This statement is vague; it would be clearer to specify which groups were significantly different from each other and include the exact p-values (e.g., Findings and Results, paragraph 2).

The discussion references previous studies but lacks a detailed comparison of how the present findings align or contrast with those studies. Including a paragraph that explicitly compares the cytokine reductions observed in this study with those in similar studies would add depth (e.g., Discussion, paragraph 2).

The discussion mentions that “swimming could influence the levels of IL-1 and TNF-α” but does not delve into potential molecular mechanisms that might explain this effect. Including a discussion of possible pathways, even speculative ones, would strengthen the manuscript (e.g., Discussion, paragraph 3).

Authors revised the manuscript and uploaded the updated document.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.

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