Peer-Review Report

Peer Review of “Material-Driven Therapeutics to Establish a Penetrating Traumatic Brain Injury Rat Model and Implantation of a 3D-Printed Scaffold: Pre-Experimental Pilot Study”

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Published Article: https://bio.jmirx.org/2026/1/e75613

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Keywords: penetrating traumatic brain injury; stereotaxic surgery; graphene; nerve tissue engineering; rat model

This is a peer review report for “Material-Driven Therapeutics to Establish a Penetrating Traumatic Brain Injury Rat Model and Implantation of a 3D-Printed Scaffold: Pre-Experimental Pilot Study.”

Round 1 Review

General Comments

The manuscript [1] presents a well-rationalized pilot study aimed at establishing a reproducible penetrating traumatic brain injury rat model that permits controlled blood-brain barrier disruption and scaffold implantation. Its strengths lie in the thorough description of surgical methods, appropriate use of immunohistochemical markers, and clear identification of mild focal injury in most animals. The incorporation of poly(d,l-lactide-co-glycolide (PLGA)/reduced graphene oxide (rGO) scaffolds and the evaluation of their biocompatibility add translational relevance.

Specific Comments

Major Comments

1. A key weakness of the study is its very small sample size (n=4), which substantially limits the statistical power, generalizability, and reliability of the conclusions. With such a low n, it becomes difficult to determine whether the observed variability—particularly the severe inflammatory response in one animal—reflects true biological differences, procedural inconsistencies, or random outliers.
2. The study lacks control groups—including a sham surgery group and a traumatic brain injury–only group—preventing clear attribution of histological changes to either the injury model or the implanted scaffold.
3. The behavioral assessment is limited to a modified neurological severity score, which is often insensitive to mild or focal injuries and may miss subtle cognitive or sensorimotor deficits.
4. The study would be strengthened by incorporating additional validated behavioral tests.

Round 2 Review

General Comments

This paper is acceptable.

Conflicts of Interest

None declared.

References

1. Harley-Troxell ME, Dennis M, Dhar M. Material-driven therapeutics to establish a penetrating traumatic brain injury rat model and implantation of a 3D-printed scaffold: pre-experimental pilot study. JMIRx Bio. 2026;4:e75613. [doi: 10.2196/75613]

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