

### **Open peer review report 1**

**Reviewer:** Christopher J Andrews, University of Queensland, School of Medicine, Australia.

#### **Comments to the authors:**

Review of Traumatic Brain Injury Induces hippocampal long-term depression in the dentate gyrus of rats.

I am happy with this paper. I believe it is worthy of publication.

I have no objection to my identity being disclosed to the authors.

The argument of the paper is as follows.

Increased hippocampal regional excitability is associated with cognitive deficits and possibly remote epilepsy.

The paper investigates TBI and its association with hippocampal cell loss and hippocampal regional excitability, via depression of the dentate gyrus.

Cell loss and depression of the DG removes brakes on excitability, so excitability increases.

TBI was shown to reduce cellularity in the DG part of the hippocampus followed by increased DG excitability.

This reduction was seen in the interneurons, particularly those of four kinds.

Cognitive dysfunction followed (TBI group versus an appropriate control group).

TBI was shown to increase excitability in the dentate gyrus, and thus affects hippocampal synaptic strength.

The paper postulates that the increase in excitability mediates the cognitive defects seen in TBI

I believe that this paper shows a useful technique demonstrating the findings stated above, which themselves are useful findings.

I offer an aside from my own interest in the cognitive consequences of electric shock.

There is no need for the authors to mention this, but it may simply be of interest.

It has been found that electric shock decreases hippocampal size (Kurtulus et al, J Leg Med (Tokyo), 22(12):2671).

In electric shock this reviewer (Andrews, Reisner, et al, JNRR, 2017, 2 papers) notes loss of cognitive powers and loss of

memory function, and especially auditory memory function, temporal lobe related, with depression-like disorders/PTSD, (among other features) which also have been associated with hippocampal cell loss.

Van Zomeran, et al, (J Neurol Neurosurg, Psych, 64(6):763) note that the features seen like the above in electrical and lightning injury, are similar to those seen in TBI.

This writer has postulated that the sort of syndrome seen in electrical injury, TBI, (maybe also viral injury, autoimmune injury, and other brain injuries) may be common symptoms consistent with a similar pathway of cellular injury in each of these injuries.