# Review of: "The Case for Conscious Experience Being in Individual Neurons"

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Potential competing interests: No potential competing interests to declare.

Disclaimer: I am one of those people cited in the epilogue of the article, for whom single neuron consciousness “is at least six impossible things to believe before breakfast”. That is the chaos theory of consciousness is much closer to me as a physicist/biophysicist and electrophysiologist, because here one can make use of physical and mathematical laws and laws of dialectics. My review should be regarded taking this into account, although single-neuron theory and chaos theory do not really contradict.

The authors claim themselves that the reader will not find in this work any new mechanistic explications/suggestions beyond those published in very good papers of Sevush, Edwards and Somov. Accordingly, the manuscript can be considered as an attempt to popularize this theory in original form. The authors state something of this kind in the chapter “Getting Used to the Idea” that is almost at the end of manuscript. They may want to consider introduce it much earlier.

I would like the authors take a stronger stance on their work. The sentence “What follows is an exploration of the case for the individual neuron approach” does not give the reader clear idea what exactly will follow: philosophical tractate, science-fiction essay or neuroscience study. Yes, these three options circled in my mind during the reading.

In the introduction, one would like to see a concise definition of consciousness, as regarded by the authors (or even better, as regarded by single-neuron theory), so that the reader does not wonder what exactly is addressed to in the manuscript.

I personally had difficult time in following the authors. They make several statements throughout the manuscript, but when it comes to argumentation, they appeal to a common sense. I agree that it is difficult to gather scientific proof for this theory, but common sense argumentation alone does not work in purely scientific literature. Hence, I would qualify the article as a philosophical science-fiction. It cannot for the moment go beyond the boundaries of a hypothesis (as Sevush explicitly indicated in his papers). I may be mistaken and this type of scientific writing can be considered acceptable.

In continuing preceding point, I would really much like to see some attempts of using practical (physiological/psychological or other) examples in support. One out of many: how single-neuron hypothesis explains sudden awakening from long-term coma, which always follows gradual increase in brain activity?

The authors do try to use everyday life’s examples in their text, and in some places these look convincing, such as in point 7 of “Wild Goose Chase”. Although the example of marines would be better suited to the chaos theory of consciousness, I

agree with the fallacy of central control agent, yet for completely different reason. Our brain functions with images – hidden patterns that arise from predetermined chaos, which is generated in grey matter due to contributions by every single neuron in the body. If we only knew the initial conditions and all the variables to be taken into account we could do much more than what is described in these two recent works on deciphering of brain activity by AI - https://www.nature.com/articles/s41586-023-06031-6 and https://www.nature.com/articles/s41593-023-01304-9. Accordingly, I should agree with authors of single-neuron theory that our brain really depends on this buzzing (for me - chaotic) processes to function correctly.

I could go ahead and continue to point out the points in the manuscript, at which I had spontaneous intention to comment on how the single-neuron theory and the chaos theory of consciousness converge and bifurcate. Obviously, it was not the purpose of my review. Still, it might indicate that the authors were not much convincing. However, I am biased and it may not be representative in my case.

Minor comments:

Calling the brain a colony of cells (even in scare quotes) does not feel right. If analogy is really needed, I would see it as a family of cell. Indeed, all cells of an individuum come from one progenitor cell, while in colonies, cells are only conspecific in nonclonal colonies and absolutely identical in clonal colonies (which has nothing to do with different and specialized types of neurons in the brain).

I'm surprised that Schrodinger's "What's life" was not cited in the manuscript.