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

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Potential competing interests: No potential competing interests to declare.

As a cell and molecular neurobiologist and neuroanatomist, I find that the ideas expressed in this paper are incomprehensible and are often based on outdated or incorrect information. They also fail to provide any experiments that could support any of their hypotheses. Some detailed comments:

1- They propose that. "cellular consciousness is the only plausible way to explain 'our' experiences within current physics and biology", By cellular they mean neuronal, but

they don't define what they mean by neuron? The cerebral cortex is comprised of circuits that contain pyramidal neurons, inhibitory neurons, and stellate neurons. Other types of neurons are found in the thalamus, basil ganglia, cerebellum, etc. For their theory to be creditable they need to identify which population of neurons exhibits consciousness.

2- What do they mean by experience? Experience requires information from our senses and this information is not distributed throughout the brain. As in 1 above, they need to define the neurons that are experiencing the sensation.

3- "The central argument is that events of experience must involve rich integration of information and individual neurons are the only places in brains where integration of information occurs". This is not correct. Integration occurs when thousands of neurons are activated and fire in synchrony. The activity of a single neuron is meaningless.

4- "Conscious events in individual neurons would make our subjectivity massively multiple". What is a conscious event and what elicits this event?

5- "The brain is not so much talking to itself as members of a vast colony talking to each other". There is no evidence to support this statement. Groups of neurons are interconnected by specific tracts and pathways that mediate specific functions and the information is not disseminated throughout the brain.

6- "idea is that some neurons, maybe thousands or millions of them, must also each be a 'me', in the sense that *'there is something it is like to be in a world'* for a me". Unless you can Identify these neurons, that sentence is meaningless.

7- "The person idea, on the other hand, I think needs its own story, and also implies uniqueness, and if there are neurons that are who's or me's we can be pretty sure there are at least thousands within one head". "Pretty sure" has no meaning in science. Again, where are these thousands (or millions?) of neurons? They repeatedly use the term "story" without defining what it means.

8- “… would it be then accurate to say that any given neuron has an evolving sense of self-story and personhood”? Sense has broad mechanistic implications and must be defined precisely.

9- They imply that neurons are the basic communicators of information but this is not correct. Information is communicated between circuits, not individual neurons.

10- “…the brain is like a termite nest of tubes criss-crossing in all directions between cells dotted about with no clear geometric regularity”. Wrong!

11- “In brains the potentials that provide information about the world are EM potentials – the signals at synapses that are integrated in dendritic trees". What is an EM potential? If they mean an electromagnetic field, then the statement is wrong. The EM field is created, not integrated by dendritic activity.

12- If they want to implicate a role for the cytoskeleton in consciousness, they need to supply evidence to support this idea.