

Review of: "Provisional Definition of the Living State: Delineation of an Empirical Criterion that Defines a System as Alive"

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In this paper, authors attempted to define the life of systems. It is interesting topic for future scientific research. I know someone should address this topic, one of the ultimate questions for science, but still very challenging. I would like to thank the author for trying to publish this paper.

However, from the view of a biologist, the author should consider more deeply about the diversity and complexity of life. If possible, I recommend to have co-author whose expertise is biology to discuss about the contents of this manuscript.

Also, living state is too much complicated to discuss and define in one paper. I think it is impossible to completely define the life. Author should more clearly mention to what extent the definition is discussed in this paper in the introduction part. It could be the endless topic.

For me, defining the term "conscious" is still very challenging and obscure, because the way of conscious is diverse depending on types of organisms. There are various types of organisms including plants and micro-organisms which don't have brain and neurons. These organisms can sense the changes in their surrounding environments, and flexibly and strictly modulate the metabolisms to adapt to such environmental changes. In some cases, biologists refer that these organisms (especially plants) possess ability to "memorize" information of environmental stimuli. Indeed, ability of plant to sense the environments is considered to be more advanced compared to human beings. It could be a type of "conscious" of the organisms. I am not sure if the author considered such type of conscious which is different from human beings. Therefore, the different types of "conscious" should be discussed.

Another important point might be the characteristics of memory. It might be important to organisms to "forget" about information. Memory of organisms may be controlled not only by the storage of past events, but also "forgetting" of unnecessary information. However, such forgetting is not complete disappearance of the information. It might be a very important process to re-organize information and worth to discuss.

Furthermore, interaction with other organisms or individuals is another important and essential characteristics of organisms. It could be another topic to be at least briefly discussed.

