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

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The article addresses very interesting and relevant issues. It proposes definitions of some concepts where there is a proliferation of approaches and theories. For this reason, some reflections are very useful.

Nevertheless, it claims to adopt a scientific approach and therefore there are many aspects that need clarification and a more structured framework.

First of all, I do think that the article should focusonly on the definition of life, and not on other concepts (e.g. consciousness): the definition of life is already so controversial that the anything else needs a much more detailed argumentation. See “Theories of consciousness” Seth & Bayne, Nature Neuroscience, 2022, 23, 439

Second, the article misses some fundamental references and discussions to well-known reflections: see the long story of J. Monod “Chance and Necessity” on the teleonomy, and see G. Chaitin (Proving Darwin: making biology mathematical) on programmable vs. intentionally evolution. This means that a much more “historical” introduction has to be provided based on those conceptual milestones, and clarify that definition is not a demonstration.

Third, please specifically address the timescales for the definition of “life” (implying the consequent measures for establishing the state of alive): survival of a species, of a group or of an individual? That translates in timescale for genetic mutation, learning/behaviour transfer, loss of functionality of the ensemble of matter resulting in a system.

So, I strongly recommend to start the article with the mentioned above concepts to make the reader enter the problem in a well defined framework.

The author also refer to intelligence, without defining it. And should also clarify why he assumes entropy as the “key” variable and not others. What the links with the idea that life is a long-term fit within a world that is based on critical dynamics?

Last, some examples would be useful to clarify the utility if the proposed definition:

Is a chemical oscillator (e.g. Bruxellator) alive for a timespan?

Is a person in coma alive? Is the definition of life resulting in a definition of death?

Can we therefore “measure” the state to be alive with the proposed empirical definition?

Looking forward to reading the revised version for this stimulating article, all my best