

Peer Review

Review of: "Systematically Challenging Three Prevailing Notions about Entropy and Life"

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The commentary “**Systematically Challenging Three Prevailing Notions about Entropy and Life**” presents an ambitious and intellectually provocative attempt to reassess long-standing interpretations of entropy, particularly its association with disorder, negentropy in biological systems, and the broader interpretation of the second law of thermodynamics. The article demonstrates strong historical scholarship and interdisciplinary engagement, integrating perspectives from physics, biology, and philosophy of science, and offers a coherent logical framework based on the authors’ definition of the “OFU nature” of entropy. The manuscript’s strength lies in stimulating conceptual discussion and encouraging critical re-evaluation of simplified textbook interpretations. However, several arguments rely heavily on semantic or definitional reinterpretations rather than rigorous thermodynamic or statistical-mechanical counter-derivations, which weakens the scientific persuasiveness of the central claims. The dismissal of entropy as a measure related to disorder appears to overlook extensive statistical mechanics literature linking entropy to microstate multiplicity and probabilistic system configurations. Additionally, some biological arguments oversimplify modern systems biology and evolutionary thermodynamics frameworks, and the manuscript would benefit from clearer quantitative demonstrations, engagement with contemporary theoretical models, and a more balanced acknowledgment of opposing viewpoints. Overall, the article is thought-provoking and valuable as a conceptual commentary but would require stronger mathematical and empirical substantiation to fully support its paradigm-challenging conclusions.

Declarations

Potential competing interests: No potential competing interests to declare.