

Peer Review

Review of: "Morphomechanics: An Extended View"

Hany Akeel Al-hussaniy¹

1. University of Baghdad, Iraq

Marta Linde's commentary, *Morphomechanics: An Extended View*, presents an ambitious and intellectually stimulating synthesis that reframes morphogenesis as an emergent property of active matter rather than a process primarily instructed by genetic or bioelectrical pre-patterns. The manuscript is conceptually rich, integrating active nematics, topological defects, mechanotransduction via mechanically activated ion channels (e.g., PIEZO1), and the controversial but intriguing concept of differentiation waves to propose a unified mechanobiological framework. A major strength is the coherent linkage between physical models (active liquid crystals, extensile vs. contractile forces, defect-mediated morphogenesis) and biological observations in Hydra, gastruloids, and epithelial systems, offering a bold alternative to gene-centric and bioelectric code paradigms. The proposal that bioelectric signals function downstream as mechanical readouts rather than instructive codes is provocative and theoretically consistent within the presented framework. However, much of the argument remains speculative and programmatic, with several key components—particularly the cell state splitter and differentiation waves—requiring stronger contemporary empirical validation. The commentary succeeds as a visionary theoretical extension that challenges entrenched developmental models, but its transformative potential will ultimately depend on experimental substantiation and clearer mechanistic integration across molecular, cellular, and tissue scales.

Declarations

Potential competing interests: No potential competing interests to declare.