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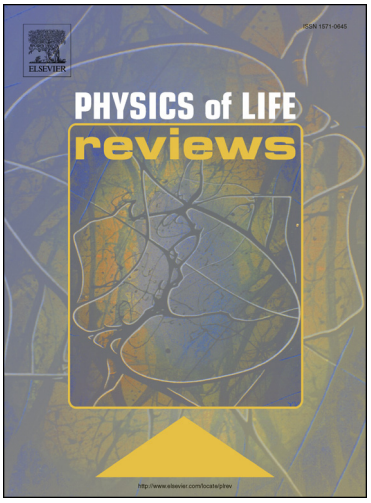

Multilayer network modeling of integrated biological systems

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Multilayer Network Modeling of Integrated Biological Systems
Comment on "Network Science of Biological Systems at Different Scales: A Review" by Gosak et al.☆

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Biological systems, from a cell to the human brain, are inherently complex. A powerful representation of such systems, described by an intricate web of relationships across multiple scales, is provided by complex networks. Recently, several studies are highlighting how simple networks – obtained by aggregating or neglecting temporal or categorical description of biological data – are not able to account for the richness of information characterizing biological systems. More complex models, namely multilayer networks, are needed to account for interdependencies, often varying across time, of biological interacting units within a cell, a tissue or parts of an organism.

Gosak et al [1] review the most recent advances in the application of multilayer networks for modeling complex biological systems, from molecular interactions within a cell to neuronal connectivity of the human brain.

1. Network Science of Biological Systems

Biology provides a fertile ground for some of the most exciting applications of Network Science. The essential molecular components of a cell are related by functional interdependencies of different nature (e.g., genetic, physical, etc.) at different scales (e.g., genetic, metabolic, etc.), making network modeling an essential tool for their modeling and analysis.

Complex networks have improved our understanding of life and disease. On the one hand, the function of a human cell is the result of interacting

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