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DEB modeling for nanotoxicology, microbial ecology, and environmental engineering

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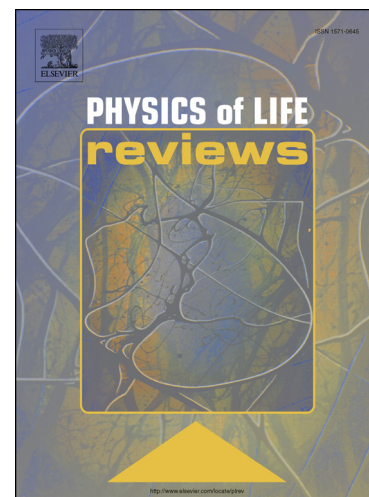
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DEB Modeling for Nanotoxicology, Microbial Ecology, and Environmental Engineering:

Comment on “Physics of metabolic organization” by Marko Jusup et al.

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Jusup et al. [1] appeal to mathematical physicists, and to biologists, by providing the theoretical basis for dynamic energy budget (DEB) modeling of individual organisms and populations, while emphasizing model simplicity, universality, and applicability to real world problems. Comments herein regard the disciplinary tensions proposed by the authors and suggest that—in addition to important applications in eco- and specifically nano-toxicology—there are opportunities for DEB frameworks to inform relative complexity in microbial ecological process modeling. This commentary also suggests another audience for bridging DEB theory and application—engineers solving environmental problems.

1. Nanotoxicology as an exemplar domain application for DEB modeling

Although few synthetic chemicals in commercial use have been examined for their toxicity to humans or to environmental receptors [2], the rapid advent of new classes of materials manufactured at the nanoscale (with 1 or more dimensions <100 nm) punctuates the opportunity—and need—to assess new chemical hazards alongside commercial

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