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# Ecological Metaphors in Microbiome Research

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## Abstract

Session: "Conceptual Challenges in Human Microbiome Research." Speakers: Mark Sagoff (organizer), John Huss, Mark Borrello. Chair: Lindley Darden. Commentator: Chris Diteresi. Microbiome researchers often employ ecological metaphors to describe the objects they study as "communities" or "ecosystems" and to characterize the human subject as a "metacommunity" or "super" or "supra" organism. This paper will analyze and assess the application of ecological metaphors in the context of conceptualizing and understanding the relation to each other and to the human body of the microbes that are found in or on it. The paper will argue that ecological concepts and metaphors are so thoroughly contested and so variously understood in ecological science they are more likely to confuse than to clarify the study of the ways these microbes behave together and affect us. It will explore the extent to which microbiomes should be seen as coevolved, integrated complexes, or should be conceptualized as fluxes of organisms that happen to be found together at a place and time. Are the most significant interactions reducible to the work of a few key microbial players or should they be understood in more holistic or emergent terms? Since only a small percentage of the microbiota are culturable with present methods, extraction or detection of nucleic acid, either DNA or RNA sequences, represents the first step to identifying many others. The paper will explore conceptually the relation between the study of microbial ecology at the phenotypic vs. genotypic level, e.g., with microscopes vs. sequencers.

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