Experimental Evolution of Multicellularity

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Abstract

Session: Microbes as Model Systems (Michael Travisano, Maureen O'Malley, Jessica Bolker, Gregory Velicer) The evolution of development (evo-devo) has been the focus of intense interest for over three decades, and important conceptual, theoretical and empirical advances have been made. These advances, however, have not been based upon direct observation of the evolution of development, because the appropriate model systems were absent. Experimental evolution and new appreciation of microbial model systems now provide tools to investigate the evolution of development as it occurs. An abundance of new studies into evo-devo using microbial selection experiments are underway. Using Baker's yeast, we are observing rapid evolution of complex development during an evolutionary transition from a single celled organism to a multicellular form. The evolution of juvenile and adult life history stages, stochastic differentiation, changes in cell shape and increased hydrodynamic morphologies are all readily observed within a single year of selection. These results challenge current thinking on the tempo and mode of the evolution: developmental complexity can easily evolve under appropriate conditions.

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