

# Transitions in Darwinian Individuality

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**E**VOLUTIONARY transitions in Darwinian individuality are central to the emergence of biological complexity. During the transition from single cells to multicellular life populations of cells acquired the capacity for collective reproduction, but the selective causes and underlying mechanisms are unknown. I will describe an experiment in which the emergence of Darwinian individuality in populations of cooperating bacteria subjected to a selective regime that rewards collective-level fecundity is observed. Central to collective reproductive success is a primitive life cycle that is fueled by conflict between levels of selection. Enhanced fitness of derived groups is attributable to a property selected at the collective-level, namely, the capacity to transition through phases of a life cycle, and is not explained by improvement in individual cell fitness. The experiment captures pivotal stages in the transition of selection from lower to higher levels, provides insight into the selective causes, and documents the evolution of emergence.