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Evolutionary advantage of a mixed strategy for the competence phenotype in bacteria CHRISTOPHER WYLIE, HERBERT LEVINE, UC San Diego, DAVID KESSLER, Bar Ilan University, CENTER FOR THEORETICAL BIOLOGICAL PHYSICS TEAM — Under certain stressful conditions, bacterial species such as *B. subtilis* undergo a differentiation process in which a *finite subpopulation* transiently and stochastically enters the "competent" state. This state is defined by the ability to import and homologously incorporate extracellular DNA fragments into the genome. This ability is accompanied by a reduced growth rate that tends to slow adaptive evolution. On the other hand, the increased genetic diversity generated by recombination tends to speed evolution. Using stochastic simulation and analytic methods, we show that this tradeoff implies that a "mixed strategy" optimizes the rate at which populations acquire beneficial mutations.

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