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Repeatability of the adaptation towards antibiotic resistance in Escherichia coli

Theory predicts that populations should evolve towards a higher fitness. The process of a population's continual fitness improvement is often represented by a fitness landscape. Rarely, however, has there been opportunity to experimentally simulate a fitness landscape, and test the repeatability of evolution towards a local optimum. We have taken advantage of knowledge of the adaptive evolution of the TEM-1 β -lactamase gene in populations of E. coli, which confers resistance to cefotaxime (Ctx), to simulate the repeatability of the evolution of this gene. We compete combinations of four beneficial mutations in TEM-1, and simulate a fitness landscape composed of 16 individual mutants. Each mutant is competed with all one-step mutant neighbours in media with a spectrum of Ctx. We present findings of this research, which aims to determine the influence of ecological interactions in the evolution of bacterial populations.

Summary

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