

## **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  $\beta$ -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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