

Abstract Submitted
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Cooperative Antibiotic Resistance in a Multi-Drug Environment

EUGENE YURTSEV, LEI DAI, JEFF GORE, Massachusetts Institute of Technology — The emergence of antibiotic resistance in bacteria is a significant health concern. A frequent mechanism of antibiotic resistance involves the production of an enzyme which inactivates the antibiotic. By inactivating the antibiotic, resistant cells can “share” their resistance with other cells in the bacterial population, suggesting that it may be possible to observe cooperation between strains that inactivate different antibiotics. Here, we experimentally track the population dynamics of two *E. coli* strains in the presence of two different antibiotics. We find that together the strains are able to grow in antibiotic concentrations that inhibit growth of either of the strains individually. We observe that even when there is stable coexistence between the two strains, the population size of each strain can undergo large oscillations. We expect that our results will provide insight into the evolution of antibiotic resistance and the evolutionary origin of phenotypic diversity and cooperative behaviors.

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