

Abstract Submitted  
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**The positioning logic and copy number control of genes in bacteria under stress**<sup>1</sup> QIUCEN ZHANG, University of Illinois UC, ROBERT AUSTIN, SAURABH VYAWAHARE, Princeton University, ALEXANDRA LAU, Mount Holyoke College — *Escherichia coli* (*E. coli*) cells when challenged with sublethal concentrations of the genotoxic antibiotic ciprofloxacin cease to divide and form long filaments which contain multiple bacterial chromosomes. These filaments are individual mesoscopic environmental niches which provide protection for a community of chromosomes (as opposed to cells) under mutagenic stress and can provide an evolutionary fitness advantage within the niche. We use comparative genomic hybridization to show that the mesoscopic niche evolves within 20 minutes of ciprofloxacin exposure via replication of multiple copies of genes expressing ATP dependent transporters. We show that this rapid genomic amplification is done in a time efficient manner via placement of the genes encoding the pumps near the origin of replication on the bacterial chromosome. The de-amplification of multiple copies back to the wild type number is a function of the duration is a function of the ciprofloxacin exposure duration: the longer the exposure, the slower the removal of the multiple copies.

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Robert Austin  
Princeton University

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