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Abstract for an Invited Paper
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Measurement of Behavioral Evolution in Bacterial Populations¹

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A curious aspect of bacterial behavior under stress is the induction of filamentation: the anomalous growth of certain bacteria in which cells continue to elongate but do not divide into progeny. We show that *E.coli* under the influence of the genotoxic antibiotic ciprofloxacin have robust filamentous growth, which provides individual bacteria a mesoscopic niche for evolution until resistant progeny can bud off and propagate. Hence, filamentation is a form of genomic amplification where even a single, isolated bacteria can have access to multiple genomes. We propose a model that predicts that the first arrival time of the normal sized progeny should follow a Gompertz distribution with the mean first arrival time proportional to the elongation rate of filament. These predictions agree with our experimental measurements. Finally, we suggest bacterial filament growth and budding has many similarities to tumor growth and metastasis and can serve as a simpler model to study those complicated processes.

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