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Pattern Transitions in Bacterial Oscillating System under Nanofluidic Confinement[1] JIE-PAN SHEN, CHIA-FU CHOU, Academia Sinica — Successful binary fission in E. coli relies on remarkable oscillatory behavior of the MinCDE protein system to determine the exact division site. The most favorable models to explain this fascinating spatiotemporal regulation on dynamic MinDE pattern formation in cells are based on reaction-diffusion scenario. Although not fully understood, geometric factors caused by bacterial morphology play a crucial role in MinDE dynamics. In the present study, bacteria were cultured, confined and reshaped in various micro/nanofluidic devices, to mimic either curvature changes of cell peripherals. Fluorescence imaging was utilized to detail the mode transitions in multiple MinDE patterns. The understanding of the physics in multiple pattern formations is further complemented via in silico modeling. The study synergizes the join merits of in vivo, in vitro and in silico approaches, to grasp the insight of stochastic dynamics inherited from the noisy mesoscopic biophysics.

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