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Mathematical Modeling the Geometric Regularity in Proteus Mirabilis Colonies BIN ZHANG, YI JIANG, Georgia State Univ, MINSU KIM COLLABORATION — *Proteus Mirabilis* colony exhibits striking spatiotemporal regularity, with concentric ring patterns with alternative high and low bacteria density in space, and periodicity for repetition process of growth and swarm in time. We present a simple mathematical model to explain the spatiotemporal regularity of *P. Mirabilis* colonies. We study a one-dimensional system. Using a reaction-diffusion model with thresholds in cell density and nutrient concentration, we recreated periodic growth and spread patterns, suggesting that the nutrient constraint and cell density regulation might be sufficient to explain the spatiotemporal periodicity in *P. Mirabilis* colonies. We further verify this result using a cell based model.

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