

プログラム共同セミナーのお知らせ

From Silence to Commitment: Transient Population Splitting in Self-Activating Gene Circuits

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開催場所：理学部 E203 会議室

Abstract

Gene expression in single cells is intrinsically stochastic, producing large cell-to-cell variation even among genetically identical cells. In self-activating genes, the protein product promotes its own expression, forming a positive feedback loop that is common in biological switches, such as the ComK system in *Bacillus subtilis*. A central question is how the distribution of protein levels evolves over time from a completely silent state.

Using a mathematical model of stochastic gene expression, we show that the population follows a three-phase sequence: an initial silent phase, a transient commitment window in which cells split into low- and high-expression subgroups, and a final active phase in which the silent subgroup disappears. This sequence holds across a broad range of biological parameters and provides a general framework for understanding stochastic commitment in self-activating gene circuits.

本セミナーは、統合生命科学研究科セミナーとして、プログラム共同セミナーの対象です。

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