CDB SEMINAR

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CNRS and Universite Pierre et Marie Curie, France

Wednesday, December 1, 2010

16:00~17:00 C1F CDB Auditorium

DnaA and the timing of chromosome replication in E.coli. A systems biology modeling approach

Summary

E. coli uses overlapping replication rounds in order to grow faster than the time required to replicate its genome. The timing of replication initiation is determined by a regulatory circuit that includes the DnaA protein as initiator molecule.

I will present a minimal quantitative model of the initiator circuit including a thermodynamic description of the dnaA promoter, replication timing described by the classic balance equation of Cooper and Helmstetter, and regulatory inactivation of DnaA at replication forks.

Our results point to two main testable scenarios, where either the rate of regulatory inactivation, or the self-repressing affinity of the dnaA promoter vary with growth rate.

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