

Cologne Evolution Colloquium

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An analytical theory of cellular growth

Biological fitness of unicellular organisms is given by the rate with which they replicate their composition. Growth models that account for physicochemical constraints and the kinetics of biochemical reactions are inevitably nonlinear, and their optimization has been restricted to small toy models. Here, we show that states of maximal balanced growth are elementary flux modes, *i.e.*, they cannot be decomposed into simpler admissible states. We derive an analytical solution for optimal cellular resource allocation patterns in a given flux mode. This description unveils fundamental quantitative principles of optimal balanced growth, providing a framework to quantify fitness costs of cellular components and constraints.

Wednesday, January 16, 2019, 17:00

University of Cologne

Institute for Biological Physics, Zùlpicher Str. 77a

Seminar Room 0.02, Ground Floor

Hosted by Michael Lässig