FASSBERG SEMINAR SERIES

Special Date

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The energetic costs of early development

All living systems function out of thermodynamic equilibrium and require a continuous supply of energy. To understand how cells and organisms function, we need to determine how metabolic energy is partitioned among the complex array of cellular processes that are necessary for life at any scale, from isolated biochemical networks to quiescent and highly proliferative cells to organismal growth and development. To investigate the energetics of biological systems, I established isothermal calorimetry to quantitatively measure the flow of energy in form of heat between developing zebrafish embryos and their surroundings. During early cleavage stage development, the heat dissipation rate increased over time and with cell number. Unexpectedly, I found that the heat dissipation rate oscillated with periods matching the synchronous early embryonic cell cycle. By combining these measurements with specific perturbations, I will show that the energetic costs associated with a given biological process during early development can be calculated, and thus, provides a means towards understanding the energetics of biological systems.

Host: Alec Wodtke

Monday / 27.01.2020 / 13:00

Max Planck Institute for Biophysical Chemistry
Ludwig Prandtl Hall / Administration Building