From chemistry to information: a model system for the coupling of metabolism and heredity

Initiative: "Leben?" - Ein neuer Blick der Naturwissenschaften auf die grundlegenden Prinzipien des Lebens

(beendet)

Bewilligung: 09.07.2019

Laufzeit: 5 Jahre

An interdependency of genetic information storage and propagation (heredity) and chemical energy dissipation (metabolism) is a hallmark of life. However, how coupling between metabolic and informational systems emerged and sustained has never been explored experimentally in a cross-disciplinary context. Experts in both experimental and theoretical aspects of systems chemistry and synthetic biology will explore these crucial aspects of the emergence of life through synthetic model systems by addressing the following questions: a) How can heredity arise from pools of information encoding polymers? b) How can heredity be coupled to energy dissipation through chemical cycles? c) How can physicochemical transitions such as liquid-liquid demixing drive such cycles? d) How can a coupled metabolic-genetic system sustain itself?

Projektbeteiligte

Prof. Dr. Job Boekhoven
Technische Universität München
Fakultät für Chemie
Institute for Advanced Studies
Garching

Dr. Philipp Holliger
MRC Laboratory of Molecular Biology
Protein & Nucleic Acid Chemistry
Cambridge
Grossbritannien

Prof. Dr. Ulrich Gerland
Technische Universität München
Physik-Department
Garching

Open Access-Publikationen

Fuel-Driven Dynamic Combinatorial Libraries