February 23rd, 2024

Lund University
Kemicentrum
Lecture hall A

CMPS Mini Symposium Series

From molecules to life: building living systems from scratch

8:30 *Bottom-up synthetic biology: beyond technology?*
Dr. Dora Tang

9:30 Coffee Break

9:45 PhD student short talks

- *Combining AlphaFold and molecular docking to predict large protein assemblies from sequence*
  Mads Jeppesen
- *The ability of the chaperone DNAJB6b to suppress amyloid formation depends on its aggregation state*
  Andreas Carlsson
- *Exploring the repertoire of PARP regulation*
  Carmen Ebenwaldner
- *Evaluating heterologous expression of TRPA1 by GFP and flow cytometry*
  Balder Werin

10:45 Coffee Break

11:00 *From molecules to life: building living systems from scratch*
Dr. Dora Tang

12:00 End of Symposium

Dr. Dora Tang

Max Planck Institute for Cellular Molecular Biology and Genetics
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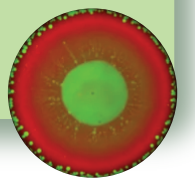
and University of Saarland



Abstract

One of the goals of bottom-up synthetic biology is to build living cells from scratch. Biology is well equipped in exploiting a large number of out-of-equilibrium processes to support life. A complete understanding of these mechanisms is still in its infancy due to the complexity and number of the individual components involved in the reactions. However, a bottom-up approach allows us to replicate key biological processes using a small number of basic building blocks. Moreover, this methodology has the added advantage that properties and characteristics of the artificial cell can be readily tuned and adapted.

In this talk, I will provide an overview of the strategies we adopt in our lab to build living systems from scratch that rely on compartmentalisation as the defining feature to support out-of-equilibrium behaviour. Specifically, I will talk about the design and synthesis of artificial cells based on liquid-liquid phase separation (coacervation) and hydrophobic effects such as lipid vesicles and proteinosomes and describe how these compartments may be used as platforms for implementing dynamic biological behaviours including: RNA catalysis and communication. I propose that our bottom-up approaches are effective in establishing living systems from scratch and in doing so provide unique model systems that can help to unravel the physico-chemical principles of living systems.

Do you have questions or want to talk to Dr. Tang?
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