

Seminar Speaker Series

in the framework of Interreg V-A project CAPSID

presents

Dr. Saha

Institute of Molecular Biotechnology, AT

PHASE SEPARATION IN GERM CELL FATE:

A role of complex composition
in biomolecular condensates

12.11.2020 at 14:00

Online virtual talk via Zoom

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Dr. Shambaditya Saha

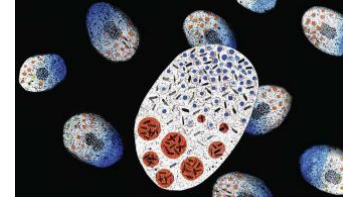
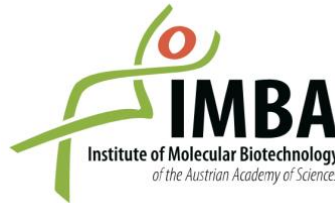


Figure illustrates P granules - A canonical liquid-like compartment - the 'Nuage'.

EXPERTISE HIGHLIGHTS

We investigate a fundamental aspect of intracellular organization – compartmentalization independent of lipid membranes. Canonical cellular compartments are confined within lipid membranes, but recent discoveries suggest that a plethora of cellular compartments form independent of membrane boundaries by liquid-liquid phase separation. We aim to understand how these 'liquid-like' compartments assemble and carry out distinct cellular functions. Currently we are investigating how the non-membrane-bound 'nuage' organelle, conserved in the germline of sexually reproducing animals, contributes to germ cell fate and fertility. Research in our group is multi-disciplinary – combines biochemistry, biophysics, structural biology, in vitro reconstitution, and in vivo studies in *C. elegans*.

IMPACT

Our research will provide significant insights into two of the central questions in phase separation-dependent intracellular organization: 1) Rules that determine precise macromolecular composition i.e. specificity, and 2) Importance of phase separation for biological function. Phase separation has now been implicated in a wide range of fundamental biological processes and diseases - cellular DNA-damage response, RNA processing including transcription, splicing, translation and storage, biology of non-coding RNAs, signal transduction, T-cell activation, viral infection, neurodegeneration, and cancer. Therefore, the general principles about phase separation uncovered in our research will help with understanding the mechanisms of a wide range of vital biological processes.

REFERENCE

Saha, S., et al. (2016). Polar Positioning of Phase-Separated Liquid Compartments in Cells Regulated by an mRNA Competition Mechanism. *Cell* 166, 1572–1584.e16.

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