LSA CHEMISTRY
UNIVERSITY OF MICHIGAN

The Chemistry Seminar Series Presents:

GOMBERG LECTURE

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"RNP Granules in Health and Disease"

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4-5:30PM | CHEM 1640

ABSTRACT

Eukaryotic cells contain multiple assemblies of RNA and protein referred to as RNP granules, or RNP condensates. In the cytosol, ubiquitous RNP granules include stress granules, which form when translation initation is limited, and P-bodies, which are constitutive RNP granules containing mRNAs and the RNA decay machinery. Both stress granules and P-bodies contain complex proteomes and transcriptomes and their assembly/disassembly are regulated by diverse RNP remodeling complexes.

Focusing on stress granules, we have provided evidence that stress granule, and presumably other RNP condensate, assembly occurs in part through intermolecular RNA-RNA interactions. However, based on in vitro studies, we demonstrate that RNA condensation should be expected to be a thermodynamically favored process in cells. This argues cells must contain mechanisms to limit RNA driven condensation. We have demonstrated that abundant RNA helicase reduces RNA recruitment to RNA condensates in vitro and in cells, as well as limiting stress granule formation. This defines a new function for abundant RNA helicases to limit thermodynamically favored intermolecular RNA-RNA interactions in cells as "RNA decondenases", thereby allowing proper RNP function.