valency of IDP domains and presence of solubility-enhancing domains. Second, we characterized permeability of these compartments to soluble macromolecules and devised strategies to target and colocalize cargo molecules into the droplets. Cargos were recruited using either RGG domains or coiled-coiled interaction domains as recruitment modules, and cargo release was triggered by proteolytic removal of the recruitment domains. Droplet assembly and cargo recruitment were robust and occurred in cytoplasm. Our results using this platform suggest it is now possible to recruit multiple enzymes and substrates to stimulus-responsive membraneless organelles. This system provides a much-needed experimental framework to investigate the biochemical consequences of localizing enzymes and substrates to membraneless organelles and to harness IDP compartments for synthetic biology applications.

P1721

Board Number: B738

A forward genetic screen identifies host factors that influence the lysis-lysogeny decision in phage lambda.

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The lysis-lysogeny decision made by bacteriophage lambda is one of the classic problems of molecular biology. Shortly after infecting a cell, the virus can either go down the lytic pathway and make more viruses, or go down the lysogenic pathway and integrate itself into the host genome. While much is known about how this decision takes place, the extent to which host physiology influences this decision and the mechanisms by which this influence takes place has remained mysterious. To answer this question, we performed a forward genetic screen to systematically identify all of the genes in *E. coli* that influence the lysis-lysogeny decision. Our results demonstrate previously unknown links between host physiology and viral decision making and shed new light on this classic system.

P1722

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Characterization of the Gain-of-function Toxicity of Optineurin in Yeast.

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Optineurin is an autophagy adaptor protein associated with two distinct types of neurodegenerative diseases: Normal Tension Glaucoma (NTG) (Rezaie et al., 2002) and Amyotropic Lateral Sclerosis (ALS) (Maruyama et al., 2010). NTG is a sub-type of Glaucoma, which may lead to complete blindness following progressive optic nerve degeneration. ALS is a fatal neurodegenerative disorder, attacking mainly the upper and lower motor neurons. Although overexpression (Chi et al., 2010) and deletion (Ito et al., 2016) of optineurin were shown to induce degenerative phenotypes in mice similar to those observed in disease, the underlying mechanisms remain unclear. Overexpression of optineurin leads to growth defects in yeast (Kryndushkin et al., 2012). Using yeast genetic approaches, the human homolog of a yeast gene, MKK1, was identified as a potential drug target that suppresses the toxicity of optineurin in mammalian cells and in zebra fish models (Jo et al., 2017). Overexpression of Ypt1, the yeast homolog of a human interactor protein of optineurin, Rab8, also alleviates optineurin mediated