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TEMASEK LIFESCIENCES LABORATORY

30 September 2016 (Friday), 4pm
The Auditorium (Level 1)
Hosted by: Dr Jedd Gregory

The Phases and dephases of endocytosis

Prof Stephen Michnick
Université de Montréal, Canada



Stephen Michnick is a biophysical chemist who has developed an eclectic and diverse research program aimed at studying the spatiotemporal organization and dynamics of biochemical networks in living cells and how these networks compute cell-fate decisions.

Hydrodynamic and mechanical forces determine cell shape and movement. A key process in morphogenesis is clathrin-mediated endocytosis (CME). We are exploring evidence that the energy required for the early stages of CME is mediated by liquid-liquid phase separation from the cytoplasm of low complexity prion-domain-containing proteins. The energy needed to form a nascent endosome is generated by viscoelastic properties of the droplet and interactions of the droplet with the cytosol and membrane. I will illustrate how a combination of biophysics and bioinformatics approaches revealed this model and could be used to predict other forms of large-scale organization of matter in living cells and how these organizations integrate cellular processes.

Recent Publications:

1. Bergeron-Sandoval L.-P., N. Safaee and **S. W. Michnick** (2016) Mechanisms and consequences of macromolecular phase separation. Cell, **165**, 1067-1079
2. *Kelil A., E. D. Levy, and **S. W. Michnick** (2016) Evolution of domain-peptide interactions to co-adapt specificity and affinity to functional diversity. PNAS USA. **13** 3862-3871.
3. Evgeny Kanshin, Louis-Philippe Bergeron-Sandoval, S. Sinan Isik, Pierre Thibault, **Stephen W. Michnick**. (2015). A Cell-Signaling Network Temporally Resolves Specific versus Promiscuous Phosphorylation. Cell Reports. **10**, 1-13.