LAUFER CENTER
FOR PHYSICAL AND QUANTITATIVE BIOLOGY

Seminar 2017

Pattern formation and geometry sensing based on stochastic composition fluctuations in a kinase-phosphatase competition reaction

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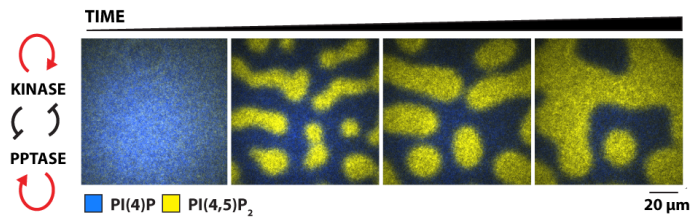
The ability of cells to regulate the localization of molecules in both time and space is a hallmark of cellular organization and signal transduction. In the case of polarized cell migration, phosphatidyl-inositol lipids synthesized by kinases and phosphatases at the plasma membrane drive the spatial organization of lipids. As a postdoctoral researcher in the Groves lab, I used supported membrane technology to biochemically reconstitute a two-component kinase-phosphatase competition reaction that is capable of spatially organizing phosphatidylinositol lipids on a planar membrane. Using micropatterned membranes to spatially confine the bistable kinase-phosphatase competition reaction, I discovered that the final reaction outcome could be modulated by membrane geometry. Stochastic kinetic modeling revealed the minimal signaling network topologies required to achieve the emergent property of 'geometry sensing.' The generality of these results suggest that cellular signaling systems can utilize composition and membrane geometry to control the outcome of membrane proximal signaling events.

Friday February 24, 2017

2:30 PM

Laufer Center Lecture Hall 101

Host: Markus Seeliger



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