Yale Institute for Nanoscience and Quantum Engineering

Friday-May 4, 2018

12:00-1:00 PM

BECTON SEMINAR ROOM
Light lunch will be served at 11:45 a.m.

Erdem Karatekin

Department of Cellular and Molecular Physiology,Nanobiology Institute, Department of Molecular Biophysics and Biochemistry, Yale University

"Dynamics of Nanometer-Sized Exocytotic Fusion Pores"

A key step during neurotransmitter or hormone release (exocytosis) is the formation of a nanometer-sized fusion pore that connects the plasma membrane to the synaptic or secretory vesicle. The pore can flicker open and closed repeatedly before dilating or resealing irreversibly. Pore dynamics affect the amount and kinetics of released cargo, and vesicle recycling. However, factors regulating pore dynamics are poorly understood, in large part due to a lack of biochemically defined assays that can probe single, nanometer-sized pores. We have developed a novel assay that probes single fusion pores formed between 15-30 nm flat lipid bilayer nanodiscs reconstituted with neuronal/exocytotic vesicular soluble v-SNARE proteins and cells engineered to express cognate "flipped" target membrane t-SNAREs on their surfaces, with the SNARE domain facing the extracellular medium. Formation of a complex between the v- and t-SNAREs leads to fusion of the nanodisc and cell membranes with the apearance of a pore connecting the cell cytosol to the exterior. Using cell-attached, voltage-clamped measurements, currents passing through single pores can be detected and used to monitor pore properties.

Gregory Elison

Department of Molecular, Cellular and Developmental Biology, Yale University

"Using Genome Engineering to Understand how Cells Control Gene Expression"

Despite advances in the understanding of promoter structure and function, the contribution of the vast majority of base pairs to promoter architecture is currently unknown. We have improved existing *in vivo* genome editing methods in order to investigate how cells control gene expression at a base-pair level. We have been able to greatly expand current knowledge of how the canonical yeast *GAL1* promoter controls the expression of the GAL1 gene. Our discoveries of new and unpredicted regulatory elements in this well-characterized promoter imply that eukaryotic promoter structure may be considerably more complex than previously thought.

Host: Professor Corey O'Hern