

Navigating the cytoskeleton: Novel tools to dissect and direct intracellular transport

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Abstract:

The Kapitein lab studies the mechanisms by which cells establish and maintain their precise shape and intracellular organization. This is important, because form and function are closely connected and cellular disorganization often leads to cellular dysfunction and disease. By combining protein engineering, optogenetics, advanced (super-resolution) microscopy techniques and mathematical modeling, we aim to obtain a mechanistic understanding of cellular organization in health and disease.

In my lecture, I will highlight two recent breakthroughs from the lab. First of all, we successfully engineered a system to control the transport and positioning of intracellular components with light. This allows us to directly explore the functional consequences of organelle mislocalization. In addition, we have engineered novel probes for the super-resolution imaging of microtubules, the intracellular biopolymers that serve as tracks for intracellular transport. These novel probes allow us to better resolve microtubule organization in dense cellular compartments, such as the axons and dendrites.

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Room PH 127