BIOENGINEERING SEMINAR

“Sorting Out Polarized Transport in Neurons“

Wednesday, November 15, 2017, 9h00
EPFL – room BM 5 202

Prof. Lukas Kapitein
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host: Prof. Sylvie Roke

Abstract

Proper positioning of organelles by cytoskeleton-based motor proteins underlies cellular events such as signaling, polarization, and growth. To explore how different motor proteins contribute to neuronal transport and to study the site-specific roles of different organelles, we have established optical control of intracellular transport by using light-sensitive heterodimerization to recruit specific cytoskeletal motor proteins (kinesin, dynein or myosin) to selected cargoes. In addition, to unravel how the specialized organization of the neuronal cytoskeleton guides different motor proteins to either axons or dendrites, we have developed novel approaches for optical nanoscopy. One of these, called motor-PAINT, uses nanometric tracking of motor proteins to super-resolve cytoskeletal fibers and determine their polarity. This has revealed a key architectural principle of the neuronal microtubule cytoskeleton that explains how different motor proteins can selectively transport cargoes to either axons or dendrites.

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