NATIONAL YANG MING CHIAO TUNG UNIVERSITY

Title of talk: An Optogenetic Strategy to Control Microtubule Cytoskeleton in Neurons

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Abstract:
Microtubules (MTs) are the most abundant cytoskeleton in neurons, and control multiple facets of their development. While the MT-organizing center (MTOC) in mitotic cells is typically located at the centrosome, the MTOC in neurons switches to non-centrosomal sites. A handful of cellular components have been shown to promote non-centrosomal MT (ncMT) formation in neurons, yet the regulation mechanism remains unknown. Here, we demonstrate that the small GTPase Ran is a key regulator of ncMTs in neurons. Using an optogenetic tool (RanTRAP) that enables light-induced local production of RanGTP, we demonstrate that RanGTP promotes ncMT formation along the neurite. In addition, the development of RanTRAP enables the spatial and temporal control microtubule cytoskeleton in neurons.

Biography:
Eric Hwang is currently an associated professor in the Department of Biological Science and Technology at National Chiao Tung University. His training and experience are in cell biology, molecular biology, biochemistry, and neuroscience. His research interest is on neuronal development and post-injury regeneration with a specific focus on the role of cytoskeleton in these processes. His lab uses a variety of techniques, including cell biology, molecular biology, biochemistry, biophysics, and material science to study these processes.

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