

Live Imaging of Subcellular Ultrastructure and Activity by Optical Microscopy

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Cells consist of numerous subcellular organelles, compartments, and macromolecular machineries, the structure and activity of which are the basis of crucial cellular functions. High resolution dissection of these subcellular ultrastructures has been made possible by the recently developed super-resolution optical microscopy. Functional monitoring of the activity of subcellular organelles has been facilitated by new dyes and fluorescent proteins. In this talk, I will present our identification of photoswitchable membrane probes and their application in super-resolution of subcellular organelles, especially mitochondria. I will also discuss our imaging studies of mitochondrial activity and its role in neuronal synaptic plasticity.