DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine

DANDRITE Topical Seminar

by visitor Emilienne Repak

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From 11:00-12:00

Aud. D2, 2nd floor, building 1531, room 119
Dept. Mathematics, Aarhus University

Emilienne Repak

Dynamic Neuronal Imaging Unit
Institut Pasteur
Paris, France

Optical control of NMDA-receptors with a diffusible photoswitch

The NMDA-type glutamate receptor (NMDAR) is one of the two principal glutamate receptors, which are the main mediators of excitatory neurotransmission in the central nervous system. Currently, the state-of-the-art technology for investigating NMDAR properties in their native environment is caged compounds, but they are restricted in their ability to precisely control the spatial and temporal activation of NMDAR due to both the diffraction limit of light, which defines the minimum volume of uncaging from whence uncaging molecules will diffuse, and the irreversible nature of the uncaging reaction. Photoswitchable molecules, by contrast, can rapidly and repeatedly be switched on and off, circumventing the diffusion limitations of caged compounds to permit fine spatial and temporal control of receptor activation. In collaboration with the Trauner lab, a leading team in the development of photoswitchable molecules, we characterized a novel compound, azobenzene triazole glutamate (ATG). ATG is the first photoswitchable compound specific for NMDAR, and the first glutamate receptor-specific photoswitch to be biologically inert in its resting, thermally stable state. Such a tool holds great promise for finely probing receptor behavior in its native environment with greater precision than possible with the currently available optical toolkit.

Host: Group Leader Keisuke Yonehara, DANDRITE