



Institute of
Molecular and
Cell Biology

SEMINAR ANNOUNCEMENT

DATE: 9 January 2012, Monday
TIME / VENUE: 2:00PM @ IMCB Seminar Room 3-46, Level 3, Proteos, Biopolis
SPEAKER: Dr. Natalia Gunko, Research Associate, The Scripps Research Institute, USA



Dr. Natalia Gunko

Ultrastructural analysis of the roles of CRF-related peptides during the development of Purkinje cells and their extracerebellar afferents

Joint IMCB-IMB seminar



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In order to establish functional and mature circuits, neurons must extend axons and dendrites and reach their potential synaptic targets. They must precisely select the neurons with which to make synapses, and selectively eliminate connections that may be inappropriate or irrelevant. The changes in synaptic receptor repertoire are important for the establishment of the synaptic specificity of the neurons. The localization of receptors in the pre- and postsynaptic membrane determines to a large extent the efficacy of synaptic transmission. The molecular basis and the mechanisms responsible for all these processes are not fully understood. Our work focuses on two neuropeptides widely expressed in the brain, the corticotropin-releasing factor (CRF) and related urocortin (UCN). Both peptides have been implicated in stress-related illnesses such as major depression, anxiety-related disorders, and in Alzheimer's, Parkinson's and Huntington's diseases. In the cerebellum, they act as modulators of dendritic differentiation during early development and later changing to a neuromodulatory functions such as the induction of long term depression in the adult brain. Our research focuses on the roles of CRF-related peptides and their receptors in the development of cerebellar Purkinje cells and their connections.

We used immunoelectron microscopy to investigate the developmental dynamics of CRF receptors and of glutamate receptor d2, one of the hallmarks of synaptic development. Using mice over-expressing CRF, we studied the role of CRF family peptides during the matching of afferent inputs to Purkinje cells and resolving competition between CF and PF terminals. Finally, we systematically analyzed organotypic cerebellar slices by TEM to visualize the induction of topological matching of presynaptic and postsynaptic structures on Purkinje cells and developmental rearrangement and stabilization of the spine system.

Host: Prof. Robert Robinson and Dr. Graham Wright

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