DANDRITE Lecture
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10:00-11:00

Building 1532, room 122 (Aud. G2) Aarhus University

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Subcellular neurotrophic signaling for neuronal development and presynaptic function

The development of neuronal networks depends on control mechanisms for neurogenesis and migration that allow neurons to find their accurate position and synaptic targets. Multiple signaling molecules and their corresponding receptors are involved in this process, but the mechanisms by which these signals are integrated are only poorly understood. TrkB and TrkC, the receptors for brain derived neurotrophic factor (BDNF) and neurotrophin 3 (NT-3) are activated by epidermal growth factor receptor (EGFR) signaling rather than by BDNF or NT3 in embryonic mouse cortical precursor cells. This transactivation regulates migration of early neuronal cells to their final position in the developing cortex. Transactivation by EGF leads to membrane translocation of TrkB from the endoplasmatic reticulum to the cell surface, promoting its signaling responsiveness. Similar transactivation mechanisms are responsible for modulating the responsiveness of specific neurons in the adult brain. Medium spiny neurons of the striatum respond to dopaminergic input by translocating TrkB to the cell surface. This then shapes the sensitivity of these neurons to BDNF from cortical afferences. Translocation of Trk-B from endogenous stores thus represents a mechanism by which other signaling inputs are integrated in order to shape development, function and plasticity of neuronal circuits in the mammalian brain.

Host: Prof. Anders Nykjær, DANDRITE, Dept. of Biomedicine, Aarhus University