

GSI - SEMINAR

Im Theorieseminarraum, SB3 Raum 3.170a

Darmstadt, Planckstraße 1

Donnerstag, den 24. Sep 2015, 14:00 Uhr

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Communication in the nervous system

Communication between neurons and neighboring cells is based on stimulus-dependent release of neurotransmitter. Thus synaptic transmission relies upon synaptic vesicles, abundant organelles of the presynaptic nerve terminal of neurons. Therefore, the analysis of the synaptic vesicle proteome is essential for identifying components involved in vesicle mobilization, migration to the presynaptic plasma membrane, docking and fusion as well as recycling of synaptic vesicles via endocytosis. By analyzing the proteome of synaptic vesicles we identified proteins which were not previously assigned to the synaptic vesicle compartment.

The proteome of the presynaptic active zone (PAZ) characterized by docked synaptic vesicles to the presynaptic membrane regulates neurotransmitter release as well as structural and functional dynamics of the nerve terminal. We identified the proteinaceous inventory of this highly complex and dynamic compartment.

The amyloid precursor protein (APP) has been allocated to an organellar pool residing in the Golgi apparatus and in endosomal compartments, and in its mature form to the presynaptic active zone proteome (PAZ). By analyzing APP knockout mice we evaluated the impact of APP deletion at the hippocampal presynaptic active zone proteome. APP deletion affects the abundance of proteins involved in Ca²⁺-binding and regulation, the endocytotic machinery, the extracellular matrix, the synaptic vesicle compartment, and the exocytotic release machinery. Interestingly, a common feature of the majority of these proteins is their dysregulation in Alzheimer's disease (AD). Our data suggest that APP is a context-sensitive regulator of the hippocampal active zone.

Einladender: Prof. Dr. Gerhard Kraft

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