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Regulation of adaptor-mediated membrane dynamics at synapses

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ABSTRACT OF THE TALK

Adaptor-mediated membrane traffic is involved in the exchange of membrane proteins and lipids within the exo- and endocytic pathways. At the plasma membrane clathrin/ AP-2 and other adaptors mediate the constitutive or regulated internalization of cargo membrane proteins including growth factor receptors, presynaptic vesicle components, and ligand-gated ion channels. Clathrin-dependent endocytosis requires the regulated synthesis of phosphatidylinositol (4,5)-bisphosphate at specific plasmalemmal sites.

In my talk I will focus on the role of the adaptor proteins stonin 2 and intersectin in recycling of synaptic vesicles (SVs). Specifically, we show that stonin 2 acts as a specific, evolutionary conserved sorting adaptor for SV endocytosis that acts by directly recognizing determinants within the cytoplasmic C2 domains of the calcium-sensing SV protein synaptotagmin. Moreover , we provide evidence that the scaffolding protein intersectin 1 (ITSN1) plays a prominent role at early steps of SV endocytosis by directly associating with the endocytic clathrin adaptor AP-2. Disruption of ITSN1-AP-2 complex formation by microinjecting an ITSN1-derived peptide into reticulospinal axons of the lamprey causes the accumulation of early endocytic intermediates, suggesting that ITSN1 regulates the regulates the endocytic limb of the SV cycle.