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LES SÉMINAIRES DE L'INMG

Ankyrin-B and βII-spectrin in axonal transport and brain connectivity

Par

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Abstract

The formation, targeting, and maintenance of axon and dendrites are critical for proper brain development and synaptic function. Deficits in synapse establishment and maturation can lead to neurodevelopmental, neurodegenerative, and psychiatric disorders. The neuronal cytoskeleton regulates the architecture and dynamics of synaptic processes by providing structural support and the tracks for motor protein-based synaptic transport. The latter is particularly important for the establishment of long axonal projections, which requires coordinated long-range organelle transport. The membrane associated adaptor ankyrin-B (AnkB) promotes fast axonal transport and elongation by coupling dynactin to multiple organelles through binding to phosphatidylinositol 3-phosphate lipids in these cargos. Additionally, AnkB directly binds βII-spectrin, which, in turn, controls the formation of a ring-shaped membrane periodic skeleton (MPS) in axons and mature dendrites. Interestingly, βII-spectrin also associates with molecular motors. I will show that AnkB and βII-spectrin are key elements in independent and overlapping pathways responsible for the transport of synaptic cargo and other organelles, and are essential for establishing proper brain structural and functional connectivity.

Publications

Ankyrin-B is a PI3P effector that promotes polarized α5β1-integrin recycling via recruiting RabGAP1L to early endosomes.
Qu F, Lorenzo DN, King SJ, Brooks R, Bear JE, Bennett V.
Elife. 2016 Oct 8;5. pii: e20417. doi: 10.7554/eLife.20417.

Ankyrin-B metabolic syndrome combines age-dependent adiposity with pancreatic β cell insufficiency.
Lorenzo DN, Healy JA, Hostettler J, Davis J, Yang J, Wang C, Hohmeier HE, Zhang M, Bennett V.
J Clin Invest. 2015 Aug 3;125(8):3087-102. doi: 10.1172/JCI81317. Epub 2015 Jul 13.

A PIK3C3-ankyrin-B-dynactin pathway promotes axonal growth and multiorganelle transport.
Lorenzo DN, Badea A, Davis J, Hostettler J, He J, Zhong G, Zhuang X, Bennett V.
J Cell Biol. 2014 Dec 22;207(6):735-52. doi: 10.1083/jcb.201407063.

An Adaptable Spectrin/Ankyrin-Based Mechanism for Long-Range Organization of Plasma Membranes in Vertebrate Tissues.
Bennett V, **Lorenzo DN**.
Curr Top Membr. 2016;77:143-84. doi: 10.1016/bs.ctm.2015.10.001. Epub 2015 Nov 30. Review.