IN BRIEF

NEUROTRANSMISSION

Doc2b is a high-affinity Ca^{2+} sensor for spontaneous neurotransmitter release

Groffen, A. J. *et al. Science* 11 Feb 2010 (doi: 10.1126/science.1183765)

Double C2 domain protein B (DOC2B) enhances exocytosis in chromaffin cells, pancreatic β-cells and adipocytes. Here, the authors showed that it also mediates spontaneous vesicle release from mouse hippocampal and cerebellar neurons. DOC2B is structurally and biochemically similar to synaptotagmin 1, which also contains two cytoplasmic C2 domains, and competes with synaptotagmin 1 for SNARE (soluble *N*-ethylmaleimide-sensitive factor attachment receptor) complex binding. These findings highlight the membrane curvature-inducing action of multiple C2 domain proteins in neurotransmitter release.

TECHNIQUES

Active flight increases the gain of visual motion processing in *Drosophila*

Maimon, G., Straw, A. D. & Dickinson, M. H. *Nature Neurosci.* **13**, 393–399 (2010)

Whole-cell patch clamp recordings from neurons in the fly brain have have been limited to restrained flies. In this study, the authors measured the responses of vertical-system visual neurons in tethered, flying *Drosophila melanogaster*. The membrane voltage of these neurons was tonically depolarized and their responses were boosted during flight, showing for the first time that they are strongly modulated by locomotion.

PRIONS

Pharmacological prion protein silencing accelerates central nervous system autoimmune disease via T cell receptor signalling

Hu, W. *et al. Brain* **133**, 375–388 (2010)

Mice that lack the cellular prion protein (PrP^C) exhibit enhanced severity of disease in experimental autoimmune encephalomyelitis (EAE), suggesting that PrP^C may have a role in CNS autoimmunity. Here, the authors silenced the PrP^C gene in murine splenocytes and injected them into mice in which EAE had been actively induced. This treatment led to an increase in T cell differentiation, proliferation and activation, and worsened the clinical course of EAE. These results suggest that PrP^C directly regulates the inflammatory response in the CNS.

ION CHANNELS

Distinct roles of NR2A and NR2B cytoplasmic tails in long-term potentiation

Foster, K. *et al. J. Neurosci.* **30**, 2676–2685 (2010)

NR2A and NR2B are subunits of the NMDA (*N*-methyl-D-aspartate) receptors that mediate long-term potentiation (LTP) induction in CA1 pyramidal cells, but their differential roles in the process are unclear. Using a combination of pharmacological and molecular–genetic approaches, the authors found that in cultured hippocampal slices NR2B protein expression, but not activation of NR2B-containing NMDA receptors, is essential for LTP induction. The long cytoplasmic tail of NR2B may function as a structural scaffold for proteins that are important for LTP. NR2A, by contrast, is required as a subunit of the conducting channel, but its tail inhibits LTP.