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IN BRIEF

REPAIR

A new player in the regeneration game

Inflammation can promote axon regeneration. For example, proinflammatory cytokines can induce retinal ganglion cells to regenerate after optic nerve injury; however, the cell types and molecular mechanisms involved in this process are not well understood. Here, the authors showed that effective axon regeneration after optic nerve injury in mice required both neutrophils — which rapidly entered the site of injury-induced inflammation — and the atypical growth factor oncomodulin that they released. This indicates that neutrophils, which are components of the innate immune system, can promote nerve regeneration in the CNS.

ORIGINAL RESEARCH PAPER Kurimoto, T. *et al.* Neutrophils express oncomodulin and promote optic nerve regeneration. *J. Neurosci.* **33**, 14816–14824 (2013)

LEARNING AND MEMORY

Time cells go with the flow

In rats, 'time cells' in the hippocampal CA1 fire sequentially at particular moments in between salient events and thus have been proposed to encode elapsed time. However, previous studies of time cells involved moving animals, and the activity of these cells might therefore be related to movement rather than time. Here, the authors recorded from time cells in immobile, head-fixed rats performing an olfactory delayed matching-to-sample task. Many CA1 neurons activated at particular moments during the delay period in this memory task and different odour memories were associated with distinct patterns of time cell activity. This suggests that time cells may encode the 'flow of time' associated with a memory.

ORIGINAL RESEARCH PAPER MacDonald, C. J. *et al.* Distinct hippocampal time cell sequences represent odor memories in immobilized rats. *J. Neurosci.* **33**, 14607–14616 (2013)

ADULT NEUROGENESIS

A granular generation gap

Do adult-born granule cells (GCs) in the olfactory bulb differ functionally from those born during brain development? In this study, the authors assessed synaptic transmission in mature GCs of different ages. They found that presynaptic $GABA_B$ receptors suppressed GABA release probability in postnatally born GCs but not in adult-born GCs. Possibly related to this result, $GABA_B$ receptors had different localizations in postnatally born versus adult-born GCs. These findings suggest that adult-born GCs are functionally distinct from GCs born during development.

ORIGINAL RESEARCH PAPER Valley, M. T. *et al.* Adult neurogenesis produces neurons with unique GABAergic synapses in the olfactory bulb. *J. Neurosci.* **33**, 14660–14665 (2013)

SYNAPTIC PHYSIOLOGY

The fast and the vesicle

Studies of synaptic vesicle recycling usually involve non-physiological or high-frequency stimulation of synapses *in vitro*. To obtain a more physiological measure of this process, Watanabe *et al.* used an optogenetic approach to stimulate, with a single light pulse, neuromuscular junctions in living worms and froze the worms immediately afterwards. Subsequent electron microscopy analysis revealed that vesicle endocytosis occurs both at the centre of the synapse and at adherens junctions and is much faster than current models of synaptic vesicle recycling — clathrin-mediated endocytosis and the 'kiss and run' mechanism — suggest.

ORIGINAL RESEARCH PAPER Watanabe, S. *et al.* Ultrafast endocytosis at *Caenorhabditis elegans* neuromuscular junctions. *eLife* **2**, e00723 (2013)