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IN BRIEF

SYNAPTIC PLASTICITY

WNT signalling regulates plasticity in worms

The insertion and removal of neurotransmitter receptors is thought to contribute to plasticity at synapses; however, the signalling mechanisms underlying such receptor dynamics have not been fully elucidated. Here, the authors show that synaptic plasticity at the *Caenorhabditis elegans* neuromuscular junction involves the translocation of acetylcholine receptors to the cell surface. Furthermore, they reveal a crucial role for a WNT signalling pathway in regulating acetylcholine receptor expression, transmission and plasticity at this synapse.

ORIGINAL RESEARCH PAPER Jensen, M. *et al.* Wnt signaling regulates acetylecholine receptor translocation and synaptic plasticity in the adult nervous system. *Cell* **149**, 173–187 (2012)

PAIN

P2X7 receptor variants influence pain

At least part of the variability in chronic pain symptoms and response to analgesics across individuals is thought to be genetically determined, but the genes involved are mostly unknown. The authors find that variations in the gene encoding the P2X7 receptor (P2X7R) that affect P2X7R pore formation alter mechanical allodynia following injury in mice and pain intensity ratings in human patients. A peptide that blocked pore formation in P2X7R also reduced pain behaviour in mice, suggesting that targeting P2X7R pore formation might reduce chronic pain in some individuals.

ORIGINAL RESEARCH PAPER Sorge, R. E. *et al.* Genetically determined P2X7 receptor pore formation regulates variability in chronic pain sensitivity. *Nature Med.* 25 Mar 2012 (doi:10.1038/nm.2710)

NEUROGENESIS

Hypothalamic neurogenesis regulates weight gain

Several sites of adult neurogenesis in the brain are well established, and recent studies have suggested that there may also be a neurogenic niche in the hypothalamus. Here, the authors show that radial-glia-like cells known as tanycytes in the median eminence of the hypothalamus proliferate and generate new neurons in adult mice. The rate of neurogenesis was altered by changes in diet (a high-fat diet induced more neurogenesis), and inhibiting hypothalamic neurogenesis reduced weight gain, suggesting a role for this process in weight regulation.

ORIGINAL RESEARCH PAPER Lee, D. A. *et al.* Tanycytes of the hypothalamic median eminence form a diet-responsive neurogenic niche. *Nature Neurosci.* 25 Mar 2012 (doi:10.1038/nn.3079)

NEURAL NETWORKS

Functional clustering of activity during NREM sleep

Effective connectivity between brain areas, resulting in large-scale functional networks, is thought to be required for consciousness. Here, the authors investigated how connectivity is altered during non-rapid eye movement (NREM) sleep. They assessed functional connectivity within and between six human brain networks during wakefulness and NREM sleep using functional MRI. The results indicated a shift from large-scale networks to functional clustering of brain activity in small independent modules during NREM sleep. These changes in organization might account for the reduced information integration and, consequently, loss of consciousness during NREM sleep.

ORIGINAL RESEARCH PAPER Boly, M. *et al.* Hierarchical clustering of brain activity during human nonrapid eye movement sleep. *Proc. Natl Acad. Sci. USA* 26 Mar 2012 (doi:10.1073/pnas.1111133109)

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