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IN BRIEF

GENES AND DISEASE

Organoids assist in ASD research

The developmental aetiology of autism spectrum disorders (ASDs) is poorly understood — partly because of the difficulty in accurately modelling human cortical development. Induced pluripotent stem cells (iPSCs) derived from fibroblasts taken from individuals with severe idiopathic ASDs were cultured as neural cell organoids. Although the genomic alterations varied between individuals with ASDs, organoids showed increased expression of proteins involved in cell proliferation and differentiation and a FOXG1-dependent increase in GABAergic neurons compared with control iPSC-derived neural cells. These findings suggest that the genomic differences among individuals with ASDs converge on common neurodevelopmental mechanisms.

ORIGINAL RESEARCH PAPER Mariani, J. *et al.* FOXG1-dependent dysregulation of GABA/glutamate neuron differentiation in autism spectrum disorders. *Cell* **162**, 375–390 (2015)

SENSORY PROCESSING

Itchy astrocytes

Many inflammatory skin diseases are accompanied by chronic, intractable itch, but the underlying pathology is poorly understood. Here, the induction of dermatitis in mice induced chronic itch accompanied by long-term reactive astrogliosis in the dorsal horn of the spinal cord, which was dependent on STAT3 and exacerbated by gastrin-releasing peptide (GRP). Furthermore, intrathecal administration of LCN2, which is upregulated by activated astrocytes, to normal mice enhanced GRP-induced scratching — an effect that was not produced in GRP receptor-mutant mice. Thus, STAT3-activated astrocytes increase the sensation of itch via a pathway involving LCN2.

ORIGINAL RESEARCH PAPER Shiratori-Hayashi, M. *et al.* STAT3-dependent reactive astrogliosis in the spinal dorsal horn underlies chronic itch. *Nat. Med.* http://dx.doi.org/10.1038/nm.3912 (2015)

NEURONAL CIRCUITS

Peckish flies are less picky

Different internal states such as hunger or arousal cause functional changes in neural circuits and enable animals to adapt their behaviour according to their needs. Here, enhanced responsiveness to attractive odours and reduced aversion to noxious odours in starved flies is shown to be mediated by two neuromodulators that have opposing effects. Short neuropeptide F sensitizes an olfactory glomerulus that mediates attraction, and tachykinin suppresses activity in a glomerulus that mediates aversion.

ORIGINAL RESEARCH PAPER Ko, K. I. *et al.* Starvation promotes concerted modulation of appetitive olfactory behavior via parallel neuromodulatory circuits. *eLife* http://dx.doi.org/10.7554/eLife.08298 (2015)

GLIA

Gasping for breath

How the brain senses local reductions in O_2 partial pressure (pO_2) that occur following neuronal activity is unknown, but it has now been shown that small decreases in pO_2 induce Ca^{2+} responses in astrocytes. Reductions in O_2 availability inhibits astrocytic mitochondrial respiration, leading to a cascade of events that culminates in IP3 receptor activation and the release of ATP, which acts on brainstem respiratory rhythm-generating neurons to increase breathing.

ORIGINAL RESEARCH PAPER Angelova, P. R. *et al.* Functional oxygen sensing in astrocytes. *J. Neurosci.* **35**, 10460–10473 (2015)