Nature Reviews Neuroscience | AOP, published online 14 march 2012

IN BRIEF

NEURODEGENERATION

HDAC2 mediates cognitive impairment

Non-selective histone deacetylase (HDAC) inhibitors reduce cognitive impairment in animal models of neurodegenerative disease. Here, the authors investigated which specific HDAC mediates this effect. In a mouse model of Alzheimer's disease, HDAC2 levels were increased in CA1 and prefrontal cortex. HDAC2 was specifically enriched in genes involved in learning and memory or synaptic plasticity. Accordingly, these genes showed hypoacetylation and reduced expression. HDAC2 knockdown reversed these changes and restored synaptic plasticity and hippocampus-dependent memory performance. These findings point to HDAC2 as a target for the treatment of neurodegeneration-related cognitive impairments.

ORIGINAL RESEARCH PAPER Gräff, J. *et al.* An epigenetic blockade of cognitive functions in the neurodegenerating brain. *Nature* 29 Feb 2012 (doi: 10.1038/nature10849)

SPATIAL PROCESSING

Parietal entorhinal cortex cells in navigation

The authors investigated the contribution of cells in posterior parietal cortex (PPC) to spatial processing by recording single units in freely moving rats. PPC cells changed their firing pattern as a function of self-motion and acceleration. The firing preference of PPC cells in rats navigating a hairpin maze was maintained when the maze was placed in a different room, but the cells completely re-tuned when the rats navigated an open field. This re-tuning was driven by the restructuring of the animal's behaviour rather than by spatial inputs. These findings suggest that PPC cells encode self-movement and acceleration independently of the environment.

ORIGINAL RESEARCH PAPER Whitlock, J. R. *et al.* Functional split between parietal and entorhinal cortices in the rat. *Neuron* **73**, 789–802 (2012)

NEUROIMAGING

Rats join the 'default mode' club

Humans, monkeys and chimpanzees have a default-mode network (DMN); that is, functionally connected brain areas that become less active during cognitive tasks. Lu *et al.* now show that among several resting-state networks in anaesthetized rats, one network is broadly similar to the human DMN. The organization of this network, with two subsystems centred around the prefrontal cortex and the retrosplenial cortex, respectively, is also similar (although not identical) to that in humans. These findings suggest that a DMN may be a fundamental aspect of the mammalian brain.

ORIGINAL RESEARCH PAPER Lu, H. *et al.* Rat brains also have a default mode network. *Proc. Natl Acad. Sci. USA* 21 Feb 2012 (doi: 10.1073/pnas.1200506109)

VISUAL SYSTEM

How the brain distinguishes bugs from birds

The brain has specialized areas for recognizing categories such as faces and houses, but how does it distinguish items within a category? The authors showed human volunteers pictures of bugs, birds and primates and compared neural response patterns in the lateral occipital complex area with the volunteers' behavioural judgements of the pictures. This revealed a continuum of cortical activity patterns that reflected the degree of 'animacy' of the pictured animals (increasing from insects to birds to primates). Future studies may establish whether inanimate objects and humans are reflected on this same continuum of neural representations.

ORIGINAL RESEARCH PAPER Connolly, A. C. *et al.* The representation of biological classes in the human brain. *J. Neurosci.* **32**, 2608–2618 (2012)