IN BRIEF

LEARNING AND MEMORY

Getting in sync with working memory

Neurons in the prefrontal and posterior parietal cortices show task-dependent synchronized activity during working memory tasks, but the role of such activity remains unclear. Salazar *et al.* recorded activity from neurons in both brain regions in monkeys while the animals performed a visual working memory task. In this task, monkeys were briefly shown a visual stimulus. Then, after a delay, they were shown two further stimuli and had to pick the one that matched the original stimulus. During the delay period, content-specific synchronized activity occurred across the fronto-parietal network, suggesting that synchronous activity represents the short-term memory.

ORIGINAL RESEARCH PAPER Salazar, R. F. *et al.* Content-specific fronto-parietal synchronization during visual working memory. *Science* 1 Nov 2012 (doi:10.1126/science.1224000)

SLEEP

The hypnotic powers of anaesthetics

How volatile anaesthetics such as isoflurane produce unconsciousness is unclear. Here, mice were exposed to hypnotic doses of volatile anaesthetics, which increased the number of neurons expressing cFOS, a marker of neuronal activity, in the ventrolateral preoptic nucleus (VLPO), a sleep-promoting component of the arousal circuitry. Isoflurance depolarized a subset of VLPO neurons that normally fire during sleep by decreasing potassium conductance, indicating that volatile anaesthetics may exert their hypnotic effects by directly activating sleep-promoting neurons.

ORIGINAL RESEARCH PAPER Moore, J. T. *et al.* Direct activation of sleep-promoting VLPO neurons by volatile anesthetics contributes to anesthetic hypnosis. *Curr. Biol.* **22**, 2008–2016 (2012)

CORTICAL PLASTICITY

Plasticity gets sex-specific

Nitric oxide synthase 1 (NOS1) has roles in different forms of plasticity. A NOS1 isoform, NOS1α, also plays a part in stroke by contributing to ischaemic damage. As this pathophysioloigcal effect is greater in males than in females, the authors tested whether the role of NOS1α in plasticity is also sex-specific. Male NOS1α-null mice showed no long-term potentiation (LTP) between barrel columns and reduced experienced-dependent potentiation (EDP) in the barrel cortex. By contrast, LTP and EDP in the barrel cortex could be detected in NOS1α-null female mice, indicating that neocortical plasticity mechanisms may show sex-specific differences.

ORIGINAL RESEARCH PAPER Dachtler, J., Hardingham, N. R. & Fox, K. The role of nitric oxide synthase in cortical plasticity is sex specific. *J. Neurosci.* **32**, 14994–14999 (2012)

NEUROGENETICS

Probing genomic diversity in neurons

Somatic mutations may contribute to neuronal functional diversity and the unexplained burden of neurological disease, but the extent of genomic diversity among individual neurons is unclear. Evrony *et al.* amplified the genomes of single neurons from the human brain and assessed the frequency with which somatic LINE-1 (L1) retrotransposon insertions occur. Some previous studies had found frequent L1 retrotransposition in the human brain, but Evrony *et al.* found < 1 somatic L1 insertion per neuron in the cortex and caudate nucleus, suggesting that L1 is not a major effector of neuronal diversity in these brain regions.

ORIGINAL RESEARCH PAPER Evrony, G. D. *et al.* Single-neuron sequencing analysis of L1 retrotransposition and somatic mutation in the human brain. *Cell* **151**, 483–496 (2012)