Nature Reviews Neuroscience | Published online 18 May 2017

IN BRIEF

LEARNING AND MEMORY

A state to remember

Memory formation requires representations of new information to be efficiently encoded by the brain memory network. Here, the authors used multivariate classification to determine encoding states that were predictive of later recall and those that were likely to lead to forgetting. In people with epilepsy who had intracranially implanted electrodes, stimulation of the memory network during states associated with efficient memory encoding disrupted memory formation, whereas, when the stimulation was applied during a period of inefficient encoding, memory was facilitated. Thus, the effect of stimulation on memory depends on the existing state of the memory network.

ORIGINAL ARTICLE Ezzyat, Y. *et al.* Direct brain stimulation modulates encoding states and memory performance in humans. *Curr. Biol.* http://dx.doi.org/10.1016/j.cub.2017.03.028 (2017)

NEURONAL DEVELOPMENT

The source of the signal

During embryonic development, spinal commissural axons extend towards the floor plate (FP), guided by the axon guidance molecule netrin 1, but the source of netrin 1 is a matter of debate. In the developing spinal cord, netrin 1 is expressed by FP cells and progenitor cells of the ventricular zone. The authors conditionally knocked out netrin 1 either from ventricular zone progenitors or FP cells and found that only loss of netrin 1 from the former disrupted axon guidance. Thus, contrary to prevailing thought, commissural axons are guided by netrin 1 produced by ventricular zone progenitors and not FP cells.

ORIGINAL ARTICLE Varadarajan, S. G. *et al.* Netrin1 produced by neural progenitors, not floor plate cells, is required for axon guidance in the spinal cord. *Neuron* http://dx.doi.org/10.1016/j.neuron.2017.03.007 (2017)

BRAIN EVOLUTION

Genetic layering

The neocortex is the most recently evolved part of the brain, and, in this study, RNA sequencing was performed on individual layers of the prefrontal cortex from humans, macaques and chimpanzees and revealed that, although the expression of most genes was conserved across all three species, the number of genes showing a change in location of expression was far higher in humans than in chimpanzees and macaques, suggesting a greater cortical reorganization in the human evolutionary lineage than in that of other primates.

ORIGINAL ARTICLE He, Z. *et al.* Comprehensive transcriptome analysis of neocortical layers in humans, chimpanzees and macaques. *Nat. Neurosci.* http://dx.doi.org/10.1038/nn.4548 (2017)

SLEEP

Dream a little dream

Dreaming was thought to be confined to rapid eye movement (REM) sleep, which occurs during periods of high-frequency electroencephalographic (EEG) activity, but, more recently, dreaming has been observed during periods of non-REM sleep, which is characterized by low-frequency EEG activity. Monitoring brain activity using high-density EEG, participants were awoken during REM and non-REM sleep and reported on the presence or absence of dreaming. The authors found that the presence of high-frequency EEG activity was predictive of dreaming during non-REM sleep.

ORIGINAL ARTICLE Siclari, F. *et al.* The neural correlates of dreaming. *Nat. Neurosci.* http://dx.doi.org/10.1038/nn.4545 (2017)