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IN BRIEF

SLEEP

Identification of a biomarker for sleep drive in flies and humans.

Seugnet, L. *et al. Proc. Natl Acad. Sci. USA* **103**, 19913–19918 (2006)

A test for excessive sleepiness could prevent many traffic and occupational accidents. The authors sought to identify candidate biomarkers of sleepiness using *Drosophila melanogaster*. Using two genetic mutants and two pharmacological interventions, they showed that amylase mRNA levels are specifically upregulated after sleep deprivation that leads to compensatory homeostatic sleep mechansisms. In flies and humans, amylase activity and mRNA levels increased after 28 hours of sleeplessness. This research might contribute to the development of a 'sleepiness test' in humans.

DECISION MAKING

Reinforcement learning signals predict future decisions.

Cohen, M. X. *et al. J. Neurosci.* **27**, 371–378 (2007)

Some models of learning propose that the brain registers a 'prediction error' when the outcome of a decision differs from the anticipated outcome. Prediction errors are thought to be reflected by a particular change in the pattern of event-related potentials (ERP) in the brain. When ERPs were measured in subjects playing a strategic game against a computer, the magnitude of the ERP change after an unexpected outcome predicted whether the subjects would alter their strategy in the subsequent trial. These data indicate that humans adjust their decision-making behaviour through reinforcement signals.

GENE EXPRESSION

Genome-wide atlas of gene expression in the adult mouse brain.

Lein, E. S. *et al. Nature* **445**, 168–176 (2007)

In the past, examining gene expression in the brain involved studying a few genes histologically or many genes in large regions using microarrays. Knowledge of the expression of many genes at a much higher resolution is essential to characterize cellular populations. This high-throughput study, which is part of the Allen Institute for Brain Science Atlas project, describes the development of an anatomically comprehensive atlas of gene expression in the mouse brain. It details the expression patterns of more than 20,000 genes at cellular resolution and reveals that more than 80% of mouse genes are expressed in the brain.

SENSORY SYSTEMS

Learning to smell the roses: experience-dependent neural plasticity in human piriform and orbitofrontal cortices.

Li, W. *et al. Neuron* **52**, 1097–1108 (2006)

The idea that odour perception is directly predictable from the odorant's molecular structure alone has been challenged by studies suggesting that verbal context or learning can influence odour quality perception. Using functional MRI, the authors examined how sensory experience could alter odour perception, a process termed 'perceptual learning'. They showed that exposure to a target odorant resulted in an increased ability to distinguish odours that are similar to the target odour and increased activity in the orbitofrontal cortex, indicating a role for this area in perceptual learning.