IN BRIEF

ENDOCANNABINOIDS

Endogenous cannabinoid signaling is essential for stress adaptation

Hill, M. N. *et al. Proc. Natl Acad. Sci. USA* 3 May 2010 (doi:10.1073/pnas.0914661107)

Repeated stress exposure causes basal and stress-induced corticosterone release to be increased and decreased, respectively. The authors investigated whether endocannabinoids have a role in this 'stress adaptation'. Repeated restraint stress decreased *N*-arachidonylethanolamine (AEA) levels in the hypothalamus, cortex, amygdala and hippocampus and increased 2-arachidonoylglycerol (2-AG) levels in the amygdala. These changes mediated the adaptation of basal and stress-induced corticosterone levels, respectively. The increase in 2-AG levels required cannabinoid receptor 1 activation. Thus, different endocannabinoids modulate different aspects of stress adaptation.

COGNITIVE NEUROSCIENCE

Environmental change enhances cognitive abilities in fish

Kotrschal, A. & Taborsky, B. *PLoS Biol.* **8**, e1000351 (2010)

In mammals, the early-life environment influences brain development and cognitive performance later in life. Here, juvenile fish (*Simochromis pleurospilus*) were fed on stable food regimens (either high or low) or were switched from one to the other. Performance in a learning task was better in adult fish exposed to variable food rations, regardless of the direction of the switch or the total amount of food received. This suggests that a single environmental change can have long-lasting cognitive effects in fish.

COGNITIVE NEUROSCIENCE

Neural basis of individual differences in synesthetic experiences

Rouw, R. & Scholte, H. S. *J. Neurosci.* **30**, 6205–6213 (2010)

The authors compared people who experience colour–grapheme synaesthesia 'in the outside world' (projectors) with those who experience it 'in the mind only' (associators). Increased grey matter and enhanced functional MRI signals during a grapheme detection task in the superior parietal cortex distinguished synaesthetes from non-synaesthetes. Grey matter was increased in visual, auditory and motor cortices in projectors, and in (para-) hippocampal areas in associators. Thus, different synaesthetic experiences may be associated with altered properties of the brain areas that mediate them.

LEARNING AND MEMORY

Long-term memory leads to synaptic reorganization in the mushroom bodies: a memory trace in the insect brain?

Hourcade, B. *et al. J. Neurosci.* **30**, 6461–6465 (2010)

The formation of long-term memory in mammals requires protein synthesis and is accompanied by structural changes at synapses. The authors show that honeybees that have learnt to associate a specific odorant with a sucrose reward have an increased density of olfactory microglomeruli in the mushroom bodies. This increase requires protein synthesis. The results suggest that similar structural synaptic rearrangements underlie long-term memory formation in insects and in mammals.