

## IN BRIEF

**SPATIAL PROCESSING****Location, location, location**

How individual CA1 pyramidal cells (PCs) contribute to spatial memory is not well understood. Changes in intracellular  $Ca^{2+}$  levels in specific PCs (indicating their place field) in superficial and deep layers of CA1 in mice were measured during a spatial-navigation task and a goal-oriented learning task. Superficial-PC place maps were more stable than deep-PC maps during the exploration task, but deep-PC place maps were more stable during the goal-oriented learning task, indicating functional specialization of PCs along the radial axis of CA1.

**ORIGINAL ARTICLE** Danielson, N. B. *et al.* Sublayer-specific coding dynamics during spatial navigation and learning in hippocampal area CA1. *Neuron* <http://dx.doi.org/10.1016/j.neuron.2016.06.020> (2016)

**NEUROIMMUNOLOGY****Immune to the placebo effect**

Patient expectation and the activation of brain reward circuitry have a role in placebo-related clinical benefits, but the mechanism is unknown. Ben-Shaanan *et al.* show that chemogenetic activation of neurons in the ventral tegmental area followed by exposure to *Escherichia coli* resulted in increased bactericidal activity of monocytes and macrophages, which was lost after ablation of peripheral catecholaminergic neurons of the sympathetic nervous system. This suggests that neurons of the ventral tegmental area might enable the reward circuitry to influence the immune system.

**ORIGINAL ARTICLE** Ben-Shaanan, T. L. *et al.* Activation of the reward system boosts innate and adaptive immunity. *Nat. Med.* <http://dx.doi.org/10.1038/nm.4133> (2016)

**DECISION MAKING****Making your mind up**

During decision making, activity in several brain areas is increased, but their role in decision making is not known. Katz *et al.* recorded from neurons in the lateral intraparietal area (LIP) and middle temporal area (MT) of awake behaving rhesus macaques while they performed a motion-direction discrimination task. Neurons in the LIP exhibited changes in firing pattern that correlated strongly with the animals' choice in the task; by contrast, changes in the firing of MT neurons were weakly correlated with choice. However, pharmacologically silencing LIP neurons had no effect on task performance, whereas silencing MT neurons strongly disrupted it, indicating a dissociation between correlation and causation in decision making.

**ORIGINAL ARTICLE** Katz, L. N. *et al.* Dissociated functional significance of decision-related activity in the primate dorsal stream. *Nature* **535**, 285–288 (2016)

**NEUROPHYSIOLOGY****Going with the flow**

Flow of cerebrospinal fluid (CSF) within the ventricular system of the brain is achieved by cilia on the ependyma that lines the ventricles and is important for the transport of signalling molecules. Here, 1  $\mu\text{m}$  fluorescent beads were used to track cilium-generated flow in organotypic cultures of the ventral part of the third ventricle. The authors found that cilia are arranged into distinct modules that beat coherently to control local flow of CSF in complex ways and across several hundred micrometres. This enables directed transport of molecules to specific locations.

**ORIGINAL ARTICLE** Faubel, R. *et al.* Cilia-based flow network in the brain ventricles. *Science* **353**, 176–178 (2016)