

## IN BRIEF

**SENSORY SYSTEMS****Channelling touch**

The mechanisms underlying touch sensation in humans are poorly understood. Here, the authors induced human stem-cell-derived neural crest cells *in vitro* to produce neurons that morphologically and electrophysiologically resembled a subset of low-threshold mechanoreceptors (LTMRs), which convey touch. Deletion of the gene encoding PIEZO2, an ion channel activated by mechanical stimuli, from human embryonic stem cells rendered the subsequently induced LTMRs mechano-insensitive, indicating that this channel is required for mechanotransduction in these LTMRs.

**ORIGINAL RESEARCH PAPER** Schrenk-Siemens, K. *et al.* PIEZO2 is required for mechanotransduction in human stem cell-derived touch receptors. *Nature Neurosci.* <http://dx.doi.org/10.1038/nn.3894> (2014)

**NEURAL CODING****Time for a song**

The fine temporal pattern of spiking has been shown to have an important role in encoding information in sensory systems, but it is unclear whether such temporal coding is used by the forebrain motor network in motor control. Here, the authors analysed different renditions of song syllables from songbirds and their corresponding spike trains in the vocal motor area RA. They found that, on a millisecond timescale, the temporal pattern of spikes conveyed considerably more information about vocal behaviour than did the number of spikes, indicating the importance of temporal coding in this system.

**ORIGINAL RESEARCH PAPER** Tang, C. *et al.* Millisecond-scale motor encoding in a cortical vocal area. *PLoS Biol.* **12**, e1002018 (2014)

**CORTICAL PLASTICITY****Critical depolarization**

Here, the authors examined the role of depolarizing GABA in regulating critical-period plasticity in the visual cortex of rat pups. Brief, early pharmacological interference of depolarizing GABA, before the opening of the critical period, did not affect the onset of critical-period cortical plasticity but it did prolong the length of time of this plasticity. Such interference also decreased brain-derived neurotrophic factor (BDNF) levels in the visual cortex, and promotion of BDNF signalling prevented the effects of inhibiting depolarizing GABA. Thus, depolarizing GABA, by modulating BDNF signalling, seems to have a lasting regulatory effect on the critical period in the rat visual cortex.

**ORIGINAL RESEARCH PAPER** Deidda, G. *et al.* Early depolarizing GABA controls critical-period plasticity in the rat visual cortex. *Nature Neurosci.* <http://dx.doi.org/10.1038/nn.3890> (2014)

**NAVIGATION****The third dimension**

Head-direction cells fire when a mammal's head points in a specific direction in a horizontal plane and may provide 'compass' information to allow navigation, at least in two dimensions. Whether mammals possess a three-dimensional (3D) compass is less clear. Finkelstein *et al.* developed a device that tracked the head direction of behaving bats in 3D space and allowed neural recordings in the dorsal presubiculum, where head-direction cells are found. In crawling and flying bats, they found head-direction cells that were tuned to azimuth, pitch or roll, or combinations of these Euler angles, supporting a role for these cells in bat navigation in 3D space.

**ORIGINAL RESEARCH PAPER** Finkelstein, A. *et al.* Three-dimensional head-direction coding in the bat brain. *Nature* <http://dx.doi.org/10.1038/nature14031> (2014)