IN BRIEF

NEURAL CIRCUITS

Mating decisions

Female flies targeted by courting males integrate sensory information provided in the form of courtship 'cues' by male flies with an evaluation of their own reproductive status before deciding whether to accept or reject these advances. Three papers now shed light on the populations of central neurons involved in this process. Feng *et al.* find that a specific population of abdominal ganglion neurons are the direct synaptic targets of sensory neurons in the reproductive tract that signal whether the female has recently mated and have a crucial role in regulating female receptivity to male courtship. Zhou *et al.* reveal two clusters of central neurons — pCd and pC1 neurons — that respond to male-specific pheromones and courtship songs, and act together to promote female receptivity. Finally, Bussell *et al.* show that a subset of neurons expressing the transcription factor *Abdominal B* regulate 'pausing', a key behavioural indicator of female receptivity that facilitates copulation. These studies provide new insights into the circuits controlling female reproductive behaviour.

ORIGINAL RESEARCH PAPERS Feng, K. *et al.* Ascending SAG neurons control sexual receptivity of *Drosophila* females. *Neuron* **83**, 135–148 (2014) | Zhou, C. *et al.* Central brain neurons expressing *doublesex* regulate female receptivity in *Drosophila*. *Neuron* **83**, 149–163 (2014) | Bussell, J. J. *et al.* *Abdominal-B* neurons control *Drosophila* virgin female receptivity. *Curr. Biol.* http://dx.doi.org/10.1016/j.cub.2014.06.011 (2014)

COGNITIVE NEUROSCIENCE

Taking no action triggers firing

Neurons in the premotor and motor cortex fire when an individual performs an action, and thus it might be expected that these neurons are silenced when the individual is required to refrain from a particular action. However, Bonini *et al.* show that, in macaque monkeys trained in a go–no-go task, some premotor cortex neurons fired both when the monkeys were required to grasp an object and when they were required to refrain from grasping the object. Some premotor cortex mirror neurons — neurons that fire during an activity and during the observation of another individual carrying out the same activity — also fired during the observation of a second monkey refraining from grasping the object. Thus, the premotor cortex may encode representations of an action (both our own and that of others) even when the action is repressed.

ORIGINAL RESEARCH PAPER Bonini, L. *et al.* Ventral premotor neurons encoding representations of action during self and others' inaction. *Curr. Biol.* http://dx.doi.org/10.1016/j.cub.2014.05.047 (2014)

TECHNIQUES

Optogenetics in the red

The use of optogenetics to inhibit the activity of defined populations of neurons with high temporal precision is of enormous value for researchers attempting to dissect inaccessible neural circuits in the brain. Chuong *et al.* now report the development of a red-light-sensitive chloride pump, named Jaws, which is capable of driving neural hyperpolarization. The authors showed that, owing to the ability of red light to penetrate tissue, Jaws can enable non-invasive transcranial inhibition of activity in the mouse brain. In addition, activation of Jaws was used to restore photosensory activity in the retinae of mice modelling the degenerative condition retinitis pigmentosa, suggesting that this opsin may also have clinical utility.

ORIGINAL RESEARCH PAPER Chuong, A. S. *et al.* Noninvasive optical inhibition with a red-shifted microbial rhodopsin. *Nature Neurosci.* http://dx.doi.org/10.1038/nn.3752 (2014)