

IN BRIEF

SENSORY SYSTEMS

Activation of pheromone-sensitive neurons is mediated by conformational activation of pheromone-binding protein

Laughlin, J. D. *et al. Cell* **133**, 1255–1265 (2008)

Specialized antennal neurons (T1 neurons) enable flies to detect pheromones. The odorant-binding protein LUSH, which is present in the extracellular lymph that surrounds T1 neurons, is important for the detection of the pheromone 11-*cis* vaccenyl acetate (cVA), but its mechanism of action was unknown. The authors examined the crystal structure of LUSH bound to cVA and showed that binding to cVA alters the conformation of LUSH. This conformational change can trigger firing in T1 neurons and alter their sensitivity to cVA.

EVOLUTION

An evolutionarily conserved sexual signature in the primate brain

Reinius, B. *et al. PLoS Genet.* **4**, e1000100 (2008)

Although sexually dimorphic physiological and behavioural characteristics are well documented in man, little is known about the genetic basis of these differences. Because the genes that are essential for these characteristics are likely to have been conserved during evolution, the authors compared genome-wide expression profiles of the occipital cortex of male and female humans, macaques and marmosets. Two genes were consistently sex-biased in all three species: *XIST*, which is important for X-chromosome inactivation in females, and *HSBP1*, which is involved in the stress response. The sex bias of 85 other genes was conserved between humans and macaques.

AXON GUIDANCE

DSCAM is a netrin receptor that collaborates with DCC in mediating turning responses to netrin-1

Ly, A. *et al. Cell* **133**, 1241–1254 (2008)

Developing spinal commissural neurons are guided towards and across the ventral midline by the chemoattractant netrin 1. Netrin 1 is known to exert its effects by binding to DCC (deleted in colorectal carcinoma), a receptor that is expressed by commissural neurons. Here the authors show that the adhesion molecule DSCAM is also expressed by mammalian commissural neurons and can bind to and mediate the axonal turning response to netrin 1. This demonstrates that DSCAM, which was already known to engage in homophilic interactions, can also act as a heterophilic receptor.

NEUROIMAGING

Mapping the structural core of human cerebral cortex

Hagmann, P. *et al. PLoS Biol.* **6**, e159 (2008)

Understanding the structural basis of connectivity in the brain promises to bring great insights into the brain's organization and function. Here the authors used diffusion spectrum imaging to map cortico-cortical axonal pathways in human volunteers. By applying network-analysis techniques, they revealed that a group of posterior medial and parietal regions form a densely interconnected 'structural core' which contains a series of 'hubs' that link to temporal and frontal modules. A close relationship between the structural core and parts of the 'default network' — regions that are highly active at rest — was also shown.