

IN BRIEF

PERCEPTION

Excitability modulates synaesthesia

Synaesthetes who experience colours when perceiving or representing numbers exhibit structural and functional differences in cortical areas that are involved in number and colour processing compared to non-synaesthetes. Using transcranial magnetic stimulation or transcranial direct current stimulation, the authors showed that in humans, grapheme-colour synaesthesia is characterized by enhanced cortical excitability in the primary visual cortex and can be augmented or attenuated with cathodal or anodal stimulation, respectively.

ORIGINAL RESEARCH PAPER Terhune, D. B. *et al.* Enhanced cortical excitability in grapheme-color synesthesia and its modulation. *Curr. Biol.* **21**, 2006–2009 (2011)

NEUROPHARMACOLOGY

Striking the right balance between G_i and G_q signalling

A new study explains why some inhibitors of the serotonin G_q protein-coupled receptor 2AR (such as clozapine), but not others (such as ritanserin), have antipsychotic actions. The authors showed that 2AR can form a heteromeric complex with metabotropic glutamate receptor 2 (mGluR2) — which is a G_i protein-coupled receptor — and that this interaction can enhance glutamate-induced G_i signalling and reduce serotonin-induced G_q signalling. The intracellular G_i and G_q signalling balance is predictive of the anti- or pro-psychotic activity of drugs targeting 2AR and mGluR2, providing a potential new metric to improve current antipsychotic therapies.

ORIGINAL RESEARCH PAPER Fribourg, M. *et al.* Decoding the signaling of a GPCR heteromeric complex reveals a unifying mechanism of action of antipsychotic drugs. *Cell* **147**, 1011–1023 (2011)

BEHAVIOURAL NEUROSCIENCE

Curbing sweet cravings

In this study, the authors examined the reward value of sweeteners in mice by assessing the animals' preferences for sweeteners compared to lick-induced optogenetic activation of midbrain dopaminergic neurons. They found that mice preferred optogenetic stimulation to the artificial sweetener sucralose, but not to sucrose. Interestingly, following a period of food restriction, the reward value of sucrose increased, whereas after administration of leptin it decreased. These results highlight the post-ingestive effects of fat metabolism on nutrient preference.

ORIGINAL RESEARCH PAPER Domingos, A. I. *et al.* Leptin regulates the reward value of nutrient. *Nature Neurosci.* **14**, 1562–1568 (2011)

ADDICTION

NR2B — a target for preventing drug relapse?

The propensity for drug relapse has been associated with cognitive impairments in the prefrontal cortex. Here, the authors examined changes in synaptic plasticity during relapse in a rat model of heroin addiction. They found that there was an increase in the long-term potentiation-like synaptic strength of prefrontal projection neurons that project to the nucleus accumbens, and that this increase was dependent on the recruitment of NR2B-containing NMDA receptors to the cell surface. Furthermore, they found that treatment of addicted rats with the NMDA receptor inhibitor ifenprodil prevented heroin relapse. These findings suggest that NR2B-containing NMDA receptors could represent a novel therapeutic target for addiction.

ORIGINAL RESEARCH PAPER Shen, H. *et al.* Heroin relapse requires long-term potentiation-like plasticity mediated by NMDA2b-containing receptors. *Proc. Natl Acad. Sci. USA* **108**, 19407–19412 (2011)