IN BRIEF

REPAIR

Reversing pathological neural activity using targeted plasticity

Engineer, N. D. *et al. Nature* **470**, 101–104 (2011)

Tinnitus is associated with plastic changes in the auditory cortex. By pairing vagus nerve stimulation with sensory inputs (multiple tone frequencies) in an animal model of noise-induced tinnitus, the authors reversed the plasticity changes in the auditory cortex and could no longer detect a gap in narrowband noise at a particular frequency — the behavioural correlate of tinnitus. The effects persisted for weeks after the end of the treatment. This approach to generate long-lasting and stimulus-specific changes to neural circuits with minimal side effects could have potential clinical applications for other conditions that are associated with pathological plasticity, such as chronic pain.

GENETICS

Distinct physiological and behavioural functions for parental alleles of imprinted *Grb10*

Garfield, A. S. *et al. Nature* **469**, 534–538 (2011)

Preferential expression of a single parental allele has influential effects during development, but no effects on social behaviour had been reported. The adaptor protein GRB10 is predominantly expressed from the maternal allele during embryogenesis but, from fetal life into adulthood, brain *Grb10* is expressed from the paternal allele. In mice, ablation of the expression of paternal *Grb10* in the brain increased social dominance behaviour, including allogrooming, but had no effect on anxiety-related behaviour, locomotor activity, olfaction or aggression, highlighting a role for this imprinted gene in the regulation of some aspects of behaviour. This study indicates that parental alleles can have tissue-specific actions on distinct physiological and behavioural processes.

ACTIVE ZONE

RIM determines Ca^{2+} channel density and vesicle docking at the presynaptic active zone

Han, Y., Kaeser, P. S., Südhof, T. C. and Schneggenburger, R. *Neuron* **69**, 304–316 (2011)

RIM proteins activate vesicle priming by reversing autoinhibitory homodimerization of Munc13

Deng, L., Kaeser, P. S., Xu, W. and Südhof, T. C. *Neuron* **69**, 317–331 (2011)

Two recent papers shed new light on the role of Rab 3-interacting molecule (RIM) proteins — active zone scaffolding molecules — in synaptic vesicle exocytosis. In the first study, using a Cre–lox based conditional knockout approach, the authors examined the calyx of Held and showed that RIM proteins help to target presynaptic Ca^{2+} channels to the active zone and thus aid vesicle docking and fast neurotransmitter release. The second study explored the interaction between RIM and the vesicle priming factor MUNC13, which normally forms a homodimer. The authors showed that RIM facilitates vesicle priming — not by coupling MUNC13 to other active zone proteins, as was previously thought, but by relieving MUNC13 from homodimerization. The RIM Zn^{2+} finger domain alone was able to promote vesicle priming by binding to MUNC13.