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# IN BRIEF

## SYNAPTIC PHYSIOLOGY

### Sprint or steady pace

All synapses exhibit both evoked and spontaneous release ('minis') of neurotransmitters. Recent data have indicated that these two release modes involve distinct mechanisms, but the details are unclear. Using calcium imaging at the *Drosophila* neuromuscular junction (NMJ), this paper showed that most NMJs exhibiting spontaneous release did not exhibit evoked release, and vice versa. Furthermore, the two modes of release involved distinct sets of NMJ glutamate receptors and were associated with differing levels of the synaptic protein BrP. BrP might therefore be involved in the preference of a synapse for one mode of transmission over another.

**ORIGINAL RESEARCH PAPER** Peled, E. S., Newman, Z. L. & Isacoff, E. Y. Evoked and spontaneous transmission favored by distinct sets of synapses. *Curr. Biol.* http://dx.doi.org/10.1016/j.cub.2014.01.022 (2014)

## NEUROPHARMACOLOGY

### Switching on the light

Blindness can be caused by retinal degeneration and a consequent inability to interpret incoming light stimuli. Although several promising repair strategies have been proposed, they are all invasive and not without complications. Here, the authors described a novel approach involving 'photoswitch' compounds that enable neuronally expressed voltage-gated ion channels to become photosensitive. In a mouse model of retinal degeneration, the photoswitch DENAQ restored retinal photoreception with negligible toxicity, suggesting that it holds promise for retinal repair in humans.

**ORIGINAL RESEARCH PAPER** Tochitsky, I. *et al.* Restoring visual function to blind mice with a photoswitch that exploits electrophysiological remodeling of retinal ganglion cells. *Neuron* **81**, 800–813 (2014)

## PAIN

### Stopping pain in its tracks

Inhibition of primary nociceptors by optogenetic approaches has been achieved in transgenic mice, but the genetic manipulation involved has limited its translational potential. A new study used a type of adeno-associated virus administered into the sciatic nerve in mice to express inhibitory opsins in primary nociceptors. Expression of the opsin in the dermal free nerve endings of the sciatic nerve in the hindpaw enabled the light stimulus to be applied transdermally. Light-stimulation of the opsin reduced both mechanical allodynia and thermal hyperalgesia in the mice. Application of such non-invasive approaches in humans could lead to a novel approach to control intractable neuropathic pain.

**ORIGINAL RESEARCH PAPER** Iyer, S. M. *et al.* Virally mediated optogenetic excitation and inhibition of pain in freely moving nontransgenic mice. *Nature Biotech.* http://dx.doi.org/10.1038/nbt.2834 (2014)

## LEARNING AND MEMORY

### Don't forget the CA2

The CA2 region of the hippocampus is a disynaptic gateway between the entorhinal cortex and CA1. This study showed that in adult mice, selective inactivation of CA2 pyramidal cell output resulted in the loss of memory of a previously encountered conspecific but had no effect on the amount of time spent interacting with a littermate or on hippocampus-dependent forms of spatial memory and fear memories. These findings indicate an important role for CA2 pyramidal neurons in hippocampus-dependent social memory.

**ORIGINAL RESEARCH PAPER** Hitti, F. L. & Siegelbaum, S. A. The hippocampal CA2 region is essential for social memory. *Nature* http://dx.doi.org/10.1038/nature13028 (2014)