Nature Reviews Neuroscience | Published online 19 Jun 2017

IN BRIEF

SLEEP

Labelling sleep generators

The preoptic area (POA) of the hypothalamus is implicated in sleep generation, but deciphering exactly which POA neurons promote sleep has been difficult. The POA sends inhibitory projections to the wakefulness-promoting tuberomammillary nucleus (TMN). Through the use of virus-mediated retrograde tracing and optogenetics, Chung *et al.* identified a population of GABAergic POA→TMN neurons that promote sleep in mice. They also identified peptidergic markers for these neurons. This study reveals details of a population of sleep-promoting neurons that may be manipulated to probe sleep circuits.

ORIGINAL ARTICLE Chung, S. *et al.* Identification of preoptic sleep neurons using retrograde labelling and gene profiling. *Nature* **545**, 477–481 (2017)

NEURODEVELOPMENT

Organizing the second brain

How enteric nervous system (ENS) circuits are assembled and organized is not well understood. Most ENS neurons and glia are derived from SOX10-expressing enteric neural crest-derived cells (ENCCs). Here, cell-fate mapping showed that ENCCs give rise to clonal clusters of cells in the small intestine, stomach and caecum in mouse embryos, and there was an overlapping spatial distribution of these clonal units in adult mice. Calcium imaging revealed that neurons of the same clonal origin were more likely to show synchronous responses than clonally unrelated neuronal pairs. Thus, ENS organization at spatial and functional levels is cell lineage dependent.

ORIGINAL ARTICLE Lasrado, R. *et al.* Lineage-dependent spatial and functional organization of the mammalian enteric nervous system. *Science* **356**, 722–726 (2017)

NEURAL CIRCUITS

An angle on navigation

Various animals use an internal sense of heading to aid navigation, but the underlying neural circuits are unclear. Green *et al.* used tethered flies walking on a ball to examine the role of neurons that directly connect the protocerebral bridge and the ellipsoid body of the fly central complex in this process. As flies turned to the left or right, these cells showed peaks of activity that moved across the bridge such that their positions tracked the fly's heading. Blocking the activity of one of the cell types in the bridge impaired heading tracking in the dark, whereas activating such cells predictably changed the heading signal, suggesting a circuit for angular integration in flies.

ORIGINAL ARTICLE Green, J. *et al.* A neural circuit architecture for angular integration in *Drosophila*. *Nature* **546**, 101–106 (2017)

NEURODEVELOPMENTAL DISORDERS

Taking on FXS with a diabetes drug

Fragile X syndrome (FXS) is characterized by learning disabilities and behavioural problems and is linked to dysregulated mRNA translation. Here, the authors treated a mouse model of FXS with the type 2 diabetes drug metformin, which, among other effects, suppresses translation. Metformin treatment rescued various phenotypes in these mice and downregulated translation-linked signalling pathways, decreasing the expression of matrix metalloproteinase 9, which is implicated in FXS. This suggests that metformin may have therapeutic potential for this disorder.

ORIGINAL ARTICLE Gantois, I. *et al.* Metformin ameliorates core deficits in a mouse model of fragile X syndrome. *Nat. Med.* **23**, 674–677 (2017)