

IN BRIEF

GENE EXPRESSION**Key codes**

Formation of memories relies on transcription of inducible genes such as immediate early genes (IEGs), but the mechanism is poorly understood. Here, IEG expression was monitored in mice following experiences with different salience and valence. Different experiences induced specific expression patterns of IEG expression. Moreover, habituation to rewarding experiences was accompanied by increasing levels of IEG expression, whereas the opposite was found with negative reinforcers, indicating that specific experiences have associated IEG 'transcriptional signatures'.

ORIGINAL ARTICLE Mukherjee, D. et al. Salient experiences are represented by unique transcriptional signatures in the mouse brain. *eLife* **7**, e31220 (2018)

SPATIAL PROCESSING**Directional dilemmas**

A new behavioural paradigm has been devised to study spatial navigation in rodents. The honeycomb maze aims to overcome disadvantages of currently available tasks and consists of 37 hexagonal platforms that can be independently raised or lowered to generate different routes. To navigate across the maze, rats had to learn to choose the platform that was positioned with the smallest angle away from the goal direction. Control rats learned this quickly, but damage to the hippocampus compromised performance. The honeycomb maze can therefore control the choices offered to the animal at each point and assesses knowledge of goal direction.

ORIGINAL ARTICLE Wood, R. A. et al. The honeycomb maze provides a novel test to study hippocampal-dependent spatial navigation. *Nature* **554**, 102–105 (2018)

CELL BIOLOGY OF THE NEURON**Untangling the ubiquitin–proteasome system**

The most common genetic cause of amyotrophic lateral sclerosis and frontotemporal dementia is an expanded CCCC GG repeat in *C9ORF72*, which results in aggregates containing poly-Gly-Ala (poly-GA). Here, cryo-electron tomography of rat primary cultured neurons transfected to express poly-GA tagged with green fluorescent protein revealed that poly-GA aggregates formed twisted, branched ribbon formations. These aggregates were associated with high levels of 26S proteasomes (a key component of the ubiquitin–proteasome system), some of which were stalled in what is normally a transient substrate-processing conformation, suggesting that poly-GA aggregates might alter neuronal proteostasis.

ORIGINAL ARTICLE Guo, Q. et al. In situ structure of neuronal *C9orf72* poly-GA aggregates reveals proteasome recruitment. *Cell* **172**, 696–705 (2018)

SLEEP**Ever-decreasing ripples**

Hippocampal synapses undergo homeostatic rebalancing during sleep by a mechanism that might involve sharp-wave-ripples (SWRs). Here, a closed-loop system was devised in which onset of a SWR triggered optogenetic silencing of the hippocampal pyramidal neurons that generate SWRs. SWR silencing in mice abolished spontaneous synaptic depression in hippocampal CA1 and reduced recall in a spatial memory acquisition test, suggesting that SWRs are involved in homeostatic synaptic downscaling.

ORIGINAL ARTICLE Norimoto, H. et al. Hippocampal ripples down-regulate synapses. *Science* <https://doi.org/10.1126/science.aaa0702> (2018)