

## IN BRIEF

**GENE EXPRESSION****The long and short of it**

Topoisomerases such as TOP1 and TOP2 $\beta$  regulate gene transcription in the developing and mature nervous system by interacting with RNA polymerase II. Topoisomerase-encoding genes are mutated in some people with autistic spectrum disorder (ASD), but their contribution to ASD is unknown. Using microarray analysis, King *et al.* show that inhibition of TOP1 and TOP2 $\beta$  reduces the expression of nearly all extremely long genes (>200 kb) in mouse cortical neurons, including some associated with ASD. These data suggest that compromised topoisomerase function might contribute to neurodevelopmental disorders such as ASD.

**ORIGINAL RESEARCH PAPER** King, I. F. *et al.* Topoisomerases facilitate transcription of long genes linked to autism. *Nature* **501**, 58–62 (2013)

**LEARNING AND MEMORY****Fading with time**

In fruitflies, age-related memory impairment (AMI) is accompanied by decreased brain polyamine levels. Gupta *et al.* found that olfactory learning was enhanced either by feeding the polyamine spermidine to aged flies or by inducing the expression of spermidine specifically in Kenyon cells (neurons essential for olfactory memory). Spermidine administration increased levels of autophagy in aged flies, and genetic disruption of autophagy caused loss of the memory-promoting effects of spermidine, suggesting that autophagy is functionally required for polyamine-mediated protection from AMI.

**ORIGINAL RESEARCH PAPER** Gupta, V. K. *et al.* Restoring polyamines protects from age-induced memory impairment in an autophagy-dependent manner. *Nature Neurosci.* <http://dx.doi.org/10.1038/nn.3512> (2013)

**NEUROPSYCHOLOGY****The joystick years**

A new study has used voxel-based morphometry of MRI scans of adult video-game players to investigate whether there is a correlation between grey matter volume and the number of years spent playing video games ('joystick years'). They found that grey matter volume in the entorhinal cortex was altered and that the direction of change was influenced by the type of game played; logic or puzzle games tended to increase entorhinal grey matter volume, whereas action-based games had the opposite effect. Moreover, hippocampal volume was found to be greater in players with more 'joystick years', suggesting positive long-term effects on visual attention and navigation.

**ORIGINAL RESEARCH PAPER** Kühn, S & Gallinat, J. Amount of lifetime video gaming is positively associated with entorhinal, hippocampal and occipital volume. *Mol. Psychiatry* <http://dx.doi.org/10.1038/mp.2013.100> (2013)

**PAIN****Feeling the pain**

The pain associated with bacterial infections such as those caused by *Staphylococcus aureus* was thought to be caused by immune mediators. A new study, however, shows that in mice, *S. aureus* activates nociceptor sensory neurons directly. Bacteria-derived pain-mediating molecules such as N-formylated peptides produced alterations in intracellular calcium and action potentials in these neurons. Furthermore, the hyperalgesia caused by *S. aureus* infection was correlated with bacterial load rather than the intensity of the immune response and was mediated by Na<sub>v</sub>1.8-expressing nociceptors.

**ORIGINAL RESEARCH PAPER** Chiu, I. M. *et al.* Bacteria activate sensory neurons that modulate pain and inflammation. *Nature* **501**, 52–57 (2013)