RESEARCH HIGHLIGHTS

Selections from the scientific literature

NEUROSCIENCE

How to turn on killer instinct

The activation of a particular group of brain cells is all it takes to make mice hunt to kill.

The brain's central amygdala has long been thought to have a role in producing emotions, particularly fear. To activate this brain region, Ivan de Araujo at Yale University in New Haven, Connecticut, and his co-workers engineered mice so that neurons in the central amygdala could be stimulated by light or small molecules. When the team activated the amygdala neurons, the animals' jaw and neck muscles tensed up, and they tried to grab an item, stretching their necks and biting and restraining the object. The mice hunted a variety of items, from crickets to bottle caps.

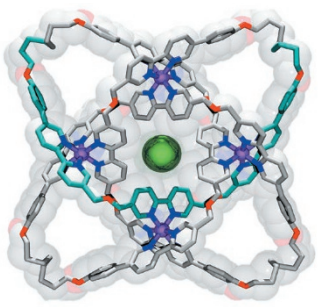
This and other research suggests that, in addition to emotion, the amygdala regulates a variety of complex behaviours, including feeding, grooming and predation.
Cell 168, **311–324 (2017)**

CHEMISTRY

Molecule gets knotted

Scientists have braided a molecule into a knot with eight crossings, the most complex yet made in the lab.

Flexible polymers can twist themselves into complex knots, but scientists have struggled to create all but the simplest structures. David Leigh and his colleagues at the University of Manchester, UK, weaved three organic strands — totalling 192 atoms — around four iron ions to assemble a tight knot with eight crossings (**pictured**). Bipyridine groups embedded in the strands bonded to each ion at three points to hold the structure in place.



Such techniques should enable the creation of more complex knots, which could be used to produce new kinds of tough, flexible material.
Science 355, **159–162 (2017)**

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ANIMAL BEHAVIOUR

Faecal odours act as rhino signals

White rhinos can learn about each other by sniffing one another's faeces.

Many mammals communicate through smells in their urine. To see whether faeces have a similar role, Courtney Marneweck at the University of KwaZulu-Natal in Pietermaritzburg, South Africa, and her colleagues analysed odours from the faeces of more than 100 wild white rhinos (*Ceratotherium simum*) in South Africa.

Distinct odour profiles were associated with animals' sex, age and state. For example, levels of the chemical 2,3-dimethylundecane distinguished males from females; nonane defined whether a male was territorial; and 2,6-dimethylundecane indicated whether a female was in a reproductive state. Territorial males that were exposed to artificial versions of these compounds responded accordingly, behaving as if threatened when presented with odours from another territorial male.

The results suggest that the animals defecate at communal sites to communicate with each other.
Proc. R. Soc. B **20162376 (2017)**

CLIMATE CHANGE

Sea-level rise for centuries to come

Atmospheric methane and other short-lived greenhouse gases are set to keep the global sea level rising for several centuries — even after any potential decline or halt in emissions.

Greenhouse gases in the atmosphere cause ocean warming and thermal expansion that results in sea-level rise. Reducing emissions of methane and hydrofluorocarbons, which have much shorter atmospheric lifetimes than does carbon dioxide, has been proposed as an effective way to slow atmospheric and ocean warming. But when Kirsten Zickfeld at Simon Fraser University in Burnaby, Canada, and her colleagues used an Earth-system model to quantify the effect, they