

year, respectively. The top contributor to this decline was hotter summers in the corn and soya growing regions of the Midwest.

Proc. Natl Acad. Sci. USA
<http://doi.org/b2vg> (2017)

NEUROSCIENCE

Super memory skills gained

With the right training, people can improve their memory almost to the level of the world's top-ranked memory athletes — and the effect can be seen in brain scans.

Memory athletes worldwide compete to memorize hundreds of words or other information in minutes. Martin Dresler at Radboud University Medical Centre in Nijmegen, the Netherlands, and his colleagues used functional magnetic resonance imaging (fMRI) to scan the brains of 23 of the top 50 athletes and compared the scans with those of untrained ('naive') people. The team then used a technique popular among memory athletes to train the naive control group daily over 40 days. The researchers found that those in the naive group roughly doubled the number of words they could recall, remembering up to 60 from a list of 72 — nearly matching the performance of some athletes.

In the fMRI scans, changes in brain connectivity patterns in the naive group before and after training looked similar to the differences between untrained volunteers and memory champions. Connections grew stronger between key areas of the cortex involved in learning, memory processing and the linking of new and old knowledge.

Neuron 93, 1227–1235 (2017)

OCEANOGRAPHY

Climate putting stress on oceans

Nearly all of the world's oceans are already affected by climate change.

Stephanie Henson at the National Oceanography Centre in Southampton, UK, and her colleagues used climate models to analyse trends in sea-surface temperature, pH, oxygen levels and primary production (a measure of food availability for marine ecosystems) between 1860 and 2005, and to predict changes until 2100. They found that 99% of Earth's oceans are experiencing decreased pH conditions that exceed the range of natural variability. The models predicted that in the next 15 years, 55% of oceans will be affected by at least one other climate-driven factor. By 2050, this proportion is likely to increase to 86% under the high, 'business-as-usual' emissions scenario.

In the medium emissions scenario, only one-third of the oceans will be affected by multiple factors by 2030. This would give many marine ecosystems an extra 20 years to adapt to climate change.

Nature Commun. 8, 14682 (2017)

EVOLUTION

Beetles repeatedly evolved mimicry

Over the course of many millions of years, members of one beetle family have evolved to impersonate army ants at least a dozen separate times, adding to evidence that evolution is more predictable than once thought.

Several species of rove beetle (Staphylinidae; **pictured**) mimic the appearance, odour and behaviour of particular army ant species in order to

infiltrate ant colonies and eat the ants' young. Joseph Parker at Columbia University in New York and Munetoshi Maruyama at the Kyushu University Museum in Fukuoka, Japan, sequenced DNA from 58 rove beetle species — including 37 that disguise themselves as various army ants — from around the world. The researchers analysed this, along with published beetle sequence data, and found that army-ant mimicry has evolved independently between 12 and 15 times in rove beetles all descended from a common ancestor that lived more than 100 million years ago.

The extensive time period over which the different beetle species evolved these similar traits raises questions about the idea that evolution is strongly contingent on chance events, the authors say.

Curr. Biol. <http://doi.org/b2vj> (2017)

MICROBIOME

Yeast worsens gut disorder

Yeast in the gut boosts levels of uric acid, which damages the intestinal wall and worsens bowel inflammation in mice.

Gut bacteria are known to influence intestinal disease, but the role of gut fungi — such as the yeast *Saccharomyces cerevisiae* (**pictured**) — has not been well studied. June Round and her colleagues at the University of Utah in Salt Lake City fed mice with *S. cerevisiae*, then chemically induced gut inflammation, or colitis. Mice that were given the yeast produced more uric acid and had more gut inflammation than untreated animals did. The team found that the yeast increased the



intestinal wall's degradation of molecules called purines, leading to higher uric acid levels. Treating the animals with allopurinol, an inhibitor of purine metabolism, eased the colitis.

In serum samples from healthy humans, elevated uric acid levels correlated with greater numbers of antibodies against *S. cerevisiae*. This yeast might play a part in human inflammatory bowel disease, the authors suggest.

Sci. Transl. Med. 9, eaaf9044 (2017)

CLIMATE CHANGE

Arctic set for rainy future

More rain than snow is likely to fall in the Arctic by the end of the century, owing to global warming.

At present, rain accounts for about 35% of Arctic precipitation. Richard Bintanja and Olivier Andry at the Royal Netherlands Meteorological Institute in De Bilt used 37 climate models to simulate future precipitation in the region. They found that total precipitation in the Arctic will rise by 50–60% by 2100, with all of the increase coming in the form of rain. In a scenario of moderate greenhouse-gas emissions, rain will make up roughly 40% of this total, whereas if emissions are high this number will be nearer 60%.

Nature Clim. Change
<http://dx.doi.org/10.1038/nclimate3240> (2017)

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