

RESEARCH HIGHLIGHTS

Selections from the
scientific literature

GENOMICS

Early risers share genetic signature

Three different teams have identified genetic variants that are associated with being a morning person.

Youna Hu, David Hinds and their team at 23andMe, a personal-genetics firm in Mountain View, California, analysed genome data from nearly 90,000 customers who stated in a survey whether they were a morning person or a night owl. Teams led by Michael Weedon at the University of Exeter Medical School, UK, and Richa Saxena at the Massachusetts General Hospital in Boston conducted similar analyses on the DNA of more than 100,000 people who participated in the UK Biobank project.

Each team found a dozen or more variants that were linked to a person's preference for sleep times — and many were in or near genes that help to regulate the body's circadian clock.

Nature Commun. 7, 10448 (2016); preprints at bioRxiv <http://doi.org/bcb7> (2016); <http://doi.org/bcb8> (2016)

CLIMATE CHANGE

More carbon from planted forests

Planting trees will not necessarily slow climate change.

Kim Naudts at the Laboratory of Climate Science and Environment in Gif-sur-Yvette, France, and her colleagues paired a history of land-use in Europe with land and atmospheric models to study the effect of forests on the climate. Although the continent's forests have expanded by 10%, timber harvesting and a shift to more

commercially valuable trees — mainly the fast-growing conifers — have resulted in the release of more than 3 billion tonnes of carbon into the atmosphere since 1750.

The change from deciduous trees to darker-leaved conifers contributed to a rise of 0.12 °C in local surface temperatures. *Science* 351, 597–600 (2016)

NEUROSCIENCE

Brain cells in wells make amyloid

Many different types of brain cell can secrete high levels of the peptide amyloid- β , which forms the brain plaques associated with

Alzheimer's disease.

To detect molecules from single brain cells, Tracy Young-Pearse at Harvard Medical School in Boston, Massachusetts, and her colleagues designed arrays of nanometre-sized wells. They took cells from healthy people and from individuals with familial Alzheimer's disease, reprogrammed them into stem cells and used them to derive a variety of brain-cell types, which they then placed in the wells. The authors added antibodies that would detect specific molecules.

Subsets of the brain cells secreted amyloid- β at different rates, and even non-neuronal cells such as

evolutionary and geographical history. The team found that the virus has spread from Europe in the past century, in part because of the trade in commercial colonies. New carriers of the virus also contributed: the *Varroa* mite (*Varroa destructor*) began to infect European honeybees about 50 years ago, when this pandemic started.

Tighter controls on commercial colonies are needed to slow the virus's spread, the authors say. *Science* 351, 594–597 (2016)



PARASITOLOGY

Honeybee virus spread by human activity

The commercial trade in honeybees has helped to spread a deadly bee virus around the globe over the past century.

Deformed wing virus reduces the winter survival of European honeybees (*Apis mellifera*), and could be a factor in the large colony losses seen in some parts of the world. To find out how the virus became pandemic, Lena Wilfert at the University of Exeter, UK, and her colleagues analysed the virus's genome to reconstruct its

astrocytes produced high levels. More of the cells derived from people with Alzheimer's disease secreted large amounts of the peptide compared to cells from healthy individuals.

J. Neurosci. 36, 1730–1746 (2016)

NEUROSCIENCE

Molecule protects ageing neurons

A small molecule reverses the neuronal deterioration that is typically found in middle-aged animals.

Compared with the neurons of young animals, nerve cells in middle-aged rats generally have fewer branches. Their

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connections, or synapses, also seem to be less able to strengthen with repeated activation — changes that could help to explain declines in learning and memory over time. Christine Gall, Gary Lynch and their colleagues at the University of California, Irvine, preserved neuronal branching and boosted synapse strengthening in rats by treating them with a molecule that enhanced the activity of the AMPA-type glutamate receptor. This increased excitatory brain signalling. Animals treated for three months also showed improvements in some tests of long-term memory.

The authors suggest that the mechanism could one day be used to protect against age-related neuronal decline. *J. Neurosci.* 36, 1636–1646 (2016)

PALAEOLOGY

Mammal with a dinosaur nose

A wildebeest-like creature that lived in Africa 70,000 years ago had a trumpet-shaped nasal passage, similar in shape to those of some dinosaurs.

Rusingoryx atopocranium was previously known from incomplete specimens, but a team led by Haley O'Brien at Ohio University in Athens and Tyler Faith at the University of Queensland in Brisbane, Australia, have discovered six more-complete skulls on an island in Lake Victoria in Kenya (one of the skulls is pictured). X-ray scans revealed large, hollow nasal passages that extended out from the top of the animals' heads. Known as nasal domes,



these have previously been seen only in some hadrosaurs that lived around 65 million years ago — a rare example of how similarities in behaviour and environment can spur the evolution of a common feature in distantly related animals.

Acoustic modelling suggested that the structures allowed *R. atopocranium* to vocalize at very low frequencies, possibly helping herds to communicate without alerting predators, the authors propose.

Curr. Biol. <http://doi.org/bcdn> (2016)

LINGUISTICS

Languages have common structure

Many languages share a universal semantic structure that is independent of their speakers' culture, environment or how closely the languages are related.

Hyejin Youn and Tanmoy Bhattacharya at the Santa Fe Institute in New Mexico and their colleagues studied the words for 22 universal concepts — such as 'Sun' and 'water' — across 81 languages, and identified which words had multiple meanings. They linked related words and meanings together to form network maps, and found common patterns in the way that different meanings were connected to each other. For example, words for 'sea' and 'salt' were closer to each other than to words for 'Sun', and this structure was preserved across all the languages.

This method could help to reveal concepts that are universal features of human cognition and language use, the authors say.

Proc. Natl Acad. Sci. USA <http://doi.org/bb94> (2016)

MATERIALS

Better battery with more juice

Researchers have made a battery that can both hold high energy and deliver high power.

SOCIAL SELECTION

Popular topics on social media

'A field of crop scientists'

When cancer researcher Ritankar Majumdar published a blog post about the collective names of doctors and scientists on 2 February (go.nature.com/fzcnqt), he had no idea he would inspire #scientistherdnames. Hundreds of tweets with the hashtag, including "a cloud of data scientists" and "a nucleus of physicists", soon dominated scientists' Twitter streams. Some tweets reflected the angst experienced in the lab. Erol Akçay, a theoretical biologist at the University of Pennsylvania in Philadelphia, tweeted: "A grant of silent sobs."

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Batteries typically can hold a lot of energy but discharge it at low rates. To make a material capable of both high energy and high power, a team led by Yan Yu at the University of Science and Technology of China in Hefei placed sodium vanadium triphosphate ($\text{Na}_3\text{V}_2(\text{PO}_4)_3$) inside a mixture of reduced graphene oxide and carbon nanotubes to improve the sodium compound's conductivity. They deposited the material onto a current-collecting stainless steel support, avoiding the use of additives that would reduce the performance of the device.

The team made a battery with the porous material and showed that the device could deliver high levels of energy at a high rate. It also kept 96% of its capacity even after being charged and discharged 2,000 times. The approach could be used with other electrode materials, the authors say.

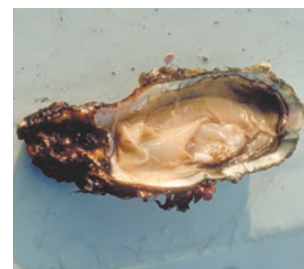
Adv. Mater. <http://doi.org/f3kvx3> (2016)

ENVIRONMENTAL SCIENCE

Ocean plastic hurts oysters

Oysters that consume the small pieces of plastic littering the world's oceans produce fewer and less-robust offspring than their unexposed counterparts.

Millions of tonnes of plastic end up in the oceans every year, and tiny 'microplastic'



fragments — those smaller than 5 millimetres in diameter — could be harming marine life. Arnaud Huvet at the French marine-research agency IFREMER in Plouzané and his colleagues placed Pacific oysters (*Crassostrea gigas*; pictured) in water laced with micrometre-sized polystyrene spheres, at levels estimated to be similar to those where oysters live in the wild. After two months, oysters exposed to the plastic produced fewer and smaller egg cells, less-mobile sperm and fewer offspring than did animals raised in water without the plastic. The offspring also grew more slowly.

Ingested plastic might be disturbing the oysters' digestion and releasing endocrine-disrupting chemicals, which affect reproductive systems, the authors say.

Proc. Natl Acad. Sci. USA <http://doi.org/bcdm> (2016)

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