

RESEARCH HIGHLIGHTS

Selections from the scientific literature

BIOCHEMISTRY

Marine enzyme can multi-task

An enzyme discovered in a marine bacterium catalyses complex reactions in a way that can be mimicked using simpler molecules, say biochemists at the Scripps Institution of Oceanography at the University of California, San Diego.

Bradley Moore and his team examined how a species of *Streptomyces* creates molecules known as merochlorins, which are promising antibiotics. They found that the bacterium uses a vanadium-dependent enzyme that first adds chlorine atoms to specific sites on a simple precursor molecule, then causes the precursor to wrap up — or cyclize — into the final merochlorin structure.

The researchers imitated the enzyme's unusual activity using a set of catalysts and small molecules to make previously overlooked products related to the initial merochlorins, in only five reaction steps.

Angew. Chem. Int. Ed. <http://doi.org/f2tm9p> (2014)

NEUROSCIENCE

Eyes offer window on dementia

The loss of cells in the retina might predict a common type of dementia years before behavioural changes set in.

A team led by Li Gan and Ari Green at the University of California, San Francisco, imaged the retinas of 12 people with mutations that cause frontotemporal dementia, a common cause of dementia in people under 60 years old. Even though most of the subjects had yet to develop symptoms, their retinas tended to be thinner than those of 24 people without the mutations. Mice lacking



GEOLOGY

Mobile rocks explained

Rocks that mysteriously slide across a dry lake bed are thought to be nudged along by large ice sheets. But previously, no one could fully explain how the rocks — some weighing more than 300 kilograms — scoot across Racetrack Playa in California.

Now a team led by Richard Norris at the Scripps Institution of Oceanography in La Jolla, California, has caught the rocks in action after tagging them with Global Positioning Satellite markers. On 20 December 2013, pools of ice in the lake started cracking in the morning sun. A gentle breeze then bumped 'windowpane' ice sheets against the rocks, moving them at a rate of 2–5 metres per minute. When the ice melted, more than 60 rocks had budged, leaving freshly formed trails (pictured) behind them. By the end of the winter, the farthest-moving rock had travelled 224 metres.

PLoS ONE 9, e105948 (2014)

the same gene also lost retinal neurons as they aged.

Retinal deterioration could be one of the earliest observable signs of frontotemporal dementia, the team says, and a useful biomarker in trials of drugs that slow the disease. *J. Exp. Med.* <http://doi.org/vdp> (2014)

GENOMICS

Ebola genomes decoded

Researchers from four countries have used deep sequencing to analyse the full suite of Ebola virus strains present in 78 people diagnosed

in Sierra Leone in the ongoing West African epidemic. The outbreak began in February 2014 in Guinea, and health officials had recorded 1,552 deaths as of 28 August, although this is thought to be well below the actual figure.

The study authors report that the current outbreak is caused by a virus variant that separated about ten years ago from viruses responsible for past Ebola outbreaks. This variant has accumulated 341 mutations since then, and 55 more as it spread among the people sampled in this study. In contrast to some past Ebola outbreaks, in which humans repeatedly acquired the virus from animal reservoirs, human-to-human transmission is driving the current outbreak. The researchers hope that the work will inform the design of Ebola diagnostics, vaccines and treatments.

Science <http://doi.org/vfk> (2014)

ANTHROPOLOGY

Sahara stopped human mixing

North Africa was a patchwork of human populations around the time our species trekked out of the continent.

Previous studies have proposed that the Sahara Desert was transformed into lush grassland during a wet spell between around 130,000 years and 75,000 years ago, offering few barriers to *Homo sapiens* expanding its range. However, researchers led by Eleanor Scerri at the University of Bordeaux, France, modelled the climate of northern Africa during this period and found that the Sahara, although much greener than today, still contained tracts of uninhabitable desert.

Comparisons of artefacts

MIKE HARTMANN

from 17 archaeological sites revealed geographic variability in the types of stone tool and techniques used to make them. The most similar tool assemblages tended to be those found closest to one another or those linked by green passageways.

Human populations in North Africa, including those that eventually colonized Europe and Asia, lived in semi-isolated groups that rarely mixed, the authors say.

Quat. Sci. Rev. 101, 207–216 (2014)

MATERIALS SCIENCE

Flexible solar cells work both ways

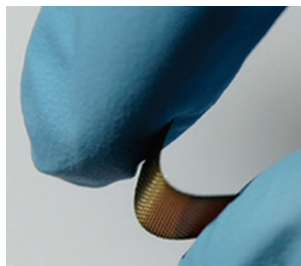
Material scientists have created a wearable fabric that can gather solar energy from either side.

Huisheng Peng at Fudan University in Shanghai and his colleagues made the material (pictured) by sandwiching

a textile, woven from metal fibres coated with a photoactive polymer, between two transparent and conductive carbon-nanotube sheets. The sandwich design means that the polymer solar cells can convert light to electricity regardless of whether they are illuminated from the top or bottom. This could make the fabric simpler to integrate into devices.

The cells convert just 1% of sunlight into electricity. But with efficiency improvements, the fabric could be used to power portable electronics, the authors say.

Angew. Chem. Int. Ed. <http://doi.org/f2tqbp> (2014)



SOCIAL SELECTION

Popular articles
on social media

Fresh arguments over old data

Every once in a while, an academic argument turns into a social-media spectacle. A collision over a seemingly innocuous subject — genes and the pursuit of happiness — has attracted a large number of onlookers.

In 2013, a paper concluded that a person's approach to happiness can shape gene expression (B. L. Fredrickson *et al.* *Proc. Natl Acad. Sci. USA* 110, 13684–13689; 2013). The study and its first author, psychologist Barbara Fredrickson at the University of North Carolina in Chapel Hill, received much media attention at the time, but a new report by US and UK researchers claims that the findings were “artifacts of dubious analysis and erroneous methodology”. Stuart Ritchie, a human-intelligence researcher at the University of Edinburgh, UK, evidently enjoyed the show, as revealed by his tweet: “This demolition of a ‘genetics of wellbeing’ paper raised my wellbeing by a considerable amount.”

Proc. Natl Acad. Sci. USA <http://doi.org/vfp> (2014)



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