

RESEARCH HIGHLIGHTS

Selections from the scientific literature

BIOCHEMISTRY

EPO made from scratch

The hormone that triggers red blood cell production, erythropoietin (EPO), is often given to patients undergoing treatment for kidney failure or cancer. A team at the Sloan-Kettering Institute for Cancer Research in New York city has devised a method to synthesize a pure form of this complex protein from scratch.

Samuel Danishefsky and his colleagues built the protein, which until now could be made only in cell culture, by piecing together four glycopeptides that they had assembled in the lab. The researchers then folded the amino-acid chain into the final protein and used mass spectroscopy to verify the structure. Umbilical-cord blood-progenitor cells that were cultured with the synthetic molecule formed red blood cells.

Angew. Chem. Int. Edn.
<http://dx.doi.org/10.1002/anie.201206090> (2012)

ECOLOGY

Protecting prey with their odours

Exposing wild black rats to the smell of bird prey seems to put them off prey that is introduced later on — a strategy that could prove useful in species conservation.

To simulate bird nesting odours, Catherine Price and Peter Banks at the University of Sydney, Australia, placed feathers and faeces from

quail (*Coturnix coturnix japonica*) in the habitat of the wild black rat (*Rattus rattus*;



pictured). Seven days later, the researchers introduced artificial nests containing quail eggs. In areas where rats had been pre-exposed to the nesting odours, quail-egg survival was 62% greater than in areas where rats and eggs were introduced simultaneously.

The authors suggest that, during the pre-exposure period, the rats learned to ignore the odour cues because they were not associated with an egg reward.

Proc. Natl Acad. Sci. USA
<http://dx.doi.org/10.1073/pnas.12109811109> (2012)

ARCHAEOLOGY

How to move a 4-tonne statue

The Polynesian settlers of Easter Island may have transported their gigantic statues by slowly rocking them from side to side to make them 'walk'.

Nearly 1,000 statues litter the island, with the largest weighing about 74 tonnes and standing more than 10 metres tall. Some archaeologists propose that the statues, or moai, were transported from the quarry in a horizontal position on top of logs. However, Carl Lipo at California State University, Long Beach, and his team say that evidence points instead to an upright mode of transportation. Broken moai that were found along roads sloping upwards

mostly lay on their backs, whereas those discovered on downwards sloping roads tended to be lying face down.

The researchers built a 3-metre-high concrete scale model, which they say has the same physical properties as a moai. Using three hemp ropes, a team of 18 people was able to move the statue 100 metres in 40 minutes (pictured). However, others are sceptical of the findings, saying that the shape of the model is inaccurate.

J. Archaeol. Sci. <http://dx.doi.org/10.1016/j.jas.2012.09.029> (2012)
For a longer story on this research, see go.nature.com/1qoups



T. L. HUNT

PLANETARY SCIENCE

Moon spun off from Earth

A catastrophic collision between Earth and another body probably created the Moon. Computer models predict that the Moon was derived from the impacting body, and yet Earth and the Moon are chemically almost identical. Two new models show how this scenario could arise if Earth was spinning faster at the point of impact than it does today.

One model, by Robin

Canup of the Southwest Research Institute in Boulder, Colorado, suggests that if the impactor was larger than previous models have allowed — perhaps even Earth-sized — a collision could create a planet and a disk of Moon-forming material, both with the same composition and made from the impactor and its target.

Meanwhile, Matija Ćuk and Sarah Stewart at Harvard University in Cambridge, Massachusetts, show that if Earth used to spin faster than it does today, even a small, fast impactor could cause Earth

to shake off a disk of material that could subsequently form the Moon.

Science <http://dx.doi.org/10.1126/science.1226073>;
<http://dx.doi.org/10.1126/science.1225542> (2012)

BIOMATERIALS

Super-reflective fish skin

Three species of silvery fish seem to have found a way around a law of physics that governs the reflection of light.

The skin of the Atlantic herring (*Clupea harengus*), European sardine (*Sardina pilchardus*; pictured) and sprat (*Spratus spratus*) is made up of alternating layers of cytoplasm and highly reflective crystals of guanine — a molecule that is also found in DNA and RNA. Nicholas Roberts and his colleagues at the University of Bristol, UK, report that the fishes' skin can reflect light without polarizing it, even when the light hits the reflectors at angles that would normally result in fully polarized reflections. The skin contains a mixture of two types of guanine crystal with different optical properties — when the two are present in a specific ratio, this mixture prevents polarization and maintains high reflectivity.

These reflectors help the fish to camouflage themselves by matching the light environment of the open ocean, say the authors. Moreover, the principles at work in these fish could have applications in optical devices such as light-emitting diodes.

Nature Photon. <http://dx.doi.org/10.1038/nphoton.2012.260> (2012)

For a longer story on this research, see go.nature.com/ndcqjt

P. FENN GALLERY/GETTY



CANCER

Targeting a vicious cycle

Cancer cells proliferate by sending the cell cycle into overdrive, but early attempts to target the cell cycle with drugs were marred by problems with toxicity. Now two groups show that shutting down cell-cycle proteins called D-type cyclins seems to stop tumour growth without affecting normal tissue.

Piotr Sicinski and his colleagues at the Dana-Farber Cancer Institute in Boston, Massachusetts, engineered mice in which the production of cyclin D1 can be switched on and off. Loss of the protein had no apparent effect on healthy adult mice, but halted the growth of mammary tumours in mice that were also genetically predisposed to developing breast cancer.

Sicinski's team, and Iannis Aifantis at the New York University School of Medicine and his colleagues, showed independently that loss of cyclin D3 either triggered the death of tumour cells, or prevented their growth, in mouse models and human cell lines of an aggressive form of leukaemia. Inhibiting downstream proteins called cyclin-D associated kinases also killed tumour cells.

Cancer Cell 22, 438–451; 452–465 (2012)

ARCHAEOLOGY

A more accurate carbon clock

Determining the age of fossils and other ancient objects could become more accurate, thanks to measurements of radioactive carbon-14 from a lake in Japan.

Radiocarbon dating is based on the steady decay rate of carbon-14 in samples, and archaeologists calibrate this carbon clock by comparing the known ages of tree rings with their carbon ages. But the tree-ring carbon record goes

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GEOSCIENCE

Sudden rupture in deadly earthquake

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15 Oct–21 Oct

A brutal secondary rupture may have been responsible for much of the devastation caused by the Wenchuan earthquake, which killed more than 69,000 people in Sichuan province, China, on 12 May 2008.

A team led by Guohong Zhang of the China Earthquake Administration in Beijing used ground-acceleration data from a national network of earthquake-monitoring stations to reconstruct the spread of the 7.9-magnitude quake. Records from 26 local stations indicate that the main slip area — a high-friction patch of fault located 25 to 50 kilometres from the epicentre — resisted the seismic stress building up around it for about 30 seconds. The slip area then failed catastrophically in a sudden 12.5-metre jolt.

Researchers have long hypothesized that an initial quake can trigger secondary ruptures. The study shows that this is a realistic scenario, the team concludes.

Geophys. Res. Lett. <http://dx.doi.org/10.1029/2012GL052516> (2012)

back only about 14,000 years, and less reliable marine records have been used to fill the gap. Christopher Ramsey at the University of Oxford, UK, and his colleagues extracted roughly 70-metre-long core samples from the bed of Lake Suigetsu. By counting the number of distinct sediment layers in the core — two layers have formed every summer and winter over the past 52,000 years — the team was able to compare the ages of the layers with their carbon-dated ages.

The more accurate carbon-14 record could help archaeologists to fine-tune the dates of key events, such as the coexistence of humans and Neanderthals.

Science 338, 370–374 (2012)
For a longer story on this research, see go.nature.com/pbv6ey

PHOTONICS

White LEDs without glare

A new luminescent material reduces the glare of white light-emitting diodes (LEDs) and could make them more



practical for home lighting.

A team led by Hisayoshi Daicho of Koito Manufacturing in Shizuoka, Japan, designed the material, which consists of chlorosilicates that have been implanted with europium ions. The phosphor absorbs violet light and re-emits it in a yellow shade. The researchers combined this phosphor with a blue one and then added a violet LED to create a system that emits white light with a uniform hue (pictured) and no glare.

Nature Commun. <http://dx.doi.org/10.1038/ncomms2138> (2012)

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