

chromosome 21, which leads to Down syndrome. Time-lapse imaging revealed that normal embryos underwent precisely timed cell divisions, whereas 70% of embryos with abnormal chromosome counts did not. The researchers also observed that cells in abnormal embryos often fragmented into tiny pieces containing chromosomes (**pictured**).

Automated image tracking of cell division and fragmentation could provide a non-invasive tool to screen embryos for healthy *in vitro* fertilization candidates, the authors say. *Nature Commun.* 3, 1251 (2012)

QUANTUM PHYSICS

Atom cooled to ground state

Using a tightly focused beam of light as optical tweezers, researchers have confined a single neutral atom for long enough to cool it to its lowest-energy quantum state, a requirement for many quantum-computing applications.

Researchers have previously cooled charged atoms in a similar way, but uncharged atoms may be more appealing for use in quantum devices because they do not interact with electric fields. Cindy Regal and her collaborators at JILA, a joint research institute of the US National Institute of Standards and Technology and the University of Colorado at Boulder, first used optical tweezers to trap an individual rubidium atom. Then, using a laser-based technique called Raman sideband cooling, they cooled the atom to its near-motionless ground state. *Phys. Rev. X* 2, 041014 (2012)

CLIMATE CHANGE

Rain shifts bear human fingerprint

Summer rainfall patterns in the Southern Hemisphere have changed markedly in response to rising greenhouse-gas concentrations and ozone-layer depletion, both caused by human activity.

Since the 1960s, southern regions at mid-latitudes have become drier whereas a zone around Antarctica has grown wetter. John Fyfe at the Canadian Centre for Climate Modelling and Analysis in Victoria, British Columbia, and his colleagues found that the observed trends agree with predicted precipitation patterns obtained from a set of 29 climate models.

They found that greenhouse gases and ozone changes were primarily responsible for the shifts in precipitation levels. Moreover, natural climate variability cannot explain the observed and modelled trends, the team found.

Geophys. Res. Lett. <http://dx.doi.org/10.1029/2012GL054199> (2012)

PLANETARY SCIENCE

Surprises beneath Moon's surface

The crust beneath the Moon's heavily battered surface is almost entirely pulverized, indicating that it took an even greater beating from space debris during the Solar System's first billion years than planetary scientists suspected.

Maria Zuber at the Massachusetts Institute of Technology in Cambridge and her colleagues report these and other findings from NASA's twin lunar-orbiting spacecraft, known as GRAIL, in a trio of articles. The twin craft probe the Moon's interior by mapping the lunar gravitational field. GRAIL data have also revealed that the Moon's average crust is considerably thinner than previously

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BEHAVIOUR

Hormone may aid monogamy

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in November

Men in monogamous relationships keep their distance from good-looking women after receiving nasal puffs of oxytocin — the human hormone that has been linked to romantic attraction — whereas single men do not.

René Hurlemann at the University of Bonn, Germany, and his colleagues recruited 86 heterosexual men who were either single or in stable monogamous relationships. The volunteers were asked to choose how close to stand to female or male experimenters, or to perform a similar task using photographs. Compared with single men and partnered men who had received a placebo, partnered men given oxytocin stood 10–15 centimetres farther away from women they deemed attractive, and approached pictures of attractive women more slowly. No effect was seen with the male experimenters.

The authors suggest that oxytocin could help to maintain fidelity in romantic relationships.

J. Neurosci. 32, 16074–16079 (2012)

estimated — measuring between 34 and 43 kilometres — suggesting that some of the fracturing caused by space debris could have penetrated the full depth of the crust and into the mantle. Such deep fracturing, which would also be expected on Earth and Mars, could have created porous structures that held hot groundwater for long periods, providing possible niches for life in the early Solar System.

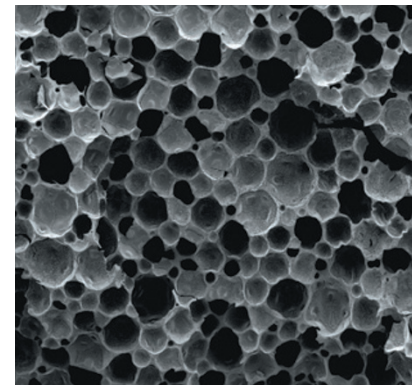
Science <http://dx.doi.org/10.1126/science.1231507>; <http://dx.doi.org/10.1126/science.1231530>; <http://dx.doi.org/10.1126/science.1231753> (2012)

MATERIALS

Foams for cell-friendly scaffolds

Porous foams with nanometre-scale patches to which cells and proteins can adhere could one day be used in tissue engineering.

A group led by Giuseppe Battaglia at the University of Sheffield, UK, and Adam Engler at the University of California, San Diego, used an established technique to



create porous polystyrene-based foams (**pictured**). By incorporating various other polymers into their foams, the researchers controlled the surface topology of the pores and thus the distribution and size of the places where cells and proteins could attach over three dimensions.

The technique could allow bioengineers to create self-assembling scaffolds that control, for example, where stem cells adhere.

J. Am. Chem. Soc. <http://dx.doi.org/10.1021/ja308523f> (2012)

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