RESEARCH HIGHLIGHTS

Selections from the scientific literature

STEM CELLS

Edited stem cells yield healthy mice

By reprogramming mouse cells into stem cells and purging them of a disease mutation, researchers have spawned disease-free animals.

Tobias Cantz at Hanover Medical School in Germany and his colleagues began by making induced pluripotent stem cells (iPSCs) from the cells of mice lacking the enzyme FAH, which are used as a model of some hereditary liver diseases. The authors then delivered a working version of the *Fah* gene to the iPSCs with a retrovirus. Finally, they used these cells to create embryos and generate mice with working copies of *Fah* and no signs of liver disease.

Human iPSCs might be similarly manipulated to rid them of mutations and then converted into working tissues for transplantation.

PLoS Biol. 9, **e1001099 (2011)**

M. PAWLITZKI/PHOTOLIBRARY

GEOCHEMISTRY

Air pollutants make a comeback

Climate warming is remobilizing toxic pollutants deposited in Arctic ice and sea water.

Long-lived or 'persistent' organic pollutants (POPs), which include chlorinated pesticides and industrial chemicals, travel in the atmosphere to the high north, where they accumulate. They have been regulated for several decades, but sea-ice retreat and rising temperatures seem to be returning some of the more volatile compounds stored in Arctic reservoirs to the atmosphere.

Jianmin Ma and Hayley Hung of Environment Canada in Toronto and their team analysed the concentrations of POPs measured since 1993 at two Arctic stations. When the effect of regulation was removed, several of the compounds showed increasing atmospheric levels, corresponding with rising Arctic temperatures and decreasing sea-ice cover. A simulation of the impact of climate change on the chemicals' atmospheric abundance confirmed this finding.

Nature Clim. Change **http://dx.doi.org/10.1038/nclimate1167 (2011)**

MATERIALS

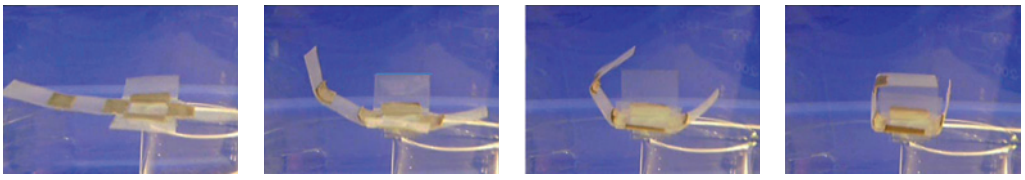
Shape-shifter forms box in water

Just add warm water, and a specially designed polymer composite can fold into a box or even a flower — on its own.

The material, a hydrogel embedded with carbon nanotubes, was conceived by Ali Javey at the University of California, Berkeley, and his collaborators. At room temperature, the composite is hydrophilic and water is incorporated in its structure. But above a threshold temperature of around 33 °C, it becomes hydrophobic and extrudes water. This reversible transition causes a mechanical strain that can be exploited to create shape-changing actuators. The carbon nanotubes ensure a fast response time.

In 48 °C water, the material took 35 seconds to fold into a box (**pictured**). Such fast self-folding materials could be useful for applications including smart solar devices and tissue engineering.

Nano. Lett. **http://dx.doi.org/10.1021/nl201503e (2011)**



X. ZHANG

NEUROBIOLOGY

How blasts hurt the brain

Brain injuries caused by explosions result in the retraction of neural connections and blood-vessel constriction, reducing oxygen flow to the brain. Researchers have identified proteins and a signalling pathway that link mechanical forces to these harmful changes.

Kit Parker at Harvard University in Cambridge, Massachusetts, and his colleagues simulated blast forces on rat neurons using devices that abruptly stretched the cells. The authors showed that such forces stimulate transmembrane proteins called integrins, which are connected to the cell's internal skeleton. This stimulation overactivates the Rho–ROCK signalling pathway that normally controls cell contraction. Blocking this