

RESEARCH HIGHLIGHTS

Selections from the scientific literature

CANCER BIOLOGY

Malaria drug shrinks tumours

To grow and divide, pancreatic-cancer cells must devour their own contents — an Achilles heel that could render them susceptible to the antimalaria drug chloroquine.

'Autophagy' is the regulated degradation of cellular structures and molecules. Alec Kimmelman of Harvard Medical School in Boston, Massachusetts, and his colleagues found that pancreatic-tumour cells have high levels of autophagy. When the researchers reduced expression of the protein ATG5, which is required for autophagy, pancreatic-cancer cells showed signs of stress, including DNA damage and altered metabolism.

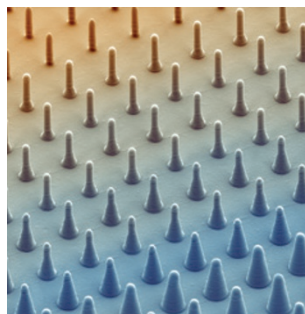
Furthermore, reduced expression of ATG5 or treatment with chloroquine, which inhibits autophagy, shrank tumours and lengthened survival time in mice that had received transplanted pancreatic-cancer cells.

Genes Dev. doi:10.1101/gad.2016111 (2011)

NANOTECHNOLOGY

Painting and shaping pillars

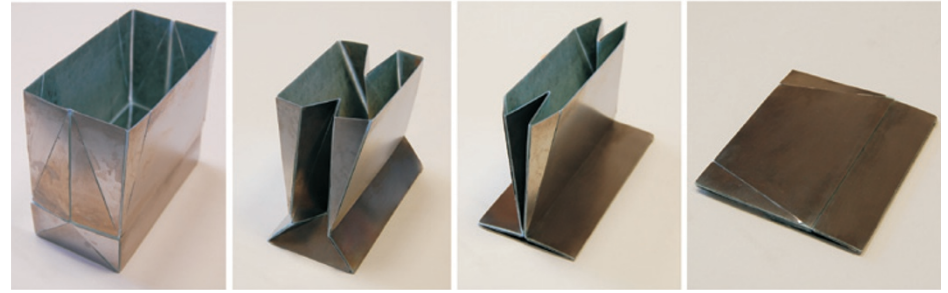
Patterning a surface with closely spaced nanometre-scale pillars can create



P. KIM & J. C. WEAVER, HARVARD UNIV.

structures that bend light, help to catalyse reactions and repel or attract fluids. But, typically, each variant pattern needs a new master mould, limiting scientists' ability to quickly test many possible patterns.

Joanna Aizenberg, Philseok Kim and their colleagues at Harvard University in Cambridge, Massachusetts, now show how to quickly transform a single master array into more complicated patterns. They deposit gold or platinum onto an array of nanopillars, and use the metal-covered posts as electrodes on which to deposit conducting polymers. By varying the deposition conditions, the researchers make tapered posts (pictured), overhangs and other three-dimensional structures with customizable diameters and spacings. *Nano Lett.* doi:10.1021/nl200426g (2011)



ORIGAMI

How to fold a rigid bag

The ability to fold containers flat is invaluable to the packing industry. Packing companies mainly use either flat-packed, rigid boxes that are open at both ends and have to be fastened shut at the bottom before use, or flexible bags that can be folded flat but are not as strong.

Now Zhong You and Weina Wu at the University of Oxford, UK, have mathematically devised a hybrid solution,

featuring advantages of both systems. Their complex folding pattern of 28 creases forms the design for a rigid bag with a closed bottom. They demonstrated their solution by making a bag out of paper bonded to steel sheets and folding it flat (pictured). This is the first time a solution has been found to fold flat a rigid bag that is taller than half its depth.

Proc. R. Soc. A doi:10.1098/rspa.2011.0120 (2011)

PALAEANTHROPOLOGY

Remains in ancient cave get younger

A South African cave central to our knowledge of ancient human ancestors is not as old as previous estimates suggest. Sterkfontein Cave, near Johannesburg, has been an important source of fossil ancestors from more than 2 million years ago. But its complex geology has thwarted efforts to accurately date the fossils and artefacts buried there.

Andy Herries at the University of New South Wales in Sydney, Australia, and John Shaw at the University of Liverpool, UK, recorded the geomagnetic orientation of different layers of calcite deposits. Knowing when during history Earth's magnetic field reversed provided a basic chronology. From this, the researchers

established that many of the deposits, and hence the cave's human remains, are younger than previously thought.

For instance, an *Australopithecus* fossil known as Little Foot is less than 2.6 million years old — much younger than the well known 3.2-million-year-old *Australopithecus afarensis* fossil from Ethiopia named Lucy. *J. Hum. Evol.* 60, 523–539 (2011)

ASTRONOMY

Comets gave rings their ripples

Ripples in the rings of Saturn and Jupiter are the consequence of collisions with cometary fragments, according to two papers.

Matthew Hedman at Cornell University in Ithaca, New York, and his colleagues spotted the ripple in one of Saturn's rings while analysing images taken by the Cassini

R. SOC.