

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## URBAN GROWTH

### The shape of cities to come

The physical features of the world's largest cities are shifting as urban centres in Asia expand upwards and outwards.

Steve Frohking at the University of New Hampshire in Durham and his colleagues combined satellite observations of night-time illumination and urban backscatter — the reflection of microwaves from the surface of built-up land — to infer how the structure of 100 large cities around the world changed from 1999 to 2009. Most Chinese cities grew vertically, echoing drastic increases in land prices. However, cities in India and Africa expanded outwards, owing to factors such as unplanned urban development and building-height limits.

The data could be used to help researchers to understand how urbanization affects energy consumption and greenhouse-gas emissions, the authors note.

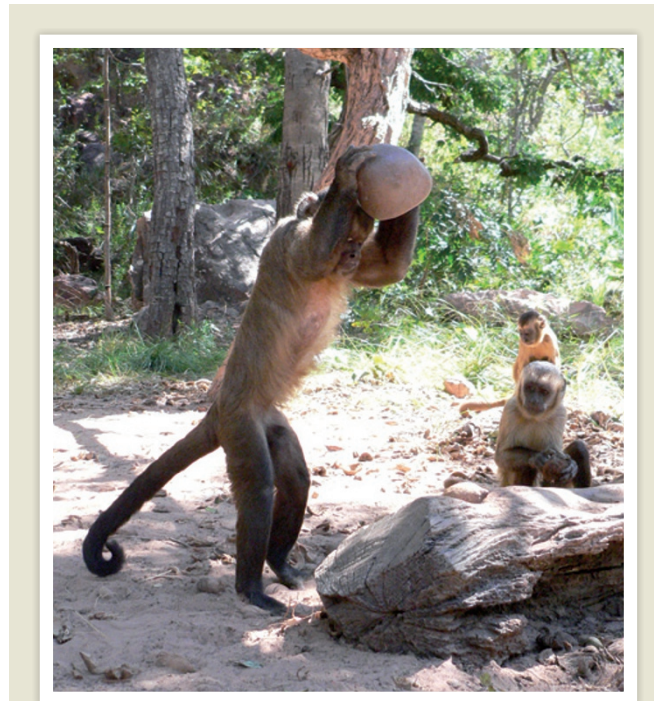
*Environ. Res. Lett.* 8, 024004 (2013)

## GENE THERAPY

### Enzymes fix disease genes

Genome-editing enzymes can be used to correct patient-specific genetic defects.

Mutations in the *COL7A1* gene cause the skin-blistering disease recessive dystrophic epidermolysis bullosa, which can be fatal. A team led by Jakub Tolar at the University of Minnesota in Minneapolis engineered enzymes called transcription activator-like effector nucleases (TALENs) to repair the defective part of the gene in skin cells from a patient with the disease.



## ARCHAEOLOGY

### Monkeys make their mark

Wild monkeys leave behind long-lasting traces of their efforts to crack nuts with tools — evidence that could be useful to archaeologists.

Bearded capuchin monkeys (*Sapajus libidinosus*, pictured) open seeds such as palm nuts by placing them on stone and wood surfaces, or 'anvils', and then pounding them with rocks. Elisabetta Visalberghi at the Institute of Cognitive Sciences and Technologies in Rome and her colleagues tracked this behaviour every month for three years at a study site in Brazil. The monkeys left behind tell-tale pits on the surfaces, and the discarded nut shells remained strewn around the anvils for years. The animals also moved stone hammers to use them at other anvils. The physical records left by modern monkeys create archaeological signatures that could help researchers to study tool use among ancient monkeys and early humans.

*J. Archaeol. Sci.* <http://dx.doi.org/10.1016/j.jas.2013.03.021> (2013)

These corrected cells were then reprogrammed into pluripotent stem cells, which, the authors suggest, could be developed into more-specialized cells that are suitable for therapy. *Mol. Ther.* <http://dx.doi.org/10.1038/mt.2013.56> (2013)

## DISEASE RESEARCH

### New hormone for diabetes

A newly identified hormone stimulates growth of insulin-producing cells in the mouse pancreas.

Douglas Melton and his colleagues at Harvard University in Cambridge, Massachusetts, identified the hormone, which they call betatrophin, by searching for genes that became more active in fat and liver tissue when insulin signalling was blocked. Injection of other mice with betatrophin resulted in an average 17-fold increase in rates of proliferation for  $\beta$  cells, the cells that deteriorate in some forms of diabetes. Although the hormone's mechanism of action is not yet known, the researchers did show that human livers also produce betatrophin. The hormone might one day replace insulin as a treatment for diabetes, the authors say.

*Cell* <http://dx.doi.org/10.1016/j.cell.2013.04.008> (2013)

For a longer story on this research, see [go.nature.com/5esyqp](http://go.nature.com/5esyqp)

## CONSERVATION BIOLOGY

### Bigger is better for protecting seas

Although small protected marine zones are important for conservation, they do not protect fish as well as larger areas do.

Nicholas Graham at James Cook University in Townsville, Australia, and Tim McClanahan at the Wildlife Conservation Society in New York assessed biomass and composition of coral-reef fish in several marine protected areas in the Indian Ocean. The authors compared small no-take zones — areas less than 10 square kilometres that were protected from human disturbance — with much larger marine 'wildernesses'. At a depth of 9 metres, mean fish biomass in the 640,000-square-kilometre Chagos Archipelago weighed in at six times the amount per hectare than that of the most successful small

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