

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## PHYSIOLOGY

### Skin cells have daily rhythms

Stem cells from human skin keep to a 24-hour schedule that might protect them from sun damage.

Salvador Aznar Benitah, then of the Centre for Genomic Regulation in Barcelona, Spain, and his colleagues analysed cultures of genetically identical stem cells from human skin at set times. They found that genes related to the 'body clock' are expressed in distinct waves over a 24-hour cycle.

Each wave is associated with peaks in expression for other genes: those that protect against DNA-damaging sunlight are most active during the day, as are those involved in DNA replication and cell growth. Genes that push stem cells to become specialized are most active in the evening and night. Disruptions to the internal clock could lead to premature ageing, the researchers suggest. *Cell Stem Cell* <http://doi.org/pbb> (2013)

## CONSERVATION

### Florida panthers keep their heads

Endangered Florida panthers have maintained their distinctive faces despite cross-breeding.

Human activity in the twentieth century drove this subspecies of *Puma concolor* (pictured) towards extinction and confined it to the southern tip of the Florida peninsula.



To combat severe inbreeding, eight Texas pumas were temporarily introduced to mate with this population.

David Reed at the Florida Museum of Natural History in Gainesville and his colleagues analysed the skulls of 20 male and 20 female panthers to see whether this cross-breeding had affected the animals' distinctive facial features. They found that identifying characteristics such as a highly arched 'Roman nose' have not been significantly altered. Those panthers born from crosses with their Texas cousins were similar to 'pure' Florida animals. *J. Mammal.* 94, 1037–1047 (2013)



## ECOLOGY

### Counting trees in the Amazon

The Amazon rainforest is renowned for its biodiversity, but just 227 'hyperdominant' species account for half of all trees across the 6-million-square-kilometre basin.

Hans ter Steege of the Naturalis Biodiversity Center in Leiden, the Netherlands, and his colleagues analysed data from 1,170 plots scattered across the forest and then extrapolated their data to the entire basin. They calculated

that the region contains around 390 billion trees with trunks of 10 centimetres or more in diameter, and some 16,000 species.

The authors suggest that the extreme dominance of a few species could simplify efforts to understand the large-scale ecology of the basin, but might complicate efforts to identify rare species that are at risk of extinction. *Science* <http://doi.org/pb2> (2013)

## BIOCHEMISTRY

### Icy origins for RNA copying?

For the first time, experiments in evolution have produced an RNA molecule that can build other RNA molecules that are longer than itself.

Many theories of the origin of life rely on RNA self-replication, but researchers have struggled to make RNA 'enzymes' that can stitch together other RNAs of a similar size. Reasoning that freezing temperatures would stabilize RNA synthesis, Philipp Holliger and his colleagues at the Medical Research Council Laboratory

of Molecular Biology in Cambridge, UK, ran *in vitro* evolution experiments in ice, producing RNA enzymes that can synthesize RNA at temperatures as low as  $-19^{\circ}\text{C}$  in tiny pockets between ice crystals.

By combining cold-generated mutations with those from previous work, the researchers created the most-efficient RNA enzyme so far: a 202-nucleotide molecule that can copy templates as long as 206 nucleotides. Ice could have aided the emergence of self-replication in the prebiotic chemical world, the authors say. *Nature Chem.* <http://doi.org/pcs> (2013)