RESEARCH HIGHLIGHTS

Selections from the scientific literature

EVOLUTION

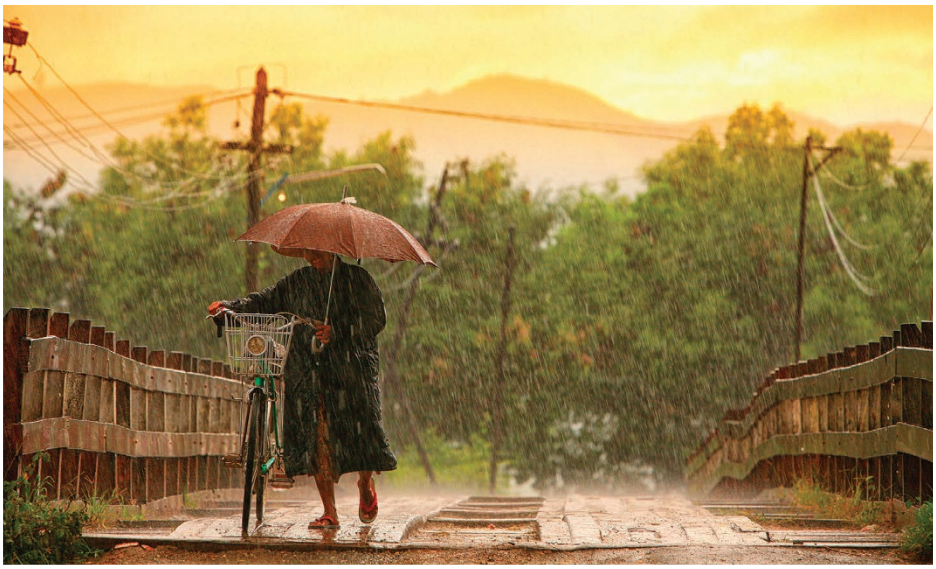
Penis bone lost through evolution

Our monogamous lifestyle may explain why humans, unlike many other mammals, lack a penis bone.

The bone, called a baculum, rests at the end of the penis and is thought to provide structural support and prolong copulation. Matilda Brindle and Christopher Opie at University College London analysed the size of bacula in nearly 2,000 species of mammal, including primates and carnivores. They found that species that copulate for longer tend to have longer bacula. The same is true of animals that have more than one mate or have seasonal-breeding patterns, which lead to intense competition between sperm from different males after mating.

The results show that the baculum first evolved 145–95 million years ago, in the common ancestor of primates and carnivores. It disappeared from the human lineage after our split with chimpanzees, and this may have coincided with the switch towards a more monogamous lifestyle, the authors say.

Proc. R. Soc. B 283, **20161736 (2016)**



DAVID SANTIAGO GARCIA/ALAMY

CLIMATE SCIENCE

Smaller monsoon boost predicted

Climate change may produce smaller-than-expected increases in rainfall in the world's monsoon regions over the coming decades, thanks to changes in land use.

More than 70% of the global population live in monsoon areas. Benjamin Quesada of the Karlsruhe Institute of Technology in Germany and his colleagues ran global climate models with and without projected deforestation and other land-use changes to compare how monsoon patterns might shift by the end of the century.

The models suggest that monsoon rain will generally become more intense in a warming world. But the projected increase was 30% smaller, on average, when the team accounted for changes in land use and land cover. Shifts in monsoon rainfall might affect regional water resources and agricultural yields, the authors say.

Geophys. Res. Lett. **http://doi.org/bv38 (2016)**

APPLIED PHYSICS

Device breaks cooling record

A cooling technology, if scaled up, could decrease temperatures by as much as 37 °C — potentially boosting the capabilities of refrigeration equipment.

Shanhui Fan at Stanford University in California and his team built a device that includes a thermal emitter that gives off heat in the mid-infrared range. Such wavelengths correspond to the 'transparency window' of Earth's atmosphere, allowing the heat radiation emitted by the apparatus to be released into space. Previous systems have reduced their temperatures by up to only 20 °C in low-altitude areas with moderate humidity levels. But the team broke this record with the addition of several features, including a vacuum chamber around the emitter. This ensured that heat was emitted only into space, and not into the surrounding air, increasing the amount of heat removed.

With further development, the technology could be used for applications including energy-efficient air conditioning.

Nature Commun. 7, **13729 (2016)**

AGEING

Genes that make mice youthful

Four genes that reprogram adult cells into embryonic-like stem cells can also reverse some signs of ageing.

The four genes encode Yamanaka factors, which are essential for embryonic development, but usually cause tumours when expressed long-term in animals. Juan Carlos Izpisua Belmonte at the Salk Institute in La Jolla, California, and his colleagues switched the genes on for two days per week over several weeks in mice that had an ageing disorder called progeria. The animals lived about 30% longer, and showed improvements in tissue healing and other signs of ageing, such as organ failure. In normal aged mice, switching on the genes led to improved recovery from