

fewer adaptations with others in their groups, suggesting that their diets have imposed weaker selection compared with that of carnivores.

Many big cats showed recent losses in genetic diversity, suggesting that population declines may be linked to their strict diet.

Genome Biol. 17, 211 (2016)

ASTROPARTICLE PHYSICS

Cosmic rays make more muons

Particle showers caused by natural ultra-high-energy collisions in Earth's atmosphere produce more muons — heavier cousins of the electron — than current physics models can explain.

Using the Pierre Auger Observatory in Argentina, Glennys Farrar of New York University and her colleagues studied showers of particles produced when 411 ultra-high-energy cosmic rays — atomic nuclei thought to originate outside the Galaxy — collided with air molecules. They also studied the fluorescent light the cascades created. The team found that the collisions, which are 10 times more energetic than those generated at the Large Hadron Collider (LHC) near Geneva in Switzerland, produced 30–60% more muons than simulations based on LHC results predict.

The results suggest that either the underlying models contain flaws, or that physics is fundamentally different at these higher energies.

Phys. Rev. Lett. 117, 192001 (2016)

PLANT BIOLOGY

Plants transmit light down stems

Plant stems can act like fibre-optic cables, piping light from above ground down to the roots.

Plants' roots produce proteins that respond to light, but it was not clear how light reached below the ground.

Chung-Mo Park of Seoul National University, Ian Baldwin of the Max Planck Institute for Chemical Ecology in Jena, Germany, and their team investigated this in thale cress (*Arabidopsis thaliana*). They found that illuminating the plant shoot altered gene expression in the roots, even when they prevented light from shining through the soil. Light in the red to near-infrared range was efficiently conducted through stem and root tissues.

Plants bearing a mutation in a light-responsive protein called HY5 showed abnormal root growth in response to shoot illumination, suggesting that light-sensing in plants is necessary for normal root development.

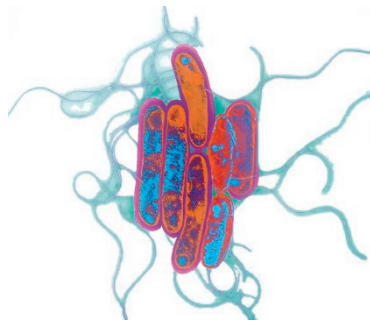
Sci. Signal. 9, ra106 (2016)

MICROBIAL EVOLUTION

Legionnaires' strains adapt well

Bacteria responsible for many cases of Legionnaires' disease emerged only in recent decades and seem to be adapting to human environments.

Legionella pneumophila (pictured) is found in aquatic environments worldwide and can contaminate water supplies, causing outbreaks of



pneumonia that can be fatal. A team led by Julian Parkhill at the Wellcome Trust Sequencing Institute in Hinxton, UK, and Carmen Buchrieser at the Pasteur Institute in Paris sequenced the genomes of 337 *L. pneumophila* isolates belonging to 5 types that cause almost half of all cases of Legionnaires' disease in northwest Europe. Sequence



analysis suggested that the 5 types emerged independently during the past few decades and spread around the world.

The recent emergence and spread of these lineages suggests that people infected with the bacterium are helping to disseminate it and that it is adapting to man-made water systems, the authors say.

Genome Res. 26, 1555–1564 (2016)

ZOOLOGY

Old apes can't see up close

The discovery that bonobos lose their close vision with age, as humans do, offers clues to the cause of this visual decline.

Heungjin Ryu of Kyoto University in Japan and his colleagues took photos of 14 wild bonobos ranging between 11 and 45 years of age as they groomed family and friends (pictured) — a behaviour that requires careful inspection. The team found that the distance from eyes to fingers was significantly longer in older animals than in younger ones. Moreover, a comparison with older images of grooming for one of the individuals, called Ki, showed that the distance had increased from about 12 centimetres in 2009 to roughly 17 centimetres in 2015. Bonobos tended to exhibit this 'long-sighted' condition, known as presbyopia, from about age 40.

The results suggest that presbyopia is caused not by

human activities such as reading and computer work, but by natural ageing of the primate eye.

Curr. Biol. 26, R1–R3 (2016)

FLUID DYNAMICS

Fluid spills from strange straws

A straw's shape has a counter-intuitive effect on the ability of fluids to flow inside it, according to a theoretical study.

If a cylindrical container with open ends is turned on its side, a liquid contained in it tends to stay inside because of surface tension, provided the container is narrow enough. However, Carlos Rascón of Carlos III University in Madrid and his collaborators have shown that fluid in containers with certain other shapes — those that are elliptical or triangular in cross-section, for example — will flow out no matter how narrow the tubes are. The team calculated that surface-adhesion forces will work together with gravity to make fluids spread along the entire length of the vessel, and ultimately escape.

The researchers say the finding has potential applications in microfluidic devices, and plan to test their predictions experimentally.

Proc. Natl Acad. Sci. USA
<http://doi.org/bspc> (2016)

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