

size and the level of social complexity. This contradicts a widely accepted theory that states that large brains evolved to help primates manage large social networks.

*Nature Ecol. Evol.* <http://dx.doi.org/10.1038/s41559-017-0112> (2017)

## AGEING

## Senescent cells cleared out

A newly developed molecule causes ageing cells to commit suicide, restoring some signs of health and stamina in old mice.

Damaged cells that stop dividing, called senescent cells, accumulate with age, and are thought to contribute to inflammation, tissue damage and age-related diseases. To find ways to clear these cells, Peter de Keizer at the Erasmus University Medical Center in Rotterdam, the Netherlands, and his colleagues designed a peptide that impairs binding between the proteins FOXO4 and p53 — an interaction that normally inhibits the 'self-destruct' signal in senescent cells. Infusions of the peptide reversed decline in kidney function in aged mice, and eliminated weight loss and liver damage caused in mice by chemotherapy drugs. In mice with a premature-ageing condition, treatment with the peptide caused regrowth of fur that had been lost, and doubled how far the animals could run.

The peptide seemed to have little effect on normal cells, probably because FOXO4 is scarce in non-senescent cells. The researchers are now preparing to test the safety of their molecule in humans.

*Cell* 169, 132–147 (2017)

## CANCER

## How fat boosts breast cancer

A molecule made by fat cells in human breast tissue increases the growth of certain breast-cancer cells. The finding suggests a potential reason why larger breast size

seems to correlate with a higher risk of cancer.

Fat cells are thought to interact with cancer cells in the breast. To learn how, Wen-Hwa Lee at China Medical University in Taiwan and his colleagues grew human breast-cancer cells along with fat cells isolated from human breast tumours that had been surgically removed. The team found that the fat cells promoted the growth of cancer cells that made a protein called MCT2. The researchers pinpointed a small molecule,  $\beta$ -hydroxybutyrate, that is secreted by the fat cells and is transported into tumour cells by MCT2. This molecule upregulated several cancer genes, boosting the growth of human breast-tumour cells that express MCT2.

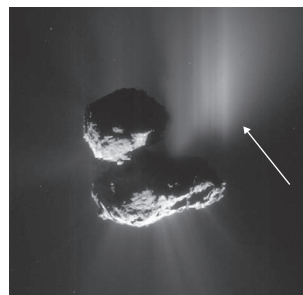
*Nature Commun.* 8, 14706 (2017)

## ASTRONOMY

## Landslides cause comet eruptions

The collapse of cliffs on comets can create plumes of gas and dust, which contribute to comets' characteristic tails.

Such outbursts are frequent, but their cause has been unclear. Maurizio Pajola at the NASA Ames Research Center in Moffett Field, California, and his colleagues analysed images taken by high-resolution cameras on the European Space Agency's Rosetta spacecraft as it orbited the comet 67P/Churyumov–Gerasimenko. By comparing images taken before and after an outburst on 10 July 2015 (pictured), the team traced the origin of the event to the collapse of an already fractured cliff, and a



subsequent landslide.

In a separate study, Mohamed Ramy El-Maarry at the University of Colorado, Boulder, and his colleagues used Rosetta's instruments to map 67P's surface over an 18-month period. They concluded that most such surface changes are caused by increased exposure to sunlight — which evaporates ice and weakens land structures — when the comet's orbit takes it close to the Sun every 6.5 years. Given that these landscape shifts are relatively cosmetic, the authors suggest that the landforms on comet 67P have not changed significantly since at least 1959, when it entered its current orbit.

*Nature Astron.* 1, 0092 (2017); *Science* <http://doi.org/b4r6> (2017)

## SEISMOLOGY

## Quake shows rare complexity

A large earthquake that rocked New Zealand's South Island in 2016 was one of the most complex ever recorded, involving the rupture of at least 12 major faults.

A team led by Ian Hamling of GNS Science in Lower Hutt, New Zealand, used field mapping, satellite observations and other measurements to analyse the magnitude-7.8 quake (pictured), which struck on 14 November. They studied the network of geological faults that ruptured along more than 170 kilometres during the quake. They found that many more faults broke, and at greater depths, than the country's national

seismic-hazard model suggested was possible.

Officials in other parts of the world may want to reassess their local earthquake risk, the authors suggest.

*Science* <http://doi.org/b4r7> (2017)

## VIROLOGY

## What makes bird flu jump species?

A single-letter change in the RNA sequence of an avian influenza virus called H7N9 could explain its continuing ability to infect humans as well as birds.

H7N9 has caused illness in more than 1,000 people since early 2013, and proved fatal in about 40% of cases. Honglin Chen at the University of Hong Kong and his colleagues compared the genome sequence of the 2013 H7N9 strain, which infects people, with all other available flu sequences. They found a single-letter substitution in the RNA for one of the viral proteins in the 2013 strain. This mutation boosts the virus's ability to infect human and mouse cells, without disrupting its ability to replicate in bird cells.

This single-letter change came from another avian flu virus, H9N2, and emerged in 2000. Surveillance programmes that monitor for this sequence in avian viruses may identify those that could potentially jump into humans.

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