RESEARCH HIGHLIGHTS

Selections from the scientific literature

PHYSIOLOGY

How alcohol ramps up hunger signals

Brain cells that regulate appetite and feeding are activated by alcohol, offering a possible explanation for why drinking can lead to overeating.

Sarah Cains at the Francis Crick Institute in London and her colleagues exposed mice to alcohol for three days and found that the animals' food intake increased during that period. An analysis of mouse brain tissue showed that alcohol boosts the activity of Agrp neurons, which trigger feelings of intense hunger when stimulated. The activity level was similar to that caused by fasting or hunger hormones.

When the team silenced these cells in mice and then gave them alcohol, the animals did not increase their eating.

Nature Commun. 8, **14014 (2017)**

ECOLOGY

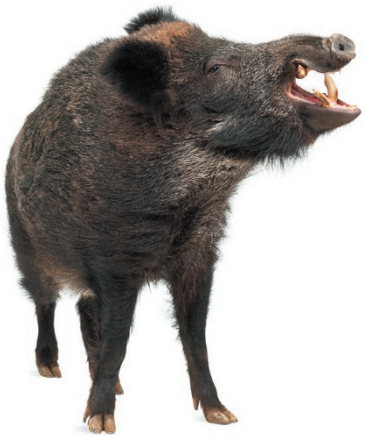
Invasive wild pigs spread across US

Eurasian wild pigs transmit disease and destroy crops in the United States, and are expected to spread throughout the country in the coming decades.

The invasive wild pigs (*Sus scrofa*; **pictured**) compete with the country's native wildlife and cost the agricultural industry more than US$1.5 billion a year. To predict their future spread, Nathan Snow, now at the USDA National Wildlife Research Center in Fort Collins, Colorado, and his colleagues modelled the distribution of wild pigs in the continental United States from 1982 to 2012. The authors found that, during this period, the pigs' rate of northward range expansion accelerated from 6.5 kilometres to 12.6 kilometres per year. If this trend persists, wild pigs are predicted to reach most counties in 30–50 years.

A warming climate may aid the northerly spread of the animals, the authors say, adding that reducing the transport of wild pigs — both accidentally and for sport — will be important in limiting the invasion.

J. Appl. Ecol. **http://doi.org/bwsp (2016)**



GETTY

JONES *ET AL.*/CC BY 4.0

MICROBIOLOGY

Bacterial explorers move fast

Bacteria that were long thought to be stationary are capable of rapid movement across surfaces when grown alongside yeast.

Streptomyces bacteria are common in soil and generate many antibiotics. Marie Elliot at McMaster University in Hamilton, Canada, and her colleagues cultured *Streptomyces venezuelae* along with baker's yeast (*Saccharomyces cerevisiae*) for 14 days. They found that the bacteria form non-branched filaments that spread over various surfaces (pictured) and obstacles. The 'explorer' cells released a volatile alkaline compound that stimulated physically separated *Streptomyces* to initiate exploration, and inhibited the growth of other bacteria.

This exploratory growth could be a way for the organisms to scavenge more nutrients, the authors say.

eLife 6, **e21738 (2017)**

NEUROSCIENCE

Age sees boost in facial recognition

The brain is thought to trim back neural connections as it develops, but scientists report that the region we rely on to recognize faces continues to increase in size into adulthood.

Kalanit Grill-Spector at Stanford University in California and her

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colleagues measured the brains of 22 children and 25 adults using functional and quantitative magnetic resonance imaging. The area of the brain that recognizes places stayed the same during development. But the brain tissue in the posterior fusiform gyrus, which is involved in facial recognition, grew in relative size with age. This change correlated with improved performance in facial-recognition tests in the adults compared with the children.

The authors suggest that these changes are caused by increases in branch-like neuronal structures called dendrites and other cellular anatomical shifts, rather than just an increase in the number of brain cells.

Science 355, **68–71 (2017)**

CANCER

'Old' cells linked to drug side effects

Cancer chemotherapy causes a host of side effects, and a particular group of cells that have stopped dividing could be at the root of this problem.

Chemotherapy drugs cause some healthy cells to stop dividing and become senescent, and such cells are thought to promote ageing. To look for links between these cells and chemotherapy's side effects, Marco Demaria at the University of Groningen in the Netherlands, Judith Campisi at the Buck Institute for Research on Aging in Novato, California, and their colleagues studied engineered mice in which senescent cells could be tracked, isolated and eliminated. They exposed animals to four commonly used cancer drugs and found that the drugs caused senescent cells to persist in non-cancerous tissue, and that those cells boosted inflammation. Elimination of the cells after drug treatment reduced several side effects of chemotherapy, improving bone-marrow recovery, decreasing heart dysfunction and lowering the risk of cancer relapse.

Targeting senescent cells could be a way to make chemotherapy more effective and tolerable for patients, the authors say.

Cancer Discov. **http://doi.org/bwsq (2016)**

BIOMATERIALS

Silk gland mimic spins strong fibres

A device that recreates the conditions in spiders' silk-spinning apparatus has produced 1,000 metres of material that is tougher than other spun artificial spider silks.

Anna Rising and Jan Johansson at the Swedish University of Agricultural Sciences in Uppsala and their colleagues used the bacterium *Escherichia coli* to make a water-soluble protein containing domains from the silks of two species of spider, *Euprosthenops australis* and *Araneus ventricosus*. The team then pumped the protein solution through a glass capillary into an acidic bath, mimicking the conditions experienced by natural silk as it passes down through a spider's silk glands and silk ducts. The result was continuous fibres with a diameter of 10–20 micrometres.

The artificial silk (**pictured**) had some physical properties that were similar to those of natural silk, but was less tough.

Nature Chem. Biol. **http://dx.doi.org/10.1038/nchembio.2269 (2017)**

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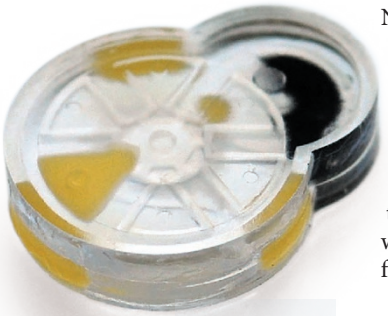

MEDICAL DEVICES

Mini machines deliver drugs

A small device with moving parts can release drugs and be wirelessly controlled after being placed in the body.

Sau Yin Chin and Samuel Sia at Columbia University in New York and their colleagues used biocompatible hydrogels to build the device, which is just over 1 centimetre wide (**pictured**). They designed different versions, layer by layer, that contained various moving parts, such as valves, pumps and rotating gears.

One version included a Geneva drive, a mechanism found in watches, that precisely controls intermittent movement. The team loaded a Geneva-drive device with a cancer drug and placed it under the skin of tumour-bearing mice. The researchers activated the device using an external magnet every two days to locally release low doses of the drug. They found that this treatment inhibited tumour growth more than high systemic doses of the drug.

Sci. Robot. 2, **eaah6451 (2017)**

CONSERVATION

Effects of wildlife trade mapped

Global maps that show where the impact of consumer demand for wildlife is felt most strongly could help to guide conservation spending and priorities.

Daniel Moran at the Norwegian University of Science and Technology in Trondheim and Keiichiro Kanemoto at Shinshu University in Matsumoto, Japan, created the maps by combining data on where threatened species live with where the products made from them are eventually sold.

The maps show the areas most affected by consumption in different countries. For example, southeast Asia is a hotspot of threatened marine species that is linked to US consumption. For land animals, the US demand affects regions in southeast Asia and Madagascar, as well as southern Europe, Africa's Sahel region and parts of Mexico.

Nature Ecol. Evol. 1, **0023 (2017)**

PLANETARY SCIENCE

Many collisions made the Moon

The Moon may have been formed not from one big cosmic smash, as the leading theory holds, but from multiple smaller collisions.

Billions of years ago in the early Solar System, space debris would have collided with the young Earth. Using computer simulations, a team led by Raluca Rufu of the Weizmann Institute of Science in Rehovot, Israel, found that multiple small impacts could have formed many moonlets around Earth. Those would then have coalesced to create the Moon.

The scenario could explain why Earth and the Moon have similar chemical compositions. Researchers think that a Moon created by a single large impact would have contained material both from the impactor and from Earth.

Nature Geosci. **http://dx.doi.org/10.1038/ngeo2866 (2017)**