RESEARCH HIGHLIGHTS

Selections from the scientific literature

HIV

Antibody–drug mix stops relapse

A combination of antibodies and multiple virus-activating drugs can keep HIV from resurging in infected mice, even after treatment ends.

During drug treatment, HIV enters a dormant state and stays hidden inside infected cells; afterwards, it bounces back. A team led by Michel Nussenzweig at the Rockefeller University in New York tested a combination of neutralizing antibodies and three drugs that activate dormant HIV so it is no longer hidden. After the treatment was given to HIV-infected mice, 57% were protected from virus resurgence, whereas no significant effects were seen in mice treated with antibodies plus only one inducer or with antibodies alone.

Such drug combinations could reduce the reservoir of HIV-infected immune cells, a key step towards curing the disease, the authors say.

Cell **http://doi.org/t7w (2014)**

JEAN GAUMY/MAGNUM PHOTOS

OCEAN SCIENCES

Farmed salmon swim to freedom

Vastly more salmon could be escaping from aquaculture farms (pictured) than is officially reported, say Ove Skilbrei and his colleagues at the Institute of Marine Research in Bergen, Norway.

Farmed salmon that escape could mate with wild populations and make them less fit for survival. The researchers tagged more than 90,000 farmed Atlantic salmon (*Salmo salar*) and released them along the Scandinavian coast in 2005. Over the next five years, the team collected data on how many tagged animals were recaptured by fishermen. In some cases, immature fish were found near their release sites, but for adults, the recapture rate after 1–2 years was less than 0.1%.

Using this probability for recapturing escapees, the team estimates that as many as 1.5 million farmed salmon escape from farms in Norway each year — significantly more than the 413,000 escapees that are reported annually.

ICES J. Mar. Sci. **http://doi.org/t6t (2014)**

MATERIALS

Soft machines made like Lego

Soft, stretchy, Lego-style bricks offer a way to make three-dimensional (3D) prototypes of elastic structures, according to researchers at Harvard University in Cambridge, Massachusetts.

'Click-e-bricks', which were developed by George Whitesides and his colleagues, can be used to build stretchy devices, such as hollow ones that expand when air is injected (**pictured**) or that have internal channels for liquid. The approach could be used to rapidly make prototypes of soft machines, such as soft robots, that move depending on changes in air pressure, current or light.

The team argues that click-e-bricks offer a faster alternative to 3D printing, which relies on hard acrylic polymers that limit the composition and complexity of the final structure.

Adv. Mater. **http://doi.org/f2tdnq (2014)**

ASTRONOMY

Comets forge organic molecules

Astronomers have captured three-dimensional images of organic compounds streaming from two comets.

Comets contain some of the oldest materials in the Solar System. Using the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile, Martin Cordiner of the NASA Goddard Space Flight Center in Greenbelt, Maryland, and his colleagues made detailed observations of chemicals flying off the comets Lemmon and ISON. Hydrogen cyanide flowed smoothly from the comets' nuclei, whereas hydrogen isocyanide formed clumps and jets. Both chemicals almost certainly formed within the comets, perhaps as a result of other large molecules breaking apart.

Such comet-formed

STEPHEN A. MORIN, HARVARD UNIV.

compounds could have been important for kicking off the chemistry that led to life on Earth, the researchers say.
Astrophys. J. Lett. 792, **L2 (2014)**

MICROBIOLOGY

How *Salmonella* bounces back

Two groups have shown how *Salmonella* bacteria can resist antibiotics.

Dirk Bumann of the University of Basel in Switzerland and his colleagues infected mice with modified *Salmonella* strains that glow green when they divide. They found varying rates of division in different tissues, and most of the bacteria that survived antibiotic treatment had a moderate growth rate.

In a separate study, Médéric Diard at the Swiss Federal Institute of Technology in Zurich and his co-workers found that whereas antibiotics kill off less-dangerous *Salmonella* mutants in the mouse gut cavity, the more-virulent strains escape by hiding inside the gut tissue. After antibiotic treatment ended, the more-virulent bacteria repopulated the gut.

The findings could point to new strategies for antibiotic treatment, the authors say.
Cell 158, **722–733 (2014); *Curr. Biol.* http://doi.org/t7z (2014)**

ASTRONOMY

Dusty visitors from interstellar space

Seven particles captured by NASA's Stardust spacecraft may be the first sample of dust from beyond the Solar System that has been brought back to Earth.

Andrew Westphal at the University of California, Berkeley, and his colleagues — with the help of 30,714 citizen scientists around the world — scanned more than 1 million images of tracks left by particles on Stardust's collectors. They identified seven candidates with a surprising variety of crystal structures and elemental compositions.

These particles could help to explain the origin and evolution of interstellar dust, which current astronomical observations can only guess at.
Science 345, **786–791 (2014)**

CONSERVATION BIOLOGY

Poaching leads to elephant decline

The illegal killing of elephants in Africa to supply the ivory trade has reached unsustainable rates.

George Wittemyer at Colorado State University in Fort Collins and his colleagues used data from elephant carcass surveys in 45 sites across Africa to model broader trends in elephant poaching on the continent. They found that levels of illegal killing peaked in 2011 at 8% of the global population, leading to the loss of roughly 40,000 elephants, or a 3% overall reduction in animal numbers that year.

Decreasing demand for ivory in China is key to conserving elephants, say the authors.
Proc. Natl Acad. Sci. USA **http://dx.doi.org/10.1073/pnas.1403984111 (2014)**

VIROLOGY

Secret to Ebola's success

The Ebola virus might elude immune responses by stopping a key protein in infected cells from activating defence genes.

Ebola, which kills up to 90% of people it infects, is known to disrupt the activity of interferon, a crucial antiviral protein. Gaya Amarasinghe at Washington University School of Medicine in St Louis, Missouri, and his colleagues found that an Ebola viral protein blocks the transport of an interferon-activated protein called STAT1 into the cell nucleus. STAT1 is needed in the nucleus to stimulate defence mechanisms.

The results suggest new drug targets in the ongoing fight against the virus.
Cell Host Microbe 16, **187–200 (2014)**

SOCIAL SELECTION

Popular articles on social media

Strong words over a 'Hobbit'

Two papers stirred up the palaeoanthropology world by suggesting that *Homo floresiensis* — a putative human relative discovered on the Indonesian island of Flores in 2003 — was instead an example of *Homo sapiens* with Down's syndrome. The theory, in the *Proceedings of the National Academy of Sciences*, was greeted with much scepticism. As part of a string of tweets, anthropologist Holly Dunsworth at the University of Rhode Island in Kingston said: "Conclusion [is] based seemingly on zilch." Co-author Robert Eckhardt, a geneticist at Pennsylvania State University, defended the diagnosis in a comment posted on a blog of the Natural History Museum in London, saying that his group and others have spent the past decade "trying to turn the 'Hobbit' circus into science".
Proc. Natl Acad. Sci. USA **http://doi.org/t66; http://doi.org/t65 (2014)**

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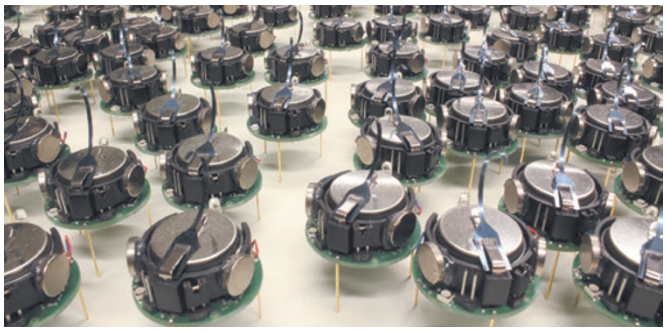

MICHAEL RUBENSTEIN, HARVARD UNIV.

ENGINEERING

Robot swarms take shape

A thousand-strong army of coin-sized robots (**pictured**) can arrange itself into various configurations.

Michael Rubenstein and his co-workers at Harvard University in Cambridge, Massachusetts, programmed 1,024 robots with a simple set of rules and an image of a shape to be formed. Four 'seed robots' act as a point of origin for a coordinate system and send their coordinates to neighbours using infrared light. This information spreads through the group, allowing each robot to determine its relative location in the swarm.

The robot flock can form programmed shapes — such as the letter 'K' — in around 12 hours and is the largest yet to demonstrate collective behaviour, the authors say.
Science 345, **795–799 (2014)**

CLARIFICATION
The Research Highlight 'Brain scans predict TV hits' (*Nature* **512,** 8; 2014) notes that Jacek Dmochowski is at Stanford University; however, the research described was done at the City College of New York.

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