RESEARCH HIGHLIGHTS

Behind enemy lines

Nature Commun. doi:10.1038/ncomms1002 (2010)
Animal displays are thought to evolve from ancestral behaviours that turn, over time, into ritual communication signals.

The masked-birch caterpillar (*Drepana arcuata* Walker, pictured) conveys ownership of its territory with vibrations, including the dragging of its anal segment across a leaf to make a scratching noise. The behaviour typically staves off intruder caterpillars. Jayne Yack of Carleton University in Ottawa, Canada, and her colleagues have found that the anal scraping seems to be a modified component of a typical territorial behaviour observed in a number of related, ancestral species — an aggressive crawl towards intruders.

Body movements previously associated with fighting can become ritualized, the authors suggest, permitting conflict resolution without physical altercation.

J. YACK

PATHOLOGY

Bent out of shape

Biophys. J. **98,** 1302–1311 (2010)
Researchers in Belgium have spied on the earliest steps in a process that leads to Parkinson's disease: the formation of protein clumps in the brain.

Yves Engelborghs and his colleagues at the University of Leuven used a technique called fluorescence correlation spectroscopy, which tracks the size of molecules by measuring their diffusion rates. The team watched individually labelled α-synuclein proteins *in vitro* as they bunched together.

These clumps are found in larger structures called Lewy bodies in the neurons of people with Parkinson's disease. The team found that the early protein clumps formed in regions in which α-synuclein proteins were highly concentrated. The proteins in these clumps adopted a shape intermediate between those of the individual proteins and those of proteins in the final, toxic aggregates found in Lewy bodies.

NANOTECHNOLOGY

Down the tube

Phys. Rev. Lett. **104,** 133002 (2010)
Super-sensitive single-atom detectors are the latest brainchild of researchers working with single-walled carbon nanotubes.

Anne Goodsell and her co-workers at Harvard University in Cambridge, Massachusetts, harnessed one of the tubes' many unusual properties: their ability to create a powerful electric field when charged. The researchers suspended a 10-micrometre-long nanotube between two electrodes and charged it to hundreds of volts. They then fired a beam of cold rubidium atoms at the tube. Atoms spiralled quickly around the tube until an electron jumped from a neutral atom to the positively charged tube. Once ionized, the atom was repelled by the tube, and shot out at high speed into a nearby detector.

The team believes that the technique could be useful as an atom 'sniffer' or counter.

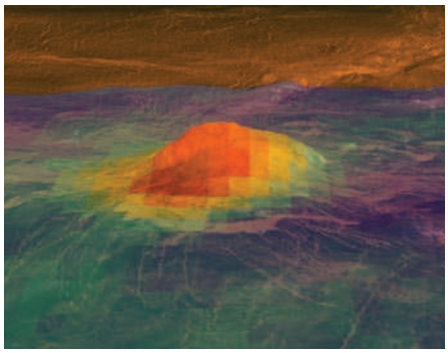
PLANETARY SCIENCE

Venus vents

Science doi:10.1126/science.1186785 (2010)
Volcanoes on Venus spewed lava as recently as three centuries ago, say Suzanne Smrekar of the Jet Propulsion Laboratory in Pasadena, California, and her colleagues. The evidence points to a geologically active planet.

Using data from the European Space Agency's Venus Express orbiter, the researchers looked at the surface composition of three hotspots — locations analogous to Hawaii — where plumes from the hot mantle pierce the crust (pictured below). The surfaces were extraordinarily fresh, leading to an age estimate for the lava flows of between 2.5 million and 250 years.

This suggests that Venus vents its internal heat in regular small eruptions, resurfacing itself piecemeal. This contrasts with the long-held view that Venus undergoes catastrophic episodes in which the crust founders and the entire planet is bathed in molten rock.



R. OLLERENSHAW/E. DEJONG/SOLAR SYSTEM VISUALIZATION GROUP/NASA/JPL CALTECH/ESA

NEUROSCIENCE

Stressing memory

J. Neurosci. **30,** 5037–5046 (2010)
The emotional arousal associated with a class of stress hormones may be required to form long-term memories, say Benno Roozendaal at the University of Groningen in the Netherlands, Marcelo Wood at the University of California, Irvine, and their colleagues.

The authors gave glucocorticoid hormones to rats and mice and tested how well the animals remembered objects and their locations. They found that the hormones improved memory by boosting acetylation, the addition of acetyl groups to nuclear targets.

This modification appears to facilitate some of the gene transcription required to consolidate memories. But promoting acetylation in the absence of the hormone didn't improve memory. The hormone had to first activate receptors on the cell membrane in order to trigger a cascade of events involved in laying down memories.

PHYSICS

Monopoles on demand

Nature Phys. doi:10.1038/nphys1628 (2010)
Elusive magnetic monopoles — regions of lone north or south magnetic charge — have recently been detected in very cold 'spin ices', a class of tetrahedral crystals. Now Will Branford and his colleagues at Imperial College London have created monopoles at