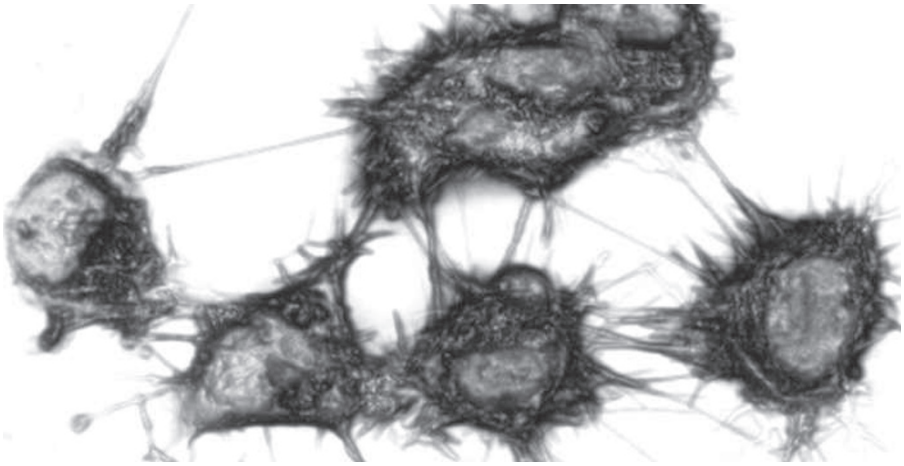
RESEARCH HIGHLIGHTS

Prion hijackers

Nature Cell Biol. doi:10.1038/ncb1841 (2009)
Prions that cause brain disease could spread between cells by hijacking a system cells may be using as a way of communicating, Chiara Zurzolo of the Pasteur Institute in Paris and her colleagues report. This may be how infectious prions infiltrate the central nervous system.

The researchers found that prions labelled with a fluorescent protein shuttled from one nerve cell to another by travelling inside nanotubes that connect these cells.

Treatment with a chemical that prevents nanotube formation halted the transfer of prions. Prions also moved from immune-system cells called dendritic cells to neurons.



K. GOUSSET *ET AL.*

PLANT SCIENCES

Rust resistant

Science doi:10.1126/science.1166453 (2009)
Why some rust-resistant plant genes maintain their potency as the fungus co-evolves has long baffled crop researchers. For instance, over the past 50 years leaf rust and stripe rust have become no more virulent against wheat plants carrying the gene *Lr34*. But other resistance genes are typically rendered useless by these pathogens within three to five years.

Lagudah Evans at CSIRO Plant Industry in Canberra, Beat Keller of the University of Zurich in Switzerland and their colleagues recently studied *Lr34*'s sequence. The team discovered that the crucial DNA sequence encodes a type of membrane protein called an ATP-binding cassette, or 'ABC' transporter.

Scientists who come across new resistance genes will be able to screen them for similar sequences and, on that basis, predict whether the resistance the new gene confers is likely to last, the authors say.

MOLECULAR BIOLOGY

Adaptation

Nature Biotechnol. doi:10.1038/nbt.1525 (2009)
A new way to silence gene expression has been devised. It differs from two common methods — antisense and RNA interference (RNAi) — in that it uses short synthetic nucleic-acid molecules known as U1 Adaptors that work inside the nucleus.

These tether another molecule called U1 snRNP splicing factor to messenger RNA molecules that have just been made. The splicing factor inhibits the processing necessary for messenger RNAs to move to a ribosome, where the genetic information they carry would be translated into proteins.

Sam Gunderson of Rutgers University in Piscataway, New Jersey, and his colleagues created U1 Adaptors that halved gene expression when added to cells at sub-nanomolar concentrations — a level of activity on a par with RNAi. Combining U1 Adaptors and RNAi further reduced gene expression.

ANIMAL BEHAVIOUR

The carriers' code

J. Exp. Biol. **212,** 499–505 (2009)
Although leaf-cutter ants leaving their nest often encounter leaf-laden colleagues coming the other way, the ant traffic never becomes gridlocked. Using an experimental nest of *Atta colombica*, Audrey Dussutour of the Paul Sabatier University in Toulouse, France, and her colleagues have determined the rules of the insect road.

When the ants were forced to cross a narrow bridge, they tended to form clusters of inbound and outbound foragers. Inbound clusters were headed by leaf-carrying ants and were almost always given priority; outbound ants tended to cross when there were no inbound ants.

The few inbound ants without loads followed behind slower, load-bearing members of their cluster. Had they raced ahead, head-to-head encounters would have caused twice the delay imposed by tailgating behaviour.

PHYSICS

Atomic quantum dots

Phys. Rev. Lett. **102,** 046805 (2009)
Assemblies of quantum dots — blobs of a few thousand atoms — with electrons shuttling between them could form miniature low-power computing circuits that do not require transistors. But these architectures are fragile and must operate at temperatures close to absolute zero to control the interactions of the electrons they confine.

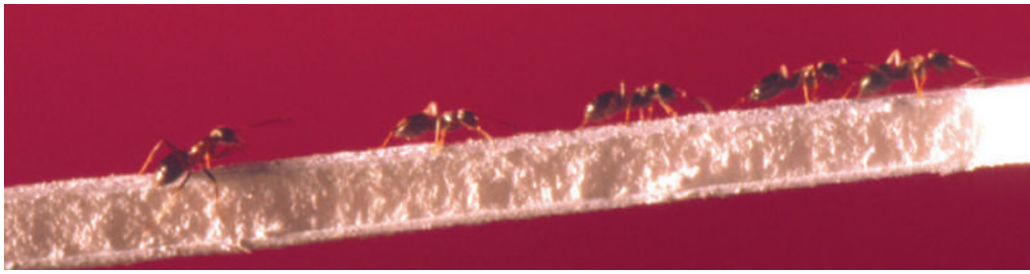
A team led by Robert Wolkow at Canada's National Institute for Nanotechnology in Edmonton, Alberta, has discovered that single silicon atoms, sitting in an electron-doped silicon lattice that is blanketed with hydrogen, provide electronic structures with better properties than quantum dots.

The atoms can be joined in assemblies much like the dots. Besides being smaller, these are much more robust to external disturbance and can tunnel electrons controllably at room temperature.

OCEANOGRAPHY

Sky view

Geophys. Res. Lett. doi:10.1029/2008GL036422 (2009)
The localized sinking of large volumes of surface water to great depth has a crucial role in global ocean circulation and so in climate



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