RESEARCH HIGHLIGHTS

When 'wit' is not 'wet'

Proc. R. Soc. B doi:10.1098/rspb.2009.1788 (2009)

Humans can distinguish between similar-sounding words regardless of the speaker. Debate has centred on whether this ability is unique to humans or exists in other animals and contributed to the evolution of human speech.

To tackle the question, Verena Ohms of the Institute of Biology Leiden in the Netherlands and her colleagues recorded 21 men and women saying the Dutch words 'wit' and 'wet', then played them back for eight zebra finches (pictured). Enticed by birdseed, the finches learned to discriminate between the two words. The birds could still tell the two apart when the words were spoken by people they hadn't heard before, including people of the opposite sex.

J. BILDARCHIV/ PHOTOLIBRARY

CLIMATE SCIENCE

Carbon sink limits

Geophys. Res. Lett. doi:10.1029/2009GL041009 (2009)

As ecosystems 'fix' nitrogen, converting it to ammonia, they may also be affecting their own ability to soak up carbon.

Ying-Ping Wang of CSIRO in Aspendale, Australia, and Benjamin Houlton of the University of California, Davis, have modelled how the terrestrial biosphere responds to interactions between factors such as nutrient flux, nitrogen fixation and light availability. The team found that ecosystems absorbed less carbon after they ran out of soil nitrogen to fix.

Calculations of future warming and carbon uptake need to take this factor into consideration, the authors say, suggesting that warming could proceed at a faster pace than expected in nitrogen-limited ecosystems.

DRUG DELIVERY

Into the tumour

Cancer Cell **16,** 510–520 (2009)

Targeting diagnostic agents or drugs to tumours could make cancer diagnosis and treatment more effective. Researchers have devised ways to get molecules to home in on tumours, but getting them deep into the bulk of the tumour has proved difficult.

Erkki Ruoslahti of the Burnham Institute for Medical Research in Santa Barbara, California, and his co-workers have identified a peptide that they bound to a known cancer drug, as well as to imaging agents, and then injected these into tumour-bearing mice. Magnetic resonance imaging and other methods revealed an 8–11-fold higher level of the peptide-bound drug in tumours than of the drug alone.

The researchers show that the peptide targets and penetrates tumours by first binding to a set of tumour-specific receptors, called αv integrins. It is then cleaved,exposing a motif that binds to another receptor, neuropilin-1, to gain entry to the cell.

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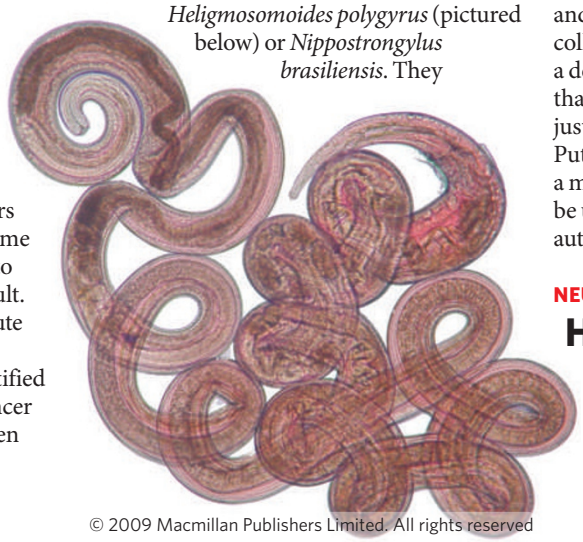
IMMUNOLOGY

Worms begone!

J. Exp Med. doi:10.1084/jem.20091268 (2009)

The cells lining the gut combat worm infections by secreting an immune modulator that blocks worms from feeding on host tissues.

Fred Finkelman of the University of Cincinnati in Ohio and his colleagues injected mice with one of two nematode parasites: *Heligmosomoides polygyrus* (pictured below) or *Nippostrongylus brasiliensis*. They monitored worm counts, levels of cytokines (immune modulators) and changes in the intestinal lining cells.



The authors found that the cytokines IL-4 and IL-13, known to be produced in response to worm infection, stimulate gut lining cells to secrete another cytokine called RELM-β. This interferes with worm feeding, promoting expulsion of the nematodes from the gut.

PHYSICS

Electron turnstiles

New J. Phys. **11,** 113057 (2009)

The ampere is the standard unit of electrical current, but its definition is arbitrary. Physicists would like to redefine the ampere in terms of the motion of a small number of electrons, so that the standard is based on the unchanging charge carried by the fundamental particles.

Ville Maisi at the Centre for Metrology and Accreditation in Espoo, Finland, and his colleagues in Finland and Japan bring such a definition closer. The team uses transistors that act as electron 'turnstiles'—allowing just one of the particles through at a time. Putting ten such gates in parallel generates a measurable current that could potentially be used to define a more precise ampere, the authors say.

NEUROSCIENCE

Hub neurons synch brain

Science **326,** 1419–1424 (2009)

In the rodent hippocampus, groups of brain cells link up to each other via highly connected hub neurons. This