

RESEARCH HIGHLIGHTS

Selections from the scientific literature

NANOTECHNOLOGY

Microphone made from a molecule

A single molecule can act as a nanometre-sized microphone.

Michel Orrit and his colleagues at the University of Leiden in the Netherlands placed molecules of dibenzoterrylene within a crystal a few degrees above absolute zero and attached a tuning fork to the crystal. Hitting the fork caused vibrations that stretched and compressed the crystal, which in turn shifted the frequency at which the molecules emitted light. The light-frequency readout allowed the team to detect the vibrations from an individual molecule.

The nano-microphone could be used as an ultra-sensitive detector for very slight vibrations, such as from tiny oscillators that measure the properties of quantum systems, the authors say.

Phys. Rev. Lett. 113, 135505 (2014)

NEUROSCIENCE

Paralysed rats stimulated to walk

Paralysed rats can be made to walk using a device that electrically stimulates the spine and adjusts the pulses according to ongoing movement.

Grégoire Courtine and his



colleagues from the Swiss Federal Institute of Technology in Lausanne implanted electrodes into the spinal cords of rats below the site of the animals' paralyzing injury. The team developed algorithms that tuned the electrical signals in realtime, based on continuous feedback on the leg's position and movement. This allowed the rats to walk with a more natural gait, compared with systems currently in development that use fixed stimulation parameters. The animals walked at least 1,000 steps on a treadmill and could climb steps (pictured).

The authors plan to test their technique in patients with spinal-cord injury. *Sci. Transl. Med.* 6, 255ra133 (2014)

PALAEONTOLOGY

Amphibian regrew limbs long ago

The oldest evidence for limb regeneration has been found in fossils of a 300-million-year-old amphibian.

Salamanders can regrow entire lost limbs. Usually, the regrowths are indistinguishable from those that they replace, but in some cases they have distinctive abnormalities such as fused or missing digits. Nadia Fröbisch and her colleagues at the Natural History

Museum — Leibniz Institute for Evolution and Biodiversity Science in Berlin found similar abnormalities in fossils of *Micromelerpeton credneri* (pictured), a distant relative of modern amphibians.

This is the first fossil evidence for limb regeneration, and suggests that this ability originated in an ancient amphibian ancestor. *Proc. R. Soc. B* 281, 20141550 (2014)



CAROLA RADKE/MFN

CANCER

Vitamin D boosts cancer treatment

Vitamin D could make pancreatic cancer treatment more effective, by reprogramming cells that bolster tumour growth.

Pancreatic cancer is particularly deadly, partly because of cells called pancreatic stellate cells, which foster an environment that favours the growth of tumours and resists chemotherapy. Ronald Evans and Michael Downes of the Salk Institute in La Jolla, California, and their colleagues found that the vitamin D receptor is expressed in human pancreatic tumours. Activation of the receptor markedly altered

gene expression in pancreatic stellate cells, shifting them to a quiescent state in which they could not support tumours as well.

As a result, treating mice bearing pancreatic tumours with a vitamin D analogue and chemotherapy slowed tumour growth and increased survival compared with chemotherapy alone.

Cell 159, 80–93 (2014)

ECOLOGY

Dingo destruction okay for prey

Efforts to control Australia's dingo populations to protect livestock may not be having negative effects on other prey species.

Some studies have suggested

ALAIN HERZOG/EPFL