RESEARCH HIGHLIGHTS

Pitch shifter

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.1000429107 (2010)
In a cluttered environment, how does a bat emitting a rapid train of sonar pulses not mistake the echo of an initial pulse from a distant object for that of a later pulse from a closer object?

To find out, Shizuko Hiryu at Doshisha University in Japan, James Simmons at Brown University in Providence, Rhode Island, and their colleagues monitored big brown bats (*Eptesicus fuscus*) as they flew through rows of hanging chains (pictured).

The researchers recorded the bats' sonar signals using small radio microphones carried by the animals. They found that the bats produced pairs of sounds, with the intervals between sounds alternating between short and long. When the shorter pairs created interfering echoes, the bats shifted the first of the two sounds upwards in frequency by 3–6 kilohertz, and the second downwards by the same amount. The authors suggest that this allows the bats to avoid ambiguous echoes in crowded environments, such as dense vegetation.

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PALAEOECOLOGY

Ancient tree nursery

Geology **38,** 295–298 (2010)
A study of more than 100 fossilized trees in the southern Andes of Argentina has allowed researchers to reconstruct the trees' habitat and deduce how they survived their harsh environment some 300 million years ago.

Silvia Césari at the Bernardino Rivadavia Museum of Natural Sciences in Buenos Aires and her colleagues analysed specimens from an ancient forest 3,000 metres above sea level. They found only one dominant tree species. Sedimentary deposits and volcanic rocks show that the area was frequently flooded and affected by volcanic activity, raising questions about the trees' survival strategy.

The team found small rootlets inside several fossils, suggesting that seedlings had developed on previously felled trees. These rootlets contain intercellular spaces (pictured below), which would have been filled with air to maintain an oxygen supply — a common feature of extant plants in areas prone to flooding. The authors say that decaying trees may have acted as "nurse logs" for saplings.

GEOL. SOC. AM.

CANCER BIOLOGY

Brain tumour trigger

Genes Dev. **24,** 683–695 (2010)
A region of the brain known as the subventricular zone has been suspected as a source of deadly tumours since at least the late 1930s. Now, Günther Schütz at the German Cancer Research Center in Heidelberg and his colleagues have identified a protein that might prompt neural stem cells in the region to become cancerous.

Previous studies had shown overexpression of the protein TLX in human brain tumours. So the team overexpressed this protein in mice and found increased neuronal generation in the subventricular zone that persisted into adulthood. Some of the animals developed tumour-like lesions. In mice that also lacked the gene that encodes the tumour-suppressor p53, invasive tumours known as gliomas appeared early in life, suggesting that TLX might be important in initiating cancer.

CHEMICAL SENSING

Bomb detector sewn up

Adv. Mater. doi:10.1002/adma.200904005 (2010)
Carbon nanotubes are finicky materials: the slightest exposure to another chemical can alter their ability to conduct electricity.

Chongwu Zhou and his colleagues at the University of Southern California in Los Angeles have taken advantage of this property to create an explosives sensor that can be transferred to cloth. Zhou's team made sheets of carbon nanotubes, stuck them to fabric and then exposed them to chemicals such as 2,4,6-trinitrotoluene (TNT) and nitrogen dioxide (NO_2).

The group recorded changes in conductance at low concentrations of the chemicals: 40 parts per billion (p.p.b.) of NO_2 and 8 p.p.b. of TNT. The team achieved similar results with zinc oxide nanowire sensors and TNT. The sensitivities of these methods are not as high as those of other detection techniques, but the size and flexibility of the fabric-based sensor could make it useful, the authors say.

IMMUNOLOGY

Secret to superinfection

Science **328,** 102–106 (2010)
A leading cause of birth defects in humans is infection in pregnancy by cytomegalovirus (CMV), which can 'superinfect' individuals who are already infected and have developed immunity to the virus.

Louis Picker, Klaus Früh and their colleagues at Oregon Health and Science University in Beaverton wondered how the reinfecting virus dodges the immune response. In such a response, killer T cells are normally activated when presented with parts of a specific antigen by a protein complex called major histocompatibility complex class I that is found on the surface of host cells. CMV is known to interfere with this process.

The researchers show that this interference,