RESEARCH HIGHLIGHTS

Hear, hear

Cell **127,** 277–289 (2006)
Researchers have uncovered a novel mechanism underlying inherited deafness.

Christine Petit of the Pasteur Institute in Paris, France, and her colleagues studied the mouse equivalent of a protein known to be defective in some people who are profoundly deaf. They found that the protein, otoferlin, is sited at a key location within the inner hair cells (pictured) of the cochlea.

These cells transform sound into signals that trigger auditory nerves to fire. Sacs of neurotransmitters are anchored to the inner side of membranes of these hair cells. They fuse with the membrane to release their contents, activating neighbouring nerve endings. Otoferlin is essential for fusion.

S. GSCHMEISSNER/SPL

PLANETARY SCIENCE

Frosted Earths

Astrophys. J. **650,** L139–L142 (2006)
Recent observations have shown that some small stars called M dwarfs host icy planets that are roughly ten times more massive than the Earth. How are these 'super-Earths' made?

Planet formation around dwarf stars is different to that around Sun-like stars. This is because the dwarfs fade and shrink during the process, pulling in the 'snow line', which separates regions of icy-planet formation from those of rocky-planet formation.

Grant Kennedy of the Australian National University in Weston Creek and his team have concocted a theoretical model of this process, showing that it favours the rapid appearance of middleweight icy planets. As the contracting snow line moves like a cold front over small rocky protoplanets, they become thickly ice-coated before coagulating through collisions to make super-Earths.

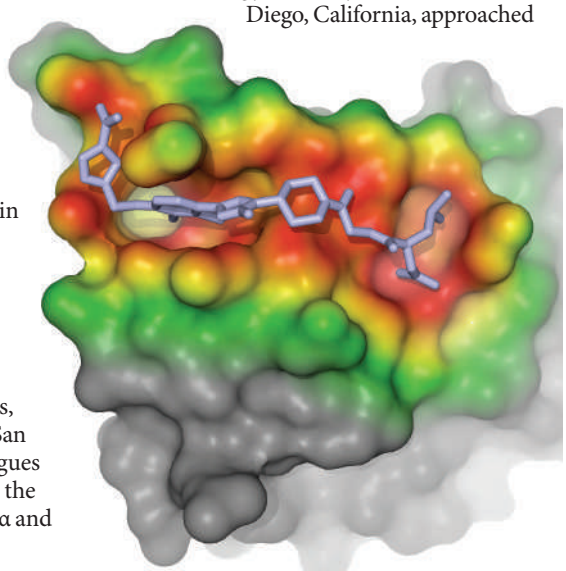
DRUG DISCOVERY

Target practice

Proc. Natl Acad. Sci. USA **103,** 15422–15427 (2006)
An analysis of how one small molecule interrupts a protein–protein interaction may help researchers to design new drugs.

Protein–protein interactions are promising drug targets, but researchers have struggled to find footholds for small molecules in flat protein–protein interfaces. Jim Wells, then at Sunesis Pharmaceuticals in San Francisco, California, and his colleagues studied a small molecule that blocks the interaction of two proteins — IL-2Rα and IL-2, involved in conveying immune signals.

This small molecule binds within a crevice of IL-2 (pictured below). They found that it targets many of the same contact points as does IL-2Rα, despite having a different structure. This is possible because IL-2 is very flexible. The finding shows that small molecules do not need to structurally mimic the proteins they displace.



STEM CELLS

Grown naturally

Nature Biotechnol. doi:10.1038/nbt1259 (2006)
Researchers have edged a step closer to making cells that might cure diabetes.

Diabetes occurs when 'beta' cells in the human pancreas fail to make enough of the hormone insulin. Making functional beta cells from human embryonic stem cells might cure this deficit, but it has proved difficult.

A team led by Emmanuel Baetge at the biotechnology company Novocell in San Diego, California, approached the problem by trying to coax human embryonic stem cells through the stages of normal fetal pancreatic development. The stem cells did develop into cells that produce high levels of insulin, but not in response to the body's normal chemical triggers.

CELL BIOLOGY

A chaperone for arsenic

Proc. Natl Acad. Sci. USA **103,** 15617–15622 (2006)
Arsenic is flushed through biological systems with the help of a protein that clings to the toxic metal and guides it to a cellular-scale pump, a new study finds.

Researchers are driven to understand arsenic toxicity because the metal contaminates water supplies in areas such as Bangladesh and West Bengal. In this study, Barry Rosen of Wayne State University in Detroit, Michigan, Adrian Walmsley of Durham University, UK, and their team identify a protein, ArsD, in bacterial cells that picks up arsenite ions from the cell's cytoplasm. ArsD then liaises with an enzyme to activate the cell's efflux pump. The protein is therefore acting as a metallochaperone — the first to be described for arsenic.

DELANO SCIENTIFIC LLC

GEOLOGY

Deep impact

Earth Planet. Sci. Lett. doi:10.1016/j.epsl.2006.09.009 (2006)
A painstaking survey of rocks from around the globe has provided new information about the nature of a meteorite impact 65 million years ago, which may have triggered the mass extinction that wiped out the dinosaurs.

The impact would have been most devastating if the meteorite hit at a shallow