

RESEARCH HIGHLIGHTS

BIOTECHNOLOGY

Genetic dexterity

Nature Biotechnol. doi:10.1038/nbt1409; doi:10.1038/nbt1398 (2008)

Two groups have developed a method to pick and choose the genes they disrupt in zebrafish using chimaeric enzymes called zinc-finger nucleases.

These enzymes cause double-stranded breaks in DNA when two of them join — and because they contain several zinc fingers that are each specific to a different triplet of DNA bases, enzymes can be engineered to target unique sequences in a genome.

Sharon Amacher at the University of California, Berkeley, and her colleagues used nucleases with four zinc fingers and observed no DNA breaks other than those they intended. The other team, led by Scot Wolfe and Nathan Lawson at the University of Massachusetts Medical School in Worcester, used three-finger nucleases and found off-target cleavage in 1–5% of zebrafish.

PLANT SCIENCE

Mossy management

Science 320, 1181 (2008)

Careful measurement of the fixed nitrogen in water that drips through the foliage of boreal forests (pictured below) at a dozen sites in northern Sweden has helped researchers pin down how that biome manages its nitrogen budget.

Shortly after forest fires, canopy dripwater delivers sufficient nitrogen to provide for cyanobacteria on the forest floor. The cyanobacteria thus reduce the rate at which they fix nitrogen from the air, Thomas DeLuca of the Wilderness Society in Bozeman, Montana, and his colleagues have found.

Because the 12 sites had undergone varying periods of post-fire recovery, the authors were able to show that cyanobacteria increase their nitrogen fixation rates as the feather mosses they live on grow back, and as the nitrogen

Blow by blow

Nature Geosci. doi:10.1038/ngeo208 (2008)

Wind measurements have verified that the tropical upper troposphere is warming, and doing so most strongly just below where it meets the stratosphere.

The absence of this warming on decadal timescales as recorded by thermometers on weather balloons and by satellites has been a mystery to climate modellers and seized upon by global-warming sceptics. Robert Allen and Steven Sherwood of Yale University in New Haven, Connecticut, calculated horizontal gradients in temperature from vertical wind gradients since 1970. The temperature record is more muddled by non-climatic artefacts than that of wind because the



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temperature-measuring instruments used are difficult to calibrate and have varied in quality over the years. The

pattern the authors found agrees with expectations derived from current climate models.

content of rainwater dips. This feedback mechanism may provide some buffer to nitrogen pollution from human sources.

EVOLUTION

Genetic bric-a-brac

Science 320, 1210–1213 (2008)

Many single-celled organisms collect genes from other organisms — a process known as horizontal gene transfer — but multicellular organisms tend not to. Now tiny invertebrates called bdelloid rotifers have been found to take on genetic material from a range of other species, including bacteria, fungi and plants.

Multicellular creatures rarely do this because their germ line is sequestered in the gonads, explain Eugene Gladyshev, Matthew Meselson and Irina Arkhipova at Harvard University in Massachusetts. Bdelloid rotifers are different. They often experience desiccation, potentially opening up their cell membranes to chunks of outsider DNA. This unusual way of injecting diversity into their genomes may help to explain why these rotifers have gone 40 million years without sex.

ASTRONOMY

Meal deal

Astronom. J. 135, 2287–2290 (2008)

Astronomers should, in principle, be able to spot a planet being gobbled up by its star, according to the calculations of Alessandro Massarotti of Stonehill College in Easton, Massachusetts.

In the later phase of life, most stars swell to a size large enough to swallow an orbiting planet. In some cases, the meal should be detectable as a change in the star's rotation, but astronomers have had no idea how often the circumstances necessary for observing this will arise.

Massarotti used a public database of extrasolar planets to calculate that watching planet gobbling should be possible in about 1% of cases. He believes that this result backs up three possible detections made by him and others during a survey published in 2007.

CHEMICAL BIOLOGY

Reducing power

Nature Chem. Biol. doi:10.1038/nchembio.92 (2008)

Mammals can reduce nitrate ions (NO_3^-) to nitrite ions (NO_2^-), a trick that only bacteria were thought able to perform.

