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BIOTECHNOLOGY

Looks good on paper

Angew. Chem. Int. Edn doi:10.1002/anie.200603817 (2007)

Paper printed with polymer channels could form a cheap and portable testing lab for biological samples, say scientists led by George Whitesides at Harvard University in Cambridge, Massachusetts.

To make the simple bioassay device, the researchers first soaked chromatography paper in a solution that forms a water-repellent polymer when exposed to ultraviolet light. They then used a mask to expose only certain regions to the ultraviolet light, defining channels and test areas. In the demonstration device (pictured right), the test areas were primed with colour-changing reagents to detect glucose (left) and protein (right). Liquid is drawn through the channels by capillary action when the edge of the paper is dipped into the sample.

NANOTECHNOLOGY

Reinventing the wheel

Nature Nanotech. doi:10.1038/nnano.2006.210 (2007)

Efforts to build machinery on the nanoscale are rolling forward, with new work reporting a molecular wheel.

Leonhard Grill of the Free University of Berlin, Germany, and his colleagues show that triptycene groups, which resemble three-bladed paddlewheels, can act as wheels only 8 angstroms wide. They fixed one triptycene to each end of a rigid axle, then pushed this primitive molecular vehicle over a copper surface using the tip of a scanning tunnelling microscope.

Evidence that the wheels could 'roll' came from looking closely at how the vehicle

moved. When one of its three-armed wheels rotated by 120°, the molecule jumped and its axle reoriented. Nanowheel rotation has been claimed before, but never shown directly.

GENETICS

Hand-me-down cells

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.0606169104 (2007)

The idea that a mother would give anything to protect her child has been extended by new research.

J. Lee Nelson of the Fred Hutchinson Cancer Research Center in Seattle, Washington, and her colleagues found that children with type 1 diabetes have higher levels of their mother's DNA in their blood than do their unaffected siblings, implying that they inherit more maternal cells. They also found small populations of female insulin-producing cells in male pancreases.

Putting the two observations together suggests that a mother's insulin-producing cells, transferred to the fetus in the womb, could contribute to the regeneration of her child's damaged pancreatic cells.

GEOLOGY

Fast movers

Geology **35,** 29–32 (2007)

Plate tectonics was more changeable in the past than once believed, a new study suggests.

Earlier work indicated that the rate of new crust being born at seafloor spreading ridges has stayed relatively constant over the past 100 million years or so. To check this, Clinton Conrad of the Johns Hopkins University in Baltimore, Maryland, and Carolina Lithgow-Bertelloni of the University of Michigan in Ann Arbor analysed afresh the ages of sea floors in different ocean basins.

They find that, globally, rates of seafloor spreading increased by about 20% between 60 million and 30 million years ago. Since then, because a fast-spreading system in the Pacific has been recycled into Earth's depths, the average spreading rate has dropped by 12%.

CELL BIOLOGY

A protective pair?

Neuron **53,** 233–247 (2007)

A molecular link between two signalling pathways in the central nervous system has been uncovered by Stephen Moss of the University of Pennsylvania in Philadelphia and his co-workers.

The team shows that an enzyme known as AMPK, implicated in appetite signalling, interacts with the neuronal receptor $GABA_B$. AMPK seems to add a phosphate group to the receptor, modifying its activity.

The finding may help to pin down AMPK's role in the brain's response to injury. The enzyme is activated in stressed tissue, but there is conflicting evidence about whether it prevents or exacerbates neuronal damage. Moss's group suggests that $GABA_B$ mediates a neuroprotective effect.

JOURNAL CLUB

Daniel Pauly
University of British Columbia, Vancouver, Canada

A marine biologist dives into the history of the Gulf of California.

A decade ago, I coined the term 'shifting baselines' to describe how society perceives environmental change. The concept has caught on: there's even a website, at www.shiftingbaselines.com, featuring short, explanatory films.

The films push the idea that the standards by which society assesses change are themselves changing. We tend to use the state of affairs that prevailed when we first became aware of an issue as our reference point for evaluating future change — a baseline that shifts with each generation.

A set of three brilliant papers illustrates how this can shape our understanding of ecosystems.

The most recent paper (A. Sáenz-Arroyo *et al. Fish Fish.* **7,** 128–146; 2006) reconstructs from historical sources, such as pirates' logs, details of the Gulf of California's ecosystem stretching back to the sixteenth century. The researchers argue that the past abundance of creatures such as marine mammals, turtles and oysters recounted in these sources should be considered when setting conservation targets today.

Their previous work examined records of Gulf groupers, fish that once dominated the area's reefs (A. Sáenz-Arroyo *et al. Fish Fish.* **6,** 121–133; 2005), concluding that fishery statistics didn't go back far enough to accurately map the species' decline.

Further, they quizzed three generations of artisanal fishers (A. Sáenz-Arroyo *et al. Proc. R. Soc. Lond. B* **272,** 1957-1962; 2005), and found that fishers' knowledge of the location or habits of species disappeared within one generation, if the species became rare.

We are all affected by this kind of collective amnesia. It allows us to handle change. But it is also the reason why we accept losses that would be intolerable, were we aware of them.