naturally incorporates a green pigment, biliverdin, that is abundant in animal tissues. Tsien's team modified the phytochrome so that it rigidifies biliverdin, which then absorbs far-red light and emits infrared light.

The researchers showed that the modified phytochrome can be used to image an animal's inner tissues, such as the liver, and say that it could be useful in fields such as cancer and stem-cell research.

MATERIALS

Everlasting memory

Nano Lett. doi: 10.1021/nl803800c (2009)

The data packed as magnetic regions on hard disks will fade in just a few decades, as atoms vibrate and reorient themselves.

But an iron nanoparticle sheathed inside a carbon nanotube could form a protected data element, whose position would remain stable at room temperature for more than a billion years, report Alex Zettl of the University of California, Berkeley, and his team.

By applying an electric pulse, the researchers controllably shift the nanoparticle back and forth. Its position — corresponding to a '0' or a '1' — can be easily read by measuring electrical resistance across the nanotube.

A device made of bundles of individually positionable nanotubes could form an ultra-high-density data store, readable for any practical time scale, the researchers think.

POLYMER CHEMISTRY

Doughnut machine

Angew. Chem. Int. Edn doi:10.1002/anie.200900533 (2009)

In solution, block copolymers — different types of synthetic polymer linked together — spontaneously cluster into a dazzling variety of shapes, including spheres, cylinders, discs and helices. Lately, even ring doughnuts (toroids) have been observed — but never alone, and always of varying size.

Taihyun Chang and his colleagues at Pohang University of Science and Technology in Korea have now hit on a recipe of copolymer and solvent that for the first time produces pure, almost uniform toroids — all about 70 nanometres in diameter and with a ring about 30 nanometres thick in cross-section. They are stable in solution for several months.

It is not clear how these doughnuts form; potential applications include use as templates for nanometre-scale patterning. For example, the researchers use them as a template to grow rings of gold nanoparticles around the doughnuts' edges.

MICROBIOLOGY

On the surface

PLoS Pathog. **5,** e1000407 (2009)

The bacterium associated with stomach ulcers creates a habitable environment by clinging to human cells and interfering with their polarity.

Helicobacter pylori avoids the stomach's lethal acidity by colonizing a thin layer of mucus that coats stomach epithelial cells. These cells are polarized — that is, the outside surface facing the stomach and the inside surface, which backs onto the underlying tissue, have different properties.

Manuel Amieva and his colleagues at Stanford University in California found that the bacterium can thrive when attached to these cells in culture, even when the culture medium lacks nutrients normally required for survival. However, *H. pylori* mutants that lacked a protein called CagA were not able to colonize the outside surface of these cells. CagA is known to alter the polarity of epithelial cells, presumably making the outside surface of the cells more like the inside surface, and thus making them colonizable.

M. VENCES

CONSERVATION

Amphibian additions

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.0810821106 (2009)

Madagascar is a biodiversity hotspot but, according to David Vieites of the Spanish National Research Council (CSIC) in Madrid and his colleagues, it may be even hotter than we think.

They sequenced the DNA of 2,850 amphibian specimens collected from more than 170 locations on the island. Analysis of these sequences suggests that at least another 129 amphibians remain to be described on Madagascar, including the frog pictured above.

At a maximum, the authors say, there may be 221 species missing from current records. This would represent an increase of almost 100% on the 244 described so far and an increase of 250% since 1991.

JOURNAL CLUB

Lee Turnpenny
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A stem-cell researcher considers an accusation of dullness.

How might hard-working scientists react to an accusation that 'modern scientists' are 'dull', as is provocatively postulated in a March editorial of the non-peer-reviewed journal *Medical Hypotheses* (B. Charlton *Med. Hypotheses* **72,** 237–243; 2009). With offence? Humour? Ambivalence? Or, perhaps, in response to a jeremiad bemoaning our apparent insufficient intelligence and creativity, we might retort, "So what? Tell us something we don't know."

Because, it seems to me, most working scientists have either long since accepted that they are not of the 'revolutionary' type exemplified by greats such as Isaac Newton, Charles Darwin and Albert Einstein, or never strived to be. Gaining and retaining employment in academia is hard enough. Yes, we are of the persevering and conscientious 'normal' type — if we weren't, nothing would get done.

We know there is too much bureaucracy. And yes, there is a lot of repetitive, boring, tiresome, problematic work to be done that is unlikely to shift any paradigms (yet), but important nonetheless. Whether or not somehow creating more windows of opportunity for would-be geniuses possessed of the requisite levels of selfishness and creativity would lead to significant changes in direction is debatable. But the drudge is always necessary in a multidisciplinary collaborative enterprise.

It's not that scientists are dull per se. Rather, instead of being the 'clever crazy' type that might belong in an institution, we labour in an institutionalized occupation that demands we play by certain rules. We know we're not going to change the world, but we like to think we can contribute to the sum of knowledge. Providing we can first convince our peers. If it was easy, everybody would do it. One might add, complaining that modern science can be dull, although valid, isn't exactly a 'revolutionary' idea. Tell us something original, eh?

Discuss this paper at **http://blogs.nature.com/nature/journalclub**