

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## ECOLOGY

### Hotter climate, altered breeding

As Earth warms, amphibians are shifting their breeding times at unprecedented rates.

Four out of ten amphibian species studied at a South Carolina wetland either delayed or advanced their breeding — depending on their breeding season — by 15.3–76.4 days over a 30-year period. For two of the species, *Ambystoma opacum* and *Eurycea quadridigitata*, this coincided with a 1.2 °C increase in overnight air temperature during their pre-breeding and breeding periods.

Brian Todd at the University of California, Davis, and his team say that the altered breeding times, which range from 5.9 to 37.2 days per decade, are among the greatest rates of change seen in ecological life-cycle events. The changes could affect the dynamics of the larger amphibian larval community, including resource availability and predation rates.

*Proc. R. Soc. B* doi:10.1098/rspb.2010.1768 (2010)

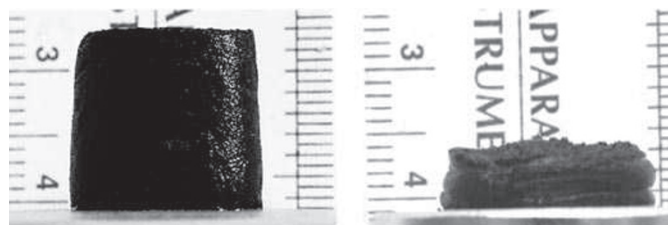
## MATERIALS SCIENCE

### Magnetic gel delivers drugs

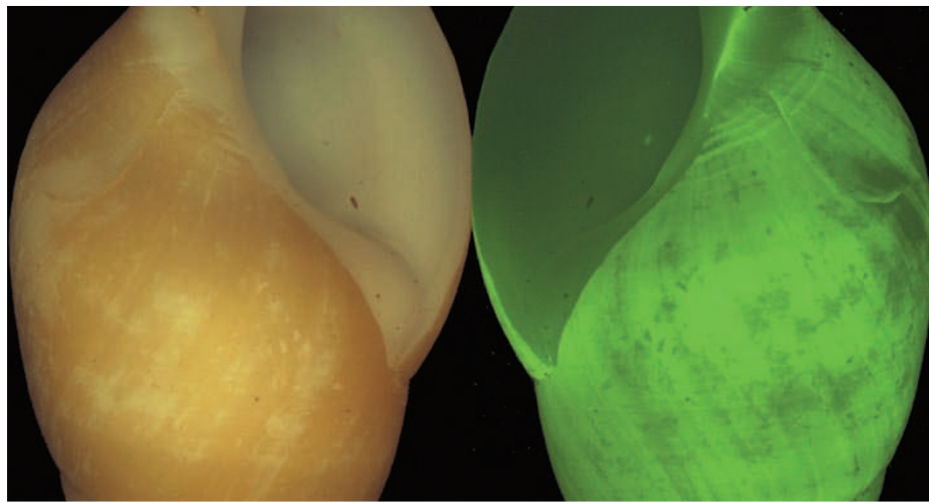
Drugs and cells can be delivered on demand by a porous material engineered to compress in response to an applied magnetic field.

David Mooney at Harvard University in Cambridge,

Massachusetts, and his team prepared an alginate-based gel with micrometre-sized pores, and paramagnetic iron nanoparticles embedded throughout. On exposure to a magnetic field, the nanoparticles put the squeeze on the ferrogel. The authors used this to release a drug payload in *in vitro* experiments and, by implanting the gel into



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## ZOOLOGY

### Snail shells spread light around

A marine snail has a shell that is remarkably well adapted for diffusing the light that it emits to ward off predators.

Stimulating *Hinea brasiliana* snails (pictured left), by tapping them or placing them in contact with potential predators, causes them to emit a blue-green light from defined areas of their body, report Dimitri Deheyn and Nerida Wilson of the Scripps Institution of Oceanography in San Diego, California. The shell directly transmits

most wavelengths of light, with the exception of blue-green ones. These are instead spread by the shell from the limited production regions of the snail's body over a much larger area (right).

The shell produced brighter and larger areas of diffused light than a commercial diffuser. Such shells allow snails to produce visible and extensive bioluminescent signals from their protected position inside the shell.

*Proc. R. Soc. B* doi:10.1098/rspb.2010.2203 (2010)

mice, for localized release of dye-stained stem cells.

With a reversible volume reduction of more than 70% (pictured), such ferrogels may also find applications as actuators and sensors in biomedical applications. *Proc. Natl Acad. Sci. USA* doi:10.1073/pnas.1007862108 (2010)

## ANTHROPOLOGY

### DNA from across the ocean

A handful of Icelanders may be descendents of a Native American woman ferried to the island hundreds of years

before Christopher Columbus reached the New World.

In a tiny proportion of the country's residents, DNA sequences from cell organelles called mitochondria (mtDNA) resemble those of some Native Americans. Unlike nuclear DNA, mtDNA is inherited only from the mother.

Sigríður Sunna Ebenesersdóttir at deCODE Genetics in Reykjavík and her colleagues traced the sequence variants back to four Icelanders born in the early 1700s. However, genetic differences between them suggest that the mtDNA derived from a woman who arrived in Iceland much earlier — possibly around