RESEARCH HIGHLIGHTS

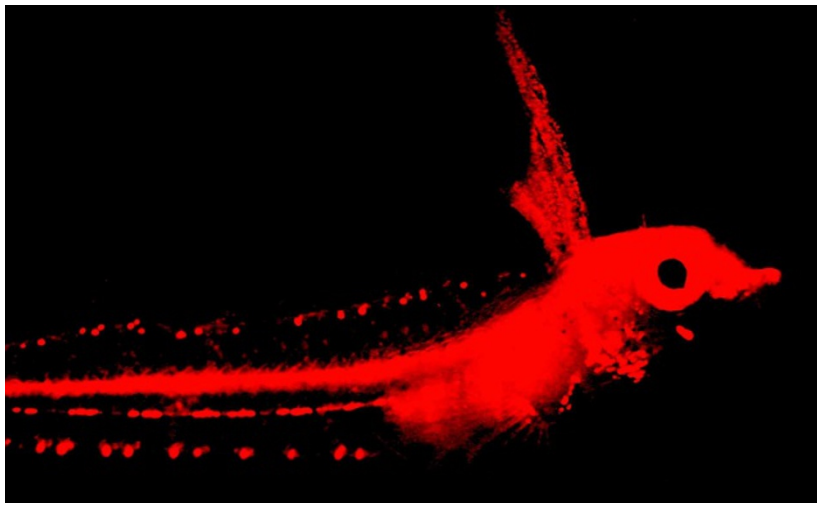
Seeing red

BMC Ecol. **8,** 16 (2008)

Water preferentially absorbs red light, so at sea it's not possible to make out red objects below a depth of around 10 metres. It was therefore thought that red was irrelevant in signalling between coral-reef fishes.

Not so. Scuba diving with filters on their masks to make red easier to pick out, Nico Michiels of the University of Tübingen in Germany and his colleagues have found at least 32 species of reef fishes that look red at depth.

These fish have crystals or pigments in their skin that fluoresce red under the incoming, mainly blue-green, light (as in the goby *Eviota destai*, pictured). The researchers say that the red markings, which are often mixed with other colours so that they appear pink, lilac or reddish brown, are most probably used for communication within each species. They add weight to this idea by showing that at least one fish, the goby *E. pellucida*, can see red.



N. K. MICHIELS *ET AL.*

CELL BIOLOGY

Home-grown fat control

Cell **134,** 933–944 (2008)

A little fat might be good for you — if it's the fatty acid palmitoleate, now discovered to be a fat-cell-derived hormone that regulates metabolism throughout the body.

Gökhan Hotamisligil at Harvard School of Public Health in Boston, Massachusetts, and his colleagues studied knockout mice lacking two proteins that normally chaperone lipids out of the bloodstream into adipose tissue. These mice are more resistant than normal mice to the bad effects of a high-fat diet. The team found increased synthesis of palmitoleate and other unsaturated fatty acids in fat cells in these mice and a consequent rise in palmitoleate levels in the blood.

They showed that palmitoleate regulates the lipid-generating program of gene expression in the liver of the mice and also stimulates muscle cells to take up glucose — and that mice infused with palmitoleate use glucose more efficiently than untreated mice.

MATERIALS SCIENCE

A rarefied insulator

Adv. Mater. **20,** 1–5 (2008)

A new material based on rare-earth elements such as cerium might overcome a barrier to making smaller silicon chips. Silicon dioxide is the traditional chip insulator, but is too bulky for smaller chips. Alternative compounds with suitably high dielectric constants are too rigid, and have proved not to insulate fully.

Now Dmitry Kukuruznyak at the Max Planck Institute for Metals Research in Stuttgart, Germany, and his colleagues have constructed another potential insulator: the rare-earth aluminium–silicon apatite $RE_6(AlO_3)_5(SiO_{3.5})$. Rather than forming rigid crystals, this compound self-organizes into flexible films on silicon at temperatures below 1,030 °C.

NONLINEAR DYNAMICS

Loading the dice

Phys. Rev. E **78,** 036207 (2008)

Gamblers — and Einstein — have assumed that throwing a die gives a random result.

But does it? Jan Nagler of the Max Planck Institute for Dynamics and Self-Organization in Göttingen and Peter Richter of the University of Bremen in Germany have simplified the throw of a die to the two-dimensional case of a dumb-bell tossed onto a surface. Will it fall with one labelled end pointing to the left or to the right?

The researchers calculated the dynamics and find that these are only truly chaotic, leading to complete randomness, for certain initial conditions: for example, if the object is cast from a roughly upright position with enough energy. A skilled thrower, they say, could have a good chance of manipulating these conditions to bias the probable outcome.

ALAMY

ASTRONOMY

When Triton lost its mate

Astron. J. **136,** 1463–1476 (2008)

Astronomers think that Neptune's largest moon, Triton, once travelled around the Sun accompanied by a planetesimal partner. At some time in the formation of the Solar System, Neptune's gravity captured Triton and ejected its mate. A new analysis details when and how this might have happened.

David Vokrouhlický of Charles University in Prague and his colleagues used the 'Nice' model, which describes how the planets attained their final configuration. According to their simulations, Triton's capture could only have occurred within the first 5–10 million years of the Solar System's formation, when a gas would have been present to slow the relative velocities of the three bodies.

That means that Neptune must have formed much earlier than some astronomers have suggested, the authors say.

ECOLOGY

Fire prevention

Nature Geosci. doi:10.1038/ngeo313 (2008)

Forest fires, whether natural or started by humans, declined worldwide during most of the past 2,000 years in parallel with