RESEARCH HIGHLIGHTS 2008

As an end of the year round-up we asked *Nature*'s editors to nominate their favourite papers published elsewhere this year. For a pick of favourites from *Nature* itself, see page xii.

A healthier haul

Science **321,** 1678–1681 (2008)

With the biomass of the world's top marine predators at about a tenth of what it was in the 1950s, fisheries need management that will stop them collapsing. In September, Christopher Costello of the University of California, Santa Barbara, and his colleagues used data from 1950 to 2003 and 11,135 fisheries to conclude that individual tradable quotas (ITQs) could help.

ITQs avoid the misaligned incentives of the 'tragedy of the commons' whereby people plunder resources as quickly as possible. The quotas divide a limited total catch exclusively among fishermen who work a fishery, and allow them to sell the rights to their share. Because the value of these shares increases with the overall productivity of the fishery, each fisherman has an incentive to manage it well. Costello's team found that the proportion of ITQ-managed fisheries that had collapsed by 2003 was half that of the non-ITQ fisheries.

D. WHITESIDE/REUTERS

BIOPHYSICS

Mob rule

Proc. Natl Acad. Sci. USA **105,** 11754–11759 (2008)

The crowding inherent within cells may affect not only protein movement and folding, but also shape, according to Pernilla Wittung-Stafshede at Rice University in Houston, Texas, and her colleagues.

They focused on the VlsE protein, a proposed virulence factor in *Borrelia burgdorferi*, the bacterium that causes Lyme disease. VlsE is usually rugby-ball shaped, but the team found that it adopts different equilibrium shapes *in vitro* in the presence of varying levels of a polymeric 'crowding agent' that mimics cytoplasmic macromolecules. When the native protein is loosened up by a denaturing agent or by heat, two new structures — a 'bean' shape and a roughly spherical conformation — intervene between the rugby ball and the denatured protein as soon as the crowding agent is added.

If crowding can be 'tuned', it might be possible to expose different sites in proteins and alter their behaviour.

J. B. FREE/NATUREPL.COM

NEUROSCIENCE

Glia on fire

Nature Neurosci. **11,** 450–456 (2008)

Glial cells in the brain are generally considered to be electrically inert, simply providing a support system for excitable neurons. But at least one class of glial cell can fire action potentials, scientists showed this year.

Ragnhildur Káradóttir, now at the University of Cambridge, UK, and her colleagues reported that about half of NG2-expressing glia in the rat brain receive input from synapses. The cells also show currents when stimulated by the neurotransmitter glutamate.

The excitable NG2 glia were much more vulnerable to oxygen starvation, which promotes glutamate release, than were non-excitable glia. Such oxygen starvation occurs in stroke, cerebral palsy and spinal-cord injury.

ZOOLOGY

Queen Bee

Science **319,** 1827–1830 (2008)

Fertile queen honeybees (*Apis mellifera*; pictured left, queen shown centre) and sterile workers develop from genetically identical larvae, but the former are fed royal jelly, whereas the latter gobble less sophisticated food. In March, researchers from the Australian National University in Canberra discovered how the jelly might confer royal status.

When Ryszard Maleszka and his colleagues silenced the expression of a DNA methyltransferase enzyme called Dnmt3 in larvae, 72% of them developed into queens, as though they had been fed royal jelly. This enzyme has an important role in packaging DNA across the genome and thus influences gene expression.

NANOTECHNOLOGY

Super speakers

Nano. Lett. **8,** 4539–4545 (2008)

Imagine a loudspeaker that is bendy, transparent and stretches to twice its length without breaking or changing the intensity of the sound it amplifies. This is what Kaili Jiang and Shoushan Fan of Tsinghua University in Beijing, China, and their colleagues have made. By attaching one of their prototype films to the screen of an iPod they have used it to play sound from the device.

The invention exploits the thermoacoustic effect, which was first realized in the nineteenth century with the platinum thermophone. The effect describes what happens when a material is heated and cooled, thus expanding and contracting the air around it, which creates sound waves. The film on the researchers' iPod generates sound 260 times more efficiently than this historical gadget because the sheets of parallel carbon nanotubes that it is made of warm up and transfer heat to air faster.

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