RESEARCH HIGHLIGHTS

REGENERATIVE BIOLOGY

Pregnancy boosts repair

Genes Dev. **24,** 543–548 (2010)

Older mice are better able to regenerate liver tissue if they are pregnant.

Eli Pikarsky and Yehudit Bergman of the Hebrew University Hadassah Medical School in Jerusalem and their colleagues removed two-thirds of the livers of pregnant and non-pregnant mice of two different ages. Two days after the surgery, three-month-old non-pregnant mice had livers that were 82% of their original size, whereas livers in 12-month-old 'aged' mice were only about half (46%) their original size. Aged mice that were pregnant, however, had regenerated almost all (96%) of their liver tissue.

Heightened liver regeneration during pregnancy seemed to be due to increased cell growth rather than faster cell proliferation. Treating 18–24-month-old mice with a drug that activates a cell-growth signalling pathway called Akt/mTORC1 improved recovery after liver surgery.

CHEMISTRY

Water splitting

Science doi:10.1126/science.1185372 (2010)

Developers of renewable hydrogen fuel are keen to get their hands on fast, stable catalysts that, together with sunlight, split water molecules into oxygen and hydrogen. Coming up with a catalyst that oxidizes water to generate oxygen has proved the toughest part.

Craig Hill and his colleagues at Emory University in Atlanta, Georgia, have devised an inorganic, soluble catalyst that drives this step at higher rates than other, similar catalysts. They show that the catalyst is stable under reaction conditions and self-assembles in water using abundant metals such as cobalt. The complex resists degradation better than other catalysts of its kind because it doesn't contain organic residues that are easily oxidized.

The researchers say the next step is to test their catalyst's performance when used with light-capturing electrodes or nanostructures.

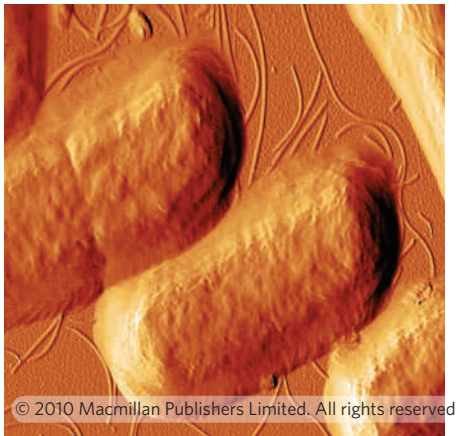
IMAGING

A view to a kill

Nature Nanotechnol. doi:10.1038/nnano.2010.29 (2010)

Researchers have captured real-time images of individual bacterial cells being killed by an antimicrobial molecule. Angela Belcher and her colleagues at the Massachusetts Institute of Technology in Cambridge used a vibrating cantilever 1,000 times lighter than the conventional sort used in atomic force microscopy. The cantilever's tip could rapidly 'feel' across the surfaces of *Escherichia coli* cells without damaging them.

The team took an image every 13 seconds over periods of minutes as an antimicrobial peptide punched tiny holes in the cells' membranes, making their surfaces appear corrugated (pictured below). Different cells succumbed at different times, with the peptide apparently incubating for seconds to minutes before inflicting damage.



A jewel's true colours

Am. Nat. doi:10.1086/651593 (2010)

The light reflected off the back of the jewel scarab beetle *Chrysina gloriosa* is unusual in being circularly polarized. Although the creatures blend into their juniper forest habitat under normal light (pictured top), they stand out clearly under circularly polarizing filters (pictured bottom). This raises the possibility that they can detect this polarized light and use it to spot one another.

So far, only certain *Odontodactylus* shrimp species are known to detect circular polarization. Parrish Brady and Molly Cummings of the University of Texas at Austin found that, at night, *C. gloriosa* fly more often towards brighter light sources, and also prefer linearly polarized over circularly polarized light. When presented with a dimmer unpolarized light source and a brighter circularly polarized source during night time, the beetles flew more often towards the former.

This suggests that *C. gloriosa* can perceive circular polarization. The authors say that the creatures may use this light during daytime or dusk to see and communicate with each other.

J. C. ABBOTT/ABBOTT NATURE PHOTOGRAPHY

EVOLUTIONARY BIOLOGY

Lend a helping claw

Am. Nat. doi:10.1086/651588 (2010)

In a few territorial species, individuals will sometimes help a neighbour to defend its land against an intruder, but why they take on this risk of injury or death has been unclear.

Michael Jennions and his colleagues at the Australian National University in Canberra observed and analysed fights between 29 trios of males — two neighbours and an intruder — of African fiddler crab (*Uca annulipes*). They concluded that a male leaves his own territory to help his neighbour because it is easier to fight alongside a familiar neighbour early on than to risk having an invader become a new and more threatening neighbour.

The team also showed experimentally that males size up the two combatants when deciding whether to help. A crab was much more likely to join in the fight if he was bigger than the intruder and if the intruder was bigger than the neighbour.