RESEARCH HIGHLIGHTS

MATERIALS SCIENCE

Skin-like sensors

Nature Mater. doi:10.1038/nmat2834; 10.1038/nmat2835 (2010)

Artificial skins have been developed that can detect the gentlest of touches of just a few kilopascals or less in pressure, the same as that felt by our fingers when typing, or picking up a pen.

Zhenan Bao at Stanford University, California, and her colleagues built a pressure sensor using the elastic polymer polydimethylsiloxane (PDMS). They engineered the material such that its capacitance — the ability to hold an electric charge — changed when pressure was applied to it. The researchers then attached this capacitor to a grid of organic transistors so that it could track pressure changes at specific positions. Their device could sense the presence of a fly and a butterfly (pictured).

Ali Javey at the University of California, Berkeley, and his team used a different approach. They laid out parallel arrays of semiconducting nanowires on a flexible pressure-sensitive rubber. Both 'skins' could eventually be used in prosthetics or touch-sensitive robotic devices.

For a longer story on this research, see go.nature.com/dmwi76

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MICROBIOLOGY

Bacteria for breakfast

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.1000079107 (2010)

Supermarket dairy shelves are filled with yogurt products containing live cultures of 'probiotic' bacteria — species that live in the human gut and are proposed to deliver health benefits when eaten at high levels. Three probiotic species seem to alter gene expression in the gut lining of volunteers consuming the cultures. The effect was similar to that of drugs for conditions including inflammation and high blood pressure.

Michiel Kleerebezem at NIZO Food Research in Ede, the Netherlands, and his co-workers analysed the gene-expression profiles of tissue taken from the small intestinal inner lining of seven healthy volunteers who had eaten a placebo and three probiotic cultures — *Lactobacillus acidophilus*, *L. casei* and *L. rhamnosus* — in a random order. The altered gene-expression profiles resembled those associated with the regulation of immune responses, cell growth, metabolism and even wound repair.

CANCER BIOLOGY

Ovarian cancer culprits

N. Engl. J. Med. doi:10.1056/NEJMoa1008433 (2010); *Science* doi:10.1126/science.1196333 (2010)

Genome sequencing has revealed two genes involved in a deadly form of ovarian cancer.

Ovarian clear-cell carcinoma is aggressive and difficult to treat. David Huntsman at the British Columbia Cancer Agency in Vancouver, Canada, and his colleagues sequenced protein-coding genes from 18 ovarian clear-cell tumours and found that six had mutations in a gene called *ARID1A*. The ARID1A protein regulates the coiling of DNA and hence gene expression, and has also been linked to tumour suppression.

Meanwhile, a team led by Kenneth Kinzler, Victor Velculescu and Nickolas Papadopoulos of the Johns Hopkins Kimmel Cancer Center in Baltimore, Maryland, sequenced protein-coding genes in eight tumours and uncovered mutations in *ARID1A* and another gene called *PPP2R1A*. The PPP2R1A protein helps to distribute chromosomes into dividing cells and controls cell growth. A follow-up experiment with 42 tumours showed that 57% had mutations in *ARID1A* and 7% had mutations in *PPP2R1A*.

ZOOLOGY

Fish fly like jets

J. Exp. Biol. **213,** 3269–3279 (2010)

Flying fish are well adapted for gliding through both water and air, staying airborne (pictured) for distances of up to 400 metres. To assess the aerodynamics of these creatures, Hyungmin Park and Haecheon Choi at Seoul National University stuffed five darkedged-wing flying fish (*Cypselurus hiraii*) that they had caught in the Sea of Japan. They placed the fish in a wind tunnel at different angles and with their fins in different positions, and measured the flow of air around them.

T. STACK/PHOTOLIBRARY

The analysis showed that the arrangement of the fins accelerates the flow towards the tail in the same way as the wings of a jet, providing extra lift and allowing the remarkable fish to fly for more than 30 seconds. Measurements of the lift-to-drag ratio revealed that the fish can fly furthest when close to, and parallel to, the surface of the water.

ECOLOGY

Biodiversity balance

Ecol. Lett. doi:10.1111/j.1461-0248.2010.01528.x (2010)

Organic farms can be friendlier to wildlife than conventional farms, but they have lower crop yields. They need more space to grow the same amount of food and so leave less room for wildlife reserves. What is the optimum land-use balance between organic farming, conventional farming and reserves?

Jenny Hodgson of the University of Leeds, UK, and her colleagues measured butterfly population densities in various British landscapes to track the effects of different types of farming on biodiversity. The team calculates that if organic yields are equal to or greater than 87% of conventional yields, it is worth switching to organic. If they are lower, it is better to farm conventionally and convert more land to reserves. But if the converted land exists only at the margins of fields, organic yields have to exceed just 35% of conventional yields to make organic farming a better strategy.

PSYCHOLOGY

Gaming the brain

Curr. Biol. doi:10.1016/j.cub.2010.07.040 (2010)

People who play a lot of action video games are known to perform better in a variety of sensory and perceptual tasks. Daphne