

**BARNYARD BIOTECH (P.72) | HURRICANES: DANGER AHEAD (P.28)**

The McGraw-Hill Companies

# BusinessWeek

JANUARY 16, 2006

[www.businessweek.com](http://www.businessweek.com)

## DREAM MACHINES

The future of cars: Smart tech, sizzling design, more choices

BY LEE WALCZAK AND DAVID WELCH (P.52)



\$4.95US \$6.95CAN 03>



0 74820 18248 2

EDITED BY  
ADAM ASTON

## INNOVATIONS

### Of bendable batteries and inkjet bones

» Japan's NEC has come up with a superthin, flexible, rechargeable battery that stores its juice in an electrochemically charged gel, and that could one day power e-newspapers or smart I.D. cards. Bendable batteries made of this material could hold as much power as like-sized lithium-ion batteries. The battery can be just

1/100th of an inch thick—about as wide as three human hairs, side by side. NEC says its thin battery can recharge in just 30 seconds. What's more, the gel is free of harmful heavy

metals commonly used in today's batteries. Don't expect it soon, though: NEC hasn't said when it will hit the market.

» Inkjet printers may be the optimum tool for building artificial bones. Researchers at Japan's New Energy & Industrial Technology Development Organization and two other institutions recently used such a system to fashion bone-like plates from ultrathin layers of a bioceramic substance. Impregnated with living cells and implanted in dogs that had suffered skull injuries, the plates served as scaffolds to support regenerated bone tissue. In producing such scaffolds, the inkjet technique proved much faster than other approaches. Researchers hope to begin human clinical trials in 2006.

—Kenji Hall



## DIABETES

### BLOOD SUGAR READINGS IN A PAINLESS BLINK OF THE EYE

**ONE OF THE BURDENS** diabetes patients face is the constant need to monitor their blood sugar by pricking their fingers. Oculir, a San Diego startup, is planning a pain-free alternative. The company is developing a monitor that reads blood sugar levels by inspecting the tiny blood vessels of the eye—without ever touching the eyeball.

The monitor works by bouncing a harmless beam of infrared light off the white of the eye. Although invisible, the spectrum of light in the

probe is just the right wavelength to interact with glucose molecules in blood flowing through tiny vessels in the thin membrane covering the eye. "The light reflected back is proportional to the amount of glucose in the blood," says CEO John Burd.

In December, Oculir raised \$7.3 million in venture capital to fund the studies necessary for Food & Drug Administration approval. Burd says if all goes well, the device could go on sale in 2009. —Arlene Weintraub

## MATERIALS

### SPRINGING AHEAD IN NANOTECH

**THE CARBON NANOTUBE** is the wunderkind of the nanotech world. Such tubes—in which carbon atoms make up the walls of cylinders just a few billionths of a meter wide—fascinate scientists because of their unrivaled strength, near immunity to radiation, and unique electrical properties.

To these talents, add super-springiness. Researchers have found that when properly aligned, films made up of "multiwalled" nanotubes—basically, tubes within tubes—

act as tireless springs. Able to collapse to less than 15% of their starting length, the tubes rebound to full size undamaged, says Pulickel Ajayan, a materials scientist at Rensselaer Polytechnic Institute and co-leader of the multi-institution research effort. When the tubes are combined, they create an ultralight foam-like material that's also highly durable. The scientists found the material can be squashed up to 10,000 times and it would still rebound fully, with no fractures or loss of strength.

Next, Ajayan's team is looking at how the material might be used. One possibility: cushioning ultra-fine electronics components.

## ENVIRONMENT

### MORE TREES, LESS WARMING—AND WATER

**TREES ARE KEY** weapons in the fight against global warming. The long-lived plants offer a cheap way to capture and lock away tons of carbon dioxide for decades. Thanks to the Kyoto Accord and similar regional efforts, companies in the U.S. and worldwide are already planting countless seedlings—or paying others to do so—to offset their emissions.

For all the benefits they bring, however, big tree plantations can have mixed local effects. A study in the Dec. 23 *Science* concludes that planting trees in open



farm- and grasslands, the sorts of sites most often considered for such projects, can harm local water dynamics. Tree farms retain about 20% more rainwater than do crops or grasses. This can cut the flow of water in streams and lead to the buildup of harmful salts in soil, notes Robert Jackson, the Duke University biologist who co-authored the report. On the plus side, he adds, replacing crops or grasslands with trees can cut pollution from erosion and from fertilizer and pesticide runoff.