RESEARCH HIGHLIGHTS

Selections from the scientific literature

ZOOLOGY

Infected faeces kill coral

Human excrement is the source of a bacterium that causes a devastating disease in Caribbean elkhorn coral.

Kathryn Patterson Sutherland at Rollins College in Winter Park, Florida, and her team exposed healthy *Acropora palmata* coral in the lab to the PDR60 strain of the bacterium *Serratia marcescens*, collected from human wastewater. The coral showed signs of white pox disease, which is characterized by white lesions, in as little as four days.

Poor-quality wastewater disposal in the Caribbean and Florida Keys allows leakage into sea water. The authors say that their work is the first example of reverse zoonosis, whereby disease-causing microbes move from humans to marine invertebrates.

PLoS One 6, **e23468 (2011)**

M. QUINTON/MINDEN PICTURES/FLPA

ECOLOGY

Down and trout in 2080

Many predictions of how climate change might alter species ranges don't look at the full picture, factoring in only temperature. Seth Wenger of Trout Unlimited, a conservation organization in Boise, Idaho, and his team have projected future habitat extent for three non-native and one native species of trout, taking into account flooding and the future co-occurrence of species, as well as temperature. Floods at certain times of year can wash away eggs and fry, and new species moving in can out compete others.

Using downscaled global-climate models and fish surveys from almost 10,000 sites, the team created maps predicting suitable habitat available in the inland western United States in 2080. All four species will see their ranges decline: by 77% for brook trout (*Salvelinus fontinalis*), 48% for brown trout (*Salmo trutta*), 35% for rainbow trout (*Oncorhynchus mykiss*) and 58% for native cutthroat trout (*Oncorhynchus clarkii*; pictured).

Proc. Natl Acad. Sci. USA **http://dx.doi.org/10.1073/pnas.1103097108 (2011)**

NANOSCIENCE

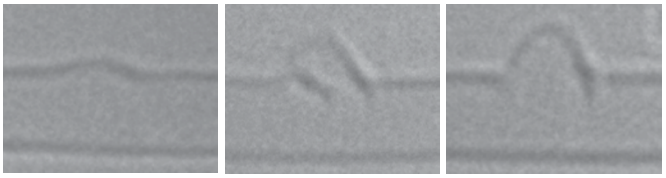
Nanotube chemistry

By pushing the relatively inert interior surface of a carbon nanotube to participate in a chemical reaction, researchers have altered the tube's structure.

Single-walled carbon nanotubes have long been used as vessels for chemical reactions, in which they generally have a passive role. Andrei Khlobystov of the University of Nottingham, UK, and his colleagues used a high-resolution electron microscope to image a nanotube as its inner surface was attacked by a catalytically active rhenium atom that they had placed inside. Their images show that a defect in the structure develops into a nanoprotrusion that then rounds off and becomes symmetrical (**pictured**).

The authors suggest that the formation of nanoprotrusions is a new avenue to explore in establishing the full potential of nanotubes as nanoreactors.

Nature Chem. **http://dx.doi.org/10.1038/nchem.1115 (2011)**



PHYSIOLOGY

Penguins dive without delay

Emperor penguins (*Aptenodytes forsteri*) can make repeated, lengthy dives with only minimal recovery periods, report Paul Ponganis at the University of California, San Diego, and his colleagues.

The authors attached recorders of depth, speed and acceleration to penguins diving at sea and at an experimental dive hole, and found that the birds often spent less than one minute at the surface between dives lasting for up to 10 minutes. These dives continue well beyond the point at which lactate — a metabolite produced when oxygen is in short supply — builds up in the blood. This suggests that dives beyond this 'aerobic dive limit' do not always require extended surface intervals.

The team also reports the longest dive ever recorded for a bird: 27 minutes and 36 seconds, after which the penguin rested for more than 8 hours before diving again.

J. Exp. Biol. 214, **2854–2863 (2011)**

CHEMICAL BIOLOGY

Salmonella succeed in beta

The inclusion of an atypical amino acid in their proteins allows *Salmonella* bacteria to resist certain antibiotics.

Until now, scientists thought