RESEARCH HIGHLIGHTS

Selections from the scientific literature

ENGINEERING

Muscle sensor controls robot arm

A robot arm can mimic the movements of a human one, thanks to a device that measures muscle activity.

Muscle sensors are typically embedded in the tissue, but the flexible device created by Ifor Samuel and his colleagues at the University of St Andrews, UK, is worn on the operator's arm. An organic light-emitting diode in the sensor emits red light, which penetrates skin, bounces off muscle tissue and is detected by light-sensitive polymers in the device.

The sensor, unlike those that measure muscle electrical activity, can distinguish between types of muscle contraction, because light is scattered differently from muscle fibres when a person is lifting or pushing.

The team showed how the sensor could be used to control a robot arm, and hope that the device will one day be able to control prosthetic limbs using residual muscle.

Adv. Mater. **http://doi.org/f2wpnh (2014)**

MARK CONLIN/GETTY

CLIMATE-CHANGE BIOLOGY

Salmon adapt to warmer waters

Pacific chinook salmon stand a good chance of adapting to higher temperatures in a scenario with modest warming, but could be wiped out under projections of maximum warming.

Bryan Neff at the University of Western Ontario in London, Canada, and his colleagues exposed the offspring of wild-caught chinook salmon (*Oncorhynchus tshawytscha*; pictured) to present-day temperatures and to those that are a few degrees higher, and measured the animals' maximum heart rate. They found that the fish adapted their cardiac capacity, and were still able to reach maximum heart rate at temperatures 2 °C warmer than today's. However, under conditions 4.4 °C warmer than the present day, the salmon began to experience heart failure.

The authors predict that by the year 2100, chinook salmon populations will face a 17% chance of catastrophic loss under moderate warming, but a 98% chance of such loss if warming reaches a maximum.

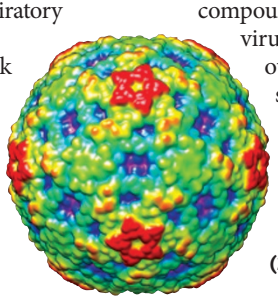
Nature Clim. Change **http://doi.org/xws (2014)**

STRUCTURAL BIOLOGY

Cold drug fits in virus's pocket

An antiviral drug developed for the common cold could be effective against another virus that affected more than 1,000 US children in 2014.

An enterovirus called EV-D68 caused respiratory illness, sometimes severe, in an outbreak last August. Michael Rossmann and his colleagues at Purdue University in West Lafayette, Indiana, determined the crystal structure of the virus (**pictured**) and found that, like other enteroviruses, it has a pocket in one of its proteins.



When the team worked out the structure of EV-D68 in conjunction with pleconaril, a drug that combats the related cold-causing rhinovirus, they found that the drug fitted into this pocket. In cultured cells infected with EV-D68, the compound inhibited the virus better than two other antivirals, suggesting that pleconaril could be a candidate for treating this enterovirus.

Science 347, **71–74 (2015)**

HUMAN EVOLUTION

Light bones linked to less activity

Low-density bones evolved only relatively recently in modern humans as they shifted from foraging to agriculture and became more sedentary, according to two studies.

Habiba Chirchir of the Smithsonian Institution in Washington DC, Brian Richmond of the American Museum of Natural History in New York and their colleagues analysed upper and lower limb bones from modern and early humans, several fossil ancestor species and chimpanzees. They found that bone density, especially in lower limb joints, decreased in humans only in the past 12,000 years or so.

In a separate study, Timothy Ryan at Pennsylvania State University in University Park and Colin Shaw at the University of Cambridge, UK, examined bone structure in the hip joint in primates and in four human populations from several hundred to several thousand years ago. They discovered that bones from forager populations were much thicker and denser than those from agricultural groups, and were similar to those of wild non-human primates. The results support the idea that physical activity is important for bone strength.

YUE LIU & MICHAEL G. ROSSMANN, PURDUE UNIV.