RESEARCH HIGHLIGHTS

Selections from the scientific literature

PHYSICS

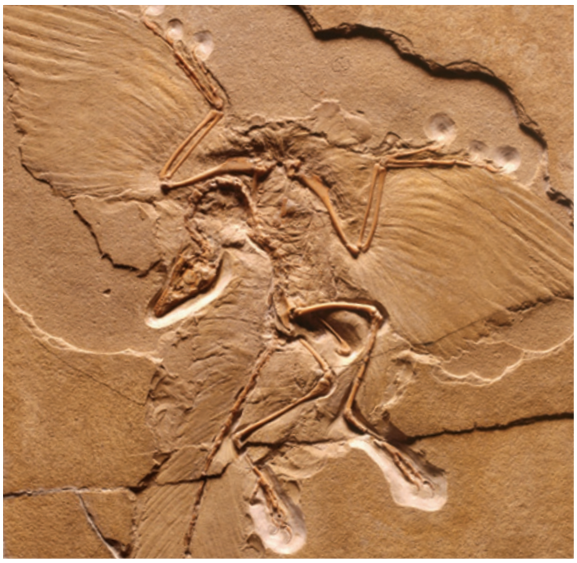
Satellites spot nuclear tests

Global navigation satellites already have many uses, and scientists may soon be adding nuclear-explosion detection to the list.

When nuclear weapons are exploded underground, they create a disturbance in the ionosphere, the thin layer of charged particles at the atmosphere's edge. The disruption, in turn, distorts signals from navigation satellites to ground stations. Jihye Park at Ohio State University in Columbus and her colleagues were able to locate a 2009 nuclear test in North Korea by analysing historical data from ground stations in South Korea, Japan and China. The technique pinpointed the test to within roughly 3.5 kilometres of the test location determined by seismographs.

The scientists say that navigation satellites could one day be incorporated into a global network that monitors illicit nuclear testing.

Geophys. Res. Lett. **http://dx.doi.org/10.1029/2011GL049430 (2011)**



L. PSIHOYOS/CORBIS

PALAEONTOLOGY

To be or not to be a bird

The winged creature *Archaeopteryx*, which lived about 150 million years ago, may be back on its perch as the first known bird. This long-held designation was challenged by a study that examined the morphology of and relationships between dozens of bird and dinosaur fossils (*Nature* **475,** 465–470; 2011). It concluded that *Archaeopteryx* (fossil pictured) was more closely related to dinosaurs such as *Velociraptor* than to early birds.

Michael Lee at the South Australian Museum in Adelaide and Trevor Worthy at the University of New South Wales in Sydney, Australia, have reanalysed these data with methods that are often used to draw evolutionary relationships from genetic information. Their work groups *Archaeopteryx* closest to birds, making it distinct from feathered and other related dinosaurs. However, because transitional forms between birds and dinosaurs differ very subtly, future fossil discoveries could reshuffle *Archaeopteryx*'s relationship with birds and dinosaurs yet again, the authors say.

Biol. Lett. **http://dx.doi.org/10.1098/rsbl.2011.0884 (2011)**

REGENERATION

Breathing easier with stem cells

Specialized stem cells in the lungs of mice can take the first steps towards regenerating damaged air sacs, or alveoli, after influenza infection.

Alveoli, where gas exchange occurs, are particularly vulnerable to damage during infections. Frank McKeon and Wa Xian at the Agency for Science, Technology and Research in Singapore and their colleagues infected mice with the H1N1 flu virus. They found that stem cells expressing a protein called p63 divide rapidly in the bronchioles — airway branches that lead to the alveoli — of the animals' lungs. The cells then move into areas of injured alveolar tissue, where they cluster together and express alveolar markers.

The p63 protein has previously been linked to the regeneration of other lung tissues. The researchers found similar p63-expressing stem cells in human lungs. In culture, these cells form alveoli-like structures, suggesting that they have a similar regenerative potential to those of mice, the authors say.

Cell 147, **525–538 (2011)**

VIROLOGY

First European Ebola-like virus

A virus belonging to the same family as the deadly Ebola and Marburg viruses has been found in Europe. This is the first time that a member of the filovirus family has been found to occur naturally outside Africa or the Philippines.

Gustavo Palacios, now at the Army Medical Research Institute of Infectious Diseases in Frederick, Maryland, and his team examined bat corpses in two caves in Spain where large die-offs had occurred. They noticed signs of viral infection and discovered filovirus RNA sequences in extracts from the liver, lungs and other organs.

It is unclear whether this virus, which the researchers named the Lloviu virus, killed the bats. In Africa, bats carry filoviruses but do not exhibit symptoms. However, the authors did not find the Lloviu virus in healthy bats in the caves or surrounding region.

PLoS Pathog. 7, **e1002304 (2011)**

SYNTHETIC CHEMISTRY

Fast track to blood thinner

Heparins are natural molecules that are used as blood thinners and are typically obtained from pig intestines or cow lungs. Synthetic preparation could avoid problems with contamination, which in 2008 killed more than 80 people in the United States.

Researchers led by Jian Liu at the University of North Carolina at Chapel Hill and Robert Linhardt at the Rensselaer Polytechnic Institute in Troy, New York, used a series of enzymes to synthesize a version of the drug in either 10 or 12 reaction steps. This is far fewer than a