RESEARCH HIGHLIGHTS

Selections from the scientific literature

VIROLOGY

Viruses switch hosts to evolve

Viruses more often evolve by jumping from one host species to another than by remaining within a particular species.

Edward Holmes and his colleagues at the University of Sydney in Australia compared the evolutionary histories of 19 virus families with those of their animal or plant hosts. They found that, in almost all cases, the trees of life for the viruses had very different branching patterns compared with the trees for the viruses' current hosts. This suggests that viruses jump between host species more often than expected. The authors report that RNA viruses — particularly the Rhabdoviridae (which includes the rabies virus) and Picornaviridae — switch host species more frequently than other viruses, whereas double-stranded DNA viruses do so the least.

These findings highlight the remarkable ability of viruses to adapt to new hosts.

PLoS Pathog. 13, **e1006215 (2017)**

GETTY

MATERIALS

Graphene layers give colourful warning

A material made of overlapping layers of graphene (atom-thick sheets of carbon) changes colour according to the level of stress applied. This could be used in structures to provide early warning of damage.

A team led by Shanglin Gao of the Leibniz Institute of Polymer Research in Dresden, Germany, designed the coating so that it changes colour more dramatically with increasing amounts of deformation. The material was placed on a glass-fibre surface and mimics fish scales (pictured) and butterfly wings, which reflect different colours depending on the viewing angle, because of interference between light waves bouncing off the surface.

The authors say that the coating could be placed on buildings or vehicles to provide a visual indication of potential structural failure, which usually starts as tiny, invisible cracks and deformations.

Mater. Horiz. **http://dx.doi.org/10.1039/C6MH00559D (2017)**

DEVELOPMENTAL BIOLOGY

Fatty bones weaken with age

The build-up of fat cells in the bone marrow could explain why bones grow weaker and heal more slowly with age.

Tim Schulz at the German Institute of Human Nutrition in Potsdam-Rehbrücke and his colleagues identified a population of stem-cell-like cells in the bones of mice that gives rise to both bone and fat cells. These progenitors produced more fat cells than bone cells in older animals and in those that ate a high-fat diet, compared with younger mice and those eating a normal diet, respectively. In mice with a fractured tibia, fat-cell precursors injected near the injury site slowed the healing process.

The researchers found that cells in the fat-cell lineage produced a protein called dipeptidyl peptidase-4 that impaired bone regeneration. These cells also inhibited the generation of stem cells in the bone marrow that give rise to blood and immune cells.

Cell Stem Cell **http://doi.org/b4dv (2017)**

ASTRONOMY

Star orbits close to black hole

A white dwarf star that circles a black hole every 28 minutes may have the closest orbit of its kind ever seen in our Galaxy.

The system, called 47 Tuc X9, is some 4.5 kiloparsecs away. It was already thought to contain two objects orbiting each other, one of them probably a black hole, but the identity of the second object was uncertain. Arash Bahramian at the University of Alberta in Edmonton and his colleagues analysed X-ray and radio observations of the system from Earth- and space-based telescopes. They discovered that the system has high oxygen levels and noted a change in X-ray brightness roughly every half an hour. The researchers inferred that a white dwarf — a dense remnant of a Sun-like star — is orbiting the black hole at a distance of about 2.5 times that between Earth and the Moon.

The black hole has probably been sucking material from the star for tens of millions of