RESEARCH HIGHLIGHTS

Selections from the scientific literature

MEDICINE

Double radiation shield

The odds of mice surviving radiation sickness are improved by antibiotic treatment, and increased further by boosting an immune-system protein.

Eva Guinan of Harvard Medical School in Boston, Massachusetts, and her colleagues exposed mice to 7 grays of radiation. This dose killed all but 5% of untreated mice within 30 days. Alone, upping levels of the protein BPI — which neutralizes certain bacterial toxins — had no measurable effect on mouse survival, whereas a regime of just fluoroquinolone antibiotics increased the survival rate to 40%. However, around 75% of mice given both antibiotics and a BPI boost survived, and these animals also recovered more bone-marrow cells than those given antibiotics alone.

Combination treatment helped mice that were treated up to 24 hours after radiation exposure; most existing treatments for radiation sickness must be taken before or within hours of exposure.

Sci. Transl. Med. 3, **110ra118 (2011)**

P. J. HUDSON/FLICKR/GETTY

PHYSICS

Thunder but no lightning

Long radiation bursts generated by thunderstorms don't always culminate in lightning, although the reasons why are not fully understood. Tatsuo Torii at the Japan Atomic Energy Agency in Tokyo and his group tracked one such burst under a thunder cloud at the tip of Japan's Tsuruga Peninsula. They observed a moving, hemispherical source of radiation, probably caused by an intense electric field inside the thunder cloud, with a radius of 700 metres and reaching to just 300 metres above sea level.

The cloud emitted radiation — but no lightning — for several minutes as it moved southwards. This was probably because the radiation hemisphere was so close to the ground, the team suggests.

Geophys. Res. Lett. **http://dx.doi.org/10.1029/2011GL049731 (2011)**

EVOLUTION

Big bites help bats diversify

A powerful bite allowed a family of New World bats to expand their diet to hard fruits, driving an explosion in species number.

Elizabeth Dumont at the University of Massachusetts in Amherst, Liliana Dávalos at Stony Brook University in New York and their colleagues compared the diet, head shape and bite strength of the New World leaf-nosed bat family (Phyllostomidae, a range is **pictured**). This group comprises 180 species and has the most varied diet — ranging from blood to insects and fruit — of any mammalian family.

The authors found that, within a subfamily of fruit-eating bats, the animals' head shapes had undergone fewer changes after gaining a certain morphology that allowed for a strong bite. That evolutionary plateau was accompanied by an increase in the number of species, all of which can eat hard fruits such as figs.

Proc. R. Soc. B **http://dx.doi.org/10.1098/rspb.2011.2005 (2011)**

LEFT AND RIGHT, M. TSCHAPKA/CENTRE, S. E. SANTANA

TECHNOLOGY

Low-power magnetic switch

Memory devices such as computer hard disks must be able to quickly and reversibly switch the orientation of magnetic domains in their data-storing platter. But switching these domains often requires electromagnets, which consume a relatively large amount of electrical power. Morgan Trassin at the University of California, Berkeley, and his colleagues report that the magnetization of a material can be reversibly switched by the direct application of an electric field, which uses less power.

The team deposited a layer of a cobalt and iron alloy onto a thin film of bismuth ferrite, the magnetic properties of which change with an electric field. Applying an electric field at room temperature altered the polarization of the magnetic domains in the bismuth-based film, which then reversed the magnetization of the alloy.

The authors suggest that this could offer an approach to designing low-power, compact memory devices.

Phys. Rev. Lett. 107, **217202 (2011)**