RESEARCH HIGHLIGHTS

Selections from the scientific literature

ASTRONOMY

Sharper cosmic pencils

In order to look back in time, astronomers peer deep into a narrow 'pencil beam' of space. These narrow surveys can be easily confounded by variations in the density of matter on scales larger than the pencil beam.

Benjamin Moster, then at the Max Planck Institute for Astronomy in Heidelberg, Germany, and his colleagues have developed a recipe for measuring uncertainty in density. The team combined measurements of galaxies with models of dark matter, a mysterious material thought to bind galaxies together, and was able to predict how the density variation affects galaxy measurements at different distances from Earth. The results should ensure more accurate interpretation of past and future pencil-beam surveys.

Astrophys. J. 731, **113 (2011)**

VIROLOGY

Stubborn virus grows in sinus

Five years after its discovery, human rhinovirus C, a cold-causing virus that is associated with acute respiratory illness in children, has finally been cultured. This is the first step towards finding the virus's infection mechanisms, as well as possible antiviral targets.

Yury Bochkov of the University of Wisconsin–Madison and his colleagues grew two forms of HRV-C from nasal lavage fluid on sinus tissue left over from human surgeries. They then cloned a copy of the viral genome in a bacterial DNA structure called a plasmid, from which they produced new viral RNA. After introducing this construct into standard cell lines, they recovered infectious virus particles.

HRV-C seems to attach to cells by way of an unknown receptor not used by other HRVs, information which could be used to guide research into treatment approaches.

Nature Med. **doi:10.1038/nm.2358 (2011)**

M. MULDER/R. NETHERLANDS INST. SEA RES.

ECOLOGY

Jonah and the waterfowl

Tiny sea snails can survive a voyage through a duck's gizzard — where prey are typically crushed to death — only a little the worse for wear.

Gerhard Cadée at the Royal Netherlands Institute for Sea Research in Texel sifted through the faeces of shelducks, *Tadorna tadorna*, for shells of the snail *Hydrobia ulvae* **(pictured)**. Snails that suffered only minor damage quickly repaired their gashes after Cadée placed them in a laboratory aquarium. The creatures developed scars on their shells that resembled marks left by certain predators that had tried and failed to eat them.

Between 2.8% and 41.8% of the *H. ulvae* shells collected at 11 sites along the Wadden Sea bore repair scars. Such wide variation may complicate efforts to relate the frequency of scars in fossilized shells to levels of predation, Cadée says.

Palaios 26, **245–249 (2011)**

STEM CELLS

New ways to change fates

Induced pluripotent stem cells (iPSCs) hold enormous promise for regenerative medicine: they have the potential to develop into cells of any type, just as embryonic stem cells do, but do not require the controversial use of human embryos. Until now, the most efficient way to make iPSCs from human skin cells required a virus to ferry four 'reprogramming' factors into cells.

Edward Morrisey at the University of Pennsylvania in Philadelphia and his colleagues describe a recipe for making iPSCs that does not require these four factors, and boosts the efficiency of the reprogramming process. By infusing cells with a viral vector encoding certain small, RNA strands called microRNAs, the team was able to reprogram human skin cells two orders of magnitude more efficiently than is possible with the standard method.

Cell Stem Cell 8, **376–388 (2011)**

OPTICAL PHYSICS

A liquid of photons

For decades, physicists have mused over the theoretical properties of Luttinger liquids, strange one-dimensional quantum states in which charge and magnetic spin of particles are predicted to decouple and move at different speeds.

Dimitris Angelakis at the Technical University of Crete, Greece, and his colleagues have taken a step towards creating a Luttinger liquid in the lab. They propose a practical scheme whereby two different types of atom would be trapped in a hollow, one-dimensional optic fibre and tuned with two sets of opposing laser beams. When one pair of beams is switched off, the authors show, a photon pulse in which charge and spin are decoupled will move along the fibre.

Phys. Rev. Lett. 106, **153601 (2011)**