

and Jeffrey Grossman at the Massachusetts Institute of Technology in Cambridge simulated the molecular interactions between graphene, salt and water, and looked at the effects of different pore sizes on salt filtration. The researchers found that graphene with a pore size of 0.7–0.9 nanometres should stop the passage of salt while letting water through. Attaching hydroxyl groups to the edges of the graphene pores would boost water flow-rate but impair salt rejection — because the chemical groups can swap with water molecules surrounding the salt ions. By contrast, attaching hydrogen atoms to the pores would improve filtration.

Graphene promises to be many times more permeable to water than conventional membranes used in desalination, the authors say. *Nano Lett.* <http://dx.doi.org/10.1021/nl3012853> (2012)

MICROBIOLOGY

Bacterial border defence

Insects combat pathogenic bacteria by producing a polymer called melanin and depositing it onto the microbe's surface. But one bacterial species has a weapon of its own — a cell-surface molecule that inhibits insects' melanin-producing enzymes.

Jon Clardy at Harvard Medical School in Boston, Massachusetts, and his team pinpointed the molecule, rhabduscin, on the surface of the bacterium *Xenorhabdus nematophila*. Nanomolar levels of the chemical blocked the activity of a melanin-producing enzyme from waxmoth larvae. *X. nematophila* that lack a rhabduscin-producing enzyme were less effective at killing the larvae than were normal bacteria.

Genes that encode enzymes involved in rhabduscin production are also found in the pathogen that causes cholera, *Vibrio cholerae*. A similar defence mechanism

might exist in this bacterium, the authors speculate. *Proc. Natl Acad. Sci. USA* <http://dx.doi.org/10.1073/pnas.1201160109> (2012)

APPLIED PHYSICS

Terahertz-wave detector

Devices that emit and detect radiation in the terahertz part of the spectrum — between the infrared and microwave regions — have potential applications in imaging, including in medical diagnostics. Researchers have developed a compact and efficient terahertz detector that works at room temperature.

Miriam Vitiello of the National Enterprise for nanoScience and nanoTechnology in Pisa, Italy, and her team built their detector out of indium arsenide nanowires 1.5 micrometres long and 30 nanometres in diameter. Radiation from a 1.5-terahertz emitter was funnelled to the detector from a bow-tie-shaped antenna.

The researchers suggest that the detector could be tuned to respond to even higher frequencies, and could be built into multi-pixel arrays, which are ideal for detectors.

Appl. Phys. Lett. 100, 241101 (2012)

STEM CELLS

Human eye parts in a dish

Retinal cells made from human embryonic stem cells could one day be used to help restore sight in people with certain forms of blindness.

Yoshiki Sasai at the RIKEN Center for Developmental Biology in Kobe, Japan, and his colleagues used the stem cells to generate retinal epithelial cells, which are precursors for the retina. After a few weeks, a single layer of these cells spontaneously formed a curved structure called an optic cup. After several more weeks, the cup developed into a multilayered structure with

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CLIMATE CHANGE

Melting ice behind Arctic warming

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Sea-ice loss seems to be the main culprit behind the rapid surface warming in the Arctic, but it contributes next to nothing to the heating of the area's lower atmosphere.

The climate is warming faster in the Arctic than elsewhere. Using simulations generated by two atmospheric circulation models, James Screen at the University of Melbourne in Australia and his team disentangled and quantified local and remote contributions to this 'Arctic amplification'.

Sea-ice retreat and related changes in local sea surface temperature are the main drivers of surface-level warming, the simulations suggest. By contrast, most lower atmosphere warming seems to result from increased atmospheric heat transport from lower latitudes. Apart from in July and August, greenhouse gases and aerosols make little direct contribution to Arctic warming, the authors note.

Geophys. Res. Lett. <http://dx.doi.org/10.1029/2012GL051598> (2012)

multiple retinal cell types, including light-sensitive photoreceptors.

The researchers also devised a method for cryopreserving the retinal tissue. They foresee that stored material could ultimately be triggered to develop into specific cell types that can be grafted onto a patient's retina.

Cell Stem Cell 10, 771–785 (2012)
For a longer story on this research, see go.nature.com/ibgaqa

ARCHAEOLOGY

One mummy but three people

A mummy found at a site off the coast of Scotland consists of remains from at least three individuals.

Human skeletons dating from 1400–1100 BC were previously unearthed at the Cladh Hallan settlement. A male skeleton was identified as a composite of multiple individuals on the basis of isotope data, but the status of a female mummy (pictured) was less certain. Terry Brown at the University of Manchester, UK, and his colleagues extracted DNA



M. PARKER PEARSON

from bones of the jaw, right arm and right leg of the female remains. After excluding possible contamination, the researchers found that all three body parts came from different individuals. DNA analysis of the skull was inconclusive.

The team suggests that the remains at Cladh Hallan were deliberately merged, perhaps to symbolically combine different ancestries into one lineage. *J. Archaeol. Sci.* <http://dx.doi.org/10.1016/j.jas.2012.04.030> (2012)

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