

RESEARCH HIGHLIGHTS

Selections from the scientific literature

CANCER

How stem cells fight chemo

Adult stem cells promote resistance to chemotherapy by releasing fatty acids that protect tumour cells.

Tumours recruit a class of adult stem cells called mesenchymal stem cells, which stimulate growth and promote metastasis. Emile Voest of the University Medical Center Utrecht in the Netherlands and his colleagues found that mesenchymal stem cells also induce resistance to the chemotherapy drug cisplatin.

The team identified two fatty acids released by mesenchymal stem cells that engender cisplatin resistance in mice. Blocking enzymes involved in the synthesis of these fatty acids prevented stimulation of cisplatin resistance by the stem cells, suggesting a new therapeutic target for the prevention of drug resistance in cancer.

Cancer Cell 20, 370–383 (2011)

METROLOGY

Redefining the kilogram

Researchers are working to redefine two SI units — those for mass (the kilogram) and current (the ampere). The aim is for the definitions to be based on relationships between fundamental constants, so researchers are testing whether phenomena that relate the constants are always the same.

Jan-Theodoor Janssen of the National Physical Laboratory in Teddington, UK, and his colleagues have shown that one such relationship,

the quantum Hall effect — which relates the electron charge and Planck's constant to resistance — holds in completely different materials. The researchers measured the resistance associated with the quantum Hall effect in both graphene and gallium arsenide, and found that it was the same, to an uncertainty of just

86 parts per trillion — a sign that the effect is a sound foundation for SI-unit redefinition. *N. J. Phys.* <http://dx.doi.org/10.1088/1367-2630/13/9/093026> (2011)



M. P. HEIDE-JØRGENSEN

ECOLOGY

Bowheads mingle in Northwest Passage

Whales are already exploiting the increasing areas of open water that melting sea ice has made available in the Arctic, and animals previously presumed to be separated into distinct Atlantic and Pacific populations may now be mixing.

Mads Peter Heide-Jørgensen at the Greenland Institute of Natural Resources in Nuuk and his colleagues tracked two adult bowhead whales (*Balaena mysticetus*) with satellite tags in 2010 (tagging process pictured). One was from the Bering–Chukchi–Beaufort

population, from the western side of North America; the other was part of the Baffin Bay–Davis Strait group, from the eastern side.

During September, the animals spent ten days within 130 kilometres of each other and crossed paths. This adds to evidence that bowheads and other animals may already be using the Northwest Passage to travel between the Pacific and Atlantic Oceans.

Biol. Lett. <http://dx.doi.org/10.1098/rsbl.2011.0731> (2011)

ANTHROPOLOGY

Denisovan dispersal details

Many of Asia's distinct populations have genetic heritage in common with a 40,000-year-old hominin found in Denisova Cave in southern Russia in 2008.

David Reich of Harvard Medical School in Boston, Massachusetts, Mark Stoneking of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, and their colleagues looked at data on single-DNA-base changes in individuals representing 33 populations from Asia and Oceania. They

found Denisovan genetic material in populations including Australian Aborigines, New Guineans and aboriginal negrito populations of the Philippines, but not in others such as East Asians and western Indonesians.

The team suggests that Denisovans lived over a huge range, from Siberia to Southeast Asia, and that gene flow into modern humans occurred on the islands of Southeast Asia rather than the mainland. The results also indicate that Southeast Asia was settled in a number of waves.

Am. J. Hum. Genet. <http://dx.doi.org/10.1016/j.ajhg.2011.09.005> (2011)

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