RESEARCH HIGHLIGHTS

Selections from the scientific literature

PLANETARY SCIENCE

Titan's sea is super salty

Saturn's largest moon, Titan, has a buried ocean that is saltier than many seas on Earth.

Titan, with its thick atmosphere and bodies of surface liquid, is of great interest to scientists looking for life beyond Earth. A team led by Giuseppe Mitri, of the National Institute of Astrophysics in Rome, looked at gravity and elevation measurements taken by NASA's Cassini spacecraft over more than a decade.

The scientists calculated that Titan's icy outer shell is less than 100 kilometres thick and is in the process of freezing and growing thicker. They also calculated that the underlying water is about as dense as the Dead Sea, probably because of high concentrations of sulphur, potassium, sodium and other salts, the authors say.

Icarus 236, **169–177 (2014)**

STEVE CAVALIER/ALAMY

AGRICULTURE

Global warming could hurt crops

The warming climate could put food supplies at risk over the next decade or two.

Using various combinations of climate models, David Lobell at Stanford University, California, and Claudia Tebaldi at the National Center for Atmospheric Research in Boulder, Colorado, compared expected yields of maize (corn) and wheat growing under natural climate variations to projected yields influenced by human-induced climate change. The results suggest that with climate warming, the risk of losing 10% or more of the global wheat yield over the next two decades increases tenfold, to a 1 in 20 chance. For maize, the risk increases by 20 times, to a 1 in 10 chance.

Environ. Res. Lett. 9, **074003 (2014)**

CANCER

Roving tumour cells tracked down

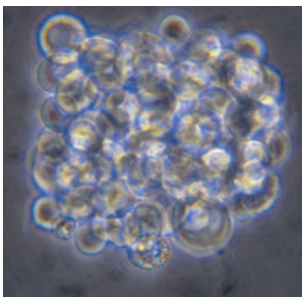
Cancer cells in the blood can now be isolated and studied in culture, opening up the possibility of personalizing treatment strategies.

Tumours shed small amounts of cancer cells into the bloodstream, but it has been difficult to isolate and grow these cells. Shyamala Maheswaran and Daniel Haber of Massachusetts General Hospital in Boston and their colleagues developed an improved microfluidic system that filters out normal blood cells, leaving tumour cells unharmed.

The team used the device to harvest circulating tumour cells from the blood of patients with advanced breast cancer. These were then grown in culture (**pictured**) and sequenced to reveal key mutations in certain cancer genes. The researchers also tested the cells' sensitivity to various drugs.

With further improvements, the technique could one day be used to guide therapy, the authors say.

Science 345, **216–220 (2014)**



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ECOLOGY

Ocean reserves miss key target

Marine reserves may not be protecting the world's most vulnerable reef-fish communities.

Marine protected areas exist mainly in regions with a large number of different fish species. Valeriano Parravicini at the Centre for the Synthesis and Analysis of Biodiversity in Aix-en-Provence, France, and his colleagues mapped the ranges of more than 6,000 species of tropical reef fishes and quantified the sensitivity of these species to human threats.

They found that areas where species are vulnerable to extinction do not often overlap with protected regions of high species richness. For example, seas off the coast of Chile and the eastern Atlantic were areas of high vulnerability, but species-rich hotspots are centred around Indonesia and Australia.