

The expansion of the open-water season will affect all aspects of the Arctic environment that depend on sea-ice coverage, such as polar-bear foraging and the livelihoods of indigenous people, the authors say.

Nature Clim. Change
<http://dx.doi.org/10.1038/nclimate2848> (2015)

CANCER

Altered T cells hit pancreatic cancer

Genetically engineered immune cells that target a protein found on some pancreatic tumours can penetrate that cancer's defences, according to studies in mice.

Harnessing engineered T cells to combat cancer has been more successful for blood cancers than for solid tumours, such as those of the pancreas, which are protected by a dense cellular barrier and are particularly deadly. Philip Greenberg and Sunil Hingorani of the Fred Hutchinson Cancer Research Center in Seattle, Washington, and their colleagues engineered T cells to recognize a protein called mesothelin that is associated with the spread of certain pancreatic tumours. The engineered T cells were able to bind to this protein more tightly than did normal T cells.

The engineered cells infiltrated pancreatic tumours in mice, leading to an increase in tumour-cell death compared with control mice. Mice that received a series of engineered T-cell infusions lived nearly twice as long as those that did not.

Cancer Cell <http://dx.doi.org/10.1016/j.ccell.2015.09.022> (2015)

IMMUNOLOGY

Worms conspire with gut microbes

Intestinal worms manipulate their host's immune system to ensure their survival, in part by changing the metabolism of the

host's gut microbiome.

The worms, called helminths, infect around 2 billion people around the world, and are able to block harmful inflammatory responses in humans and mice. Nicola Harris at the Swiss Federal Institute of Technology in Lausanne and her colleagues studied mice infected with the helminth *Heligmosomoides polygyrus bakeri*, and found that mice that had been treated with antibiotics to kill gut bacteria before being exposed to the worms had more allergic airway inflammation than did untreated, worm-infected animals. Worm infection caused the microbiota to produce increased levels of short-chain fatty acids in mice, pigs and six out of eight human volunteers. The anti-inflammatory effects of worm infection were lost in mice that had been engineered to lack a receptor for the fatty acids.

The findings suggest that helminths and gut microbes have evolved this mechanism to regulate the host immune system over many millions of years, the authors say.

Immunity <http://dx.doi.org/10.1016/j.immuni.2015.09.012> (2015)

DEVELOPMENTAL BIOLOGY

Survival boost for cloned embryos

Researchers have improved the success rate for producing cloned embryos or embryonic stem cells by removing a chemical group from DNA-binding proteins.

Transferring a nucleus from an individual's adult body cell into a human egg — a process called somatic cell nuclear transfer (SCNT) — could one day generate embryonic stem cells that match that person's DNA. But embryos made using SCNT rarely mature. To improve this, Dong Rylul Lee at CHA University in Seoul, Yi Zhang at Boston Children's Hospital in Massachusetts and their colleagues

SOCIAL SELECTION

Popular topics
on social media

Funding of basic science stirs debate

Pure science does not always stimulate innovation — rather, technological change often springs naturally from human inventiveness. Writer Matt Ridley makes this provocative point in a 23 October essay in *The Wall Street Journal* called 'The Myth of Basic Science' (go.nature.com/2bbqpg) that fuelled heated and thoughtful responses on social media about the role and benefits of science and technology. Ridley says that government-funded basic research is not the only path towards innovations that improve society.

But others countered that publicly funded research has many benefits. "The causes of technical and social change are manifold, and scientific research forms just part of the ecosystem, but this doesn't make it inconsequential," wrote Jack Stilgoe, a science-policy expert at University College London, in an article for *The Guardian* commenting on Ridley's essay (go.nature.com/zkkalt). Ridley responded to his critics on Twitter, saying that basic research is important but that government is not the only way to fund it.

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used a human messenger RNA encoding a protein that removes methyl groups from a type of histone protein found on DNA in the donor nucleus. When the authors injected the RNA into 56 human eggs that had received donor DNA, they found that 14.3% of the treated embryos developed into late-stage blastocysts, compared with none of the untreated controls.

Using this technique, the team derived embryonic stem cells from skin cells donated by people with age-related macular degeneration, which causes partial vision loss.

Cell Stem Cell <http://doi.org/8v2> (2015)

MATERIALS

Extra dimensions in 3D printing

Two research groups have used magnetic fields to tune the texture and strength of materials as they are being printed, allowing the formation of complex 3D structures.

André Studart and his colleagues at the Swiss Federal

Institute of Technology in Zurich added magnetic particles at different concentrations to resins of varying viscosities. Applying a low magnetic field during the 3D printing process allowed the team to control the orientation of the particles, and hence the texture, within the printed object. The researchers used their technique to create a composite with an intricate internal spiral staircase (**pictured**). Their system could be used in robotics to print shape-changing objects that respond to environmental triggers, Studart says.

In a separate paper, Studart's former postdoc, Randall Erb, and his team at Northeastern University in Boston, Massachusetts, used the magnetic technique to improve the mechanical strength of 3D printed objects by controlling crack formation. *Nature Commun.* 6, 8643 (2015); 8641 (2015)

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