

RESEARCH HIGHLIGHTS

Selections from the scientific literature

VIROLOGY

Zika shrinks 'mini brains' in culture

The Zika virus may trigger an immune response that causes developing brain cells to stop dividing and self-destruct.

The link between Zika infection and the birth of babies with abnormally small heads, or microcephaly, has grown stronger, but it is still not clear how the virus attacks developing brains. Tariq Rana at the University of California, San Diego, and his team grew cerebral organoids — 3D structures that model the developing brain — from human embryonic stem cells and then infected them with Zika. Over a 5-day period, uninfected organoids grew by 22.6%, whereas those exposed to Zika shrank by 16%.

Zika infection boosted the activity of a pathogen-sensing gene, *TLR3*, which has been linked to brain inflammation and degeneration. Blocking the *TLR3* protein in infected organoids lessened the damage caused by the virus.

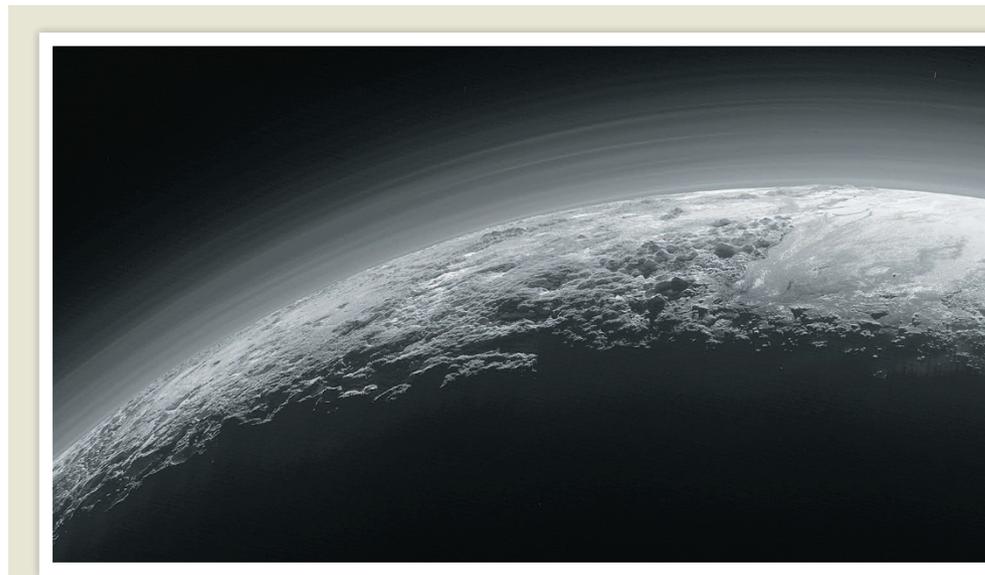
Cell Stem Cell <http://doi.org/bgrx> (2016)

BIOMATERIALS

Second 'skin' turns back time

A polymer film that sticks to human skin reduces the appearance of wrinkles and bags under the eyes.

Robert Langer at the Massachusetts Institute of Technology in Cambridge and his colleagues designed a polysiloxane-based film that is applied to and cured on the skin. The transparent film has similar mechanical properties to skin, allowing it to conform to the surface. In small studies with human volunteers, the researchers showed that the



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PLANETARY SCIENCE

Solar wind hits Pluto hard

The solar wind is diverted by Pluto, suggesting that, like some larger planets, the dwarf planet has a shield against the stream of energized particles emanating from the Sun.

Before NASA's New Horizons spacecraft visited the dwarf planet (pictured) in 2015, most scientists thought that Pluto interacted with the solar wind in the same way as a comet does. Comets lack protection from the wind, which diffuses around the cometary surface. But in analysing data from the spacecraft, David McComas at Princeton University in

New Jersey and his colleagues identified a 'Plutopause' — a region where Pluto's tenuous atmosphere shields the dwarf planet from the solar wind.

The Plutopause is relatively small and well defined, much like the solar-wind boundaries around Mars and Venus. Even though Pluto is small, it still exerts enough gravitational pull to keep its atmosphere sufficiently close to provide a buffer from the solar wind.

J. Geophys. Res. Space Phys. <http://doi.org/bgdv> (2016)

film reshapes the skin, making bags under the eyes look less puffy and reducing wrinkling.

The film was made from reagents that are considered to be safe for the skin. It could be used cosmetically or in wound dressings, the authors say. *Nature Mater.* <http://dx.doi.org/10.1038/nmat4635> (2016)

BIOPHYSICS

Jammed microbes feel the pressure

Microbes living in a confined space can push up against each other with enough force

to physically damage their environment.

A team led by Oskar Hallatschek of the University of California, Berkeley, created a microscopic chamber that would hold roughly 100 cells of budding yeast (*Saccharomyces cerevisiae*). As the cells proliferated, they did not leave the chamber in a steady stream through a narrow exit channel but instead jammed together, building up contact pressures of almost 1 megapascal. This force was enough to cause cracks in agar gels containing growing yeast cells, and to slow down the organism's growth.

Self-driven jamming may help microbes to invade soft materials, which could contribute to biofouling — the accumulation of unwanted microbial material on surfaces, the authors say.

Nature Phys. <http://dx.doi.org/10.1038/nphys3741> (2016)

CELL BIOLOGY

Immune cell aids vascular repair

White blood cells that gobble up cellular debris also help to heal damaged blood vessels in the brain.