

RESEARCH HIGHLIGHTS

Selections from the scientific literature

HIV

A race to kill or be killed

HIV's prime cellular victim can itself kill affected cells during the early days of infection. And it seems that the more vigorous this response by CD4 T cells is, the greater an HIV-positive person's chance is of being able to maintain a relatively low viral level and the better their disease outcome is likely to be.

Hendrik Streeck at the Ragon Institute in Charlestown, Massachusetts, and his colleagues studied two groups of people with untreated HIV during the first year of infection. By the end of the period, members of one group had developed a higher viral load than had those of the other. The authors found that patients with a lower HIV load had a greater percentage of HIV-specific CD4 T cells. Moreover, at the beginning of the study, a higher proportion of CD4 T cells in these patients expressed proteins, particularly one called granzyme A, that kill other cells.

The authors say that measuring the responses of these T cells during the early stages of infection could allow medics to predict how HIV infection will progress in individual patients.

Sci. Transl. Med. 4, 123ra25 (2012)

SUNCOR ENERGY



KYODO/REUTERS

OCEANOGRAPHY

Tsunamis collide and grow taller

Ridges and mountains on the sea floor dangerously amplified the eastward-bound segments of the tsunami that devastated Japan's Tohoku coast (pictured) last year.

Satellite observations made on 11 March at different locations over the Pacific Ocean suggest that tsunami height increased as the wavefront raced towards the west coast of America. Tony Song at NASA's Jet Propulsion Laboratory in Pasadena, California, and his team compared satellite data with a tsunami simulation and maps of ocean-bottom topography. They conclude that

topographic barriers such as the Hawaiian Ridge slowed and curved the eastward-bound tsunami front. As segments of this disrupted front collided and merged, the peak-to-trough height of the tsunami wave more than doubled.

Understanding how tsunamis interact with ocean-floor topography could help researchers to improve tsunami forecasting.

Geophys. Res. Lett. <http://dx.doi.org/10.1029/2011GL050767> (2012)

For more on the Japan earthquake, see www.nature.com/japanquake.

ENVIRONMENTAL SCIENCE

Oil-sands pollution quantified

Air pollution caused by crude-oil extraction from Canadian oil sands is comparable to that measured over mid-sized cities or in the vicinity of large coal-burning power plants.

Chris McLinden of Environment Canada in Toronto and his colleagues used satellite observations to determine how the mining and processing of oil sands (pictured) affect air quality in Alberta — home to the world's second-largest crude-oil reserve. The authors measured

greatly increased atmospheric levels of two major pollutants, nitrogen dioxide and sulphur dioxide, over a 30-by-50-kilometre area of intense surface mining. They also noted that nitrogen dioxide pollution in the area had risen steadily since 2005.

Geophys. Res. Lett. <http://dx.doi.org/10.1029/2011GL050273> (2012)

IMMUNOLOGY

Fighting viruses antibody-free

Neutralizing antibodies were thought to be essential to helping the body fight off

viruses, but it turns out that this is not always the case.

Antibodies are made by immune cells called B cells. A team led by Matteo Iannacone and Ulrich von Andrian at Harvard Medical School in Boston, Massachusetts, studied mice engineered to make their B cells incapable of producing antibodies but still able to make a chemical called lymphotoxin $\alpha 1\beta 2$. When the animals were infected with vesicular stomatitis virus, this lymphotoxin caused another type of immune cell, the macrophage, to be preferentially infected by the virus. Infected macrophages secreted another molecule,