

IMMUNOLOGY

Cross-reactions boost immunity

A memory of microbes may help the immune system to fight pathogens that it has never encountered before.

Mark Davis and his colleagues at Stanford University in California examined white blood cells called T cells that carry the CD4 antigen — which quickly rouse other cells into launching a robust immune attack — in blood samples of 26 healthy adults. Although all the blood donors tested negative for HIV, the researchers found unexpectedly high levels of the T cells that recognized the virus and were primed to launch an attack. When they analysed umbilical-cord blood from newborns, however, they found that these ‘memory’ cells were absent, which may explain why young children are so susceptible to infection. The researchers also showed that vaccination against flu activated cells that recognize proteins not just from flu, but other bacterial species.

These findings may help to explain why vaccinations against one disease can offer protection against other infections.

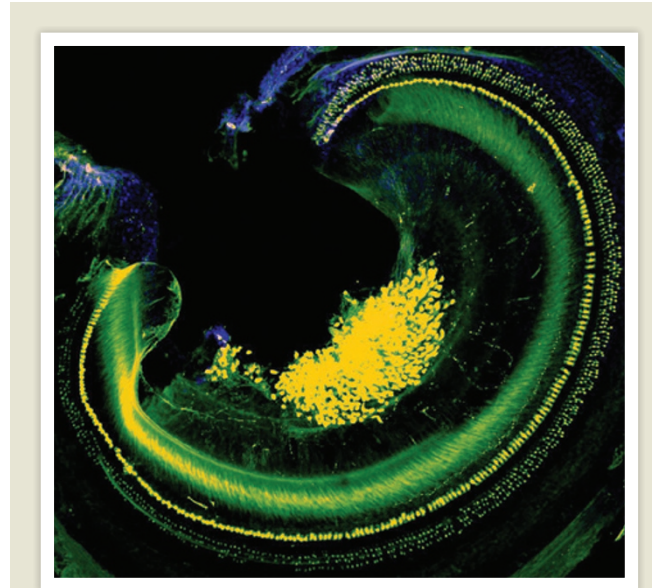
Immunity <http://dx.doi.org/10.1016/j.immuni.2012.10.021> (2013)

NANOTECHNOLOGY

Lasers tune tiny diamonds

Minuscule diamond crystals show promise for applications that range from biological imaging to quantum computing, but they have been difficult to manipulate individually.

Romain Quidant of the Institute of Photonic Sciences in Barcelona, Spain, and



MOLECULAR THERAPY

Deafness diverted

Molecular therapy improves hearing and balance in a mouse model of a hereditary disease that causes deafness and balance disorders.

In humans, Usher syndrome is often caused by a mutation in the gene *USH1C* that results in the production of a truncated form of the protein harmonin — which normally guides development of the inner ear (pictured) — and leads to impaired hearing.

Jennifer Lentz at Louisiana State University in New Orleans, Michelle Hastings at Rosalind Franklin University in North Chicago, Illinois, and their collaborators injected newborn mice with DNA-like molecules that mask the mutation in the cell’s protein-expression machinery, causing normal harmonin to be produced. This stopped the loss of inner-ear cells that respond to sound, improved low- and mid-frequency hearing and reduced behaviours associated with balance impairment such as head-tossing and circling. The effects lasted at least six months. The authors suggest that a similar approach may have therapeutic potential in human congenital deafness.

Nature Med. <http://dx.doi.org/10.1038/nm.3106> (2013)

his colleagues developed a way to use infrared lasers to trap diamond nanocrystals with a single nitrogen atom inside. They could then change the polarization of the laser to twist and turn the nitrogen-atom axis and move individual nanodiamonds in

three dimensions. Because the technique worked for crystals suspended in solution, the researchers believe it could be used in biological systems.

Nature Nanotechnol. <http://dx.doi.org/10.1038/nnano.2012.259> (2013)

PALAEANTHROPOLOGY

New hominin wrist bones

Newly described wrist bones support the argument that *Homo floresiensis* is a distinct species, rather than a deformed *Homo sapiens*.

In 2003, scientists discovered parts of a skeleton (LB1) that is at least 17,000 years old in Liang Bua on the Indonesian island of Flores. The individual was described as a new hominin species, mostly based on analysis of features of its skull and lower body. The wrist bones of LB1 included features seen in many apes but not modern humans. Caley Orr, now at Midwestern University in Downers Grove, Illinois, and his colleagues have analysed wrist bones from other finds at Liang Bua and their conclusions support the original findings. The bones are smaller than those of LB1, but contain features not found in modern humans and Neanderthals.

The finding rebuts claims that the primitive features of LB1 bones were due to pathology, the authors say. *J. Hum. Evol.* 64, 109–129 (2013)

ZOOLOGY

Bats as disease reservoirs

Bats may be more likely than rodents to pass on a viral infection to other mammalian species, including humans, suggests a large-scale analysis.

Angela Luis of Colorado State University in Fort Collins and her colleagues searched the literature, counting and characterizing zoonotic viruses — those that can be transmitted to humans from other animals — that had been reported in bats