RESEARCH HIGHLIGHTS

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SEXUAL SELECTION

Networking for mates

Am. Nat. doi:10.1086/655216 (2010)

Male birds trying to woo females may improve their chances by socializing more, effectively boosting their relative attractiveness.

Kevin Oh, currently at Cornell University in Ithaca, New York, and Alexander Badyaev at the University of Arizona in Tucson studied house finches (*Carpodacus mexicanus*) in Arizona, where males' breast feathers range from pale yellow to deep red (pictured, with a female).

The duo analysed the birds' social networks and found that during the non-breeding season, less elaborate males shifted more often between social groups than ornate ones did. Highly social birds were more successful at finding a mate than were comparably adorned males that did not change groups as much.

CANCER BIOLOGY

Leukaemia lockdown

Cancer Cell **18,** 74–87 (2010)

The primary therapy for chronic myeloid leukaemia (CML), a blood cancer, is the drug Gleevec (imatinib mesylate), which targets a protein thought to be causative in the disease. But many patients relapse when treatment is stopped. To find additional drug targets, James DeGregori at the University of Colorado School of Medicine in Aurora and his colleagues looked for genes essential to keeping CML cells alive.

They found that a gene-regulating protein, NFAT, helped CML cells to survive even during treatment with Gleevec or similar drugs. Moreover, cyclosporin, a drug widely used to suppress the immune system, blocked NFAT's effects in mice, and might help patients if combined with current therapies.

PHYSICS

Detection from a distance

Nature Photonics doi:10.1038/nphoton.2010.165 (2010)

Nestled between microwaves and infrared light on the electromagnetic spectrum, terahertz waves can penetrate plastic and fabrics and are used to identify chemicals. But unlike most electromagnetic radiation, they cannot travel far through air because they are absorbed by water vapour.

Xi-Cheng Zhang and his colleagues at Rensselaer Polytechnic Institute, New York, have now devised a way to detect the radiation from at least 10 metres away. The researchers focus two laser beams together in air to create a plasma (an ionized gas), which interacts with terahertz radiation to produce ultraviolet fluorescence that can be measured from afar. Variations in the intensity of this fluorescence betray the phase and amplitude of the original terahertz wave.

This method could be used to spot chemical explosives, which have characteristic terahertz spectra, from a safe distance.

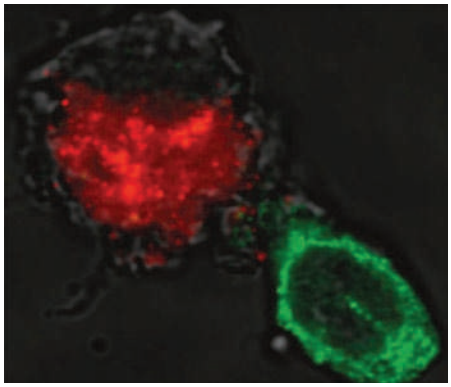
VIROLOGY

HIV spread in 3D

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.1003040107 (2010)

One route HIV takes to infecting the immune system's T cells is through dendritic cells, which present antigen on their surface. Researchers have captured three-dimensional images of single viral particles being transmitted between the two cell types (pictured, T cell in green).

Sriram Subramaniam at the National Institutes of Health in Bethesda, Maryland, and his co-workers used three-dimensional electron microscopy to show that the surface membrane of the dendritic cell first extends and, like a veil, envelops the T cell. This provides a protected area in which the membranes of the two cells form protrusions that come together like interlocking fingers. Viral particles are seen at the tips and along the T-cell protrusions. The T cells' CD4 receptors mediate HIV transmission.



This shielding of T cells at these junctions could limit the ability of HIV-neutralizing antibodies to block T-cell infection.

NEUROSCIENCE

Versatile vision

Neuron **67,** 49–60 (2010)

Perception of patterns in the eye has long been attributed solely to two types of retinal cell — the rods and cones — but a study suggests that they are not alone in having this ability.

Neuroscientists had thought that intrinsically photosensitive retinal ganglion cells (ipRGCs) could respond only to the presence or absence of light in regulating certain activities, such as circadian rhythms. But Samer Hattar at Johns Hopkins University in Baltimore, Maryland, David Berson at Brown University in Providence, Rhode Island, and their colleagues show that, in mice, these cells are more abundant and diverse than previously thought. In addition, they project into more areas of the brain — including those responsible for visual perception.

Mice engineered to lack the rod and cone biochemical pathways, but with their ipRGC pathways intact, could still distinguish patterns in a visual test. However, it took them double the number of trials to achieve a normal level of performance.

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