dots. The authors say these observations reveal that cadmium–selenide quantum dots are paramagnetic — their magnetism is induced and temporary — owing to interactions between cadmium and the chemical groups added to its surface to stifle its reactivity. The team saw no evidence to substantiate previous claims that quantum dots are ferromagnetic — that is, permanent magnets.

EVOLUTION

Home-field advantage

Am. Nat. **173,** 579–588 (2009)

It has long been thought that for many species, local populations are adapted to their local areas and would show greater fitness there than anywhere else. However, some transplant studies have shown 'out of town' organisms doing better than the natives.

Joe Hereford, now at the University of Maryland, College Park, looked at 74 transplant studies containing 777 estimates of local adaptation. He found that species showed local adaptation 71% of the time, and that, in general, native populations were 45% fitter than transplanted populations. And species displaying high local adaptation were not always very unfit when transplanted.

NEUROGENETICS

Protecting plasticity

Nature Neurosci. doi:10.1038/nn.2327 (2009)

Angelman syndrome is a form of mental retardation caused by mutations in the gene *UBE3A*. Scientists have discovered a role for the Ube3A protein that might explain the learning deficits associated with the disorder.

Benjamin Philpot of the University of North Carolina at Chapel Hill, Michael Ehlers at Duke University in Durham, North Carolina, and their colleagues focused on the mouse visual cortex. They found that, unlike normal mice, when mice lacking Ube3A were exposed to light, they lost synaptic plasticity — the learning-associated ability to change the strength of signals sent between brain cells — in this area. But the Ube3A-deficient mice recovered plasticity when deprived of visual stimuli, suggesting that Ube3A may help to maintain experience-dependent plasticity during periods of high brain activity.

D. MANNING & B. GLOVER, UNIV. CAMBRIDGE

ECOLOGY

Pollinators get a grip

Curr. Biol. doi:10.1016/j.cub.2009.04.051 (2009)

Animal-pollinated plants produce many cues and structures that help pollinators to navigate plant parts. Most flowering plants have cone-shaped cells on the surface of their petals, but the specific function of these cells was unknown. An elegant experiment now shows that they help pollinators to get a grip on the plant surface.

Beverley Glover at the University of Cambridge, UK, and her colleagues observed the behaviour of bumblebees (*Bombus terrestris*) on natural and artificial surfaces that were coated with flat or conical cells. When the surfaces were presented at awkward angles, the bees grasped more easily and preferentially selected the textured surfaces. By making the flower surface tractable for landing pollinators, the authors suggest, conical epidermal cells increase the efficiency of pollination.

CANCER BIOLOGY

Cancer cop back on the beat

Cancer Cell **15,** 376–388 (2009);
Cancer Cell **15,** 441–453 (2009)

Reactivating the cancer-fighting protein p53 when it has been disabled in tumour cells can rein in cancer-promoting genes and kill cancer cells in culture.

The protein is inactivated in many human cancers, allowing tumour cells to escape programmed cell death. Galina Selivanova of the Karolinska Institute in Stockholm and her co-workers report that a compound called RITA suppresses the expression of several cancer-causing genes by reactivating p53. RITA also unleashes a host of cell-death-promoting proteins, killing cancer cells.

Meanwhile, Klas Wiman, also of the Stockholm Karolinska Institute, and his colleagues show that another p53-reactivating compound, PRIMA-1, converted to reactive compounds in living cells. One of the active metabolites reacts with the sulphur-containing groups on the p53 protein, possibly restoring mutated p53 to a normal conformation. p53 is then able to trigger death in cancer cells.

JOURNAL CLUB

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A structural biologist has great expectations for llamas' small antibodies.

Llamas aren't just unusual and exotic looking: their antibodies are also a reason for much excitement. Made entirely of heavy chains, they are about half the size of those found in humans and many other vertebrates, which are normally composed of both heavy and light chains. When it comes to therapeutic applications, these larger antibodies are hard to store and deliver. But llama and other camelid antibodies demonstrate superior heat-stability and solubility, without compromising affinity or specificity, making them an attractive alternative.

Robin Weiss of University College London and his colleagues isolated three llama antibodies, known as 'neutralizing' antibodies, that can broadly prevent multiple HIV subtypes from infecting cells (A. Forsman *et al. J. Virol.* **82,** 12069–12081; 2008). They began by creating an antibody library from two llamas immunized with the HIV gp120 antigen. To select for neutralizing antibodies, antibodies were raised against one HIV subtype but cross-screened against multiple subtypes. The researchers also included a competitive elution step to select antibodies that can compete with binding by CD4, the primary HIV receptor on human T cells. It remains to be seen how these neutralizing antibodies fare in animal studies and where they bind in atomic detail.

Intriguingly, there have been reports of several potent, broadly neutralizing human antibodies (for example, F10 and CR6261 against influenza's haemagglutinin) in which only heavy chains are involved in antigen binding — reminiscent of the situation of llama antibodies. These studies corroborate that the heavy chain alone can mediate broad neutralizing activity, and invite speculation that this may be a special strategy engaged by the human immune system to reach cryptic binding sites. Llama antibodies may be even better suited for those hard-to-reach targets.

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