had been deleted performed better in a visual task involving the blocking of one eye than did normal mice. The MHC I proteins curb the retuning of circuitry that enables the functioning eye to compensate for the blocked one, the authors say.

ECOLOGY

Diverse recovery

J. Ecol. doi:10.1111/j.1365-2745.2009.01603.x (2009)
Protecting biodiversity improves the chances that an ecosystem will contain a species that allows it to recover after an extreme environmental event, scientists have concluded.

Jasper van Ruijven and Frank Berendse at Wageningen University and Research Centre in the Netherlands followed the progress of more than 100 small experimental plots planted with either individual species or varying mixtures of eight common species, including several grasses, before and after a natural drought. The drought occurred six years after planting.

They found that plots with greater biodiversity did not show improved resistance to the drought — but they were able to recover more efficiently. They attribute most of this effect to one species, *Anthoxanthum odoratum*. Recovery was independent of pre-drought biomass.

GENETICS

Immune impediment

Nature Genet. **41,** 1341–1344 (2009)
Transplanted bone marrow cells commonly attack the recipient's cells, even though key proteins on the surface of the donor's and recipient's cells match. To find out what might be the cause of this 'graft-versus-host disease', Steven McCarroll of Harvard Medical School in Boston, Massachusetts, and his colleagues analysed gene deletions in the genomes of 1,345 pairs of patients and immune-matched siblings from whom bone-marrow transplants were made.

They found that the immune attack was more likely to occur when the donor — but not the recipient — had deletions in both copies of the gene *UGT2B17*. The donor's immune cells seem to respond to the gene's protein as 'foreign' in the recipient.

ASTRONOMY

A black hole draws near

Astrophys. J. **706,** L230–L234 (2009)
Astronomical distances are best measured by trigonometric parallax — using the annual shift in star position caused by Earth's motion around the Sun to derive distance. Now James Miller-Jones of the National Radio Astronomy Observatory in Charlottesville, Virginia, and his colleagues have used parallax to measure the first accurate distance to a nearby binary star system containing a black hole.

The authors took radio measurements at three-month intervals for a year and combined them with archival data. They reveal that the star–hole system, known as V404 Cygni, is just 2,390 parsecs from Earth — nearly half the distance previously thought. The group believes that the previous work underestimated the interstellar dust along the line of sight to the star system. The authors suggest that future parallax measurements will improve the understanding of how black holes form and behave.

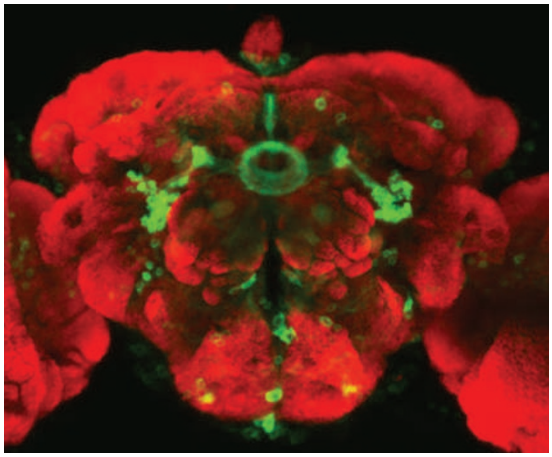
NEUROSCIENCE

Rude awakening

Neuron **64,** 522–536 (2009)
Fruitflies recruit distinct neural circuits when undergoing different forms of arousal — either waking from sleep, or being disturbed by puffs of air.

David Anderson at the California Institute of Technology in Pasadena and his colleagues found that flies with loss-of-function mutations in the dopamine receptor were more easily startled by air puffs than were flies without the mutation, but seemed less easily roused from sleep, as they slept longer.

When the researchers restored normal functionality to the dopamine receptor in a brain area called the central complex (pictured left, dopamine receptors labelled green), the puff-induced arousal dropped to normal levels but sleep arousal remained unchanged.



ELSEVIER

JOURNAL CLUB

Peter Baumann
Howard Hughes Medical Institute, Stowers Institute for Medical Research, Kansas City, Missouri

A molecular biologist explores ways to revolutionize agriculture.

The complete absence of sex in a few species has long fascinated biologists, but their research is driven by more than just curiosity. Hybrid plants are the mainstay of agriculture, but require ongoing breeding and selection to maintain their desirable traits. Apomixis, or asexual reproduction by seeds, is rare among commercially important crops, but engineering plants capable of this could produce stable crops with valuable traits.

Three Herculean tasks are involved: alteration of meiosis (the cell division that normally reduces the number of chromosomes in the sex cells, or gametes) to maintain the full maternal genome; fertilization-independent development of the embryo; and formation of the endosperm tissue that nourishes the embryo.

Raphaël Mercier of the French National Institute for Agricultural Research in Versailles and his team have taken a step towards achieving this goal. Using a combination of three mutants, they engineered a mustard weed that produces gametes carrying the complete maternal genome (I. d'Erfurth *et al. PLoS Biol.* **7,** e1000124; 2009). Their breakthrough came while characterizing a mutation in the aptly named *omission of second division (osd1)* gene, which causes the reproductive cells to skip the second meiotic division. By combining an *osd1* mutant with mutations that modify two other steps in meiosis, the team made meiosis similar to mitosis — cell division that occurs in non-reproductive cells.

Conservation of the genes involved across crop species fosters hopes that the strategy can be applied to many of them. The problem of endosperm formation will have to be overcome, and unfertilized seeds will need to be coaxed into development. The available tool kit of mutants affecting these processes makes me optimistic that these challenges will be overcome. However, convincing consumers that heavily engineered plants can secure future food supplies may require more than scientific ingenuity.

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