RESEARCH HIGHLIGHTS

Here comes the rain

Geophys. Res. Lett. **32,** L13701 (2005)
Climate change may heighten variation in precipitation from year to year, according to Filippo Giorgi and Xunqiang Bi at the Abdus Salam International Centre for Theoretical Physics in Trieste, Italy. Their region-based approach lends weight to previous work that suggests climate change could increase weather variability.

Giorgi and Bi divided the Earth's surface into a grid of regions, each 1 degree square. They used this grid system with 18 different computer models of twenty-first-century climate to see what differences were predicted over the years. In all regions the climate was warmer and the variability in the amount of precipitation from year to year increased significantly.

CANCER GENETICS

Nasty neighbourhood

Nature Genet. doi:10.1038/ng1596 (2005)
Tissue cells surrounding tumours can contain permanent changes to their genes that could encourage tumour development, say researchers. These 'epigenetic' changes take the form of chemical modifications to DNA and are passed on when cells divide.

A team led by Kornelia Polyak at the Dana-Farber Cancer Institute in Boston, Massachusetts, have developed a new way of screening the entire genome of a cell for epigenetic changes. They studied three kinds of cells in the tissues surrounding breast tumours and found alterations in all three. The changes resulted in abnormal gene expression in these cells. The findings suggest that epigenetic changes are involved in creating the abnormal tumour microenvironment thought to foster disease progression.

IMMUNOLOGY

Gut reaction

Cell **122,** 107–118 (2005)
Lack of exposure to harmless bacteria has been blamed for the rising rates of allergic diseases, such as asthma, in industrialized nations. Support for this 'hygiene hypothesis' comes from a study that shows how a sugar produced by a gut bacterium directs the development of immune cells in animals.

A team led by Dennis Kasper of Harvard Medical School in Boston, Massachusetts, demonstrated that mice raised in a germ-free environment had several immune-system defects. These included unusually high proportions of immune cells called T_H2 cells, whose abnormal activity is linked to allergies. Dosing such mice with the gut bacterium *Bacteroides fragilis* restored normal immune development. The team found this was due to a previously unknown kind of sugar called PSA that is made by the bacterium.

MATERIALS SCIENCE

Cracked it

Phys. Rev. Lett. **95,** 025502 (2005)
When a piece of material breaks, what determines the shape of the resulting pieces? To find out, researchers from the National Centre for Scientific Research in Paris and the University of Manchester, UK, drove a cutting tip through a thin, brittle polymer film.

They say that, under certain conditions, the shape of the crack depends solely on the width of the cutting tool. It does not depend on the tool's speed, or on the width or thickness of the film. The researchers were also able reduce cracking behaviour to a simple set of geometrical rules, which they used to reproduce the fracture patterns created by several different shapes of cutting tool.

J. BURTON/ GETTY IMAGES

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

MEDICAL MICROBIOLOGY

Secret sex life

Curr. Biol. **15,** 1242–1248 (2005)
A fungus that causes life-threatening infections may have been having sex under researchers' noses. Until now, they thought it reproduced only asexually.

Aspergillus fumigatus can cause serious respiratory illness in people with weakened immune systems, and is a major cause of allergies. Paul Dyer from the University of Nottingham, UK, and his colleagues found that the *A. fumigatus* genome contains active genes very similar to those that other fungal species need for sex. They also discovered two different mating types, and evidence that genes can transfer between different populations. If the fungus has been hiding a furtive sex life, geneticists could perform breeding experiments to uncover the genes it uses to cause disease.

SYNTHETIC BIOLOGY

Close couple

Nature Chem. Biol. doi:10.1038/chembio719 (2005)
Scientists have designed a way to make proteins that works independently of the