RESEARCH HIGHLIGHTS

Male eggs laid last

Proc. Natl Acad. Sci. USA **103,** 14406–14411 (2006)

House finches (*Carpodacus mexicanus*, pictured) have a smart strategy to spare their chicks from parasites. Females whose nests are infested with mites lay female-bearing eggs first and male ones last. Male chicks then grow faster than the females.

The strategy helps to ensure that reproductive output is damaged as little as possible by the infestation, say researchers led by Alexander Badyaev of the University of Arizona in Tucson. Male chicks are more vulnerable to being killed by mites, so laying them last and giving them more of a growth spurt minimizes their time in the nest while allowing them to grow to full fledging size in a shorter time.

A. BADYAEV

CANCER BIOLOGY

Breaking and entering

Genes Dev. doi:10.1101/gad.1451806 (2006)

To spread, or metastasize, around the body, cancer cells must escape from their site of origin. Doing so requires crossing the basement membrane, a specialized barrier of connective tissue.

Stephen Weiss and his colleagues at the University of Michigan, Ann Arbor, have identified three enzymes that allow tumours to degrade proteins in the basement membrane, opening a hole through which cancer cells can escape. Expression of any one of the three enzymes is enough to chew through the barrier.

Once the hole is there, tumour cells squeeze through, amoeba-style. Knowing the enzymes that puncture the basement membrane could enable future cancer therapies to target this process.

PHYSICS

Silicon success story

Phys. Rev. Lett. **97,** 116101 (2006)

Researchers at Vanderbilt University in Nashville, Tennessee, have unpicked one of the reasons why silicon has been so successful in electronics.

When silicon is heated to temperatures above 800 °C, its surface layer becomes oxidized, turning into silicon dioxide. The interface between the silicon and the insulating oxide layer is exceptionally smooth, which is essential to making high-performance electrical devices.

Leonidas Tsetseris and Sokrates Pantelides modelled the oxidation process. They found that the random deposition of oxygen, which might be expected to give a rough interface, is counteracted by relaxation processes (such as diffusion of the oxygen) activated by the high temperatures.

ENVIRONMENTAL SCIENCE

Storm surge

Science doi:10.1126/science.1129116 (2006)

Hurricanes seem to be the main factor in replenishing inorganic sediments along the US Gulf Coast. This finding will have to be taken into account in plans to restore the region's wetlands by diverting rivers into the marshes — an effort meant, in part, to increase sedimentation rates.

The results come from a team led by R. Eugene Turner, of Louisiana State University in Baton Rouge, which walked, boated and helicoptered along the ravaged shoreline after Hurricanes Katrina and Rita hit Louisiana and Texas last autumn. Mud samples revealed the huge amounts of inorganic sediments left by the storms — 227 times the amount introduced by one river diversion built for wetland restoration.

The health of marshes depends on many factors, however, and river diversions may bring other benefits.

SCIENCE

IMMUNOLOGY

To the root of the problem

Cell **126,** 1121–1133 (2006)

A molecule called RORγt helps to promote inflammation and might be targeted by new drugs to fight autoimmune diseases such as multiple sclerosis and rheumatoid arthritis.

A certain population of immune cells, called Th17 cells, is known to promote inflammation and be a key driver of autoimmune disease. RORγt directs the development of these cells, say Daniel Cua at Schering–Plough BioPharma in Palo Alto, California, Dan Littman at the Skirball Institute of Biomolecular Medicine in New York and their colleagues. They found that mice lacking RORγt are resistant to autoimmune disease and have fewer Th17 cells.

RORγt triggers the production of inflammation-provoking cytokines and may normally help to control the numerous bugs in the gut.

NEUROSCIENCE

Insight into Alzheimer's

Science 10.1126/science.1132341 (2006); *Science* **313,** 1781–1784 (2006)

Two studies give new insight into the biology of β-amyloid, the protein that forms clumps in the brains of Alzheimer's patients.

One team studied an enzyme called β-secretase, which is targeted by current drug therapies. It is needed for β-amyloid to form, but its normal function was unknown.