

RESEARCH HIGHLIGHTS

Losing Louisiana

Nature Geosci. 2, 488–491 (2009)

The Mississippi Delta is sinking, and to rebuild it some have proposed diverting the Mississippi River to carry sediment to coastal areas. But a new study shows that the delta's rivers don't have enough sediment to counter predicted sea-level rise.

Mike Blum and Harry Roberts, both then working at Louisiana State University in Baton Rouge, found that the rivers currently transport less sediment than the amount that was needed for delta formation. Sinking land and accelerating sea-level rise will submerge 10,500–13,500 square kilometres by 2100, they predict.

Even if sediment trapped in dams was freed, the duo found, the rivers still couldn't supply the 18–24 billion tonnes needed to keep the delta above water until the end of the century.



M. BLUM/NASA

CANCER BIOLOGY

Double agent

Science 324, 1713–1716 (2009)

A protein associated with some cancers acts in the energy-producing organelles of the cell called mitochondria.

The protein, STAT3, regulates gene expression. It is activated by the addition of a phosphate group, which sends the protein into the nucleus. Transformation of healthy cells into cancerous ones by the small protein Ras is inhibited by an absence of normal STAT3. But David Levy of New York University School of Medicine and his colleagues found that STAT3 mutants that cannot accept the phosphate or cannot bind to DNA still allow Ras to transform cells.

Surprisingly, the researchers found that STAT3 is active in mitochondrial metabolism, and during transformation mediates metabolic changes necessary for cancers to grow.

NEUROSCIENCE

Early bird learns the tune

PLoS ONE doi:10.1371/journal.pone.0005929 (2009)

Scientists have assumed that vocal learning in songbirds starts with subsongs — the bird equivalent of infant babbling. But Wan-chun Liu from the Rockefeller University, New York, and his colleagues, have determined that vocal learning begins much earlier — when juveniles first beg for food.

When begging, juvenile male chipping sparrows (*Spizella passerina*) exhibit neural activity in part of the forebrain associated with learned song, the team found. And begging patterns appear in the sparrows' first subsongs.

Auditory feedback is crucial to vocal learning, and distinguishes it from innate

calls. Deafening affected the structures of males' begging calls, but had no such effect on females; female chipping sparrows do not sing and their begging calls are innate.

PHYSIOLOGY

Ground control

Biol. Lett. doi:10.1098/rsbl.2009.0360 (2009)

The limits on acceleration are commonly described in terms of horsepower, be it from internal combustion or accompanied by real hoofbeats.

But motorbike and drag-racing aficionados know that too much acceleration can lift front wheels off the ground, sacrificing control. Sarah Williams and her colleagues from the Royal Veterinary College in Hatfield, UK, have found that quadrupeds face the same problem.

Data from racing greyhounds (pictured, below) and polo ponies showed that acceleration limits at high speeds are predicted by models of muscle power. At

lower speeds, however, animals do not reach the acceleration theoretically possible from muscle power. Instead they seem to be limited by the rate that would cause the quadruped equivalent of a 'wheelie'.

ECOLOGY

Putting height on the map

J. Ecol. doi:10.1111/j.1365-2745.2009.01526.x (2009)

Average plant height peaks in the tropics and declines towards the poles, says an international team after analysing a data set of almost 6,000 species. Plants living near to the equator are 29 times taller on average than those found between 60–75 °N (in Iceland, say) and 31 times taller than those at 45–60 °S (such as on the South American archipelago of Tierra del Fuego).

Plant height drops 2.4-fold at the edge of the tropics, suggesting that temperate and tropical species pursue different ecological strategies, according to Angela Moles of the University of New South Wales in Sydney, Australia, and her colleagues. Cold or dry places support plants with a range of heights, but there are few short species in warm, wet environments. Rainfall in the wettest month of the year is the best predictor of plant height, the researchers say.

EVOLUTIONARY DEVELOPMENT

The birth of a thymus

Cell doi:10.1016/j.cell.2009.04.017 (2009)

In a broad-ranging study, Thomas Boehm of the Max Planck Institute of Immunobiology in Freiburg, Germany, and his colleagues attempt to reconstruct the evolutionary history of the thymus, the immune-system organ where T cells accumulate and mature.

The authors looked at the expansion and diversification of genes implicated in T-cell



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