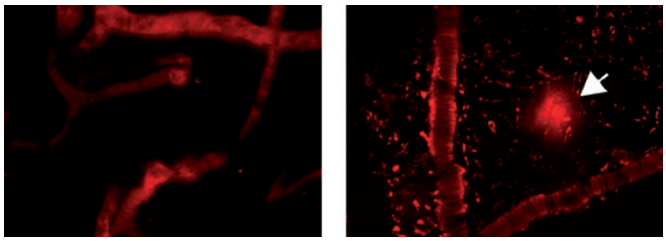


NATL. ACAD. SCI.

GEOLOGY

Earthquake risk has not risen

A spate of large earthquakes has shaken the world in recent years, with five reaching a magnitude greater than 8.5 since 2004. This has led some to question whether earthquakes come in clusters, and whether, at present, the risk of large quakes is temporarily above the norm. But Andrew Michael of the US Geological Survey in Menlo Park, California, shows that apparent clusters of large quakes in the global record are indistinguishable from random variability.

He applied three classes of statistical tests to earthquakes of magnitude greater than 7 that have occurred since 1900, and omitted the localized aftershocks connected to each quake. He demonstrates that similar clusters would still be found if the quakes were independent, random events occurring at a low but constant average rate. He concludes that the risk of future earthquakes has not increased, except within ongoing aftershock sequences.

Geophys. Res. Lett. **http://dx.doi.org/10.1029/2011GL049443 (2011)**

NEUROIMAGING

Getting past a brain block

A physiological defence mechanism called the blood–brain barrier prevents toxins from entering the brain, but it also blocks molecules such as drugs and fluorescent dyes. Tara Spires-Jones at the Massachusetts General Hospital in Charlestown and her colleagues circumvented this problem by coating molecules with carbohydrate nanoparticles.

The researchers show that the nanoparticles allow imaging dyes, contrast agents and antibodies that normally cannot cross the blood–brain barrier to be rapidly delivered into the mouse brain. By injecting a nanoparticle-coated dye that binds to the protein plaques found in the brains of people with Alzheimer's disease, the authors visualized the plaques in a mouse model of the disease (**pictured right**, with arrow). This was not possible when using the dye alone (**left**).

The nanoparticles bind to a protein in the bloodstream called apolipoprotein E, which allows them to penetrate the blood–brain barrier without disrupting it.

Proc. Natl Acad. Sci. USA **http://dx.doi.org/10.1073/pnas.1111405108 (2011)**

METABOLISM

Genetic switch for big muscles

Shutting down a gene-regulating protein boosts mouse muscle mass and exercise endurance, as well as insulin sensitivity.

Johan Auwerx at the Swiss Federal Institute of Technology Lausanne (EPFL) and his colleagues deleted the gene that encodes NCoR in the muscles of mice. The mutant animals ran for a longer period of time and over a greater distance than normal mice. Their muscles also contained higher numbers of power-generating cellular organelles called mitochondria.

In a separate study, Jerrold Olefsky at the University of California, San Diego, and his co-workers, including Auwerx, deleted the gene in fat cells in mice. The authors found that the animals became more obese than did normal mice when fed a high-fat diet, but had higher insulin sensitivity in liver, muscle and fat tissues.

Gene-expression analysis of the mutant mice revealed that the most upregulated set of genes was associated with the PPAR-γ signalling pathway, which is involved in fat-cell development and insulin sensitivity.

Cell 147, **827–839; 815–826 (2011)**

ANIMAL COGNITION

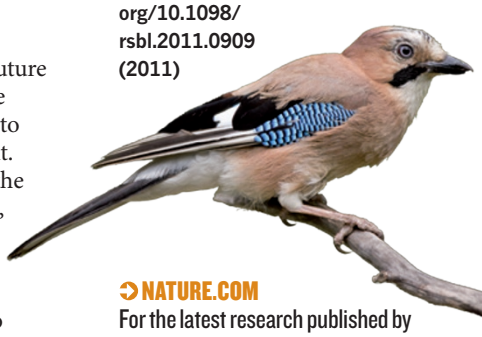
Jays plan meals in advance

The ability to plan for a future need that differs from the current one was thought to be a uniquely human trait. However, researchers at the University of Cambridge, UK, show that Eurasian jays (*Garrulus glandarius*; **pictured**) stash snacks according to their anticipated future desires, even if that means saving something they don't currently want.

Lucy Cheke and Nicola Clayton fed the birds with one type of food, such as peanuts, and then gave them an opportunity to store that food and another type, such as raisins, in two trays. The duo trained the birds to learn that in subsequent stages of the experiment they could access only one specific tray at a time. The birds sorted their snacks into the trays so that they could, at the next stage, access the food type that they would most desire at that time — that which they had not eaten in the previous stage.

The results suggest that the birds are able to override a current motivational state to plan for a future desire.

Biol. Lett. **http://dx.doi.org/10.1098/rsbl.2011.0909 (2011)**



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DEVELOPMENTAL BIOLOGY

How the zebrafish brain mends itself

HIGHLY READ on dev.biologists.org in October

Adult zebrafish can regenerate brain cells after injury; now researchers in Germany have traced the origin of the replacement cells.

Michael Brand and his colleagues at the Technical University of Dresden engineered zebrafish in which they could follow the lineage of developing neural cells as the adult brain recovered from a stab injury. The team found that the basic brain architecture was restored, with no apparent scarring in a type of neural cell called glia. Neural progenitor cells called radial glia divided and generated neuroblasts — cells that develop into neurons — which then travelled to the site of injury.

The newly generated neurons survived for more than three months and expressed proteins appropriate to adult neurons.

Development 138, **4831–4841 (2011)**