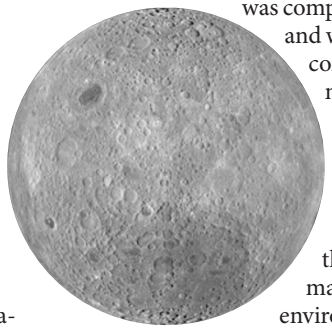
adaptation in nature.

Other traits, such as body size, did not show a pattern of adaptation in either country. The findings support the idea that, in a changing climate, animals evolve mainly by adapting to changes in seasonal shifts.

Am. Nat. **http://dx.doi.org/10.1086/664709 (2012)**

MICROBIOLOGY

New species spring forth



ARIZONA STATE UNIV./GSFC/NASA

Microorganisms in a Siberian hot spring have been caught in the act of diverging to form two species.

Rachel Whitaker at the University of Illinois in Urbana-Champaign and her team sequenced the genomes of 12 strains of *Sulfolobus islandicus* — an archaeon living in hot springs around a volcano on Russia's Kamchatka Peninsula. The sequences show that the microbes belong to two groups — dubbed red and blue — and that genes are exchanged more readily within than between the groups. This means that each group of microbes meets the classic definition of a biological species.

The authors think that physiological differences between the two populations could be preventing gene flow. For instance, strains of the red group replicate faster and to higher densities than do those of the blue group.

PLoS Biol. 10, **e1001265 (2012)**

GEOLOGY

Stretch marks on the Moon

The Moon has been stretched within the past 50 million years — a surprising and relatively recent sign of extensional tectonics for a body that has been around for 4.5 billion years.

Using a camera on NASA's Lunar Reconnaissance Orbiter, Thomas Watters of the Smithsonian Institution in Washington DC and his colleagues spotted graben — long, narrow blocks of rock that drop down and form trenches as the Moon's crust is stretched. Some of the graben are as shallow as one metre, suggesting that, in geological terms, they are fresh.

The authors suggest that their findings are inconsistent with models that predict that the primordial Moon was completely molten and would have contracted so much that local extensional pressures would have been quashed. Instead, the graben may reflect an environment of weaker contractions that resulted from the early Moon having only a molten exterior.

Nature Geosci. **http://dx.doi.org/10.1038/ngeo1387 (2012)**

NEUROSCIENCE

Cognitive boost to brain connections

By sensitizing the process by which neurons normally alter the strength of their connections, a molecule derived from a neuronal protein improves learning and memory in rats.

José Esteban at the Autonomous University of Madrid and his colleagues studied the effects of the molecule, FGL, on rats and on slices of the rat hippocampus, a brain region involved in learning and memory. They showed that FGL caused persistent activation of signalling molecules in hippocampal neurons. This set in motion a chain of molecular events that increased the efficiency with which a type of receptor called AMPA was inserted into neuronal connections, or synapses. The incorporation of additional AMPA receptors into synapses is known to improve synaptic plasticity.

The authors hope that FGL could provide a starting point for the development of drugs that boost cognition.

PLoS Biol. 10, **e1001262 (2012)**

COMMUNITY CHOICE

The most viewed papers in science

MOLECULAR BIOLOGY

Noncoding RNAs decapped

HIGHLY READ on www.cell.com 22 Jan–21 Feb

Long RNA molecules have recently been discovered that seem to regulate genes rather than code for proteins, but little is known about how they do this. Loss of a protective cap from these long noncoding RNAs (lncRNAs) seems to be a crucial step in regulating a specific type of gene in yeast.

Like protein-encoding messenger RNAs, lncRNAs have a cap that protects the molecule from decomposing. By preventing loss of the cap in budding yeast, Jeff Coller and his colleagues at Case Western Reserve University in Cleveland, Ohio, found that many lncRNAs function at genomic regions near highly regulated genes that respond to specific environmental cues such as sugars and iron. One family of these 'inducible' genes — the GAL system, which enables cells to metabolize a sugar called galactose — is regulated by lncRNAs that must lose their caps for the cell to activate the sugar-processing genes.

Mol. Cell 45, **279–291 (2012)**

PALAEOECOLOGY

Ancient forest preserved in ash

Volcanic ash buried a swampy forest roughly 298 million years ago, preserving a wealth of detail about the region's flora. Scientists have uncovered the fossilized plants in what is now northern China.

Jun Wang at the Chinese Academy of Sciences in Nanjing, Hermann Pfefferkorn at the University of Pennsylvania in Philadelphia and their team reconstructed the ancient ecosystem by analysing the positions of individual plants across three sites (an artist's impression **pictured**) that cover a combined area of more than 1,000 square metres. Besides sporting a broad, low canopy of tree ferns, the peat forest contained trees that looked like feather dusters and reached heights of 25 metres or more. The team also found fossils of vines and three species of Noeggerathiales — small spore-bearing trees thought to be close relatives of the earliest ferns.

REN YUGAO

Proc. Natl Acad. Sci USA **http://dx.doi.org/10.1073/pnas.1115076109 (2012)**

For a longer story on this research, see go.nature.com/eklwre

NATURE.COM

For the latest research published by *Nature* visit:
www.nature.com/latestresearch