

of their neighbors through energy transfer after absorbing light themselves. Mongin *et al.* now show that certain nanoparticles can act as triplet sensitizers. — JSY

Science, this issue p. 369

GEOCHEMISTRY

New crustal clues from old rocks

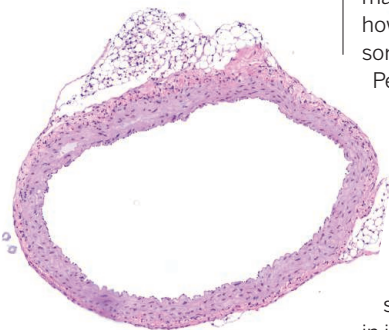
The ghost of continental crust long eroded away may exist in certain element ratios found in Archean rocks. Tang *et al.* used Ni/Co and Cr/Zn ratios as a proxy for the magnesium oxide that long ago weathered away in Earth's oldest rocks. This allowed a reconstruction of rock composition, which appears to be very different from that of the crust today. The shift to contemporary crust composition occurred after the Archean era, suggesting the onset of plate tectonics. — BG

Science, this issue p. 372

VASCULAR BIOLOGY

Raising blood pressure with age

Hypertrophy of vascular smooth muscle cells increases blood pressure. The activation of angiotensin AT1 receptors in vascular smooth muscle cells by angiotensin II can trigger either proliferation or hypertrophy, depending on age. Nishimura *et al.* discovered that an age-related increase in the association of AT1 receptors with purinergic P2Y₆ receptors explained the different responses to angiotensin II. Vascular smooth muscle cells



Angiotensin II-induced hypertrophy in mouse aorta

from young mice had fewer P2Y₆ receptors than those from older mice. Angiotensin II increased the proliferation of vascular smooth muscle cells from young mice but increased cell size in those from older mice by activating different signaling pathways. — WW

Sci. Signal. **9**, ra7 (2016).

COMPARATIVE BEHAVIOR

Let me comfort you

Consolation behavior promotes stress reduction of one by another. We know that consolation occurs in humans and apes. Burkett *et al.* observed that within a pair of monogamous prairie voles, an unstressed partner increased its grooming of a stressed partner. Furthermore, the unstressed partner matched the stressed partner in its stress hormone response. Thus, consolation may be more common than assumed in animals, and prairie voles may prove a useful model for understanding the physical and neural mechanisms underlying consolation behavior. — SNV

Science, this issue p. 375

NEURODEVELOPMENT

Neuronal migrations follow vascular pathways

In the developing brain, various types of cells migrate from their birthplaces to their workplaces. Oligodendrocyte precursors, which develop to form the insulating sheaths that make signal transmission along an axon faster, travel farther than many. Tsai *et al.* now show just how the oligodendrocyte precursor cells find their way (see the Perspective by Dejana and Beltsholtz). The progenitor cells follow along the endothelial cells of the vasculature. Disrupting endothelial cells interfered with oligodendrocyte migration, leaving some sections of the brain deficient in insulators. — PJH

Science, this issue p. 379; see also p. 341

IN OTHER JOURNALS

Edited by **Kristen Mueller** and **Jesse Smith**



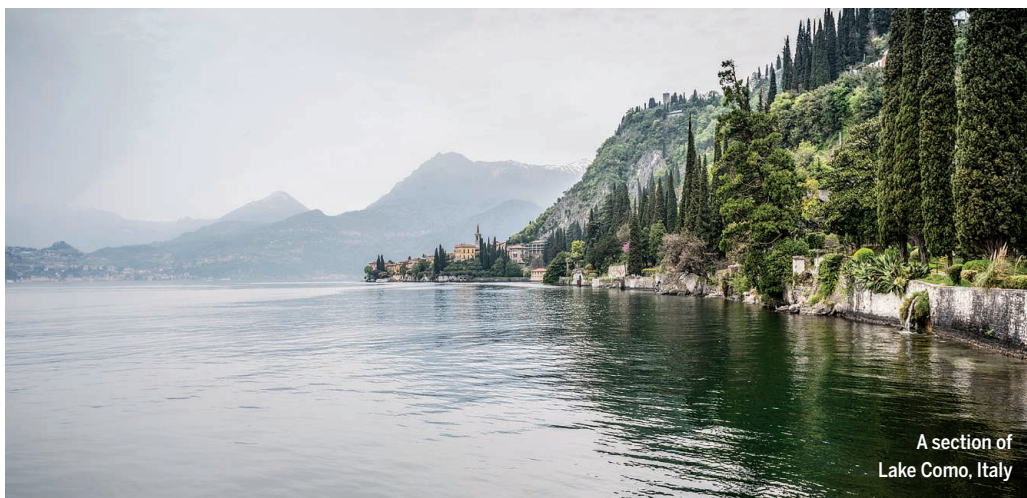
Mites and humans have a long evolutionary history

GENOMICS

Humans and mites: A love story

Like it or not, skin mites can inhabit our skin. They live—mostly harmlessly—deep in our pores and sebaceous glands. To better understand their genetic diversity, Palopoli *et al.* took skin samples from 70 people living in the United States with a variety of ancestries. Genetic sequencing of their mitochondria allowed the scientists to calculate the rate of the mites' evolution. This revealed an evolutionary timeline for the mite variants and, therefore, of their human hosts. The results show that mites have been associates of humans since we evolved. Specifically, people of African descent have the greatest mite strain variance and those of European descent, the least, with a range of distinct geographically distributed variants in between. — CA

Proc. Natl. Acad. Sci. U.S.A. **112**, 15958 (2015).

A section of
Lake Como, Italy

CLIMATE CHANGE

Variations in lake temperature trends

Lake ecosystems are very sensitive to even small changes in water temperature, so knowing how their temperatures are changing in response to global warming is important for understanding nutrient cycling, ecosystem productivity, and food web interactions within them. O'Reilly *et al.* combined satellite and in situ surface summertime water temperature data for nearly 250 lakes worldwide, in order to determine broad trends as well as variability across a range of lake sizes and geomorphologies. They show that surface-water warming rates depend both on climate and local factors, and they find that there is less regional consistency in lake warming than has been supposed. This implies that predicting how lake ecosystems will respond to climate change depends on much more than simply where the lake is located. — HJS

Geophys. Res. Lett. 10.1002/2015GL066235 (2015).

GRAPHENE

Stretching a graphene nanoribbon

External magnetic fields can have a profound effect on the behavior of electrons in a material, but creating sufficiently large fields is tricky. In graphene, however, researchers have shown that straining the material leads to large “pseudomagnetic” fields that affect the electrons in a similar way. These fields tend to be non-uniform and concentrated in small areas. Using the theory of elasticity and computer simulations, Zhu *et al.* now show that it is possible to create the desirable uniform fields of tailored strengths by pulling on the ends of a graphene nanoribbon. The trick is in the tapered shape of the nanoribbon; varying the shape and the length of the ribbon produces fields of different strengths. — JS

Phys. Rev. Lett. **115**, 245501 (2015).

PHOTOCATALYSIS

Titanium and oxygen pulled apart by light

Light absorption often prompts extremely rapid chemical changes in the absorbing medium that in turn can stimulate chemical reactivity. Yoo *et al.* applied ultrafast electron microscopy to elucidate these changes in a class of titanium silicate catalysts that harness light to transform nitric oxide, CO₂, and various other small molecules. The titanium centers start out in a square pyramidal geometry with a double-bonded oxygen at the apex. Less than trillionths of a second after the light absorption, the microscopy data captured a lengthening of this bond that was consistent with reduction of the titanium to a Ti³⁺–O¹⁻ motif primed for ensuing reactivity. — JSY

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1522869113 (2016).

PSYCHOLOGY

Studying improves learning, too

Fifteen years ago, the passage of the No Child Left Behind Act in the United States ushered in an era of increased testing, for the purpose of measuring achievement, in primary and secondary schools. Eight years ago, a seminal study demonstrated that repeatedly testing already-learned information in one group of students enhanced their retention of those items, whereas repeated studying in another group seemed to have little effect. Soderstrom *et al.* use both modes of repetition in individual students and replicate the earlier results, but also find that spaced restudy of those items further increases learning beyond the effect of repeated testing. — GJC

Psychol. Sci. 10.1177/0956797615617778 (2015).

PLANT SCIENCE

For rRNAs, it's location, location, location

Genes that encode ribosomal RNAs (rRNAs), key components of the protein synthesis machinery, are found in many copies in tandem. Epigenetic chromatin modifications silence excess rRNAs, but scientists do not fully understand what regulates such silencing. Studying the plant *Arabidopsis*, Chandrasekhara *et al.* mapped individual rRNA genes to their specific chromosomes and found that location matters: *Arabidopsis* leaves expressed rRNAs located on chromosome 4 but not those on chromosome 2. Relocating rRNA genes on chromosome 2 to chromosome 4 led to their expression. Thus, transcription of rRNA genes may be regulated in one fell swoop by a chromosomal regulatory control center. —PJH

Genes Dev. **30**, 10.1101/gad.273755.115 (2016).

CANCER METASTASIS

Suppressing cancer spread

Preventing cancer metastasis is a major challenge, but the discovery of potential new metastasis suppressor genes may help guide new therapies. Ozturk *et al.* now show that relative to nonmetastatic cells, metastatic breast cancer cell lines express lower amounts of the protein serum deprivation response (SDPR). When the authors overexpressed SDPR in metastatic breast cancer cells, the cells migrated poorly in culture, and when injected into mice, they showed a reduced ability to disseminate to the lung. Analysis of gene expression data sets indicated a loss of SDPR in multiple tumor types. The gene encoding SDPR appears to be silenced by an epigenetic mechanism: DNA methylation of its promoter. — LC

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1514663113 (2016).

Stretching a graphene nanoribbon

Jelena Stajic

Science **351** (6271), 351-352.
DOI: 10.1126/science.351.6271.351-c

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