production. Desai *et al*. present a high-resolution structure of the 75-component yeast mitoribosome, determined by electron cryomicroscopy. Mitoribosomes share an ancestor with modern bacterial ribosomes. Comparing the structure of the yeast mitoribosome with mammalian mitoribosomes suggests how they have evolved differently to perform species-specific functions. —VV

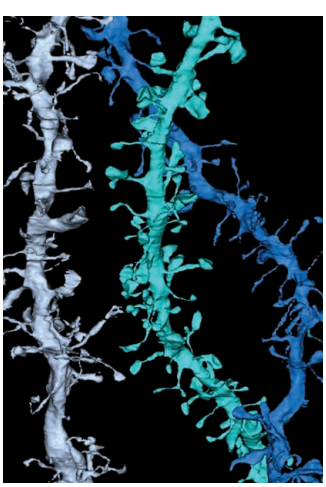
Science, this issue p. 528

SLEEP RESEARCH

Synapse remodeling during sleep

General activity and information processing while an animal is awake drive synapse strengthening. This is counterbalanced by weakening of synapses during sleep (see the Perspective by Acsády). De Vivo *et al*. used serial scanning electron microscopy to reconstruct axon-spine interface and spine head volume in the mouse brain. They observed a substantial decrease in interface size after sleep. The largest relative changes occurred among weak synapses, whereas strong ones remained stable. Diering *et al*. found that synapses undergo changes in synaptic glutamate receptors during the sleep-wake cycle, driven by the immediate early gene *Homer1a*. In awake animals, *Homer1a* accumulates in neurons but is excluded from synapses by high levels of noradrenaline. At the onset of sleep, noradrenaline levels decline, allowing *Homer1a* to move to excitatory synapses and drive synapse weakening. —PRS

Science, this issue p. 457, p. 507; see also p. 511



3D reconstructions of mouse neuronal dendrites

PHOTOS (FROM LEFT): DE VIVO *ET AL*.; SUDRES JEAN-DANIEL/HEMIS.FR

CHROMOSOMES

Tethering DNA for packing purposes

Condensin protein complexes are critical for chromosome segregation and compaction. They form ring-shaped structures that encircle and topologically constrain DNA strands. Wang *et al*. show that *Bacillus subtilis* condensin complexes hold the two arms of the circular chromosome together (see the Perspective by Sherratt). The complexes seem to do this by encircling individual DNA duplexes and then tethering the two duplexes together by "handcuffing." The complexes actively travel along the DNA and function to enlarge DNA loops processively, leading to chromosome compaction. —GR

Science, this issue p. 524; see also p. 460

PHYSICS

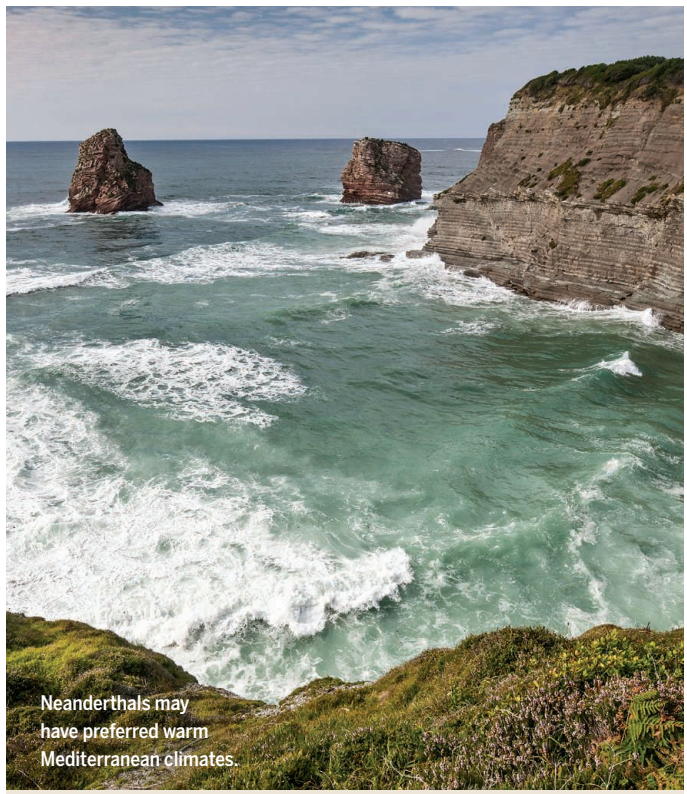
Getting a sense of atomically thin materials

Two-dimensional materials such as graphene and transition metal dichalcogenides provide a powerful platform for optoelectronic applications. As the materials get thinner, however, characterizing the electronic properties can present an experimental challenge. Lovchinsky *et al*. demonstrate that atomic-like impurities in diamond can be used to probe the properties of 2D materials by nanometer-scale nuclear quadrupole resonance spectroscopy. Coherent manipulation of shallow nitrogen-vacancy color centers enabled probing of nanoscale ensembles down to several tens of nuclear spins in atomically thin hexagonal boron nitride. —ISO

Science, this issue p. 503

IN OTHER JOURNALS

Edited by **Sacha Vignieri** *and* **Jesse Smith**



Neanderthals may have preferred warm Mediterranean climates.

PALEOANTHROPOLOGY

Interglacial Neanderthal habitats

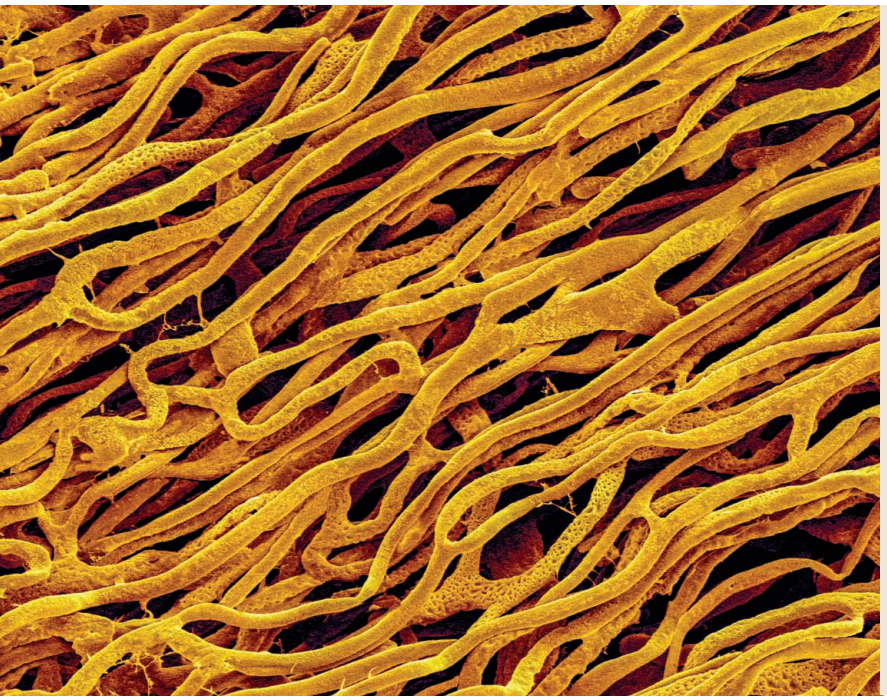
Despite burgeoning research in Neanderthal archaeology in recent years, much remains to be discovered about their interactions with the paleoenvironment. Using a species distribution modeling approach, Benito *et al*. studied how climate and topography shaped Neanderthal distribution in Europe during the Last Interglacial optimum around 120 thousand years ago, when the climate was warmer than it is today. Archaeological records and paleoclimatic data indicate that Mediterranean coastal regions with locally varied topography and mild summers were the most favored habitat. Montane regions such as the Alps and Pyrenees, as well as the central European plains, once thought to be the core Neanderthal habitat, were suboptimal because of low winter temperatures. —AMS

J. Biogeogr. **44**, 51 (2017).

CANCER

Regulator loop enabling cancer cell growth

It is not easy being a cancer cell, so such cells may need help from factors other than oncogenes that contribute to the cancer cell phenotype. Bublik *et al*. identify such a factor in protein fibroblast growth factor 13 (FGF13). FGF13 does not function like a regular growth factor. Instead, it acts in the nucleolus to repress transcription of ribosomal RNA and inhibit protein synthesis. Furthermore, it is tightly linked to the action of



BLOOD VESSEL DISEASE

Targeting nitric oxide to treat aneurysm

Aneurysms are the abnormal enlargement of arteries and can lead to death if the artery wall bursts. Oller *et al.* studied patients with Marfan syndrome, an inherited genetic condition in which individuals are prone to cardiac aneurysms. They discovered lower levels of ADAMTS1 in the heart tissue of Marfan syndrome patients compared with that of organ transplant donors. Genetic inactivation of ADAMTS1 in mice resulted in a Marfan syndrome–like disease, which included low blood pressure, aortic dilation, and aneurysm development. These effects were driven by enhanced activity of nitric oxide, and treatment with a nitric oxide inhibitor reduced blood vessel size and reversed the clinical signs of aneurysm formation. —PNK

Nat. Med. 10.1038/nm.4266 (2017).

Could nitric oxide inhibitors help prevent cardiac aneurysm?

the tumor suppressor p53. The p53 protein inhibits expression of the *FGF13* gene, which also encodes a microRNA that in turn down-regulates p53, forming a negative feedback loop. FGF13 may help cancer cells avoid the toxic effects of excessive protein synthesis and could therefore be targeted for cancer therapy. —LBR

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1614876114 (2016).

NEUROGENOMICS

ERVs affect brain gene expression

In mammals, endogenous retroviruses (ERVs) provide genomic sequences that can bind to transcription factors that promote transcription of both the ERVs and nearby host genes. In humans, specific developmental stages exhibit repression of ERV transcription. In contrast, cellular genetic networks regulated by proximal ERVs have been identified, suggesting that their expression can be either useful or harmful for the host. To test this idea, Brattås *et al.* examined ERV transcriptional regulation across stages of human brain development. They found dynamic ERV expression across developmental stages and identified a protein, TRIM28, that silenced transcription of ERVs in early development. These data indicate that selection may be driving evolution to optimize the effects of parasitic genomic elements such as ERVs. —LMZ

Cell Rep. **18**, 1 (2017).

IMMIGRATION

Want lower crime? Legalize immigrants

Immigrants granted legal status in Italy committed less crime compared with those who were not granted legal status. Applications for legal status are submitted online at particular times each year ("click days") and processed on a first-come, first-served basis. Pinotti accessed data on the timing of over 110,000 applications on click days in 2007 and compared applicants who submitted before versus after the quota was reached (usually within 30 to 60 min). In the year after the click days, the crime rate declined from 1.1 to 0.8% for immigrants who applied before the cutoff but remained at 1.1% for those who missed the cutoff. The effect is dominated by those having few economic opportunities before legalization. —BW

Amer. Econ. Rev. **107**, 138 (2017).

ASTEROSEISMOLOGY

A Neptunian mirror for solar oscillations

The Sun's brightness varies by a tiny amount because of seismic oscillations. The Kepler satellite has detected the same process on other Sun-like stars, which can be used to determine their mass and radius. Gaulme *et al.* examined Kepler observations of Neptune, which reflects sunlight from its clouds, faintly enough not to saturate Kepler's detectors. They detected the Sun's oscillations, but these implied a mass and radius that were both too high. Observations from other facilities show that this is because the Sun was in an unusually active period. Scaling relations for other stars may have underestimated the systematic uncertainty in determining mass and radius. —KTS

The Kepler satellite

Astrophys. J. **833**, L13 (2016).

PHYSICS

Catching a glimpse of an exotic lattice

We normally think of a crystal lattice as consisting of atoms. At low temperatures and densities, however, electrons are expected to form a crystal of their own—the so-called Wigner crystal. This phase is very fragile and thus tricky to detect reliably. Jang *et al.* used pulsed tunneling spectroscopy to detect signatures of this elusive phase in the form of sharp resonances that appeared when the solid, a GaAs/AlGaAs heterostructure, was exposed to high magnetic fields. The resonances appeared as a consequence of vibrations of the Wigner lattice. Their sharpness suggested long-range correlations in the crystal. The technique may be applicable to probing other electronic orders. —JS

Nat. Phys. 10.1038/nphys3979 (2016).

PHOTOS (FROM TOP): SUSUMU NISHINAGA/SCIENCE SOURCE; NASA AMES/JPL-CALTECH/T PYLE

ERVs affect brain gene expression

Laura M. Zahn (February 2, 2017)

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Editor's Summary

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