

interaction regulated the return to a resting state, but one that was not quite as quiescent as the original state. Stem cells in this resting but primed state sustained the stem cell pool. —PJH
Science, this issue p. 292

STRUCTURAL BIOLOGY

Transmitting signals across the synapse

Glutamate receptors located on neuronal cells play a role in mediating electrical signals at excitatory synapses. These glutamatergic synapses are extremely important for nearly all cognitive functions. Elegheert *et al.* analyzed a complex that bridges the synapse, comprising β -neurexin 1, a cell adhesion molecule on the surface of presynaptic axons; cerebellin 1, a synaptic organizer; and the postsynaptic glutamate receptor GluD2. The structural and functional analysis provides insight into the mechanism of synaptic signaling. —VV

Science, this issue p. 295

GLACIERS

The heat is on

Rising surface air temperatures are understood to cause glacial melting, but it is becoming increasingly clear that the ocean also has a strong impact. Cook *et al.* studied glaciers that drain the Antarctic Peninsula and found a strong correlation between mid-depth ocean temperatures and glacier-front changes along the peninsula's western coastline. Glaciers in the south, which are exposed to warmer waters, have



Antarctic glacier from the melting Larsen B ice shelf (Antarctic Peninsula)

undergone significant retreat, while those in the northwest, which terminate in cooler waters, have not retreated as much or as uniformly. Thus, ocean-induced melting appears to be the main cause of glacial retreat in the region. —HJS

Science, this issue p. 283

LITHIUM ION BATTERIES

Carbon nanotubes boost battery storage

Molybdenum disulfide is a promising anode material for lithium ion batteries. However, it is plagued with low intrinsic electrical conductivity and large strain during cycling, which cause low rate capability and fast capacity decay. Lou *et al.* designed ultrathin nanosheets of molybdenum disulfide tubular structures wired with carbon nanotubes. These modified electrode structures exhibited lithium battery storage performance with very high specific capacity, exceptional rate capability, and ultralong cycle life. —ZHK

Sci. Adv. 10.1126/sciadv.1600021 (2016).

ORGANIC CHEMISTRY

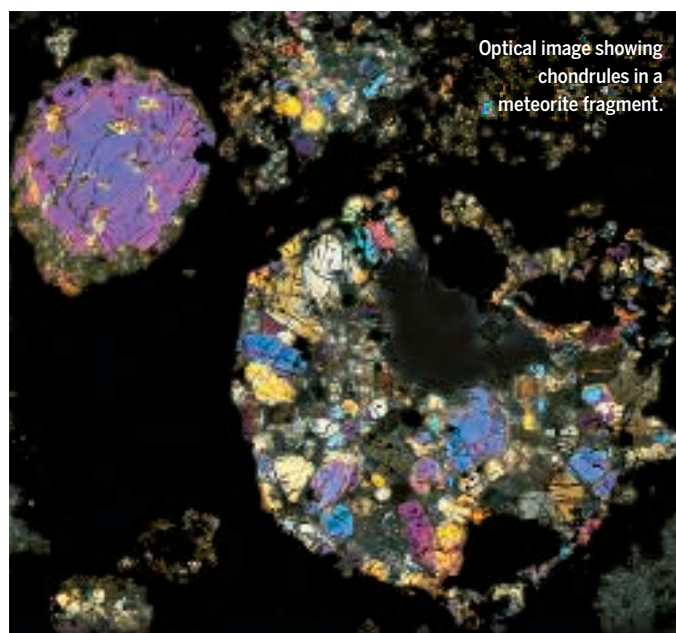
A light approach to C-N bond formation

The need to form C-N bonds arises frequently in drug discovery research. One versatile approach involves the attachment of the C and N fragments to a Pd catalyst. This approach needs a bulky ligand to "crowd" the fragments together off the metal center. Corcoran *et al.* present a complementary approach that uses Ni in place of Pd. Instead of the bulky ligand, they used a light-activated cocatalyst that strips an electron from the Ni to accelerate the bond formation. A screen involving elaborately substituted reagents confirmed the utility of this approach in cases that challenge the traditional Pd coupling. —JSY

Science, this issue p. 279

IN OTHER JOURNALS

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



Optical image showing chondrules in a meteorite fragment.

PLANETARY SCIENCE

Smashing bits to show asteroid strength

How strong is an asteroid? Earth rocks are poor analogs because of differences in composition, gravity during formation, and geologic processing. Cotto-Figueroa *et al.* tested samples from two large meteorites (pieces of asteroid that have fallen to Earth) by crushing them in a vice to measure the bulk material properties. By comparing cubes of different sizes, they extrapolated the strength of meter-sized asteroids, finding values that are consistent with the observed break-up of meteors as they enter Earth's atmosphere. The results will be useful for planning sample return or asteroid mining missions or for deflecting potentially hazardous asteroids away from Earth. —KTS

Icarus 277, 73 (2016).

HEALTH ECONOMICS

Why pay more for medicine in some places?

The cost of health care varies widely with geography in the United States, but the role of place-specific supply versus demand has been unclear. Finkelstein *et al.* studied the migration of elderly Medicare recipients to show that supply features, such as physician preference for aggressive care and the proportion of for-profit hospitals in a region, accounted for 50 to 60% of the variation. Roughly a quarter of the variability was probably due to observable

differences in patients' health, with the rest due to patients' preferences and unmeasured health issues. The findings suggest that policies aimed at changing doctors' behaviors by altering incentives could be more promising than those aimed at changing patients' preferences. —BW

Quart. J. Econ. <http://economics.mit.edu/files/11482> (2016).

TUMOR IMMUNOLOGY

A less personal cancer therapy?

Many new cancer therapies are built around the concept

PALEOGENOMICS

Immigration and admixture in Europe

The Neolithic transition in Europe marked the shift from hunting-gathering societies to sedentary farming societies. Evidence has been accumulating from DNA recovered from human remains that the transition was the result of migration and admixture of farmers from western Asia, rather than cultural transmission. The route of this migration (or migrations) has been less certain. Hofmanova *et al.* analyzed paleogenomic data from Neolithic individuals from Greek and Turkish sites to provide evidence of genetic links between early farmers in the Aegean region and those in Central Europe. Their data indicate the importance of the Aegean region as the direct migration route of early Neolithic farmers from southwest Asia into Europe. —AMS

Proc. Natl. Acad. Sci. U.S.A. **113**, 6886 (2016).

Early Neolithic farmers moved through the Aegean region as they traveled from Asia to Europe.



of personalized medicine. This includes an emerging class of therapeutic cancer vaccines that induce the immune system to destroy tumor cells expressing patient-specific neoantigens. Such vaccines may not work well for breast cancer, a tumor type that expresses few neoantigens. Conceivably, a therapeutic vaccine could be designed to target tumor-associated antigens that are shared among breast cancer patients, assuming such shared antigens exist. Munson *et al.* provide evidence that they do. They analyzed T cell receptor (TCR) sequences of tumor-infiltrating lymphocytes in 20 breast cancer patients and found a panel of TCRs shared among patients' tumors and peripheral blood that were not present in peripheral blood of healthy controls. —PAK

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1606994113 (2016).

PHYSICS

Shaping the interaction potential

Alkali atoms have been the workhorse of cold-atom research thanks to their favorable spectral

properties. Over the past decade, however, some of the alkaline earth elements, such as Sr, have proven their worth and expanded the capabilities of cold atoms as quantum simulators and optical clocks. Gaul *et al.* add another piece to the toolbox of alkaline earth elements. Using a three-state system, they optically excited some of the atoms in a Sr gas to a highly excited Rydberg state. The procedure resulted in a strong effective interaction that, for some parameters, had a pronounced peak at a finite distance. This unusually shaped potential may enable the exploration of exotic phases. —JS

Phys. Rev. Lett. **116**, 243001 (2016).



Muscle attachment sites on fossils or bones may not accurately indicate hand activities such as tool use.

ANTHROPOLOGY

Poor predictors

Although it poses a challenge, we have a great interest in understanding the behavior of extinct species. One approach that is commonly used to infer past behavior, especially of hominids, is the reconstruction of muscle anatomy from regions of muscle-to-bone attachment, or entheses, that remain on fossils or bones. Williams-Hatala *et al.* looked at hands from human cadavers to determine how accurate entheses are for predicting muscle morphology and therefore function. Looking across the measures most often used to infer hand

function and tool use in hominids, they found very little correlation between the characteristics of entheses and attached muscle morphology. Because we know little about how entheses are shaped by stress and strain, they argue, caution should be used when extrapolating complex behaviors from these remnants. —SNV

Sci. Rep. 10.1038/srep28353 (2016).

ORGAN DEVELOPMENT

Modeling pancreas development with CRISPR

Reprogramming cells from one fate to another enables researchers to generate and study rare cell types. Combining this approach with TALEN (transcription activator–like effector nuclease) and CRISPR/Cas genome-editing technologies opens the way to understanding transcriptional control of organ development. Zhu *et al.* used these methods to study pancreatic development and disease. With a direct differentiation protocol, 50- to 80%-definitive endoderm cells were generated, and transcription factors that are key to pancreatic development (PDX1, RFX6, PTF1A, GLIS3, MNX1, NGN3, HES1, and ARX) were systematically knocked out using CRISPR/Cas to generate mutant hESC lines. This work confirmed prior findings but also revealed that RFX6 regulates pancreatic progenitor number, that PDX1 is dosage-sensitive for pancreatic endocrine development, and that NGN3 has a divergent role in mice and humans. —BAP

Cell Stem Cell **18**, 755 (2016).



Immigration and admixture in Europe

Andrew M. Sugden (July 14, 2016)

Science **353** (6296), 259-260. [doi: 10.1126/science.353.6296.259-d]

Editor's Summary

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