that is essential for ALT, which could in principle be targeted to halt tumor growth. — PAK

Science, this issue p. 273

ANIMAL PHYSIOLOGY

Geese need to hug the land to fly high

Animal migrations provide numerous examples of astonishing feats. Impressive even among these is the migration of bar-headed geese across the Himalayan Mountains, which reach heights of thousands of meters. Bishop *et al.* remotely monitored birds' heart rates, movement, and body temperature during migration. The geese "hug" the landforms, taking advantage of drafting and wind patterns. This unexpected strategy conserves energy, even though it means the geese repeatedly lose, and must then regain, altitude. — SNV

Science, this issue p. 250

PALEOCEANOGRAPHY

A new tilt on predicting future ENSO variability

A new finding should improve the ability of climate models to predict the behavior of the El Niño–Southern Oscillation (ENSO) in a warmer future. Ford et al. looked at the distribution of surface and subsurface temperatures in the eastern and western equatorial Pacific 19,000 years ago and between 3000 and 6000 years ago. Temperatures fluctuated over a greater range during the older period. ENSO thus depended more on the tilt of the equatorial Pacific thermocline than on the east-to-west temperature gradient, as previously thought. — HJS

Science, this issue p. 255

WOMEN IN SCIENCE

Women's participation and attitudes to talent

Some scientific disciplines have lower percentages of women in academia than others. Leslie *et al.* hypothesized that general attitudes about the discipline would reflect the representation of women in those fields (see the Perspective by Penner). Surveys revealed that some fields are believed to require attributes such as brilliance and genius, whereas other fields are believed to require more empathy or hard work. In fields where people thought that raw talent was required, academic departments had lower percentages of women. — PJH

Science, this issue p. 262; see also p. 234

APPLIED PHYSICS

Tunnel through and emit coherently

The generation of coherent light (lasers and masers) forms the basis of a large optics industry. Liu *et al.* demonstrate a type of laser that is driven by the tunneling of single electrons in semiconductor double-quantum dots. Distinct from other existing semiconductor lasers, the emission mechanism is driven by tunneling of single charges between discrete energy levels that are electrically tunable. The ability to tune the levels by single-electron charging would allow their laser (or maser) to be turned on and off rapidly. — ISO

Science, this issue p. 285

TOPOLOGICAL MATTER

Nailing down the topology of a semimetal

Topological insulators are exotic materials that have a conducting surface state that can withstand certain types of material imperfection. Theoreticians have predicted a different kind of surface state in related three-dimensional topological Dirac semimetals, which do not have an energy gap in the band structure of the bulk. Xu *et al.* used photoemission spectroscopy to map out the band structure of the material Na_3Bi and detected the predicted surface state. Their results may lead to further insights into the physics of topological matter. — JS

Science, this issue p. 294

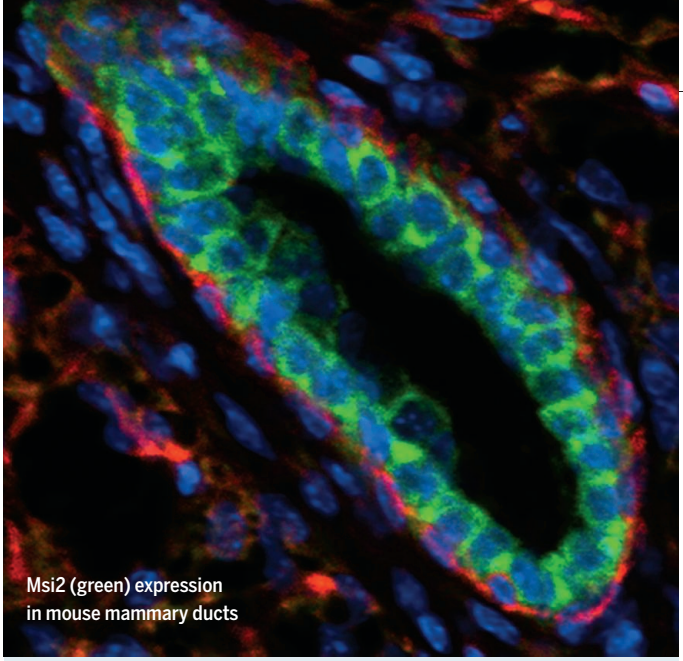
Lettuce plants are also a source of natural rubber

PLANT SCIENCE

Building rubber without rubber trees

Natural rubber trumps synthetic, petroleum-derived rubber in useful qualities such as elasticity and abrasion resistance. But rubber trees are quite susceptible to disease, leading scientists to search for other sources of natural rubber and to understand the specifics of its biosynthesis. Lettuce plants are a source of natural rubber, and now Qu *et al.* identify a scaffold protein called CPTL2 that keeps rubber-synthesizing enzymes from bouncing around the cell. Tethered to the cell's endoplasmic reticulum, CPTL2 anchors a protein important for rubber polymerization in place. Plants with reduced expression of CPTL2 could not synthesize rubber, revealing its essential role. — PJH

J. Biol. Chem. 10.1074/jbc.M114.616920 (2014).



Msi2 (green) expression in mouse mammary ducts

CANCER

Blocking tumor cell transitions

A process called the epithelial-to-mesenchymal transition allows cancer cells to invade nearby tissue and metastasize. Katz *et al*. investigated the molecular underpinnings of this process and determined that tumors with a more epithelial gene signature expressed higher amounts of the Musashi (Msi) family of RNA-binding proteins as compared to tumors with a more mesenchymal profile. High amounts of Msi proteins locked mammary cells in a state that was less mobile and incapable of differentiation. Reducing Msi expression allowed breast cancer cells to transition into a mesenchymal-like form. Msi proteins may impose an undifferentiated state on cancers, as these proteins are also abundant in neural stem cells. — LC

eLife **3**, e03915 (2014).

ENDOSOMAL SORTING

The ER gets in on an endocytic sorting act

Endosomes are organelles that carry protein cargo from the plasma membrane and the extracellular fluid into cells. Although endosomes closely associate with the endoplasmic reticulum (ER) in cells, scientists don't understand why. Rowland *et al.* now identify the ER as an unexpected player in the sorting of cargo in the endosome and when endosomes divide (fission). Studying this process in mammalian cells, the authors found that an ER tubule crosses over the endosomal membrane, forming a stable contact at positions where endosomes first constrict and then divide. Such ER wrapped-endosomal contact sites prevent cargo from diffusing inappropriately. Interfering with ER dynamics reduced the efficiency of endosome fission. — SMH

Cell **159**, 1027 (2014)

NEUROSCIENCE

Brains in synchrony help us to communicate

Humans are social beings and often understand each other quite well; however, we still only have a limited knowledge of the brain mechanisms that underlie this astonishing ability. To better understand this, Stolk *et al*. scanned the brains of pairs of people that worked together to complete a specific task by communicating only through a visual display. The participants' brain activity synchronized in an area called the right superior temporal gyrus when they completed familiar but not unfamiliar tasks. These results suggest that establishing mutual understanding relies on spatially and temporally coherent brain activity between the two people communicating. — PRS

Proc. Natl. Acad. Sci. U.S.A. **111,** 18183 (2014).

STAR CLUSTERS

An entire family with the same birthday?

Astronomers often read the history of a star cluster in the shapes that emerge when its members are plotted in color-magnitude space. Tight curves suggest a population with very similar ages, whereas more extended features imply a broader range of ages. Li *et al.* consider the main-sequence turn-off—where stars have exhausted hydrogen in their cores—for the massive cluster NGC 1651 and demonstrate the feature's breadth with plots of Hubble Space Telescope photometry. Surprisingly, their models show that the spread can be manifested only if the population shares one common age. Five other massive clusters show the same phenomenon, which the authors interpret as evidence of populations composed of rapidly rotating stars, which should revise interpretations of color-magnitude diagrams. — MMM

Nature 10.1038/nature13969 (2014).

MATERIALS SCIENCE

For stability just add some debris?

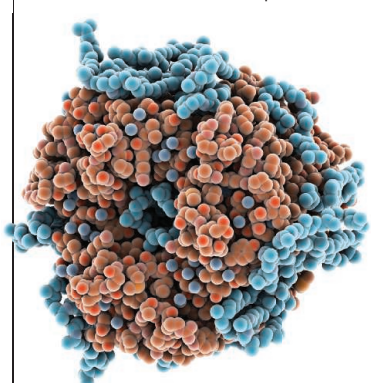
Graphene oxide membranes are made by dissolving graphene sheets—the oxidative exfoliation product of graphite—in water and then filtering the solution to form a stacked film. These membranes can exhibit long-term stability in aqueous environments, though, so why are they stable when their parent sheets are soluble? Yeh *et al.* attribute this stability to the introduction of multivalent cations during the purification process. For example, if anodized aluminum oxide filter discs are used during processing, the discs can corrode, releasing aluminum ions that crosslink the graphene oxide membranes and make them stable in water. In contrast, membranes prepared using Teflon filter discs readily disintegrated. Multivalent cations, such as Mn^{2+}, also can give them additional stability. — MSL

Nat. Chem. 10.1038/nchem.2145 (2015).

LIPID CHEMISTRY

A more stable phase via triangulation

Cell membranes house many important proteins that are hard to study outside their native environment. Salvati Manni *et al.* now have devised a special building block that stabilizes artificial, membrane-like phases



Bacteriorhodopsin, which can be crystalized ex-vivo at low temperatures

at low temperature. Their approach potentially opens the door to more detailed studies of temperature-sensitive membrane proteins. Biological membranes assemble from lipid molecules. The authors induced low-temperature stability by incorporating a rigid triangular ring, or cyclopropyl group, into a more conventional lipid structure. They validated the result by x-ray analysis of embedded bacteriorhodopsin protein at 4°C. — JSY

Angew. Chem. Int. Ed. 10.1002/anie.201409791 (2014).

PHOTOS: (LEFT TO RIGHT) Y. KATZ *ET AL.*: *ELIFE* **3** (7 NOVEMBER 2014) © 2015 ELIFE SCIENCES PUBLICATIONS LTD.; LAGUNA DESIGN/SCIENCE SOURCE

Building rubber without rubber trees

Pamela J. Hines

Science **347** (6219), 245.
DOI: 10.1126/science.347.6219.245-a