

more frequent but less severe chemically induced seizures than did normal mice. — WW  
*Sci. Signal.* **9**, ra6 (2016).

#### LUNAR ATMOSPHERE

### The Moon's time-variable exosphere

Earth's Moon does not have a conventional gaseous atmosphere, but instead an "exosphere" of particles ejected from the surface. Colaprete *et al.* have used NASA's LADEE orbiter to investigate how the exosphere varies over time, by using the glow from sodium and potassium atoms as a probe (see the Perspective by Dukes and Hurley). The exosphere composition varies by a factor of 2 to 3 over the course of a month, as different parts of the Moon are exposed to sunlight. There are also increases shortly after the Moon passes through streams of meteoroids. — KTS

*Science*, this issue p. 249;  
see also p. 230

#### PALEOANTHROPOLOGY

### Earliest human Arctic occupation

Paleolithic records of humans in the Eurasian Arctic (above 66°N) are scarce, stretching back to 30,000 to 35,000 years ago at most. Pitulko *et al.* have found evidence of human occupation 45,000 years ago at 72°N, well within the Siberian Arctic. The evidence is in the form of a frozen mammoth carcass bearing many signs of weapon-inflicted injuries, both pre- and postmortem. The remains of a hunted wolf from a widely separate location of similar age indicate that humans may



Weapon-inflicted damage on a bone from a frozen mammoth carcass

have spread widely across northern Siberia at least 10 millennia earlier than previously thought. — AMS

*Science*, this issue p. 260

#### MUSCLE PHYSIOLOGY

### Another micropeptide flexes its muscle

Genome annotation is a complex but imperfect art. Attesting to its limitations is the growing evidence that certain transcripts annotated as long noncoding RNAs (lncRNAs) in fact code for small peptides with biologically important functions. One such lncRNA-derived micropeptide in mammals is myoregulin, which reduces muscle performance by inhibiting the activity of a key calcium pump. Nelson *et al.* describe the opposite activity in a second lncRNA-derived micropeptide in mammalian muscle, called DWORF (see the Perspective by Payre and Desplan). This peptide enhances muscle performance by activating the same calcium pump. DWORF may prove to be useful in improving the cardiac muscle function of mammals with heart disease. — PAK

*Science*, this issue p. 271;  
see also p. 226

#### GENE REGULATION

### Reactivating the fetal globin gene

Mutation of adult-type globin genes causes sickle cell disease and thalassemia. Although treating these hemoglobinopathies with gene therapy is possible, there is a pressing need for pharmacologic approaches to treat general patient populations. One promising approach is to reactivate repressed expression of fetal-type hemoglobin (HbF) in adult erythroid cells. Masuda *et al.* reveal a molecular mechanism governing HbF repression as mediated by the LRF/ZBTB7A transcription factor. The study may encourage the development of new HbF reactivation therapies for hemoglobinopathies. — BAP

*Science*, this issue p. 285

## IN OTHER JOURNALS

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



Pen-tailed tree shrew gives us a glimpse of one of our earliest ancestors

#### MAMMALIAN EVOLUTION

### A window into the past

Tree shrews are often held up as being living fossils, presumably very similar to our own earliest primate ancestor. The dearth of actual fossils of these small tropical mammals, however, has meant that much of this conclusion has been speculative. Li and Ni describe a new fossil tree shrew that is exceedingly similar to the extant pen-tailed tree shrew (*Ptilocercus lowii*), yet twice as old as any previously described sister taxa. The fossil suggests that this tree shrew has gone nearly unchanged since the Oligocene (over 34 million years ago). Further, it supports the suggestion that the extant *P. lowii* gives us a living glimpse of the first ancestor of the Archonta, our own superordinal group. — SNV

*Sci. Rep.* 10.1038/srep18627 (2016).

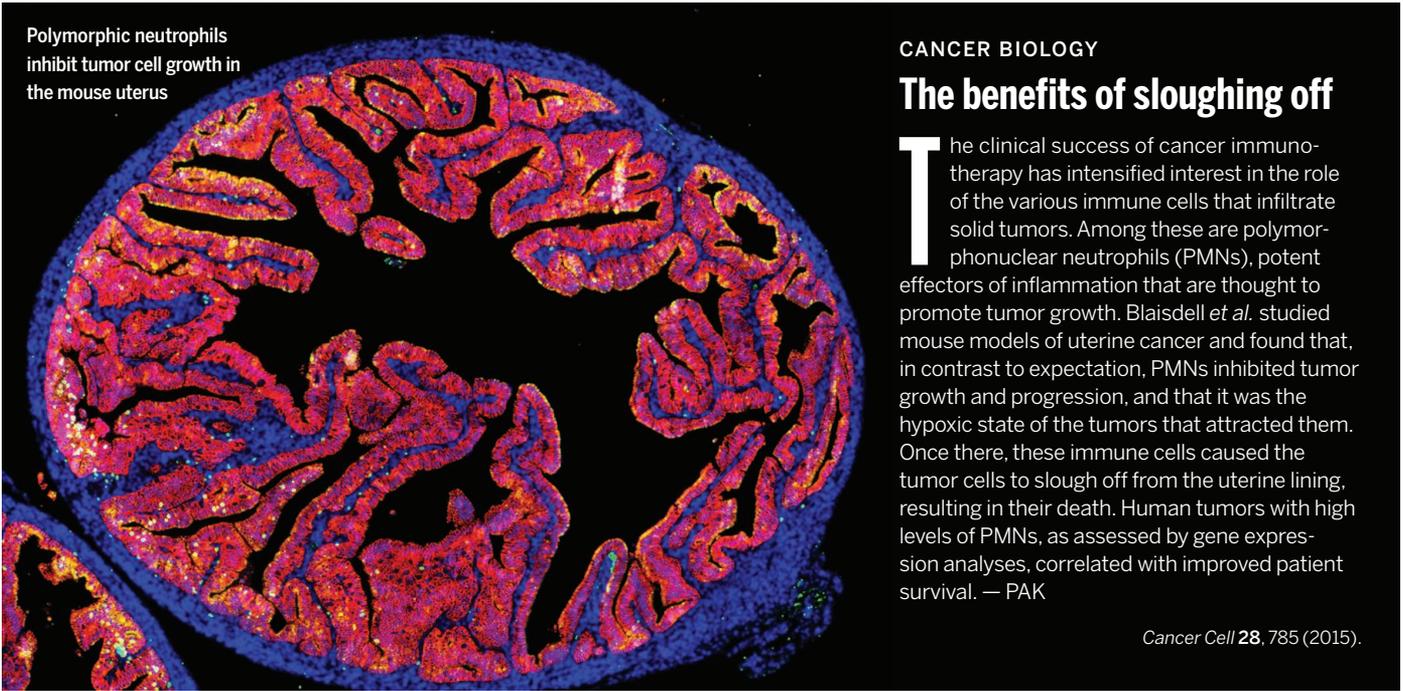
#### REPRODUCIBILITY

### Improving the quality of publicly archived data

The deposition of research data in public archives and repositories is becoming common practice across the sciences, with many journals mandating the archiving of data associated

with papers. However, in a survey of 100 publicly archived ecological and evolutionary data sets associated with recently published papers, Roche *et al.* found that fewer than 50% were complete and reusable. Many lacked necessary metadata, consisted of processed rather than raw data, or were presented

Polymorphic neutrophils  
inhibit tumor cell growth in  
the mouse uterus



## CANCER BIOLOGY

### The benefits of sloughing off

The clinical success of cancer immunotherapy has intensified interest in the role of the various immune cells that infiltrate solid tumors. Among these are polymorphonuclear neutrophils (PMNs), potent effectors of inflammation that are thought to promote tumor growth. Blaisdell *et al.* studied mouse models of uterine cancer and found that, in contrast to expectation, PMNs inhibited tumor growth and progression, and that it was the hypoxic state of the tumors that attracted them. Once there, these immune cells caused the tumor cells to slough off from the uterine lining, resulting in their death. Human tumors with high levels of PMNs, as assessed by gene expression analyses, correlated with improved patient survival. — PAK

*Cancer Cell* **28**, 785 (2015).

in non-machine-readable formats, all of which are obstacles to reusing published analyses. The situation might be improved through the adoption of a reward culture, in which carrots rather than sticks for the public deposition of fully reusable data become the order of the day. — AMS

*PLOS Biol.* 10.1371/journal.pbio.1002295 (2015).

## AGING

### Regulating progenitor competence over time

Because stem and progenitor cells serve in development and repair, their integrity is crucial for maintaining tissue function throughout an organism's life. However, many cellular mechanisms break down with time, and stem cells are probably not immune to this process. Farnsworth *et al.* explore the *Notch* signaling pathway as involved in cell fate determination for specific *Drosophila* neuroprogenitors termed intermediate neural progenitors (INPs). Young INPs respond just fine to *Notch* signaling, but old INPs lose this ability because of the presence of the inhibiting transcription factor *Eyeless*/

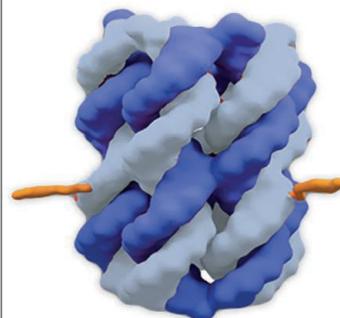
Pax6, which interferes with *Notch* regulation of its target genes. Identifying the mechanisms and effects of aging will assist in understanding development, injury, and disease as they change over time. — BAP

*Curr. Biol.* **25**, 3058 (2015).

## NANOTECHNOLOGY

### Artificial ion channels

Membrane proteins that form channels for ions to pass through are key regulators of transport into and out of biological cells. Burns *et al.* report a synthetic channel that can transport molecular ions across a bilayer in a controlled way. In contrast to biological ion channels, the synthetic channel is made from DNA, which folds



Structural model of a biomimetic, DNA-based ion channel

into predictable structures and is easier to control than are proteins. The channel is held in the membrane via hydrophobic anchors. In the presence of a specific DNA "key," it selectively transports small organic molecules with a positive charge across the bilayer. DNA channels of this kind are comparatively cheap and fast to produce and may find uses in drug delivery and synthetic biology. — JFU

*Nat. Nanotechnol.* 10.1038/NNANO.2015.279 (2015).

## SURFACE ASSEMBLY

### Patterning colloids with microbubbles

A laser-based method can create arbitrary patterns of nanoparticles and colloids on plasmonic substrates with photothermally generated microbubbles. Lin *et al.* generated microbubbles in colloidal suspensions at low laser powers, using a plasmonic surface (a quasi-continuous gold nano-island film) that had its resonance tuned to the laser wavelength of 532 nm. The microbubbles captured and immobilized particles through Marangoni convection around the bubble, surface tension, gas

pressure, and substrate adhesion. They patterned polystyrene nanoparticles (~60 nm) and beads (~0.5 to 5  $\mu\text{m}$ ) as well as 6-nm cadmium selenide-zinc sulfide core-shell nanoparticles. — PDS

*Nano Lett.* **5**, 10.1021/acs.nanolett.5b04524 (2015).

## PLANETARY SCIENCE

### Bright spots on Ceres may contain water

When NASA's Dawn spacecraft reached the dwarf planet Ceres in March 2015, there arose an immediate puzzle: What are the bright white spots located inside several surface craters? Natheus *et al.* have analyzed data from Dawn's camera and conclude that the most likely candidate is deposits of hydrated magnesium sulphate (Epsom salt): a compound that contains water. One crater called Occator fills with a haze each day, which disappears at night, probably caused by clouds of evaporated water. Deposits of salt and water ice just below the surface could be uncovered by impacts and provide clues to how Ceres was formed. — KTS

*Nature* **528**, 237 (2015).

## Patterning colloids with microbubbles

Phil Szuromi

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DOI: 10.1126/science.351.6270.237-f

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