

transition and that it depended on the cooling speed, as predicted by theory. — JS  
*Science*, this issue p. 167; see also p. 127

#### ULTRAFAST DYNAMICS

### Traveling a long way past the junction

Diodes are central components of modern electronic circuits. They essentially consist of two semiconductors sandwiched together, with one deficient in electrons (p), the other enriched (n). Najafi *et al.* used ultrafast electron microscopy to study the dynamics in a silicon diode on a time scale of trillionths of a second. They discovered that when light excites the diode's charge carriers, those carriers migrate much farther past the p-n junction than standard models would imply. The authors explain the results using a ballistic transport model. — JSY

*Science*, this issue p. 164

#### GUT MICROBIOTA

### Gut microbes resist inflammation

It is vital to human well-being that our gut microbiota can be distinguished from harmful, but often very similar, organisms. Cullen *et al.* begin to analyze how one dominant symbiont, *Bacteroidetes thetaiotaomicron*, does this. Our guts release potent antimicrobial peptides when we become infected with pathogenic bacteria such as salmonella, but these symbionts make an outer lipopolysaccharide coat that differs from those of pathogens by only one phosphate molecule. Enzymatic removal of this group is enough to confer resistance to the host's immune response and allow the symbionts to escape damage. — CA

*Science*, this issue p. 170

#### COMPUTER SCIENCE

### I'll see your program and raise you mine

One of the fundamental differences between playing chess and two-handed poker is that

the chessboard and the pieces on it are visible throughout the entire game, but an opponent's cards in poker are private. This informational deficit increases the complexity and the uncertainty in calculating the best course of action—to raise, to fold, or to call. Bowling *et al.* now report that they have developed a computer program that can do just that for the heads-up variant of poker known as Limit Texas Hold 'em (see the Perspective by Sandholm). — GJC  
*Science*, this issue p. 145; see also p. 122

#### DNA REPAIR

### A factor for repairing broken DNA

Unprogrammed DNA double-strand breaks are extremely dangerous for genomic stability. Nonhomologous end-joining (NHEJ) repair systems are present in all domains of life and help deal with these potentially lethal lesions. Ochi *et al.* have discovered a new factor involved in NHEJ by searching for proteins with structural similarities to known NHEJ proteins. Specifically, PAXX, a paralog of XRCC1 and XLF, interacts with a key repair pathway protein, Ku, and helps promote ligation of the broken DNA. — GR

*Science*, this issue p. 185

#### VASCULAR BIOLOGY

### Peroxidized lipids dilate blood vessels

Cerebral arteries must maintain constant blood flow to the brain even though blood pressure fluctuates constantly. Sullivan *et al.* characterized a signaling pathway that is specific to the endothelial cells that line cerebral arteries. Reactive oxygen species (ROS) cause lipid peroxidation. In endothelial cells in cerebral arteries, locally produced ROS oxidized lipids, which triggered calcium influx through the ion channel TRPA1. In turn, this calcium influx activated a potassium-permeable channel, resulting in the dilation of cerebral arteries. — WW

*Sci. Signal.* **8**, ra3 (2014).

## IN OTHER JOURNALS

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



#### GLACIOLOGY

### Losing traction at higher speeds

How, exactly, will glaciers and ice sheets respond to climate warming? We know that they will melt faster as temperatures rise, but the way they slide over the ground below also should be affected, and that could have a significant impact on how fast they fall apart at their margins. Zoet and Anderson conduct a laboratory study to investigate how drag between ice and the surface that supports it changes

with increased sliding speed. They find that drag decreases with increased sliding speed if there exist the right kinds of gaps between the ice and the surface below, which means that weather or climate variability has the potential to cause even more rapid glacier motion, and thus faster sea-level rise. — HJS

*J. Glaciology* 10.3189/2015JoG14J174 (2014).

#### CASPASES

### For caspases, an escape from death

Caspase proteins are well known for their role in degrading proteins and causing programmed cell death, but researchers now show that they may have nondeadly jobs, too. While looking for proteins that partner with microRNAs (small non-coding RNAs that silence gene expression) to regulate how the nematode *Caenorhabditis elegans* develops, Weaver *et al.* found the caspase CED-3. Further experimentation revealed that CED-3 cleaved proteins that play important



An Alaskan glacier sliding to its destruction



Female great tits have superior memories when it comes to food.

## ANIMAL COGNITION

### Greater challenge, smarter birds

**M**ales of many species, including humans, perform better than females at spatial navigation tasks. Great tits, a common European songbird, rely on spatial navigation for feeding—they pilfer stores of food cached by other bird species. Brodin and Urhan studied whether male and female great tits differed in their ability to find food after watching it get cached. Surprisingly, they found that females remembered the locations of the hidden food better than males. The authors attribute this to male dominance in foraging interactions, which makes finding food harder for females, but also makes them smarter about doing so. — SNV

*Behav. Ecol. Sociobiol.* 10.1007/s00265-014-1836-2 (2014).

## PALEOBIOLOGY

### Microbes driving the time machine

Preservation of the tissues of Earth's earliest animals—those that were present before and during the Cambrian explosion—required a lot of luck. According to new isotope data from *Conotubus hemiannulatus* fossils from Shaanxi Province, China, that luck was a function mostly of microbial activity. Schiffbauer *et al.* show that decaying carbon-rich animals are preserved typically either by being replaced three-dimensionally by pyrite crystals or compressed as carbonaceous films. Sedimentation rate ultimately controlled whether and for how long animal tissues were exposed to zones of bacterial sulfate reduction or methanogenesis within the sediment and thus their preservational style. — NW

*Nat. Commun.* 10.1038/ncomms6754 (2014).

drugs with programs that would maximize the overall societal benefit, two guiding principles created by the World Health Organization for allocating scarce resources. The authors' analysis suggests that the utilitarian principle, which maximizes overall societal benefits by locally distributing drugs to high-incidence areas, trumps access to all. — CA

*Nat. Commun.* 10.1038/ncomms6454 (2014).

## MOLECULAR MEDICINE

### Bat-filled tree source of Ebola epidemic?

Ground zero for the Ebola epidemic in West Africa may have been a hollow tree where children played and bats roosted. A year ago, a toddler in the Guinean village of Meliandou died of a mysterious disease; his family became infected shortly after. Bats are leading suspects for how the toddler caught the disease; in March 2014, scientists went to Guinea to look for signs of an Ebola outbreak in wildlife. But Saéz *et al.* report finding no such evidence and no direct evidence of Ebola infections in 169 bats they captured and tested. Yet they did find a clue: A tree stump near the toddler's house that burned on 24 March 2014, causing a "rain of bats," villagers said. Ash around the tree contained DNA fragments matching the Angolan free-tailed bat, known to survive infections with Ebola. — GV

*EMBO Mol. Med.* 10.15252/emmm.201404792 (2014).

## HIV CONTROL

### For HIV drugs, location trumps all

When resources are limiting, HIV-control programs need to be geographically selective. Gerberry *et al.* reached this conclusion after performing a comparative study of strategies for deploying prophylactic antiretroviral drugs in sub-Saharan Africa. The researchers used geospatial modeling to compare programs that would provide equal access to

## MENTAL HEALTH

### Biology undermines clinician empathy

The translation of biological insight into therapeutic success is the Holy Grail of biomedical researchers. In the field of mental health, a clinician's empathy with patients also is a key to successful outcomes. Lebowitz and Ahn show that a focus on biological roots for mental disorders can threaten this empathy and the therapeutic alliance between clinician and patient. Mental health providers were presented with descriptions of patients experiencing depression, social phobia, schizophrenia, or obsessive compulsive disorder. Clinicians expressed more empathy when those descriptions emphasized potential causes that were psychosocial (e.g., aspects of life history) rather than biological (e.g., genetics or neurobiology). The pattern held whether the clinician had more medical training (psychiatry) or less (psychologist or social worker). — BW

*Proc. Natl. Acad. Sci. U.S.A.* 10.1073/pnas.1414058111 (2014).

roles in temporal cell fate patterning, stem cell pluripotency, and microRNA processing.

— BAP

*eLife* 10.7554/eLife.04265 (2014).

## PSYCHOLOGY

### Filing words away makes room for more

Google's search engine makes remembering facts less important than it used to be; Internet access in many countries is 24/7, so finding facts like the speed of sound (340 m/s) is quick and easy. To better understand how people remember new information they encounter digitally, Strom and Stone had subjects use computers to study two PDF files containing lists of words. They found that the metaphorical savings of space, gained by saving the first PDF file to the computer, translated into more memory available for encoding a second list of words. Subjects who saved the first file improved the number of words recalled from the second list. — GJC

*Psychol. Sci.* 10.1177/0956797614559285 (2014).



An HIV-infected woman in the Central African Republic

# Science

## Greater challenge, smarter birds

Sacha Vignieri

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