

a specialized quantum optical payload. They successfully demonstrated the satellite-based entanglement distribution to receiver stations separated by more than 1200 km. The results illustrate the possibility of a future global quantum communication network. —ISO

*Science*, this issue p. 1140

## NEURODEVELOPMENT

### Early life stress in depression susceptibility

The linkage between stress early in life and behavioral depression in adulthood is complex. Peña *et al.* were able to define a time period in early development when mice are especially susceptible to stress. Mice subjected to stress during this time period were less resilient to stress in adulthood. Genes regulated by the transcription factor orthodenticle homeobox 2 (OTX2) primed the response toward depression in adulthood. Although early stress could establish the groundwork for later depression, that priming could be undone by intervention at the right moment. —PJH

*Science*, this issue p. 1185

## NUTRIENT SENSING

### Preparing for the feast during the fast

A protein kinase complex known as mTORC1 plays a key role in cellular metabolism and nutrient sensing. Di Malta *et al.* elucidated a mechanism that regulates the metabolic changes that are necessary during the fast-to-feed transition. During starvation, a pair of transcription factors promotes the expression of a pair of guanosine triphosphatases that are required for mTORC1 activity and for its recruitment to the lysosome. However, mTORC1 activity also requires amino acids, which are lacking during starvation. Nevertheless, the cell becomes “primed” by this process so that on refeeding, it efficiently reactivates mTORC1, which

is recruited to the lysosomal surface. This mechanism is particularly important in cancer cells. —SMH

*Science*, this issue p. 1188

## EDUCATION

### Engaging local stakeholders

Ecological knowledge in itself often fails to incite environmental behavior change. Thus, local stakeholders at the frontlines of ecological challenges are increasingly being involved in adaptive ecosystem management choices. Fujitani *et al.* performed a multiyear study on 181 members of a German angling club involved in adaptive management of fisheries. These members were more likely to retain knowledge of ecological topics and express pro-environmental behavior intentions compared with those receiving only a standard lecture. Engaging stakeholders with ecosystem management will be important for local decision-making related to sustainability. —NK

*Sci. Adv.* 10.1126/sciadv.1602516 (2017).

## CANCER

### A site-specific switch for cancer cells

To metastasize, cancer cells must switch from epithelial (polarized and fixed) into mesenchymal (motile and invasive) phenotypes to disseminate and colonize both primary and metastatic sites. Zhou *et al.* found that the long noncoding RNA H19 acted as a site-specific microRNA sponge to promote an epithelial or mesenchymal switch in tumor cells. In epithelial-like tumor cells in primary and metastatic sites, H19 sequestered miR-200b/c and ultimately inhibited migration. In mesenchymal-like disseminated cells in circulation, H19 sequestered a different microRNA, Let-7b, and ultimately promoted migration. —LKF

*Sci. Signal.* 10.eaak9557 (2017).

## IN OTHER JOURNALS

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



Damage done by a 2005 earthquake in Balakot, Pakistan

## GEOPHYSICS

### Finding foreshocks in the damage zone

Foreshocks are small earthquakes that precede much larger and more damaging earthquakes. The role that these small quakes play in nucleating the mainshock is unclear, but unraveling the relationship could provide clues about future earthquakes. Savage *et al.* obtained precise locations of foreshocks and aftershocks from the 2011 earthquake in Prague, Oklahoma. The foreshocks occurred in a broad region known as the damage zone before localizing near the main fault rupture. This behavior suggests that determining the precise location of foreshocks may be a promising tool for earthquake forecasting. —BG

*Geophys. Res. Lett.* 10.1002/2017GL073226 (2017).

## STEM CELLS

### Immune control of hair growth

Hair follicles in mammalian skin undergo cycles of quiescence and regeneration. Hair follicle stem cells play a role in the regeneration phase. Ali *et al.*

have found that regulatory T cells ( $T_{\text{regs}}$ ), immune cells known to suppress inflammation, colocalize with stem cells in hair follicles. In a mouse model of hair regeneration, depletion of  $T_{\text{regs}}$  reduced hair growth. Analysis of gene expression revealed that  $T_{\text{regs}}$  promote the



Dogs recognize that individuals have distinct perspectives.

## ANIMAL COGNITION

### I know what you know

**T**heory of mind involves recognizing that others have a distinct perspective. Such an ability is difficult to identify in species that cannot tell you about their thoughts, but research over the past decade or so has shown that it is not unique to humans, being present in at least apes and corvids. Dogs, which coevolved with humans, are excellent at reading our cues but have not been shown experimentally to “read” our minds. Catala *et al.* tested pet dogs for their ability to recognize when a particular observer has important knowledge through a classic knower-guesser test. They found that dogs followed the gaze of an observer whom they saw witness the hiding of a reward, rather than one who was guessing about its location. Thus, the dogs recognized that the observer knew something they did not, and that it was of value to pay attention to the information conveyed. This recognition of other knowledge is a first step toward a full theory of mind, an ability that would be adaptive across the animal kingdom. —SNV

*Anim. Cogn.* 10.1007/s10071-017-1082-x (2017).

proliferation and differentiation of hair follicle stem cells.  $T_{regs}$  express a high level of Jagged, a ligand of the cell-cell communication system called the Notch signaling pathway that controls stem cell self-renewal and differentiation. The findings may have implications for treating individuals with alopecia areata, a hair loss condition. —LC

*Cell* 10.1016/j.cell.2017.05.002 (2017).

## PSYCHOLOGY

### Thinking about what others believe is hard work

In a remarkable set of studies, Powell and Carey marry two previously unlinked lines of research. Executive function refers to the ability to make decisions, such as being able to switch from pressing the keyboard down (up) arrow when seeing a down (up)

arrow on the computer screen to pressing the up (down) arrow when seeing a down (up) arrow. A person’s ability to carry out such a task diminishes after being forced to exercise self-control (for example, for a child, waiting to open a box of toys). Theory of mind involves predicting another’s behavior on the basis of understanding that person’s beliefs. After suffering through the delayed-gratification exercise, 4- and 5-year-old children displayed impaired theory-of-mind capabilities. —GJC

*Cognition* 164, 150 (2017).

## DEVELOPMENT

### TET function in development

In development, cell fate commitment enables the generation of the body’s specialized cells.

When one fate is targeted, other paths must be prevented. DNA methylation of CpG dinucleotides is key for such molecular repression. However, the erasure of DNA methylation is also critical in development and occurs at specific times, such as during embryonic postimplantation. The ten-eleven translocation (TET) genes perform this role. Khoeiry *et al.* now identify a methylation-independent role for TET1 to repress genes involved in the differentiation of epiblast and extraembryonic ectoderm through regulation of the transcriptional repressor JMJD8. Embryonic defects result if TET1 is removed. Hence, the well-known demethylase has critical functions in normal development through both catalytic and noncatalytic activities. —BAP

*Nat. Gen.* 10.1038/ng.3868 (2017).

## OPTICAL IMAGING

### Revealing the hidden movers

Radar and lidar use pulses of electromagnetic radiation (typically microwaves or laser light) to track and range stationary or moving objects. However, when the object is obscured or hidden from view within a scattering medium, these technologies are ineffective. Akhlaghi and Dogariou have devised an imaging process that can track a hidden target as it moves within a scattering medium. Illuminating one side of the scattering medium with coherent light creates a speckle pattern on the other side. By monitoring changes in the speckle pattern, they show that the spatial and temporal movement of the target can be reconstructed. The technique could find application in biomedical imaging and remote sensing, as well as being applicable to other areas such as acoustics and microwaves. —ISO

*Optica* 4, 447 (2017).

## MOLECULAR DEVICES

### Bipolar light-emitting junctions

Molecular junctions formed from Ru(bpy)<sub>3</sub> oligomers (bpy, 2,2′-bipyridine) transition with increasing thickness from transporting electrons to emitting light. Tefashe *et al.* used electrochemical deposition to grow Ru(bpy)<sub>3</sub> oligomers along with PF<sub>6</sub><sup>-</sup> counterions on conducting carbon, which was then capped with conducting carbon to form a junction. Films thicker than 4 nm emitted light at wavelengths between 600 and 900 nm for biases above 2.7 V. Unlike previous devices based on Ru(bpy)<sub>3</sub>, the emission is bipolar (occurs for both positive and negative bias) and has a rapid onset (5 ms) and long persistence (10 hours). The authors argue that both hole and electron injection occur through a resonant process involving a metal-to-ligand charge transition. —PDS

*J. Am. Chem. Soc.* 10.1021/jacs.7b02563 (2017).

# Science

## Thinking about what others believe is hard work

Gilbert Chin

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