

## SMALL RNA DECAY

### Breaking down miRNAs

Although much work has examined microRNA (miRNA) biogenesis, relatively little is known about miRNA decay. Elbarbary *et al.* now identify Tudor-SN, an endonuclease that interacts with the RNA-induced silencing complex. Tudor-SN targets miRNAs at CA and UA dinucleotides located more than five nucleotides from miRNA ends. Tudor-SN-mediated miRNA decay removes miRNAs that silence genes encoding proteins that are critical for the G<sub>1</sub>-to-S phase transition in the cell cycle. —BAP

*Science*, this issue p. 859

## NEUROSCIENCE

### A neuronal circuit for overeating

Recurrent binge eating is a common eating disorder. Zhang and van den Pol investigated an understudied brain region known as the zona incerta and found that it projects inhibitory inputs to the paraventricular thalamus, a brain region involved in suppressing feeding behavior. In mice, acute stimulation of this inhibitory projection resulted within seconds in overeating, especially high-fat food. Chronic stimulation induced persistent overeating and weight gain. —PRS

*Science*, this issue p. 853



Mice can be stimulated to binge-eat high-fat food.

## PROTEIN DYNAMICS

### Trapping RNA polymerase in the act

The enzyme RNA polymerase (RNAP) finds promoter elements in the genome, separates (or “melts”) the DNA strands, and transcribes the template DNA strand to give RNA. A mobile clamp in RNAP plays a key role in initiating transcription. Feklistov *et al.* locked the clamp of bacterial RNAP in distinct conformations by using small molecules. They then used fluorescent probes to monitor binding as the promoter DNA was separated. Unexpectedly, they found that the clamp transiently closed to nucleate DNA melting, opened to load single-stranded DNA into the active site, and then closed around the template strand to start transcription. —VV

*Science*, this issue p. 863

## CANCER

### No safe haven for metastases

Although targeted therapies for cancer offer great promise, they are often much less effective against brain metastases than against peripheral tumors. This is generally attributed to the drugs' difficulty in penetrating the blood-brain barrier. Kodack *et al.* discovered that, at least in breast cancer that has spread to the brain, the brain microenvironment itself plays a role in treatment resistance. In mouse models and human cancer samples, human epidermal growth factor receptor 3 (HER3) expression increased in breast cancer-associated brain lesions. The HER3 facilitated the tumors' survival in the presence of targeted treatment. Thus, inhibiting HER3 could help overcome tumor resistance to therapy. —YN

*Sci. Transl. Med.* **9**, eaal4682 (2017).

## IN OTHER JOURNALS

Edited by Caroline Ash and Jesse Smith



The degradation of coral reefs is deepening their nearshore environments.

## OCEANS

### Risks of reef erosion

Coral reefs serve as natural barriers that protect coastal regions from storms and erosion, but climate change, ocean acidification, and other stressors from human activities are increasingly causing coral reefs to degrade. Yates *et al.* report evidence of seafloor erosion in five coral reef ecosystems in the Atlantic, Pacific, and Caribbean. Comparison with historical data shows that over the past few decades, seafloor elevation has decreased by 0.09 to 0.8 m at the study sites—far more than expected on the basis of model predictions. Together with sea level rise from climate change, the seafloor erosion at these sites results in deeper water and puts coastal populations at increased risk. —JFU

*Biogeosciences* **14**, 1739 (2017).

## NEURODEVELOPMENT

### Roadmaps for building the neonatal brain

In the postnatal mammalian brain, neurons continue to be generated and migrate to their home stations. Often, these neuroblasts travel along pathways defined by the blood vessels or the glial cells that surround

and support neurons. García-González *et al.* also find that serotonergic axons establish neuroblast migratory pathways. Knockout of the serotonin receptor in transit-amplifying cells and neuroblasts of mice misguided and slowed migration of the new cells. The postnatal neuroblasts travel along the serotonergic axons and depend

Hotter summers in the future will make Americans more reluctant to exercise.



## ENVIRONMENT AND HEALTH

### Burn to run in the U.S.A.

**O**ur willingness to be physically active in our free time is influenced by weather; common excuses for not exercising are that it is too hot, too cold, or too wet. Obradovich and Fowler analyzed historical meteorological data and exercise surveillance data from the Centers for Disease Control and Prevention, and they developed a model to predict human responses to climate change in the next few decades. The model incorporated variables to compensate for city-specific differences (e.g., infrastructure). It appears that by 2050, climate change might result in physically active person-months increasing by 40, on average, per 1000 individuals. Over the course of this century, Americans could become more physically active in their free time in northern areas of the country, but less active in the summer, especially in southern regions. —BJ

*Nat. Hum. Behav.* 10.1038/s41562-017-0097 (2017).

on serotonergic signaling to sustain and guide their migration. Similar serotonergic axons also characterize neuroblast migratory pathways in fish, birds, rabbits, nonhuman primates, and humans. —PJH

*Neuron* 10.1016/j.neuron.2017.04.013 (2017).

## ASTHMA

### The NET effect of viral-triggered asthma

Infection with rhinovirus is a common cause of allergic asthma. Toussaint *et al.* studied how the virus triggers inflammation and stimulates an asthmatic attack. Rhinovirus infection causes the release of host double-stranded DNA and the formation of neutrophil extracellular traps (NETs). NETs

are structures that capture microorganisms and activate immune cells and inflammatory responses. The authors show that rhinovirus-driven NETs promote the infiltration of inflammatory cells to the airways, causing the clinical features of an allergic response. Treatment with a compound blocking NET formation stopped the asthma from becoming worse. —PNK

*Nat. Med.* 10.1038/nm.4332 (2017).

## GEOPHYSICS

### Building a better mantle with BEAMS

Solid-state convection has operated in the mantle since Earth's formation 4.56 billion years ago. This is difficult to reconcile with evidence for ancient and isolated regions of the mantle,

though. Ballmer *et al.* propose bridgmanite-enriched ancient mantle structures (BEAMS) as a solution to this riddle. BEAMS have a low Mg/Si ratio, and their presence would cause a relative increase in the mantle mineral bridgmanite, along with a 20-fold viscosity increase. BEAMS may square many odd features in the lower mantle with the geochemical signatures of ancient, isolated, and persistent mantle regions. —BG

*Nat. Geosci.* 10.1038/NGEO2898 (2017).

## INFECTIOUS DISEASE

### PPR a risk to Europe

Imagine the shock if your flock of sheep dropped dead, foaming at the mouth. This is a classic symptom of acute infection with peste de petits

ruminants (PPR), a morbillivirus resembling the now eradicated rinderpest, which causes up to 80% mortality in small livestock. There are robust vaccines, but they are not deployed systematically, although PPR has been earmarked by the United Nations Food and Agriculture Organization for eradication by 2030. Baazizi *et al.* confirm that an East African strain of PPR virus is circulating in northern Algeria, Tunisia, and Morocco. This strain probably originated from an outbreak in Sudan in 2000 but has crossed the Sahara as a result of porous borders and high levels of illegal trade. The threat to Europe comes from two fronts because PPR virus is also present in western Turkey. Among other mammals, cervids are susceptible to the virus, which puts northern Europe at particular risk, owing to the high deer populations in this region. —CA

*PLOS ONE* 10.1371/journal.pone.0175461 (2017).

## MOLECULAR MATERIALS

### Perovskite ferroelectric bond-switching

Ferroelectric materials are normally inorganic ceramics, such as barium titanate, but for flexible devices, molecular ferroelectrics that could readily form thin films are of interest. Xu *et al.* report that substitution of organic cations for potassium in an iron cyanide perovskite— $[(\text{CH}_3)_3\text{NOH}]_2[\text{KFe}(\text{CN})_6]$ —creates a ferroelectric with a high Curie temperature (402 K), where it undergoes a phase transition through a bond-switching mechanism from a low-temperature monoclinic ferroelectric phase (space group *Cc*) to a high-temperature cubic paraelectric phase (*Fm $\bar{3}m$* ). Thin films of this material showed rectangular polarization–electric field hysteresis loops at a relatively high driving frequency of 5 kHz and could be reversibly poled with the bias field from a probe tip. —PDS

*J. Am. Chem. Soc.* 10.1021/jacs.7b01334 (2017).

## The NET effect of viral-triggered asthma

Priscilla N. Kelly

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