generally think that we keep our RNAs to ourselves. Kim *et al.* now show that the parasitic dodder plant breaks that rule. When dodder attacks a host plant, it opens up a conduit through which messenger and perhaps other regulatory RNAs are exchanged between parasite and host. Because a single dodder plant can attack multiple hosts, such exchanges may underlie instances of genes transferring between species. — PJH

Science, this issue p. 808

CYSTIC FIBROSIS

A breathtaking tale of sticky mucus

Patients with cystic fibrosis have difficulty breathing because their airways are clogged with thick mucus. Does this mucus accumulate because there is a defect in the way it is produced? Or does it accumulate because of other disease features, such as dehydration or airway wall remodeling? Distinguishing between these possibilities is important for future drug development. In a study of piglets with cystic fibrosis, Hoegger *et al*. identify mucus production as the primary defect (see the Perspective by Wine). The airway glands of the piglets synthesized strands of mucus normally, but the strands were never released and stayed tethered to the gland ducts. — PAK

Science, this issue p. 818; see also p. 730

CELL THERAPY

A Swiss Army knife for treating sepsis

Sepsis is a complication of infection that kills ~7 million people a year, with no successful molecular therapy. But cells are more versatile than molecules: They make products and respond to their environments. Now, Fletcher *et al.* investigate whether cells are better equipped to battle this multifocal disease. One injection of anti-inflammatory cells derived from the lymph nodes dramatically increased survival in two mouse models of sepsis under conditions that mimic those in the clinic. These beneficial cells reduced the deadly "cytokine storm" associated with sepsis. — KL

Sci. Transl. Med. **6**, 249ra109 (2014).

RNA NANOSTRUCTURES

The future of RNA origami writ large

Researchers have long fabricated intricate nanostructures from carefully linked DNA strands. Now they can use RNA made by gene expression, which avoids the costly strand synthesis and lengthy annealing steps necessary with DNA origami. Geary *et al.* used molecular modeling to extend the size of folded RNA origami structures (see the Perspective by Leontis and Westhof). The modeling revealed assembly patterns for linking single-stranded RNA into A-form helices. The authors created two-dimensional structures as large as 660 nucleotides on mica surfaces. — PDS

Science, this issue p. 799; see also p. 732

WATER ENGINEERING

Sourcing corrosive sewer sulfides

Sewer systems are corroding at an alarming rate, costing governments billions of dollars to replace. Differences among water treatment systems make it difficult to track down the source of corrosive sulfide responsible for this damage. Pikaar *et al.* performed an extensive industry survey and sampling campaign across Australia (see the Perspective by Rauch and Kleidorfer). Aluminum sulfate added as a coagulant during drinking water treatment was the primary culprit in corroding sewer systems. Modifying this common treatment strategy to include sulfate-free coagulants could dramatically reduce sewer corrosion across the globe. — NW

Science, this issue p. 812; see also p. 734

IN OTHER JOURNALS

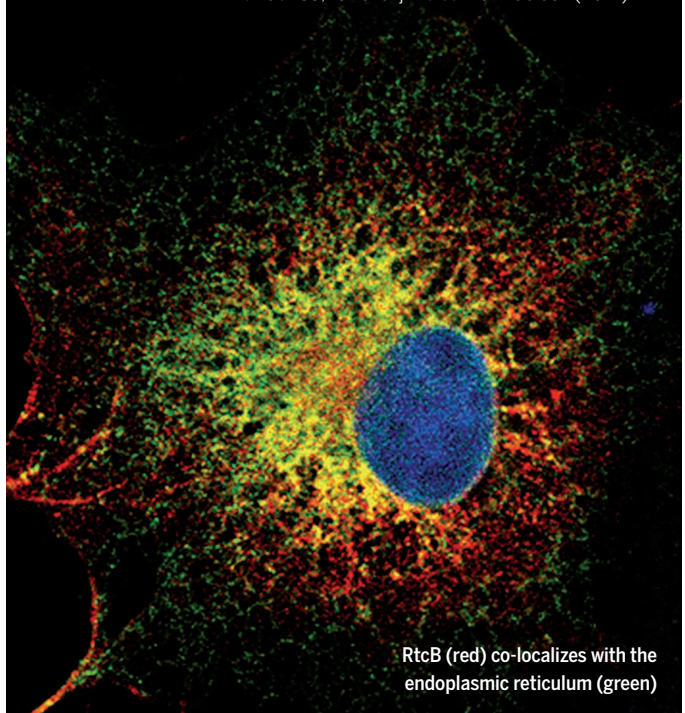
Edited by **Kristen Mueller** *and* **Jesse Smith**

UNFOLDED PROTEINS

Stitching mRNA back together again

Cells get rid of toxic, inappropriately folded proteins in a process called the unfolded protein response (UPR). The UPR occurs in the cell's endoplasmic reticulum, which folds and sorts proteins. It requires an unconventional type of RNA splicing: the removal of small pieces of genetic material called introns from messenger RNA (mRNA). But biologists weren't sure how the spliced mRNA got put back together. Lu *et al*. now report that the enzyme RtcB patches together the two halves of a spliced mRNA that codes for XBP1, an important regulator of the UPR. In the endoplasmic reticulum, RtcB bound another enzyme, IREα, which splices the intron out of the XBP1 mRNA. — GR

Mol. Cell **55**, 10.1016/j.molcel.2014.06.032 (2014).



RtcB (red) co-localizes with the endoplasmic reticulum (green)

AGING

A sweet decline for the aging fly brain

Our livers and muscles store glucose as glycogen, a branched polysaccharide. Glycogen is a major energy reserve, but it may play a more sinister role in the aging brain. Along with other components, glycogen forms aggregates in the brains of aging mice, humans, and flies that correlate with a decline in neuron function. To better understand this, Sinadinos *et al*. experimented with fruit flies. They used RNA interference to inhibit the flies' production of glycogen synthase, the enzyme that makes glycogen from glucose. Then the researchers measured how fast the flies could climb. As the flies aged, their neurons functioned better than those of controls. Treated male flies—but not females—lived longer. — LBR

Aging Cell 10.1111/acel.12254 (2014).

Dalian, Liaoning Province, China

COASTAL ECOSYSTEMS

The cost of economic growth

Anthropomorphic changes threaten the stability of coastal ecosystems, but whether economic growth contributes to such degradation is unknown. To find out, He *et al*. assessed the trends in coastal population, economy, and 15 different human impacts, including salt production, fishing, and marine freight transport, on 30,000 km of Chinese coastline both before and after economic reforms began in China in 1978. They found that all 15 human impacts increased after 1978, even though population growth remained constant, suggesting that economic growth contributed to coastal ecosystem decline. The authors highlight the need for a national policy of environmental management to protect the coupled human-ocean ecosystem. — AMS

Sci. Rep. **4**, 5995 (2014).

OPTICAL COMMUNICATION

Steering an optical signal without wires

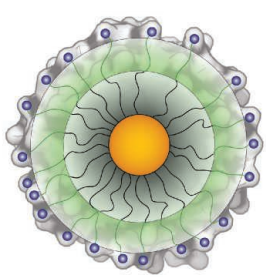
All wireless communications —radio, cell phones, wi-fi, or anything else—need reliable links between transmitters and receivers. In general, higher-frequency bands can convey more information than lower-frequency ones. Using a patterned array of tiny metallic nanoantennas, Dregely *et al.* show that they can steer an optical beam wirelessly from a transmitter to any one of a number of receivers. Because light has such high frequencies, these kinds of directed wireless optical channels should be able to transmit even greater amounts of information than devices using more traditional, longer-wavelength approaches. — ISO

Nat. Commun. 10.1038/ncomms5354 (2014).

CHEMISTRY

Coatings keep gunk off nanoparticles

Nanoparticles have many potential therapeutic applications, such as delivering drugs. In untreated biological fluids such as plasma or serum, however, protein layers can cover the particles' surfaces, interfering with their intended function. Moyano *et al.* show that gold nanoparticles coated with zwitterionic ligands — neutral molecules with both positively and negatively charged regions — prevent protein coronas from forming around the particles. As a consequence, the nanoparticles can interact with cells as intended. Furthermore, the hydrophobicity of the nanoparticles can be tuned, which affects the cellular uptake of the particles. — MSL



A corona-free nanoparticle

ACS Nano 10.1021/nn5006478 (2014).

VIRAL COMPETITION

How infection rate determines virus spread

When a virus attacks a plant, it can damage cells locally or it can spread to the entire plant through the vasculature. Viral spread increases the odds that the virus could jump to other plants. To better understand this process, Rodrigo *et al*. mathematically modeled the timing and features that contribute to viral spead. They also watched viruses infect plants in experiments. A virus was sure to spread systemically when it infected many sites on the plant, and the most successful viruses were the ones that replicated the fastest, not the ones that spread quickly from cell to cell. But with a more moderate number of infection sites, rapid jumping between cells determined success. — PJH

J. R. Soc. Interface **11**, 20140555 (2014).

HYDROLOGY

Looking beneath the drying surface

Groundwater is being depleted in the Colorado Basin region even faster than the rapid drawdown of Lakes Powell and Mead. Castle *et al.* determined groundwater depletion in the American Southwest by using data from the GRACE satellites, which measure minute variations in Earth's gravity field: in this case, ones associated with water movement below the surface. Looking at 9 years of results beginning at the end of 2004, 4 years after the current drought there began, they find that groundwater use makes up a much larger fraction of basin water use than previously recognized. Its continued depletion, they conclude, may pose a serious threat to the region's ability to meet future water needs. — HJS

Geophys. Res. Lett. 10.1002/2014GL061055 (2014).

OCEAN CHEMISTRY

Mercury levels in surface ocean tripled

Human activities such as coal burning have tripled mercury in the surface ocean, posing a threat to human health, a study finds. Mercury emitted to the atmosphere rains out to the oceans, where it is converted to the neurotoxin methylmercury that bioaccumulates in fish. Lamborg *et al.* collected 8 years of water samples from four oceans and used databases of human-generated CO_2 from coal burning to scale up to worldwide pollution. The ocean contains 60,000 to 80,000 tons of pollution mercury, they found, two-thirds in water shallower than 1000 meters. In the top 100 meters, mercury has tripled compared to preindustrial times. — JY

Nature, 10.1038/nature13563(2014).

Stitching mRNA back together again

Guy Riddihough

Science **345** (6198), 783.
DOI: 10.1126/science.345.6198.783-a