

(see the Perspective by Riginos and Leis). Small cryptobenthic fish, like blennies, make up nearly 40% of reef fish biodiversity. Furthermore, the majority of cryptobenthic fish larvae settle locally, rather than being widely dispersed, and have rapid turnover rates. Such high diversity and densities could thus provide the biomass base for larger, better-known reef fish. —SNV

*Science*, this issue p. 1189;  
see also p. 1128

## BIOCATALYSIS

### Light teaches (co)enzymes new tricks

Light is widely used in organic synthesis to excite electrons in a substrate or catalyst, opening up reactive pathways to a desired product. Biology uses light sparingly in this way, but coenzymes such as flavin can be driven to excited states by light. Biegasiewicz *et al.* investigated this reactivity and found a suite of flavoenzymes that catalyze asymmetric radical cyclization when exposed to light. “Ene”-reductases, when reduced and illuminated, converted starting materials containing an  $\alpha$ -chloroamide and an alkene into five-, six-, seven-, or eight-membered lactams. Different enzymes furnished different stereochemistry in the products, likely because of changes in active-site pocket geometry. —MAF

*Science*, this issue p. 1166

## STRUCTURAL BIOLOGY

### Keeping the gate open

Cystic fibrosis is a progressive disease that affects lung function and is often fatal. It is caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR). One class of mutants impairs ion conductance, and the drug ivacaftor acts by increasing the ion flux. Liu *et al.* describe high-resolution structures of CFTR bound to ivacaftor and to an investigational drug GLPG1837 that also potentiates ion flow.

The two drugs bind at the same site in the transmembrane region. This site coincides with a hinge involved in channel gating, suggesting that the drugs may stabilize the open conformation of the channel. —VV

*Science*, this issue p. 1184

## ISLET TRANSPLANTATION

### Revascularizing eye-lets

Pancreatic islet transplantation is a potentially promising therapy for type 1 diabetes, but poor revascularization hinders islet long-term viability. Figueiredo *et al.* studied the role of protein tyrosine phosphatase 1B (PTP1B) in regulating islet vascularization. Islets from PTP1B<sup>-/-</sup> mice retained more endothelial cells during in vitro culture and restored normoglycemia when transplanted into the anterior chamber of the eye in diabetic mice. Future work is needed to determine whether targeting PTP1B can improve islet transplantation in human patients. —CC

*Sci. Transl. Med.* **11**, eaar6294 (2019).

## NEURODEVELOPMENT

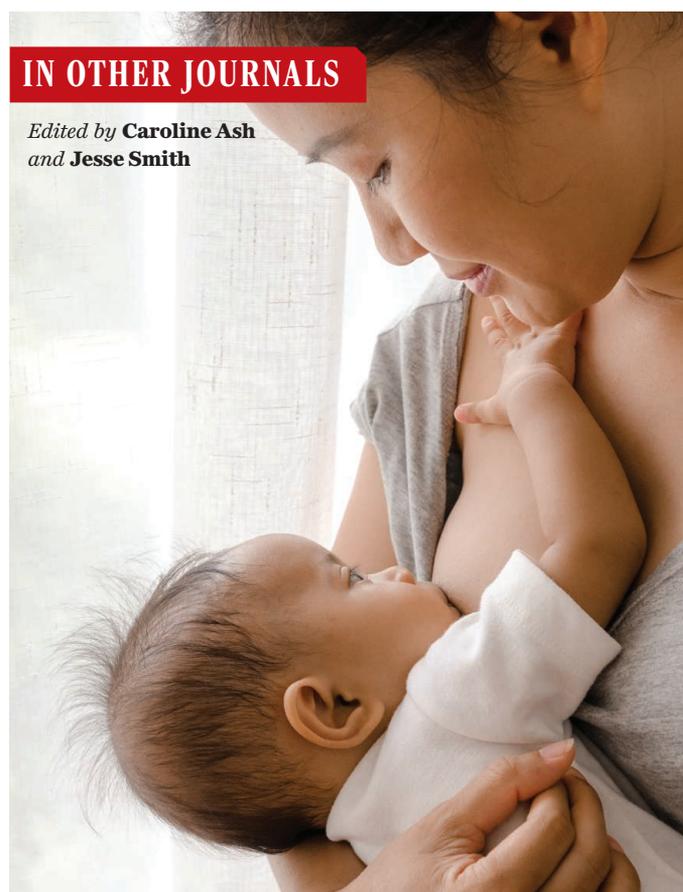
### Rescued by a dietary supplement

Patients with Rett-like syndrome show impaired motor and cognitive development. Soto *et al.* studied this disorder in a 5-year-old patient with a mutation in an *N*-methyl-D-aspartate (NMDA) receptor subunit. The electrophysiological and morphological defects in neurons expressing this mutant were improved by the NMDA receptor agonist D-serine. D-Serine itself can be toxic, but it can be converted to its stereoisomer L-serine, a natural component of various foods. Supplementing the patient’s diet with L-serine powder increased her D-serine levels and improved her motor and cognitive performance after about 1 year of treatment. —LKF

*Sci. Signal.* **12**, eaaw0936 (2019).

## IN OTHER JOURNALS

Edited by **Caroline Ash**  
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## IMMUNOLOGY

### BeATing back obesity

Children who are breastfed appear to be at a lower risk for obesity later in life. One explanation is that breast milk may somehow prevent the premature transition from beige adipose tissue (BeAT) to white adipose tissue during childhood and adolescence. Yu *et al.* report that alkylglycerol ether lipids found in breast milk maintain the BeAT of infant mice. Adipose tissue macrophages metabolize these lipids into platelet-activating factor, which then induces macrophage release of interleukin-6, signal transducer and activator of transcription 3 (STAT3) signaling in adipocytes, and the development of BeAT. Although usually inactivated in adulthood, this pathway resurfaces in obese adipose tissue, indicating a degree of metabolic flexibility that could be exploited for therapeutic applications. —STS

*J. Clin. Invest.* **129**, 2485 (2019).

**Lipids in breast milk delay the transition from beige to white adipose tissue and protect against obesity.**

## INFORMATION STORAGE

### Storing information in molbytes

Present technologies for storing information have been developed over many decades, and

each has its own weaknesses and strengths. In this work, Cafferty *et al.* present a possible alternative storage approach that uses mixtures of small organic molecules (“molbytes,” oligopeptides in the present



## PSYCHOLOGY

## Social media use and mental health

There has been public concern that increasing social media use among adolescents may cause reduced well-being. Orben *et al.* analyzed social media use among more than 12,000 teenagers in the United Kingdom over the course of 8 years to determine whether increased social media use predicted reduced life satisfaction over time. They found virtually no effect of social media use on life satisfaction either between individuals or in the same individual across time. These results suggest that concern over the use of social media and its relationship to mental health may be unwarranted. —TSR

*Proc. Natl. Acad. Sci. U.S.A.* **116**, 10226 (2019).

Adolescents using social media on their smartphones

study), distinguishable by mass spectrometry, to encode, write, store, and read any information in a binary manner. Each new message depends entirely on simple physical manipulations with the molecules, so no additional synthesis is required. The proposed strategy is in its early development stage but demonstrates that the chemistry of small molecules can potentially offer alternative approaches for secure long-term, zero-energy storage of information. —YS

*ACS Cent. Sci.* **5**, 911 (2019).

## AGING

### Senescent beta cells

Removal of senescent cells, which accumulate during aging, may have clinical utility in managing chronic diseases. One chronic disease commonly associated with aging is type 2 diabetes. Diabetes develops when pancreatic beta cells age and senesce, which then contributes to failure of glucose homeostasis. Aguayo-Mazzucato *et al.* investigated senescence of the insulin-producing beta cells in mouse models of diabetes. Removal of senescent cells with drug treatment or by specific depletion

of cells expressing the marker p16<sup>Ink4a</sup> in transgenic mice helped restore beta-cell function. Similar properties were observed in cultured human beta cells—results that hint of translational possibilities. —LBR

*Cell Metab.* 10.1016/j.cmet.2019.05.006 (2019).

## NEUROSCIENCE

### Imagination as a dialogue

The hippocampus constructs scene imagery to facilitate recollected or imagined mental representations. However, input from the ventromedial prefrontal cortex (vmPFC) is also needed for scene construction. How do these regions interact when we imagine a scene? Barry *et al.* addressed this question using magnetoencephalography. Participants imagined novel scenes or single objects after being given a cue. The direction of information flow during scene imagination mirrored that observed during episodic memory retrieval, in which vmPFC drives hippocampal activity. These results indicate that the vmPFC selects the elements for a scene, whereas the hippocampus is necessary to construct the scene imagery.

The vmPFC strongly modulates the construction of spatially coherent, contextually appropriate scene imagery. Episodic memory and imagination thus use similar regional dialogue in the brain. —PRS

*J. Neurosci.* **39**, 4375 (2019).

## CELL BIOLOGY

### QC keeps on keeping on

Several protein quality control processes have been identified that monitor and remove misfolded or damaged proteins in the endoplasmic reticulum. Schmidt *et al.* asked whether additional pathways monitor proteins further along the secretory pathway in the Golgi complex and the endosome. They identified a degradation pathway in budding yeast cells associated with endosome and Golgi, which they named EGAD. EGAD extracts membrane proteins from the Golgi and endosomes, allowing them to become substrates for cytosolic proteasomal degradation. An important cellular substrate of this pathway is a protein called Orm2, which is involved in down-regulating sphingolipid biosynthesis. The selective degradation of Orm2 facilitates the

homeostatic regulation of sphingolipid biosynthesis. —SMH

*EMBO J.* 10.15252/embj.2018101433 (2019).

## NANOMATERIALS

### Enhancing nanodiamond sensors

The fluorescence and spin properties of nitrogen vacancy (NV) centers in nanodiamonds could make them useful sensors when linked to biomolecules. Although nanodiamonds with diameters of about 5 nanometers can be extracted from the products of closed-chamber detonation of explosives like trinitrotoluene, the number of spin-triplet (negatively charged) NV centers can be too low to ensure that each nanodiamond is active. Terada *et al.* show that irradiation of detonation nanodiamonds with a sufficient fluence of 2 mega-electron volt electrons can increase the number of negatively charged NV centers by a factor of 4. The irradiation process aggregated the nanodiamonds, but they were redispersed with boiling oxidizing acid. —PDS

*ACS Nano* 10.1021/acsnano.8b09383 (2019).