and tested it in mice and monkeys. The TV was obtained by binding an antibody fragment of the human immunoglobulin G1 to the transferrin receptor expressed in brain endothelial cells. Fusing the TV to the anti–β-secretase antibody resulted in high expression of the antibody in the CNS in mice and monkeys. In a mouse model of lysosomal storage disorder, peripheral delivery of iduronate 2-sulfatase fused to the TV had therapeutic effects. The TV might be effective for delivering therapeutics in neurological disorders. —MM

Sci. Transl. Med. **12**, eaay1359, eaay1163 (2020).

OCEAN CIRCULATION

Changing forces in midstream

The intensity and frequency of the strongest cyclones east of Taiwan have increased over the past several decades as the climate has warmed. Zhang *et al*. found that one result of this trend has been the strengthening of Kuroshio current transport off the coast of Japan. The Kuroshio, like its Atlantic counterpart the Gulf Stream, is a surface current that moves huge volumes of warm water from low latitudes to high ones. As strong Pacific cyclones have become stronger, they have increased the amount of energy contained in cyclonic mesoscale ocean eddies and decreased that of anticyclonic ones. This in turn has increased the transfer of energy to the Kuroshio as eddies move into the current, providing a feedback between climate warming and ocean heat transport. —HJS

Science, this issue p. 988

ORGANIC CHEMISTRY

Stitching alkynes into bryostatin 3

The bryostatin family of marine natural products has been explored for a wide variety of pharmaceutical applications but remains challenging to source. The general structure comprises a macrocycle that contains three smaller, six-membered rings. Bryostatin 3 is distinguished by the added complexity of a fourth, fused lactone ring. Trost *et al*. report a convergent synthesis of this complex molecule, taking advantage of alkyne coupling reactions to stitch together three main fragments and asymmetric dihydroxylation and propargylation reactions to set stereochemistry. —JSY

Science, this issue p. 1007

CANCER

Profiling tumor bacteria

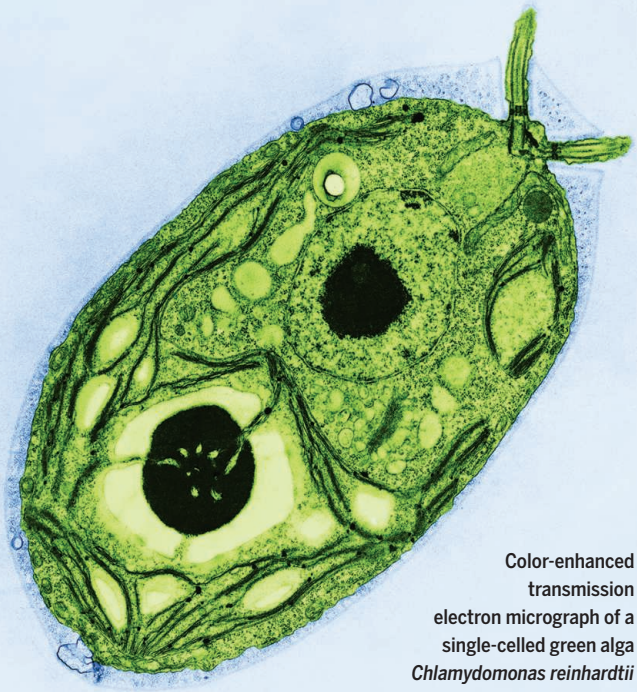
Bacteria are well-known residents in human tumors, but whether their presence is advantageous to the tumors or to the bacteria themselves has been unclear. As an initial step toward addressing this question, Nejman *et al*. produced an exhaustive catalog of the bacteria present in more than 1500 human tumors representing seven different tumor types (see the Perspective by Atreya and Turnbaugh). They found that the bacteria within tumors were localized within both cancer cells and immune cells and that the bacterial composition varied according to tumor type. Certain biologically plausible associations were identified. For example, breast cancer subtypes characterized by increased oxidative stress were enriched in bacteria that produce mycothiol, which can detoxify reactive oxygen species. —PAK

Science, this issue p. 973; see also p. 938

Tropical cyclones, such as Typhoon Maria in 2018, seen in a satellite image, appear to be strengthening the Kuroshio current in the North Pacific.

IN OTHER JOURNALS

Edited by **Caroline Ash** *and* **Jesse Smith**



Color-enhanced transmission electron micrograph of a single-celled green alga *Chlamydomonas reinhardtii*

BIOLOGICAL MEMBRANES

Dissecting uneven complex distribution

Eukaryotic cells contain heterogeneous membranes that vary in curvature, lipid and protein composition, and cellular context. Filling in molecular details for such cellular structures is a great challenge for structural biologists. Wietrzynski *et al*. used in situ cryo–electron tomography to capture views of the native thylakoid membranes of the single-celled green alga *Chlamydomonas reinhardtii*. Advances in data collection and processing permitted identification of specific membrane-associated complexes such as photosystems I and II, adenosine triphosphate synthase, and thylakoid-associated ribosomes. Two-dimensional projections of the membrane surface revealed a sharp compositional transition between appressed membranes (those that directly face another membrane) and nonappressed membranes. This technique should enable study of how these membranes are organized at both the cellular and molecular levels and how they react to different light conditions. —MAF

eLife **9**, e53740 (2020).

MEDICAL GENETICS

Genetic variant takes the pressure off

The identification of rare genetic variants that protect carriers from a specific disease can provide a launch point for studies of disease biology and therapy. In a search for genes that affect the risk of developing the common eye disease glaucoma, Tanigawa *et al*. examined data from more than 500,000 individuals represented in UK and Finnish biobanks. They found that missense and nonsense variants in *ANGPTL7*, the gene encoding angiopoietin-related protein 7, which is a member of

IMAGES (FROM LEFT): EOSDIS WORLDVIEW/NASA; BIOPHOTO ASSOCIATES/SCIENCE SOURCE

a protein family implicated in angiogenesis, were associated with lower intraocular pressure and reduced risk of glaucoma, including a variant that reduced risk by 34%. Consistent with a role in glaucoma, ANGPTL7 is expressed in the trabecular meshwork, a tissue that drains fluid (aqueous humor) from the eye. —PAK

PLOS Genet. **16**, e1008682 (2020).

IMMUNOLOGY

Commensals produce a gut reaction

Commensal bacteria in the small intestine are known to help shape immune responses. Less well understood is whether the microbiota residing in the stomach are similarly immunoregulatory. Satoh-Takayama *et al*. report that commensal bacteria can indeed regulate group 2 innate lymphoid cell (ILC2) homeostasis in the stomach. Furthermore, *Helicobacter pylori*, a pathogen responsible for gastritis and gastric cancer in humans, rapidly induces stomach ILC2 proliferation and activation in mice in an interleukin-7 (IL-7)– and IL-33–dependent manner. IL-5 production by ILC2 triggers B cell secretion of immunoglobulin A, which plays a role in *H. pylori* containment. ILC2 and commensal bacteria in the stomach may therefore serve as targets for various gastrointestinal disorders. —STS

Immunity **52**, 635 (2020).

NEUROSCIENCE

Dopamine circuits facilitate fear learning

To ensure survival, powerful mechanisms of pain sensation and fear learning have evolved in animals. One important fear-learning center is the amygdala of the mammalian brain. Dopamine neurons in the midbrain ventral tegmental area (VTA) project into several brain regions, including the amygdala. Using in vivo optogenetics and optrode recordings, as well as anatomic circuit tracing and cFos imaging, Tang *et al*. studied the role of this dopamine pathway in the formation of fear memory. The authors found that a few VTA dopamine neurons projecting into the mouse amygdala were activated when a mild shock was administered to the animal's foot. Dopamine release thus facilitates the formation of a fear memory. —PRS

J. Neurosci. **40**, 3969 (2020).

ORGANIC CHEMISTRY

Epoxidizing arenes

Although the metabolism of aromatic rings often involves epoxide formation, this reaction has proven challenging to translate into applications in synthetic chemistry. Siddiqi *et al*. now report a straightforward sequential protocol for arene epoxidation: A photochemical cycloaddition with a triazoline reagent first dearomatizes the arene and then a manganese catalyst introduces the oxygen in the epoxide ring. Oxidative removal of the triazoline completes the process. Minor modification of the conditions for benzenes also cleanly produced ring-expanded oxepines from naphthalene and quinoline reactants. —JSY

J. Am. Chem. Soc. 10.1021/jacs.0c02724 (2020).

PHYSICS

Tuning the Chern number

The material $MnBi_2Te_4$ is an antiferromagnet that can, in thin-film form, support interesting topological states. Ge *et al*. investigated the transport properties of $MnBi_2Te_4$ films 7 to 10 layers thick in the presence of a magnetic field. The authors showed that the films were in the so-called Chern insulator state, exhibiting quantized conductance that could not be explained by the ordinary quantum Hall effect. The thinner, seven-layer samples had a Chern number of 1, whereas the 9- and 10-layer samples were in an even more exotic state with a Chern number of 2. The tuning of the Chern number with sample thickness was also supported by numerical calculations. —JS

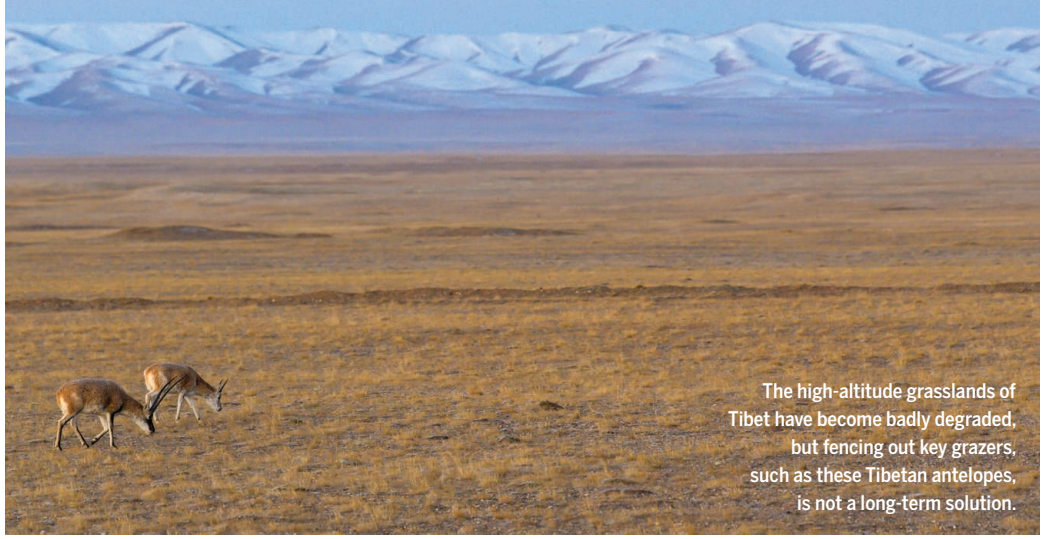
Natl. Sci. Rev. 10.1093/nsr/nwaa089 (2020).

GRASSLAND

Move the fences

The sensitive alpine meadow and steppe systems of the Tibetan Plateau have experienced serious degradation over the past half-century. To restore these habitats, an extensive system of wire fences has been erected across the region; some have been in place for 30 years. Fences can protect plants from immediate grazing by livestock, but they limit connectivity for other organisms, interrupt trophic dynamics, and artificially divide landscapes. Sun *et al*. used a large-scale meta-analysis to determine whether these fences have been effective for restoration, how they affect wildlife, and what effect they have on human populations on the basis of interviews with local herdsmen. Fences that had been in place for short to medium periods of time were able to increase aboveground vegetative biomass for both meadows and steppe. However, long-term fencing decreased plant growth and diversity, with negative ecosystem impacts. In addition, fences inhibited the movement of three focal mammal species—Tibetan gazelles, yaks, and donkeys—which increased their grazing impact on unfenced regions. The herders perceived fences as not only preventing their ability to use traditional grazing practices but also as being ineffective overall. Fences can be useful tools but only when they are transitional and impermanent. —SNV

Sci. Bull. 10.1016/j.scib.2020.04.035 (2020).



The high-altitude grasslands of Tibet have become badly degraded, but fencing out key grazers, such as these Tibetan antelopes, is not a long-term solution.

PHOTO: STAFFAN WIDSTRAND / WILD WONDERS OF CHINA