ANEWONBOI
Heart rate and blood pressure control
PIEZ01 and PIEZ02 are two mechanically activated ion channels that are highly expressed in lungs, bladder, and skin. Zeng et al. found that both ion channels are expressed in sensory neurons of a ganglion complex that contribute to the baroreflex, a homeostatic mechanism that helps to keep blood pressure stable (see the Perspective by Ehmke). Conditional double knockout of PIEZ01 and PIEZ02 in these neurons abolished the baroreflex and disrupted blood pressure regulation and heart rates in mice. These changes were very similar to those seen in patients with baroreflex failure. In mice, selective activation of PIEZ02-expressing ganglion neurons triggered immediate increases in heart rate and blood pressure. —PRS
Science, this issue p. 464; see also p. 398

ARCHAEOLOGY
Pre-Clovis projectile points in North America
The Clovis culture was a prehistoric Paleoiandian culture. Archaeological research over the past decades has refuted the Clovis-first hypothesis in the peopling of the Americas. However, controversy continues over the timing of earlier migrations, the identification and description of the material culture possessed by these early migrants, and the likely routes by which these peoples entered North America. Waters et al. studied the Debra L. Friedkin site in Texas to resolve some of these questions. They performed careful stratigraphic excavation and a meticulous program of chronometric dating to identify a style of projectile points with triangular blades and stemmed bases. These projectiles were dated to have been made between 13,500 and 15,500 years ago and were found below typical Clovis-style points dated to 13,000 years ago. Thus, either the stemmed form was transformed locally over time into the more widespread Clovis style or it is a style created by people of an earlier and separate migration. —MSA

OPTICS
Shrinking synchrotron generation
The generation of synchrotron radiation is typically achieved by accelerating charges in large magnetic fields. Synchrotron facilities are usually the realm of large international organizations. Henstridge et al. show that the interaction of a femtosecond light pulse moving in an arc on a specially designed metasurface can also generate synchrotron radiation. In this case, the synchrotron radiation at terahertz frequencies was produced by the nonlinear polarization induced by the light pulse. The results hold promise for the development of powerful on-chip light sources. —ISO
Science, this issue p. 439

CANCER
Killing tumors by targeting their neighbors
Pancreatic cancer is infamous for its bad prognosis as well as for its dense stroma. Most therapies target the tumor cells themselves rather than the stroma. Zhou et al. identified a therapeutic target called DKK3, which is produced by pancreatic stellate cells. This protein was present in the majority of human pancreatic tumors sampled. Ablating DKK3, either by genetic means or with a monoclonal antibody, provided a potentially effective treatment. Antibody treatment reduced tumor growth and extended survival in mouse models, especially when combined with an immune checkpoint inhibitor. —YN

ELECTROCHEMISTRY
Coarsening platinum electrodes
Platinum (Pt) electrodes can undergo oxidation and reduction that can alter their surface morphology. Deng et al. used atomic force microscopy to follow changes in surface morphology of a smooth Pt foil in sulfuric acid as it was cycled between various oxidizing and reducing potentials. After oxidizing the surface at or above 1.8 volts, mild reduction (~0.8 volts) created Pt ions in the surface region, which, upon further reduction, deposited Pt nanoparticles and created a rough surface. The formation of nanoparticles depended critically on oxide thickness. Thinner oxides created fewer nucleation sites, which led to fewer, but larger, nanoparticles. —PDS

ENVIRONMENTALISM
Measuring charity
How do we know that a donation made to a charity is effective? We can total up the funds raised by a civil society group, but this measure misses if, and how well, the money translates into public good. Water pollution in the United States is still a problem, despite the 1972 Clean Water Act. Grant and Langpap examined the
ECOLOGY

Pollination in an agricultural landscape

Plants and their insect pollinators form ecological networks across landscapes, networks that can be altered by human activity, principally agriculture. Redhead et al. assessed the composition and structure of plant-pollinator networks across Great Britain, assembling citizen-science records of all plant-pollinator interactions. By simulating extinction of plant species from communities, they were then able to assess the relative robustness of these networks to changes in community composition. They found that networks in highly agricultural landscapes are more robust to perturbation, as the pollinators in these landscapes tend to be generalists, and the plants less extinction prone. Nevertheless, they note that managing landscapes for crop pollination may not be a recipe for wider biodiversity conservation. —AMS


ANIMAL BEHAVIOR

Italian honeybee, a generalist pollinator, visiting chive flowers

This analysis points to nonprofit organizations as an effective mechanism for helping to resolve large-scale collective action problems. —CA


ANTHROPOLOGY

Moral judgment across cultures

The importance of intentions in moral judgments varies across cultures. One theory holds that these differences are driven by variation in cultural norms regarding the acceptability of inferring other peoples’ mental states. To test this question, McNamara et al. investigated moral judgments among indigenous iTaukei Fijians whose cultural norms discourage mental-state reasoning. Participants judged cases in which an actor transgressed by accident more harshly than cases in which an actor intended to do harm but failed to do so. When participants were primed to focus on thoughts in a follow-up study, this pattern reversed. These data suggest that moral and legal theories that emphasize intention may emerge from an implicit focus on mental states that is often taken for granted in Western contexts. —TSR

Cognition 182, 95 (2019).

DIET

Temperature and food preference

On a cold day, hot soup seems nice. This desire has a fundamental evolutionary basis that may lie in survival. Brankatschk et al. provided Drosophila fly larvae with a choice of food types: one containing only yeast and another consisting only of plant material. At moderate temperatures, yeast was preferred, but at cold temperatures, the larvae’s preference shifted to plant material. When these larvae metamorphosed into adult flies, they showed increased cold resistance and improved survival in the winter, possibly because the plant fatty acids enhance membrane fluidity and motor coordination. —BAP


STEM CELLS

Blood by the clock

Hematopoiesis is the process by which the cellular components of blood are maintained by hematopoietic stem and progenitor cells. Golan et al. found that supporting stem cells in the bone marrow and replenishing mature cells in the blood is coupled to the light-dark cycle. Light, via norepinephrine and tumor necrosis factor (TNF), induces blood replenishment and suppresses stem cell self-renewal, whereas darkness, via melatonin and TNF, promotes stem cell self-renewal and diminishes vascular permeability to increase the pool of cells available for the next day. Understanding the daily rhythm of the bone marrow could have implications for the time of day at which bone marrow and stem cell transplants are likely to be most successful. —GKA


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Can you recognize recognition?
Melissa McCartney

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