

belonging to the still-living genus *Castanopsis*. Hypotheses of Fagaceae origins have focused only on the Northern Hemisphere. Ancestral *Castanopsis* may represent one of numerous paleo-Antarctic plant genera that are found with *Castanopsis* today in Southeast Asian rainforests. —AMS

Science, this issue p. 972

MALARIA

Targeting malaria transmission

To effectively block transmission of *Plasmodium falciparum*, vaccines must target appropriate antigens. To identify candidate antigens, Dantzler *et al.* studied immune responses from large cohorts of people who had been infected with *P. falciparum*. Multiple complementary assays revealed how antibodies recognize gametocytes, the sexual stage that allows transmission from human blood into mosquitoes. Interesting antigens were present in immature gametocytes, with a subset conserved among *P. falciparum* strains. Natural immunity to these antigens indicates that an appropriately designed vaccine could potentially interfere with malaria transmission. —LP

Sci. Transl. Med. **11**, eaav3963 (2019).

GLOBAL WARMING

Keep cool and carry on

The current trajectory of global warming is predicted to lead to an increase in global mean temperatures greater than pre-industrial levels of 2.6° to 3.1°C by 2100. The Paris Agreement aims to keep that number below 2°C, with recent efforts pushing signatories to ratchet up those ambitions and stay below 1.5°C. Lo *et al.* assessed data on both climate and heat-related mortality from 15 major U.S. cities. They found that the current Paris Agreement limit should result in substantial reductions in mortality in all of these cities except for Atlanta, with Philadelphia seeing the greatest

drop in heat-related deaths at 3.1%. Achieving the more ambitious 1.5°C target would translate into an estimated reduction in annual deaths of between 110 and 2720 per city. —AC and KJP

Sci. Adv. **10**.1126/sciadv.aau4373 (2019).

NEURODEVELOPMENT

Brain map of touch sensation

The brain's somatosensory cortex contains a topographical map that reflects touch sensation inputs. During embryonic development, axons from the midbrain thalamus build columnar connections to the cortex in the absence of sensory input. Working in mice, Antón-Bolaños *et al.* found that these thalamocortical connections are responsible for organizing the somatosensory cortex (see the Perspective by Tiriác and Feller). Organization of the map in the cortex depends on spontaneous calcium waves in the embryonic thalamus. Thus, the somatosensory map is sketched out before actual sensory input begins to refine the details. —PJH

Science, this issue p. 987; see also p. 933

NEUROSCIENCE

This is safe, you can eat it

Social transmission of food preference is a model for studying nonspatial memory. In mice, a signal that food is safe to eat is transmitted by its smell along with molecules in the breath of a conspecific. How the odor itself is encoded and assigned valence is poorly understood. Loureiro *et al.* found a monosynaptic pathway between two brain areas, the piriform cortex and the medial prefrontal cortex, that plays a central role in this process. This connection strengthens during social interaction, thereby allowing a mouse to provide a food safety message to its companion. —PRS

Science, this issue p. 991

IN OTHER JOURNALS

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



The toxic pollen of teasel flowers does not deter bumblebees from gathering nectar.

POLLINATION

Pollen trade wars

For bees, pollen is an important source of protein and fats and is thus a strong motivation for visiting flowers. For plants, pollen is essential, and they do not want it lost to reproduction by greedy or inefficient pollinators. To circumvent this conflict, some plants have developed toxic pollen to deter consumption by pollinators. Wang *et al.* discovered that the flowers of teasel (*Dipsacus* spp.) contain a distasteful saponin in their pollen. After visiting a flower, bumblebees typically groom their hairy bodies to harvest adhering pollen grains—but not after visiting teasel flowers. The reason why some bumblebees still avidly visit this plant is because the nectar reward is generous and not tainted by the bitter saponin. Meanwhile, as bumblebees circulate among the plants to gather nectar, the ungroomed teasel pollen grains sticking to their hair ensures efficient pollination. —CA

Curr. Biol. **29**, 1401 (2019).

HIV VACCINES

It's all about delivery

Human immunodeficiency virus (HIV) has proved to be a notoriously difficult virus to vaccinate against. Most immunization studies focus on altering components of the vaccine to improve immune responses. Cirelli *et al.* instead asked what would happen if they changed

the delivery method rather than vaccine composition. Slow vaccine delivery—in small amounts over several days—was found to enhance HIV neutralizing antibodies when compared with standard methods where the vaccine is injected all at once. Rhesus monkeys developed more potent T follicular helper cell responses, and germinal center B cells showed improved

DIET EVOLUTION

A carnivore in herbivore's clothing

It is widely known that pandas eat bamboo. The conundrum is that these members of the order Carnivora show herbivore traits in their jaw and teeth but carnivore traits in their gut and digestive enzymes. Nie *et al.* used niche models, tracking, and nutrient analysis to better characterize the details of the bamboo diet and its absorption, and they find that pandas' motley traits may not be incongruous after all. Although their diet is vegetarian, pandas prefer to eat bamboo at stages in the plant's growth when it has the highest protein content. The macronutrient energy ratios that pandas obtain from bamboo by being picky are similar to those obtained by hypercarnivores that secure more than 70% of their diet from animal sources. Herbivory works well in bamboo forests with abundant resources. —SNV

Curr. Biol. **29**, 1677 (2019).

For pandas, bamboo can be as nutritious as meat.



engagement to viral envelope antigens. Slow-release vaccination strategies may open new avenues to tackle currently intractable pathogens. —PNK
Cell **177**, 1153 (2019).

STEM CELLS

Hormones control adrenal stem cells

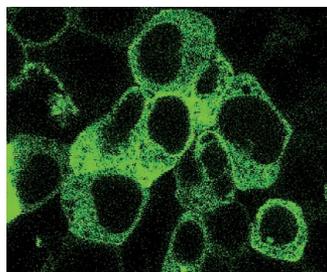
The adrenal cortex produces steroid hormones involved in stress responses. This part of the adrenal gland is sexually dimorphic. The cortex is larger in females, in whom it displays variable susceptibility to disease, including cancers. Grabek *et al.* examined the cellular basis of this sex bias. Females have much higher cell turnover, which means that the steroidogenic tissue is effectively replaced every 3 months. By contrast, male hormones suppress proliferation and stem cell recruitment. Females not only show increased proliferation but also recruitment of mesenchymal cells from the capsule. These responses depend on the hormonal environment rather than sex chromosomes. So, if androgens are removed, the stem cell compartment becomes activated, whereas adding androgens

inhibits capsular stem cell activity. These sex-specific activities may be of relevance to disease susceptibility. —BAP

Cell Stem Cell **10**.1016/j.stem.2019.04.012 (2019).

TARGETED DEGRADATION
Pathogen-sourced enzyme redirected

Cells of all types have the means to degrade specific proteins. These pathways can be hijacked by some bacteria to diminish host immune responses. The enzymes involved can in turn be used in the lab to modulate the proteome of eukaryotic cells. Ludwicki *et al.* attached a bacterial ubiquitin ligase to a protein that binds green fluorescent protein (GFP), thus redirecting it



Confocal microscopy image of fluorescent protein targets expressed in HEK293T cells

to add ubiquitin to GFP and GFP fusion proteins, which causes their degradation. The authors used polyamines and mRNA-binding proteins to stabilize and deliver mRNAs encoding an engineered ubiquitin ligase to cells. The mRNA nanoplexes enabled proteome editing both in vitro and in mice. —MAF

ACS Cent. Sci. **5**, 852 (2019).

DIVERSITY

No more excuses for all-male panels

Biases, both implicit and explicit, impede the participation of women in STEM. Recent studies show that men are invited to speak on scientific panels at twice the rate that women are. McCullagh *et al.* describe the success of the "Request a Woman Scientist" database, part of the 500 Women Scientists organization, which works to build an inclusive scientific community. The database is composed of more than 7500 women from multiple disciplines and countries and provides anyone looking for scientific expertise with an extensive and multi-disciplinary network of vetted women in science. To date, 11%

of women scientists included in the database have been contacted to participate in media engagements, peer review, panel participation, educational outreach, and professional and research connections, further promoting the profile and participation of women in STEM. —MMc

PLOS Biol. **17**, e3000212 (2019).

ORGANIC CHEMISTRY
Outside help for a carbene catalyst

Metal catalysis is sometimes enhanced by secondary interactions with components that are not directly coordinated to the metal. Dhayalan *et al.* have explored this concept with metal-free organocatalysis. Specifically, they found that dynamically tethering a boronic acid to the periphery of an N-heterocyclic carbene catalyst raised enantioselectivity of a benzoin condensation. Furthermore, by applying a decision tree analysis correlating selectivity with parameters such as dipole moment and torsion angle, they efficiently optimized the boronic acid structure for gram-scale reactions. —JSY

Nat. Chem. **11**, 543 (2019).