distant galaxy. The GRB itself lasts only a few seconds but is followed by an afterglow that can persist for hours or days. The H.E.S.S. Collaboration observed the afterglow of GRB 190829A, a nearby long GRB. The proximity of this burst allowed it to be detected at tera-electron volt energies that would otherwise be absorbed in the intergalactic medium. By analyzing the spectrum and light curve at x-ray and gamma-ray wavelengths, the authors show that the afterglow cannot be explained by standard models. —KTS

**PALEOClimATE**

**Antarctic paleotemperatures**

It has been widely thought that East Antarctica was ~9°C cooler during the Last Glacial Maximum, close to the ~10°C difference between then and now determined independently for West Antarctica. Buizert et al. used borehole thermometry, firm density reconstructions, and climate modeling to show that the temperature in East Antarctica was actually only ~4° to 7°C cooler during the Last Glacial Maximum. This result has important consequences for our understanding of Antarctic climate, polar amplification, and global climate change. —HJS

**CORONAVIRUS**

**Back to school—safely**

Severe COVID-19 in children is rare, but many schools remain closed because the transmission risk that school contact poses to adults and the wider community is unknown. Observing the heterogeneity of approaches taken among U.S. school districts, Lessler et al. investigated how different strategies influence COVID-19 transmission rates in the wider community using COVID-19 Symptom Survey data from Carnegie Mellon and Facebook. The authors found that when mitigation measures are in place, transmission within schools is limited and infection rates mirror that of the surrounding community. —CA

*Science*, abd2939, this issue p. 1092

**HOST SIGNALING**

**Virus beats bronchodilators in airways**

Agonists of the β2-adrenergic receptor (β2AR) are used as bronchodilators to relieve airway obstruction in asthmatic patients, but they are less effective in patients infected with respiratory syncytial virus (RSV). Harford et al. found that RSV infection of human airway smooth muscle cells resulted in the loss of the β2AR from the plasma membrane and in its proteasomal cleavage, and enhanced the contractility of these cells in vitro. Drugs that do not act on the β2AR may be needed to relieve airway obstruction in patients infected with RSV. —JFF


**T CELLS**

**Reconstructing T<sub>FR</sub> cell development**

Antibody responses, including those against self-antigens, are tightly controlled within germinal centers by balancing the activity of T follicular regulatory (T<sub>FR</sub>) and T follicular helper (T<sub>fh</sub>) cells. Kumar et al. reconstructed the developmental trajectory of T<sub>FR</sub> cells using flow cytometry–indexed single-cell transcriptomics of follicular T cells isolated from human peripheral blood, lymph nodes, and tonsils. They used transcriptomics to support a model in which mature germinal center T<sub>FR</sub> cells arise from regulatory T cells, with circulating T<sub>FR</sub> cells representing a separate developmental pathway. These results suggest that mature T<sub>FR</sub> cells primarily arise independently from their less mature counterparts in peripheral blood, providing further insight into how human T<sub>FR</sub> cells develop. —CO


**CARDIOLOGY**

**Taking machine learning to heart**

Both children and adults can have cardiac problems. Congenital problems predominate in childhood, whereas adults are more likely to suffer from conditions associated with age. In both cases, however, accurate diagnosis depends on access to health care and the availability of trained specialists. In two recent studies, Arnaout et al. and Yao et al. showed how machine learning can supplement specialist care in both pediatric and adult cardiology settings. Arnaout et al. analyzed fetal ultrasound images to detect congenital heart disease. Yao et al. used machine learning in conjunction with electrocardiogram imaging to detect adults with low ejection fraction (a measure of the amount of blood that the heart succeeds in pumping), which is a risk factor for subsequent heart failure. In each case, the technology should help to improve diagnostic accuracy and access to appropriate treatment. —YN


**MECHANOChemISTRY**

**N-heterocyclic carbenes by compression**

Mechanochemistry, the application of mechanical force to drive chemical reactions, is widely used in industry to activate force-sensitive inorganic materials (mechanophores). In recent years, there has been considerable interest in developing organic and polymeric mechanophores that could offer new opportunities for the development of catalytic systems, drug-release technologies, sensors, and other advanced functional materials. Shen et al. report that some flex-activated polymeric mechanophores can release an N-heterocyclic carbene under mechanical load without degradation of the polymer main chain and over multiple compression-activation cycles. The proposed mechanophores could be used as a platform to release various classes of N-heterocyclic carbenes, widely used organocatalysts, which could trigger practically useful secondary reactions upon activation. —YS

**AGRICULTURE**

**Intervention beans**

Agricultural interventions to improve human nutrition do not always recognize ecological and social processes. To explore how multiple aspects of farming can be integrated, Santoso et al. designed an agricultural intervention study among Tanzanian smallholder farmers. Mentor farmers were asked to share agricultural information, and legume seeds were supplied to participating villages for two growing seasons between 2016 and 2019. Although the effect depended on local context, by comparison with similar programs using more expensive livestock interventions, this study achieved results at the upper end of the range. Although little change was observed in anthropometric measures, children’s diet was diversified, household food insecurity improved, men became more involved in household tasks, and women’s well-being improved. —CA  *J. Nutr.*, 10.1093/jn/nxab052 (2021).

Providing legume seeds for agricultural intervention results in a wide range of nutritional and social benefits.

**GEOLOGY**

**Hydrogen coal storage**

Hydrogen is a zero-carbon fuel that is particularly difficult to store because of its high diffusivity in many materials. Iglauer et al. found that hydrogen adsorbs onto sub-bituminous coal and suggests using coal seams for large-scale hydrogen storage. The authors made these measurements in the laboratory under various pressure and temperature conditions. The gas adsorption substantially increased with pressure, suggesting that deeper coal seams might be the best candidates for storage if this adsorption behavior is validated in the field. —BG  *Geophys. Res. Lett.*, 10.1029/2021GL092976 (2021).

Large-scale hydrogen storage may be possible underground in sub-bituminous seams (black, pictured).

**QUANTUM OPTICS**

**Harnessing the dark to store light**

An excited atom will naturally decay to the ground state, with the exciting and emitted photons forming the basis for the optical protocols in quantum communication and computation. Within an ensemble of atoms, this emission process can proceed constructively, resulting in faster ensemble decay in an effect known as superradiance. In contrast to the superradiant process, Ferioli et al. report subradiance in an ensemble of excited rubidium atoms, where collective behavior between the decaying atoms proceeds destructively, thereby extending the lifetime of the excited atom ensemble in what can be described as a dark state. Engineering such dark states could provide a route to storing light. The reduced linewidth could also be useful in metrology applications. —ISO  *Phys. Rev. X*, 11, 021031 (2021).

**CELL BIOLOGY**

**Cells feel the strain**

Cells respond to mechanical strain by stiffening their actin cytoskeleton, a process that is energetically costly. Salvi et al. show that cells can compensate for this cost by increasing glucose transport when subjected to mechanical strain. In canine or human epithelial cells in culture, exposure to strain caused accumulation of the glucose transporter GLUT1 at cell-cell junctions. The increase in transporters increased the uptake of glucose required for cytoskeletal stiffening. The transporters were tethered by the ankyrin G protein to E-cadherin–containing adhesion complexes at the cell junctions. Cells expressing a mutant form of E-cadherin that did not interact with ankyrin G failed to accumulate GLUT1 and were unable to form an effective epithelial barrier. —LBR  *Nat Cell Biol.*, 23, 457 (2021).

**HUMAN EVOLUTION**

**Origins of the sweaty ape**

Humans are unique mammals that lack hair in many parts of their body and have an increased capacity for sweating, which assists in thermoregulation, through eccrine sweat glands. Using a comparative genomics approach to study the regulation of genes involved in the development of eccrine sweat glands, Aldea et al. investigated noncoding genomic elements to determine the differences underlying the increased eccrine sweat gland density of humans relative to other primates and mice. They found that human-specific evolution in a noncoding enhancer, hECE18, likely increases gene expression of the Engrailed1 gene, which is required for the development of eccrine sweat glands. Furthermore, humanized hECE18 knock-in mice have an increased number of these glands, supporting the idea that this human-specific adaptation is a result of changes in the noncoding regulatory regions of proteins. —LMZ  *Proc. Natl. Acad. Sci. U.S.A.*, 118, e2021722118 (2021).