KIDNEY CANCER
Pediatric and adult kidney tumors differ

Understanding tumor origins and the similarities and differences between organ-specific cancers is important for determining treatment options. Young *et al*. generated more than 72,000 single-cell transcriptomes from healthy and cancerous human kidneys. From these data, they determined that Wilms tumor, a pediatric kidney cancer, origi-nates from aberrant fetal cells, whereas adult kidney cancers are likely derived from a specific subtype of proximal convoluted tubular cell. —LMZ

Science, this issue p. 594

EVOLUTION
Adaptive conflicts with the modern world

Mammals evolved in terrestrial environments. Those that now live in the marine environment have had to adapt to the partic-ular selective pressures that this environment imposes. Meyer *et al*. surveyed the genomes of several marine mammal species to identify regions of conver-gent change. Multiple losses of the *Paraoxonase 1* gene are evident in marine mammals, likely resulting from remodeling of lipid metabolism or anti-oxidant networks. The multiple occurrences of this loss of function across taxa indicate an evolutionary benefit. However, *Paraoxonase 1* is the primary mammalian defense against

Marine mammals are genetically vulnerable to some pollutants.

organophosphorus toxicity. Marine mammals may be at a great disadvantage in the Anthropocene if run-off of this agricultural product into the marine environment continues. —SNV

Science, this issue p. 591

AUTOIMMUNITY
Pancreatic perturbation

Autoimmune pancreatitis (AIP) is difficult to diagnose and can sometimes be confused with pancreatic cancer, which presents with similar symp-toms. AIP is an inflammatory disease involving elevated immunoglobulin G4 (IgG4); however, the target autoanti-gens are unknown. Previous work pointed to the extracel-lular matrix providing the target for IgG4. Shiokawa *et al*. now show that a truncated form of laminin 511 may be a major autoantigen in AIP. Half of the AIP patients that they investigated had antibodies against laminin 511, which were absent in healthy controls. Patient pancreatic tissues were positive for laminin 511, and immunization of mice with this protein induced AIP-like symptoms. —LP

Sci. Transl. Med. **10**, eaaq0997 (2018).

CELL BIOLOGY
Going through a phase

Neuronal communication at synapses relies on regulated neurotransmitter secretion. Neurotransmitters are stored in small vesicles that are orga-nized in clusters within nerve terminals. On stimulation, the vesicles fuse with the presyn-aptic plasma membrane, but despite their tight packing, replacement synaptic vesicles are rapidly recruited. Vesicles newly reformed by membrane recycling randomly intermix with the clusters. Milovanovic *et al*. show that synapsin, an abundant synaptic vesicle–associated protein, organizes these vesicle clusters by liquid-liquid phase separation—like oil in water. —SMH

Science, this issue p. 604

A melt river on Petermann Glacier in northwestern Greenland

IN OTHER JOURNALS

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

ICE SHEETS
A responsive past

One of the ways that we might develop more accurate projections of the Greenland Ice Sheet's response to global warming is to investigate analogous periods in the past and use them to establish constraints for its future behavior. Reusche *et al*. investigated the history of two large outlet glaciers in the northwestern sector of the ice sheet across the Holocene by measuring surface-exposure ages of associated moraines. Their data shed light on the competing effects of generally warming surface air temperatures and discrete climate cooling events. These results help show how quickly the ice sheet can respond to both positive and negative centennial atmospheric temperature fluctuations. —HJS

Geophys. Res. Lett. 10.1029/2018GL078266 (2018).

MICROBIOTA
Establishing bad host relations

The human microbiota is a mixture of microorganisms that are maintained in symbiosis with the host. However, sometimes this symbiosis goes awry, caus-ing pathogen outgrowth and disease. For example, periodically, *Staphylococcus aureus* emerges from the skin-resident micro-biome as a disease-causing

CREDITS: (FROM LEFT) ROBERT K. BONDE/USGS – GAINESVILLE; DAVE WALSH/VWPICS/ALAMY STOCK PHOTO

A malaria-free childhood improves educational outcomes in Tanzania.

NEURODEVELOPMENT
Malaria challenges learning

Owing to interventions, the prevalence of malaria has declined in Tanzania. Klejnstrup *et al.* analyzed 15 years' worth of data on malaria rates, along with school achievement data for more than 200,000 children. They found that children born in periods with higher prevalences of malaria struggled more with numeracy and English literacy than counterparts at less risk of malaria. The effect of a malaria-free childhood on educational outcomes rivaled the effects of smaller class sizes and better-trained teachers. —PJH

PLOS ONE 10.1371/journal. pone.0199542 (2018).

pathogen. Boldock *et al.* show that such irruptions can be mediated by particulate peptidoglycan (PTG) expressed from the cell walls of nonpathogenic (commensal) skin bacteria. PTG promotes *S. aureus* survival in innate immune cells such as macrophages and neutrophils, and this facilitates systemic infection. This phenomenon is not mediated by established receptor pathways such as Nod1, Nod2, Myd88, or the NLPR3 inflammasome. —GKA

Nat. Microbiol. **3**, 881 (2018).

METABOLISM
High fat promotes overeating

Disagreement abounds over what constitutes a healthy diet and which components might provoke overeating and obesity in human populations. Hu *et al.* took a systematic approach to the latter question by feeding mice diets that differed in their proportion of fat (from 8 to 80%), protein (from 5 to 30%), carbohydrate (from 10 to 80%), or sucrose (from 5 to 30%). The only mice that ate more than they needed and became overweight

were those eating a diet high in fat content. Furthermore, high-fat diets stimulated hedonic or reward pathways in the brain, as measured by gene expression. Because an equivalent comparison in humans would require a decade of study, we are unlikely to know how closely the results would be replicated in people. —LBR

Cell Metab. 10.1016/ j.cmet.2018.06.010 (2018).

PLANT GENOMICS
Decoding parasitic plant genomes

Parasitism has evolved multiple times in plants and resulted in some major agricultural pests, including relatives of the morning glory family called dodder or strangleweed. To examine the effects of parasitism on the genome, Vogel *et al.* and Sun *et al.* respectively sequenced the genomes of field dodder (*Cuscuta campestris*) and Australian dodder (*Cuscuta australis*). Both studies identified major gene losses, likely facilitating the transformation into leafless, rootless plants unable to photosynthesize. Vogel

et al. documented more than 50 examples of gene transfer into field dodder from their hosts. Sun *et al.* examined transcriptomes of the haustoria, which are specialized organs that allow dodder to extract water and nutrients from host plants. —LMZ

Nat. Commun. 10.1038/s41467-018-04344-z, 10.1038/ s41467-018-04721-8 (2018).

GEOPHYSICS
Gravity tracking of a great earthquake

Changes in local gravity are connected to changes in subsurface mass. Panet *et al.* used GRACE (Gravity Recovery and Climate Experiment) satellite data to track large-scale deformation before and after the magnitude-9 Tohoku-Oki earthquake in Japan. Their analysis of the gravity data indicates that deformation occurred deep in the subducting slab starting several months before the earthquake. After the earthquake, mass transferred to the Pacific and Philippine Sea plate interiors. The large-scale and long-time-period gravity observations provide a distinctive perspective

on this devastating and well-studied earthquake. —BG

Nat. Geosci. 10.1038/s41561-018-0099-3 (2018).

OPTICS
Lighting the path to AI

Artificial intelligence (AI) explores different architectures that strive to exploit the powerful information-processing capability of the brain. Artificial neural networks use connected artificial components (mimicking the function of neurons and synapses) to process information and perform complex tasks such as written and spoken language and image recognition from vast datasets. All the networks require training, however, which usually has been done by computer, and the process can be very time-consuming. Hughes *et al.* developed an optical method in which the training process is done with laser light propagating through a complex network of paths patterned into an optical chip. The results bring the prospect of an optical chip–based AI platform operating at the speed of light a step closer. —ISO

Optica **5**, 864 (2018).

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