time, known as the "sunk cost," reduces the likelihood of giving up the pursuit of a reward, even when there is no indication of likely success. Sweis *et al.* show that this sensitivity to time invested occurs similarly in mice, rats, and humans (see the Perspective by Brosnan). All three display a resistance to giving up their pursuit of a reward in a foraging context, but only after they have made the decision to pursue the reward. —SNV

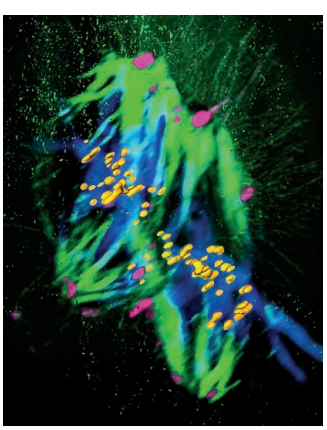
Science, this issue p. 178; see also p. 124

EARLY DEVELOPMENT

It takes two to tango

Fusion of egg and sperm combines the genetic material of both parents in one cell. In mammals, including humans, each parental genome is initially confined in a separate pronucleus. For the new organism to develop, the two genomes must be spatially coordinated so that the first embryonic division can create two cells that combine both genomes in one nucleus. Reichmann *et al.* found that at the beginning of the first division, two microtubule spindles organize the maternal and paternal chromosomes and subsequently align to segregate the parental genomes in parallel (see the Perspective by Zielinska and Schuh). Failure of spindle alignment led to two-celled embryos with more than one nucleus per cell. Dual-spindle assembly in the zygote thus offers a potential mechanistic explanation for division errors frequently observed in human embryos in the fertility clinic. —SMH

Science, this issue p. 189; see also p. 128



Dual spindles separate maternal and paternal chromosomes in parallel.

HEPATITIS C VIRUS

Hampering HCV transmission

No hepatitis C virus (HCV) vaccine is currently available. Furthermore, evidence from studies in nonhuman primates suggests that any future human HCV vaccine would be unlikely to induce complete immunity. Major *et al.* examined whether lowered HCV titers potentially resulting from an imperfect vaccine might still stem HCV transmission in people who inject drugs. They measured the HCV RNA from infected human plasma retained in contaminated needles and syringes. Their mathematical model combining these measurements with published data on HCV viral kinetics suggested that a partially effective vaccine could reduce the HCV transmission risk from sharing contaminated needles and syringes. —CAC

Sci. Transl. Med. **10**, eaao4496 (2018).

CELL BIOLOGY

An inflammatory way to activate AMPK

In its role as a sensor of energy status, the kinase AMPK is activated by phosphorylation mediated by the tumor suppressor LKB1. Antonia and Baldwin found that AMPK activation could also be mediated by a pathway involving TAK1, a kinase associated with inflammatory pathways, and its target, IKK. IKK phosphorylated AMPK independently of LKB1. Combining an IKK inhibitor with the cancer drug phenformin improved the drug's ability to kill LKB1-deficient cancer cells, highlighting a potential treatment for cancers lacking this tumor suppressor. —WW

Sci. Signal. **11**, eaan5850 (2018).

EMERGING THERAPIES

Gene editing gets a head start

The development of gene-editing technologies into therapies for human disease is an exciting prospect. A crucial question is whether there are advantages to correcting disease-causing mutations before rather than after birth, and whether this approach is even feasible. In a proof-of-concept study in mice, Ricciardi *et al.* accomplished successful in utero correction of a hemoglobin gene mutation that causes β-thalassemia, a serious blood disorder. They injected nanoparticles containing gene-editing machinery (triplex-forming peptide nucleic acids and single-stranded donor DNA) intravenously into midgestational mouse fetuses. After birth, the treated mice showed sustained amelioration of anemia and survived longer than untreated mice. —PAK

Nat. Commun. 10.1038/s41467-018-04894-2 (2018).

CANCER

Finding the precise drug

Treating cancer according to the molecular makeup of tumor cells is challenging. How can we find a target that will kill tumor cells and match it to an effective drug? Alvarez *et al.* analyzed the protein-signaling networks in human gastroenteropancreatic neuroendocrine tumors (GEP-NETs) to find master regulators of tumor survival. Subsequent screening of GEP-NET–derived cells with various drugs confirmed that their top hit, entinostat, inhibited GEP-NET growth in vivo. This approach has the potential to provide unbiased precision therapy for many cancers, especially rare cancers, such as GEP-NETs. —GKA

Nat. Genet. 10.1038/s41588-018-0138-4 (2018).

CREDITS: (FROM LEFT) ARTASIOVA/HOSSAIN/REICHMANN/ELLENBERG/EMBL; KTSDESIGN/SCIENCE SOURCE

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MICROBIOTA

Cell-to-cell action in cholera

Gut bacteria are competitive. They jostle for niches and nutrients by means of a variety of mechanisms. Gram-negative bacteria devote a lot of resources to the comparatively large (up to 600 nm) type 6 secretion system (T6SS) used to stab neighboring bacterial and host cells. Contrary to expectations, Fast *et al.* discovered that commensal bacteria are not always protective against T6SS-toting pathogens. *Vibrio cholerae* T6SS contributes to host death in the fly model of cholera. *Acetobacter pasteurianus* is a common, normally harmless, commensal in the fly gut. If A. pasteurianus is removed, surprisingly, *V. cholera* is enfeebled, too. This effect seems to be mediated by signaling through the immune deficiency (IMD) pathway of the fly. The IMD is "primed" by the commensal organism. —CA

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1802165115 (2018).

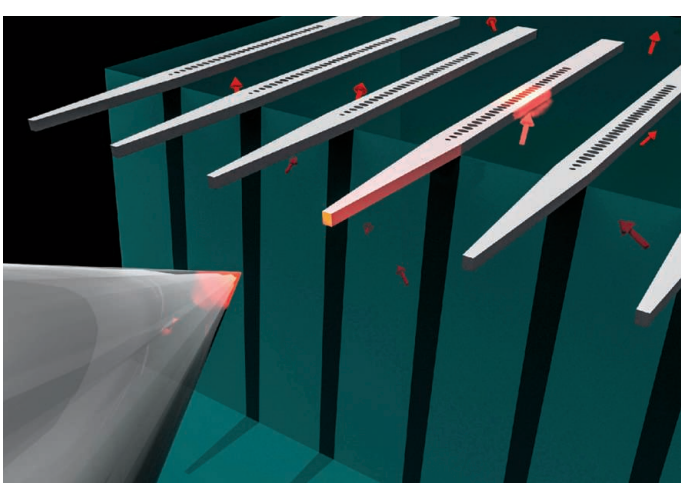
The pathogenicity of *Vibrio cholerae* (illustrated at left) is reduced by removal of a commensal bacterium.

QUANTUM OPTICS

Single photons for optic fibers

Being robust, fast, and able to encode information in a number of different ways, single photons are ideal carriers of quantum information. Exploiting the vast optic fiber network to route single photons between distant points, however, is hampered by the lack of single-photon sources operating at telecom wavelengths. Dibos *et al.* show that single erbium ions doped in a solid-state host material produce single photons at just the right wavelength for long-distance transmission. They use a silicon-based nanophotonic crystal in close proximity to a doped ion to enhance the extraction of single photons and to couple them in an optic fiber. The results demonstrate the basis of an architecture to develop long-distance quantum optical networks. —ISO

Phys. Rev. Lett. **120**, 243601 (2018).



Schematic illustration of silicon waveguides and a YSO crystal

ILLUSTRATION: A. M. DIBOS *ET AL.*, *PHYS. REV. LETT.* **120**, 243601 (2018)

CELL BIOLOGY

mTORC1 jams cell traffic

The cytoplasm of a cell is stuffed with large molecules and organelles. Such crowding may cause some molecules to aggregate, which could in turn affect their biological function. To monitor cytoplasmic crowding, Delarue *et al.* made a probe from bacterial proteins that form large scaffolds linked to fluorescent proteins. In yeast and human cells, the probes revealed that the protein kinase complex mTORC1 (mechanistic target of rapamycin complex 1) enhanced cytoplasmic viscosity. It did so by increasing production of ribosomes while inhibiting their degradation. Because ribosomes occupy about 20% of a cell's volume, mTORC1 activity tunes cytoplasmic crowding and thus influences cell physiology. —LBR

Cell 10.1016/j.cell.2018.05.042 (2018).

CARBON CAPTURE

Help wanted

Preventing global surface air temperatures from rising too high will require emissions to be reduced and CO_2 to be removed (captured) from the air. Many ways to do this have been proposed, although none to date are both technologically and economically feasible, so new and better strategies are needed. Rau *et al.* suggest that generating H_2 with a combination of saline water electrolysis and mineral weathering, powered by electricity not derived from fossil fuels, could greatly increase energy generation and CO_2 removal, at a lower cost than methods involving biomass energy plus carbon capture and storage. This approach also would allow carbon to be sequestered as long-lived ocean alkalinity rather than as concentrated CO_2. —HJS

Nat. Clim. Change **8**, 621 (2018).

THERMOELECTRICS

Lower symmetry for higher performance

Thermoelectric materials interchange heat and electricity. Lowering thermal conductivity while maintaining electrical conductivity is important for developing promising thermoelectric materials. Li *et al.* depart from the usual strategy of using high-symmetry materials by moving from cubic to rhombohedral GeTe, which ends up boosting the thermoelectric performance. The performance metric called the figure of merit is 2.4 at 600 K. The general strategy may be applicable to other materials, providing another pathway to improve performance. —BG

Joule **2**, 976 (2018)

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