

demonstrate that preverbal infants can formulate a logical structure called a disjunctive syllogism (see the Perspective by Halberda). That is, if A or B is true, and A is false, then B must be true. Presenting infants with scenes where the outcome revealed B to be false evoked looks of surprise. —GJC and AMS

Science, this issue p. 1263;
see also p. 1214

NEURODEVELOPMENT

Call to action

The developing brain initially makes more synapses than it needs. With further development, excess synapses are pruned away, leaving mature circuits. Synapses can be eliminated by microglia, which engulf and destroy them. Vainchtein *et al.* found that the microglia are called into action by astrocytes, supportive cells on which neurons rely. Astrocytes near a redundant synapse release the cytokine interleukin-33 (IL-33), which recruits microglia to the site. In mice, disruptions in this process, as caused by deficiency in IL-33, led to too many excitatory synapses and overactive brain circuitry. —PJH

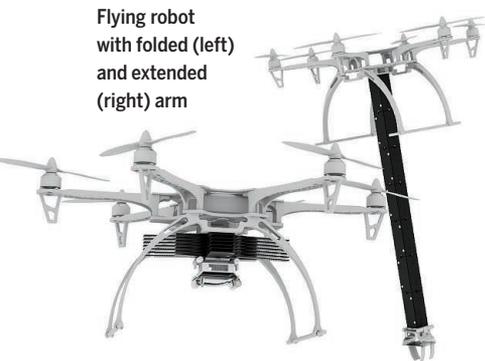
Science, this issue p. 1269

SOFT ROBOTS

Robots reach out

Unmanned aerial vehicles (UAVs) sometimes need to reach into confined spaces. Previous foldable robotic arms have been too flexible to be practical. Kim *et al.* created a modular, origami-inspired robotic arm with a locking mechanism based

Flying robot with folded (left) and extended (right) arm



on the idea that when two folds intersect at a right angle, only one can be folded at a time. This allowed tendon-based actuation by a single electric motor and enabled a UAV to grasp objects in a narrow space and insert a camera among tree branches. —RLK

Sci. Robot. **3**, eaar2915 (2018).

AGING

Lysosomes keep neuronal stem cells young

An important consequence of aging is loss of regenerative capacity in stem cells, particularly those of the nervous system. Leeman *et al.* isolated quiescent and activated stem cells from mice and compared their transcriptomes. The findings emphasize the role of large lysosomes in quiescent neuronal stem cells in which aggregated proteins accumulate. Treatments that stimulated lysosomal function allowed aged quiescent stem cells to clear protein aggregates and restored the cells' ability to be activated. Such restoration of stem cell function might alleviate compromised proteostasis in aging. —LBR

Science, this issue p. 1277

NEUROTECHNOLOGY

Good vibrations for movement perception

Because prostheses do not provide physical feedback during movement, amputees may not feel that they are in full control of their bodily action. Marasco *et al.* developed an automated

neural-machine interface that vibrates the muscles used for the control of prosthetic hands. This system instilled kinesthetic sense in amputees, allowing them to control prosthetic hand movements in the absence of visual feedback and increasing their sense of control. —MM

Sci. Transl. Med. **10**, eaa06990 (2018).

IN OTHER JOURNALS

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

VOCAL BEHAVIOR

Speaking in parts

The complexity of human speech is an anomaly among primates, where calls have typically been thought of as stereotyped and not variable. Recent work has shown that there is more learning and control present in nonhuman primate vocalizations than previously believed, but adult calls have nevertheless seemed to be stable. Pomberger *et al.* interrupted calling marmosets with acoustic playbacks triggered by their own calls and found that the animals could extend their “phee” calls beyond normal lengths by restarting them rapidly after perturbation, but they could only alter their calls at periodic time points. These results suggest that the phee call is not one long stereotyped series, but rather is composed of small sequential segments, like human speech. —SNV

Curr. Biol. **10.1016/j.cub.2018.01.070** (2018).

Marmoset phee calls occur in units, like human speech.

MICROBIOTA

Predicting fecal transplant success

Consumption of fecal matter is taboo, unless you have a life-threatening disease, such as *Clostridium difficile* infection. In these cases, fecal microbiota transplantation (FMT) is extraordinarily effective at restoring gut function to a healthier state. However, FMT does not work so well for other indications that are less strongly associated with the microbiota. We have a weak understanding of what factors allow microbial engraftment in the gut. Smillie *et al.* took genomic data from FMT-treated *C. difficile* patients to build a machine-learning statistical

model that tells us which bacterial strains will engraft. The main predictive factors are abundance of a strain in the donor and the species present in the patient. Donor strains whose species are also present in the patient always engraft. If the taxa are discordant, then it appears that microbial interactions prevent engraftment. —CA

Cell Host Microbe **10.1016/j.chom.2018.01.003** (2018).

MOLECULAR BIOLOGY

Secrets of CRISPR enzymes revealed

CRISPR-Cas9 cleaves DNA, enabling genome editing. Surprisingly, three studies have



usage from Anglo-Saxon times to the present. They found that one model—nearest-neighbor chaining—predominates, possibly because it minimizes the cognitive costs of communicating new ideas. —BJ

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1714730115 (2018).

TUMOR IMMUNOLOGY

Tumor sensing by the immune system

The idea that innate lymphoid cells (ILCs) play a role in cancer is of interest because these immune cells respond to IL-33, a cytokine proposed to regulate cancer development. Saranchova *et al.* report that the subgroup called ILC2s may limit tumor growth rate and metastasis. In a mouse model engineered to lack ILC2s, lung cancer cells implanted into the leg enlarged more rapidly than in mice expressing ILC2s. Moreover, in the absence of ILC2, cancer cells spread to other tissues, including the lung, brain, and adrenal gland. The authors propose that IL-33 released by the cancer cells locally stimulates ILC2s, which in turn produce other cytokines that promote an immune response to cancer, limiting its growth and spread. —LC

Sci. Rep. 10.1038/s41598-018-20608-6 (2018).

PLANT MORPHOLOGY

Plant puzzle patterns

The epidermal cells of plants have a jigsaw-like appearance

when viewed microscopically. What is the function of this intricate pattern, and how does it arise? Sapala *et al.* suggest that the interlocking arrangement reduces mechanical stress in the cell wall—stress that arises from the turgor pressure from within. Simulation modeling and observations of several plant species and organs show that as growth proceeds, stress causes localized cellulose deposition, leading to small surface indentations in cell walls that gradually develop into the jigsaw pattern. —AMS

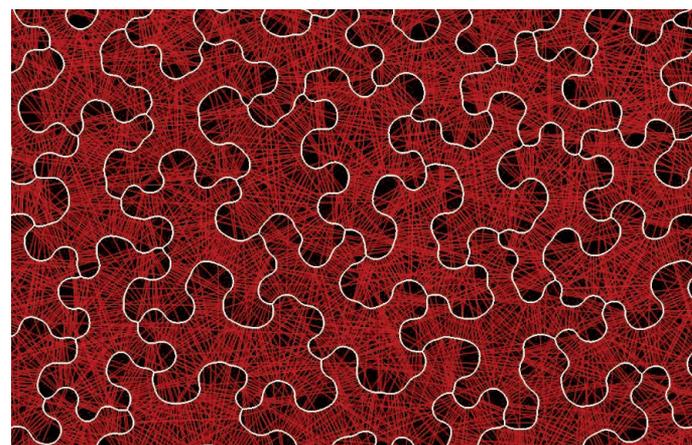
eLife 10.7554/eLife.32794 (2018).

CLIMATE CHANGE

Seeing the human hand

Environmental temperature changes occur both naturally and because of human activity (anthropogenic global warming), and distinguishing those two types is difficult. Wills *et al.* present a method that can be used to make that distinction for Pacific sea surface temperatures, which allows them to identify the separate effects of global warming, the Pacific Decadal Oscillation (PDO), and the El Niño–Southern Oscillation. They do this on the basis of differences in time scale and spatial pattern, which enables them to circumvent the use of climate models. Among other results, they find that midlatitude PDO anomalies are more persistent than previously thought. —HJS

Geophys. Res. Lett. 10.1002/2017GL076327 (2018).



Jigsaw patterning in plant cells counters mechanical stress.

concurrently uncovered an intrinsic RNA cutting activity of Cas9. Cas9 cuts endogenous RNA in some bacteria and, when programmed, targets RNA in test tubes as well. Strutt *et al.* showed that Cas9 expression in a heterologous bacterium protects against infection by an RNA virus. Rousseau *et al.* showed that the activity can be switched off by virus-derived anti-Cas9 proteins. Dugar *et al.* profiled the cellular RNAs that are subjected to endogenous Cas9 targeting. Although how it is used to fend off intruders or regulate gene expression by bacteria remains to be investigated, this newly identified activity of Cas9 provides an exciting tool in our increasing

arsenal for modulating RNA metabolism. —SYM

eLife 10.7554/eLife.32724 (2018); *Mol. Cell.* 10.1016/j.molcel.2018.01.025, 10.1016/j.molcel.2018.01.032 (2018).

LINGUISTICS

Tracking expanding dimensions of words

Language can evolve by adding new meanings or “senses” to old words. Thus, the word “face” can refer to the body part or the front surface of a cliff. There are several theories regarding how new senses of words arise historically. Ramiro *et al.* used an algorithmic approach to study 5000 English words taken from a digital historical dictionary that covers word

Science

Seeing the human hand

H. Jesse Smith

Science **359** (6381), 1228-1229.
DOI: 10.1126/science.359.6381.1228-g

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