algorithms, the authors have designed a drone that can dodge multiple objects. —MML

Sci. Robot. **5**, eaaz9712 (2020).

CHEMICAL ENGINEERING
Every twig and splinter used

Plant-based production of commodity chemicals faces steep competition from fossil resources, which are often cheaper and easier to partition. Sustainable use of renewable resources requires strategies for converting complex and recalcitrant biomolecules into streams of chemicals with extraordinary efficiency. Liao *et al.* developed a biorefinery concept in which wood is eventually fully converted into useful chemicals: phenol, propylene, pulp amenable to ethanol production, and phenolic oligomers that can be incorporated into ink production (see the Perspective by Zhang). A life-cycle assessment and techno-economic analysis highlight the efficiency of the process and reveal the potential for such biorefinery strategies to contribute to sustainable chemicals markets. —MAF

Science, this issue p. 1385; see also p. 1305

ANTIBODIES
Antibody assembly in lampreys

For B lymphocytes in jawless vertebrates to produce antibodies, a combination of gene cassettes must be stitched together to create a functional antibody gene. Circumstantial evidence based on gene expression data previously implicated the cytidine deaminase CDA2 in this process. Morimoto *et al.* used CRISPR-Cas9–mediated mutagenesis to show that loss-of-function mutations in the *CDA2* gene result in the loss of antibody gene assembly without disrupting the formation of functional genes encoding lamprey T cell receptors. These methods establish lampreys as

a genetically tractable model system. —IW

Sci. Immunol. **5**, eaba0925 (2020).

STRUCTURAL BIOLOGY
Choosing a partner that fits

G protein–coupled receptors (GPCRs) are responsible for transducing diverse signals from outside to inside cells. This process requires specificity both in ligand binding to GPCRs and in coupling between GPCRs and their intracellular partners, G proteins. Qiao *et al.* determined the structure of the human glucagon receptor (GCGR), a type B GPCR, bound to glucagon and one of two heterotrimeric G proteins, G_s or G_{i1}. GCGR signals mainly through G_s, and the structures provide a basis for this specificity. Conformational changes in GCGR, relative to the inactive state, create a binding cavity for the G proteins. The pocket is opened sufficiently to accommodate a bulky binding motif in G_s. G_{i1} can still bind but the pocket does not close around it, so there is a smaller interaction interface. —VV

Science, this issue p. 1346

GEOMORPHOLOGY
Erosion-vegetation interactions

The impact of vegetation on erosion rates is hard to gauge. Although vegetation can hold soils in place mechanically, root systems can also loosen soils or even help to fracture rock. These processes can increase erosion, especially because areas of heavy vegetation tend to be in areas with high precipitation rates. Starke *et al.* tackled this issue using a large set of observations that span 3500 km of the Andes mountain range. They found a complex set of interactions where increasing vegetation decreases erosion in more arid regions but can accelerate erosion in vegetation dense regions. —BG

Science, this issue p. 1358

COGNITION
Avian statisticians

We humans, even those not well versed in the study of statistics, make statistical inferences regularly when we decide to, say, choose from a bowl with a high ratio of chocolate chips to nuts. In the animal world, this kind of inference, and the ability to broadly apply it when making choices, has also been found in chimpanzees, but whether it exists outside of this lineage has been debated. Bastos and Taylor looked for statistical ability in parrots, which are increasingly recognized as having high-level cognitive functions. When trained to understand that certain tokens conferred a reward, keas (scavenging parrots native to New Zealand) consistently judged their chances of acquiring one under different circumstances. They were as successful as humans at avoiding samples offered from containers with the fewest reward tokens and consistently chose samples offered from containers with the most. They also spotted when the experimenters introduced biases. —SNV

Nat. Commun. **11**, 828 (2020).

Parrots, like this New Zealand kea, are increasingly recognized for having high-level cognitive abilities.

BRAIN MAPPING
Connecting the human amygdala

The amygdala is a brain structure that is affected in many different psychiatric disorders. We still have an inadequate understanding of its role within the organization of the human brain. Sylvester *et al.* used repeated sampling and precision mapping to define three amygdala subdivisions in 10 individuals based on connectivity patterns with the cortex. These subdivisions occupied similar locations in different subjects and similar network connectivity. One subdivision has preferential functional connectivity to the default mode network, which engages when an individual is focused on a specific task; a second, medially located subdivision preferentially connects to the dorsal attention network; and a third connects to

SEISMOLOGY
The red planet quakes

The first unsuccessful attempt to detect seismic activity on Mars was in 1975 on the Viking landers. More than 40 years later, Giardini *et al.* finally detected marsquakes with the seismometer on the InSight mission that landed on Mars in 2018. Most of the detected marsquakes have been small, but there were a few that could be as large as a magnitude 4. Although most of the 174 events were likely due to seismic activity, some may have been caused by meteorite impact or other sources. The catalog forms a basis for further investigation into the rock properties in the martian interior. —BG

Nat. Geosci. **13**, 205 (2020).

Seismic activity on Mars (shown) has been detected by NASA's InSight lander.

CHEMINFORMATICS
Machine learning for natural extracts

Natural products and their derivatives continue to be an important source of drug candidates because of their structural diversity and wide-ranging biological activities, which are unmatched by synthetic compounds. Natural products are generally complex mixtures with chemical constituents that are not well characterized. Reher *et al.* report a nuclear magnetic resonance–based machine-learning tool, SMART, for rapid structural analysis of major constituents from crude natural extracts and for the discovery of new natural products. For example, SMART automatically characterized a cyanobacterial extract mixture and isolated a new chimeric macrolide, symplocolide A; it also dereplicated several known natural products. The proposed cheminformatic tool paves the way for new computer-aided approaches to natural product drug discovery. —YS

J. Am. Chem. Soc. **142**, 4114 (2020).

a ventrally located amygdala subdivision, but does not show any functional network preferences. These data may help to develop biologically plausible biomarkers and targets for intervention in psychiatric patients. —PRS

Proc. Natl. Acad. Sci. U.S.A. **117**, 3808 (2020).

CANCER
Cancer therapy in good order

Treatment of cancer patients with two or more drugs acting through different mechanisms is a strategy that has prolonged many lives. Whether the drugs within these combination therapies are delivered concurrently or sequentially can have a major impact on efficacy. A new study illustrates this principle for drugs that inhibit cell cycle kinases CDK4 and CDK6 (CDK4/6 inhibitors), which have attracted great interest because of their clinical efficacy in breast cancer. Studying mouse models of pancreatic cancer, Salvador-Barbero *et al.* found that sequential treatment with Taxol (which inhibits mitosis) followed by a CDK4/6 inhibitor (which prevents cell cycle entry) offered substantially more therapeutic benefit than concurrent treatment with the drugs. Mechanistically, this is because the CDK4/6 inhibitor prevents cancer cells from repairing the chromosomal damage caused by Taxol. —PAK

Cancer Cell 10.1016/j.ccell.2020.01.007 (2020).

PSYCHOLOGY
The psychology of the alt-right

The political movement known as the "alt-right" has increased in popularity in the United States over the past several years. However, empirical descriptive research on the psychological characteristics that unite members of the movement is needed. Forscher and Kteily conducted detailed survey work to determine the popularity of the movement and its psychological profile. On the basis of their findings, the authors estimate that 6% of the U.S. population, and 10% of people who voted for Trump in the 2016 election, identify as being part of the alt-right. Alt-right members do not indicate feelings of economic anxiety, but rather exhibit preferences for social group–based hierarchies favoring whites. These results have implications for understanding the role of intergroup relations and conflict in U.S. electoral politics. —TSR

Perspect. Psychol. Sci. **15**, 90 (2020).

SIGNALING
A decoy insulin receptor in worms?

Insulin signaling in the worm *Caenorhabditis elegans* appears to be regulated by expression of a truncated, alternatively spliced form of the receptor that lacks the intracellular signaling domain of the receptor. Expression of the spliced form of the receptor, DAF-2B, is regulated in the worm and serves to modulate the effects of insulin-like peptides. Expression of DAF-2B alters sensitivity to insulin. Martinez *et al.* suggest that the modified receptor might alter insulin signaling by sequestering insulin peptides on the inactive receptor, although such binding was not shown. Interaction with the full-length receptor is also a possibility. The results raise the intriguing possibility that a spliced receptor might function similarly in mammals and contribute to the control of insulin signaling. —LBR

eLife **9**, e49917 (2020).

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