

of human immunology but are also encouraging for adoptive immunotherapy. — ACC
Sci. Transl. Med. **7**, 273ra13 (2015).

ADDICTION THERAPY

Reversing cocaine-evoked behavior in mice

Therapeutic optogenetic protocols are highly effective at reversing symptoms in animal models of neuropsychiatric disease. However, translating these protocols into the clinic is challenging because we have not yet made the technical leap required to perform effective optogenetic stimulation in primates. Creed *et al.* tested whether it would be possible to circumvent these challenges by avoiding the problem altogether. They adjusted an existing therapeutic approach—deep brain stimulation—to mimic an effective optogenetic stimulation protocol to treat a mouse model of cocaine addiction. — PRS

Science, this issue p. 659

PLANT DEVELOPMENT

Genetic control of stem cell fate in plant roots

Without roots, most plants cannot thrive. Crawford *et al.* have now unearthed the robust control systems that build roots. Signaling by the plant hormone auxin triggers three genes that control the development of stem cells forming the root. With this trio of genes, any one of which can do the job, root development is backed up with fail-safe controls. The team could use the same system of controls to sprout roots in the wrong places, making roots instead of shoots. — PJH

Science, this issue p. 655



Arabidopsis embryo seedling

HOST RESPONSE

Bacterial infection breaks the lymph node barrier

During infections, lymph nodes are command central. Fragments from invading pathogens enter lymph nodes through the lymph. There, specialized cells called subcapsular sinus (SCS) macrophages capture these antigens and use them to initiate humoral immunity. Despite being such important players, Gaya *et al.* report that in mice, infection throws these organized sentinels into disarray (see the Perspective by Buzsáki). Disrupting SCS macrophages had important consequences: Bacterially infected mice could not respond as efficiently to a subsequent viral infection. — KLM

Science, this issue p. 667;
see also p. 612

CANCER

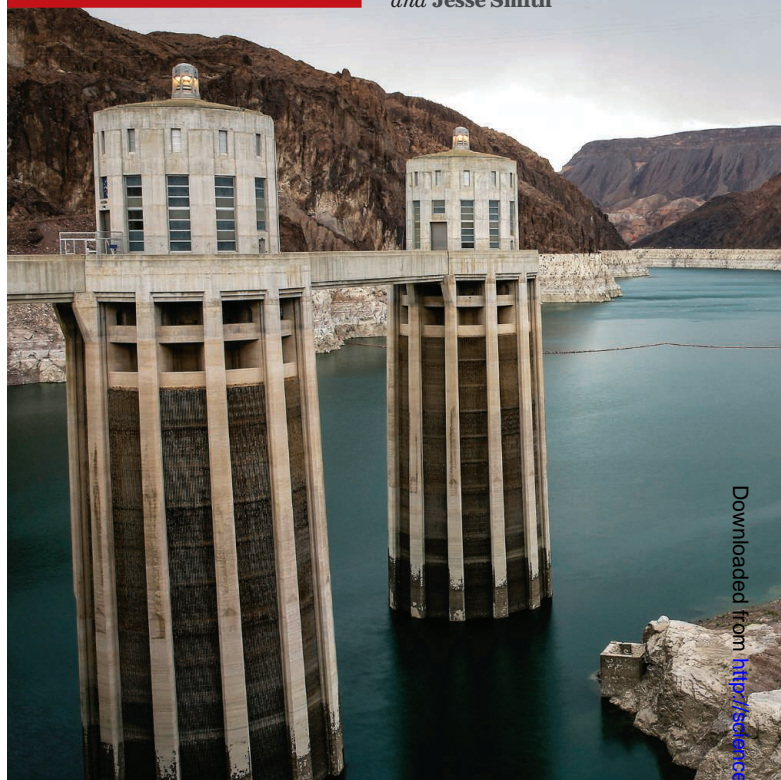
Targeting Wnt signaling in lymphoma

Although several human cancers show increased activity of the Wnt/ β -catenin signaling pathway, tumors may lack mutations that would account for the increase. Walker *et al.* found that the transcription factor FOXP1 enhanced the transcription of Wnt-regulated target genes by binding to and promoting the acetylation of β -catenin. Patients with diffuse large B cell lymphomas overexpressing FOXP1 have a poor prognosis, and diffuse large B cell lymphoma cells with high FOXP1 levels were sensitive to Wnt inhibitors. Xenografted tumors in mice were smaller when they lacked FOXP1 or when Wnt signaling was blocked. — WW

Sci. Signal. **8**, ra12 (2015).

IN OTHER JOURNALS

Edited by Kristen Mueller
and Jesse Smith



ORGANIC CHEMISTRY

How to bring two chlorines face to face

Organic chemists have known for well over a century how to chlorinate the carbons at both ends of a double bond. A vast array of different methods now exists to replace the chlorines with other molecular fragments. One persistent limitation, however, has been the tendency of the two chlorines to bond to opposite faces of the starting compound. Cresswell *et al.* now present a versatile method that adds both chlorines to the same face. The key is a selenium catalyst that probably binds to the face opposite the first chlorine, before being displaced from behind by the second. — JSY
Nat. Chem. **10**, 1038/nchem.2141 (2015).

BIOTECHNOLOGY

Outsourcing production on a small scale

Microbes are wizards at making structurally intricate and bioactive molecules, but their

products are usually only made in small quantities for local consumption. Zhou *et al.* demonstrate how thoughtful design and a bit of tinkering can lead to much greater yields of oxygenated taxanes, a precursor of the antitumor drug paclitaxel. First they split the job between a bacterium and a yeast. Second, they switched the fuel for these microbial factories from glucose (which the yeast turned into ethanol, which sedated the bacteria) to xylose (which the bacteria consumed and turned into acetate, which fed the yeast). — GJC

Nat. Biotechnol. **33**, 10.1038/nbt.3095 (2015).

WOUND HEALING

Wound healing requires senescence

Cells divide as tissues develop and regenerate, but they can only do so a limited number of times. Eventually they stop dividing and enter a state called cellular senescence. Senescent cells secrete a variety of factors,



CLIMATE CHANGE

California drought worst in the past millennium

Since 2012, California has been suffering a severe drought. Griffin and Anchukaitis use tree-ring records of past climate conditions to determine how the current drought compares to other droughts since 800 CE. Based on metrics for soil moisture and for precipitation, they conclude that 2014 was the worst single drought year in at least the past 1200 years, caused by very low (but not unprecedented) precipitation and record high temperatures. The 3-year period from 2012 to 2014 was the worst unbroken drought interval in the past millennium. Although the effects of climate change on rainfall patterns in California remain uncertain, higher temperatures may contribute to future droughts in the region. — JFU

Geophys. Res. Lett. 10.1002/2014GL062433 (2014).

The impact of drought on Lake Mead—pointer to California's future?

PEER REVIEW

Gauging gatekeeper performance

Researchers curse the peer review system after a rejection letter and praise it when their papers sail into publication. But do research journals make the right decisions? To find out, Siler *et al.* tracked the fates of over 1000 accepted and rejected manuscripts submitted to three leading medical journals. The authors found that overall the journals made good decisions: Manuscripts rejected without peer review received fewer citations than manuscripts rejected after peer review. However, the journals rejected the 14 most highly cited articles (12 without peer review), which may reveal issues in recognizing unconventional leaps. — BJ

Proc. Natl. Acad. Sci. U.S.A. **112**, 360 (2015).

FOREST ECOLOGY

Pathogens promote forest diversity

Environmental conditions affect the diversity of species, whether flora or fauna, in a particular habitat. But what keeps a tree that normally grows in a low-rainfall area from growing in a tropical forest? Spear *et al.* investigated this question by transplanting drought-resistant tree seedlings into wet forests. Although both wet-forest and drier-forest species suffered pathogen attacks, the damage and mortality associated with these attacks were worse

in seedlings transplanted from drier forests. Together with the exclusion of wet-forest species from dry forests by drought, this result indicates that pathogens also promote and maintain the diversity of tree species in tropical forests. — AMS

J. Ecol. **103**, 165 (2015).

skeletal resemblances to ancient African monkeys. Now, Bond *et al.* describe three 36 million-year-old fossil teeth found in the Peruvian Amazon that support this idea: The shape of the teeth and phylogenetic analyses link



South American silvery marmosets (*Mico argentatus*) had an African ancestor.

the fossils to monkeys that inhabited Africa during the late Eocene, about 38 million years ago. The discovery also pushes back the monkeys' arrival date—perhaps by vegetation raft across the Atlantic Ocean—by 10 million years. — CG

Nature, 10.1038/nature14120 (2014).

but scientists still do not fully understand the role senescent cells play in many physiological processes, such as wound healing. Demaria *et al.* now show that wounds close more slowly in mice genetically engineered to lack senescent cells. After wounding, endothelial and mesenchymal cells undergo senescence and secrete the protein PDGF-AA. PDGF-AA helps wounds to heal more quickly by causing myfibroblast cells to differentiate. — BAP

Dev. Cell **31**, 722 (2014).

INORGANIC CHEMISTRY

Taking another look at a BB triple bond

Carbon and boron are neighbors in the periodic table, and that proximity entices chemists to make them emulate one another, akin to dressing siblings in matching outfits. An exciting achievement in this area was the preparation of a compound with a BB triple bond, analogous to the CC bond in an alkyne. Köppe and Schnöckel now

have analyzed this compound in a thermodynamic context that highlights the substantial stabilizing influence of the capping groups (N-heterocyclic carbenes) on each B atom. They further considered the stiffness of the BB bond reflected in vibrational analyses. On this basis, they suggest that the compound might be better considered to have a lower-order BB bond, with higher-order bonds to the capping groups. — JSY

Chem. Sci. 10.1039/c4sc02997f (2014).

PALEONTOLOGY

African origin for New World monkeys

New World monkeys—smallish, flat-nosed primates with prehensile tails such as silvery marmosets, golden lion tamarins, and squirrel monkeys—have inhabited South America for at least 26 million years, but it is unclear when they arrived and where they originated. Many paleontologists suspect an African origin, based on

Science

Outsourcing production on a small scale

Gilbert Chin

Science **347** (6222), 624.

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