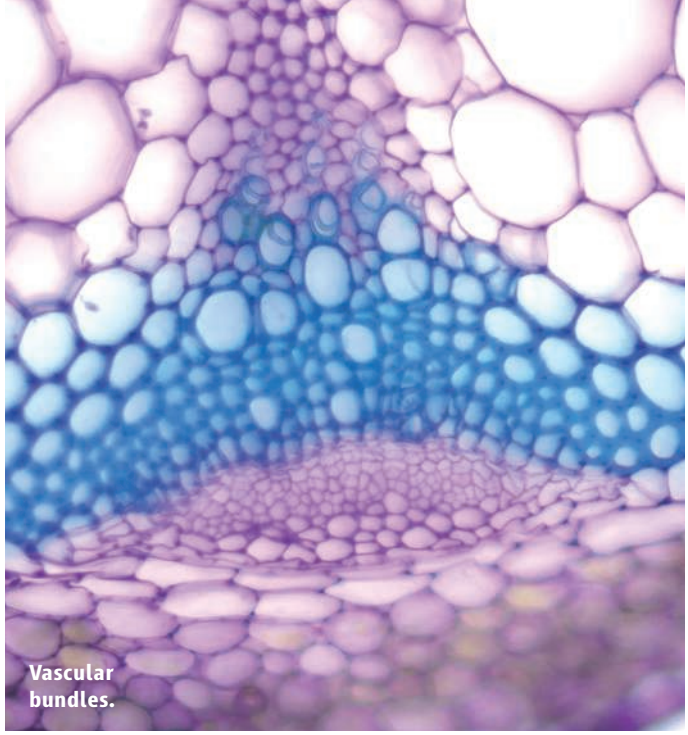
EDITED BY GILBERT CHIN AND JAKE YESTON



Vascular bundles.

PLANT SCIENCE

Standing Tall

Vascular meristems, though less well known than their flashier sister the apical meristem, have perhaps the bigger job; they produce most of the biomass that makes up plant stems and tree trunks. The vascular meristems also produce the phloem and xylem responsible for the transportation of nutrients throughout the plant. It is the seasonal changes in growth rates from these vascular meristems that give rise to the rings observed in cross-sections of woody trees. Fisher and Turner have identified a mutation in *Arabidopsis* Landsberg *erecta* that affects the organization of those tissues arising from the vascular meristem. In *phloem intercalated with xylem* (*pxy*) mutant plants, the phloem and xylem tissues are not as neatly separated as they are supposed to be, and the cell divisions are not as coordinated as usual. The vessels are irregular in shape and trajectory, and the mature plant is much shorter than the wild type. The protein encoded by *PXY* has sequence features that resemble those of receptor kinases, and *PXY* is expressed in leaves, roots, and stems. The authors speculate that *PXY* may be involved in determining the correct orientation of the cell division plane. — PJH

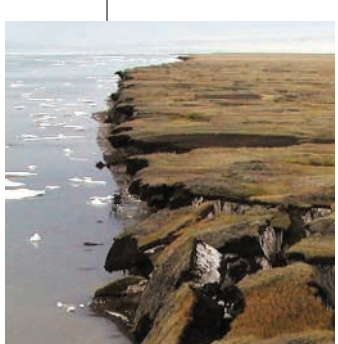
Curr. Biol. **17**, 1061 (2007).

CELL BIOLOGY

Break Up to Make Up

In animal cells, the endoplasmic reticulum (ER) forms a lacelike network throughout the cytoplasm; in addition, a distinct domain of the ER is used to surround the nuclear material to form the nuclear envelope. ER networks can be produced in cell-free systems, and their formation requires the activity of a pair of ER proteins, Rtn4a and DP1/NogoA. Audhya *et al*. further examined the process of ER network formation in vitro and studied ER dynamics within living cells. In embryos of the nematode *Caenorhabditis elegans*, depletion of the homologs of Rtn4a and DP1/NogoA—RET-1 and YOP-1—produced cellular defects in the peripheral ER network. Furthermore, a member of the small guanosine triphosphatase Rab family, RAB-5, was required for ER network formation in vitro, and in nematode embryos, reduction of RAB-5 also caused peripheral ER defects. RAB-5, RET-1, and YOP-1 were also important in the kinetic control of nuclear envelope disassembly at the beginning of mitosis, as depleting them resulted in the generation of daughter cells with atypical double nuclei. Previously, Rab5 has been shown to be important in the regulation of membrane trafficking during endocytosis. Its effects on ER morphology appear to be independent of these functions, because other perturbations that directly affect endocytosis did not lead to similar defects in ER morphology or to nuclear envelope breakdown during mitosis. — SMH

J. Cell Biol. **178**, 43 (2007).



CLIMATE SCIENCE

Warming to Coastal Erosion

High northern latitudes are displaying, as predicted, exceptional sensitivity to recent climate warming, as temperatures there have soared more quickly than in any other part of the world. The effects of these rising temperatures are likely to be dramatic. For example, huge expanses of permafrost are in imminent danger of melting, which would have a tremendous impact on such areas as biogeochemical processes involving greenhouse gases, the physical stability of structures built on the previously frozen ground, and the geomorphology of the region. Mars and Houseknecht have combined data from topographic maps and satellite images to document how coastal land loss and thermokarst lake expansion and drainage have affected a segment of the Beaufort Sea coast of Alaska over the past 50 years. They find that coastal erosion rates more than doubled between the early and later parts of that period, and that the acceleration of coastal erosion rates is due to the longer warm seasons, as open water and wave action associated with earlier pack ice breakup affect the coast. — HJS

Geology **35**, 583 (2007).

CHEMISTRY

Actin Openers Gently Closed

The iejimalide natural products—each composed of a 24-membered ring bearing a peptide tail—pose a considerable synthetic challenge, because the seven C=C double bonds throughout the cycle labilize adjacent chiral centers. Moreover, as Fürstner *et al.* discovered in preliminary explorations, the most apparently selective site for closing the ring—an ester linkage—proves uncooperatively prone to side reactions. The authors instead relied on olefin metathesis for the cyclization, demonstrating remarkable selectivity for the desired reaction site in the presence of so many alternative double bonds. A further advantage of the metathesis protocol was the efficiency of the catalyst at ambient temperature, which protected the precarious molecular framework from thermal rearrangement or decomposition. Having prepared iejimalide B, the authors adapted their synthetic strategy to diversify the structure of the peptide tail. The key was the use of a trimethylsilylethylcarbonate protecting group on nitrogen, which could be easily removed after the cycliza-

CREDITS (TOP TO BOTTOM): FISHER AND TURNER, *CURR. BIOL.* **17**, 1061 (2007); GARY CLOW, USGS

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tion step and replaced by a range of acyl or sulfonyl substituents. Like the natural product itself, these analogs proved surprisingly adept at actin depolymerization in cells, raising the prospect of multiple biochemical investigations with this compound class. — JSY

J. Am. Chem. Soc. **129**, 10.1021/ja072334v (2007).

PSYCHOLOGY

The Power of Suggestion

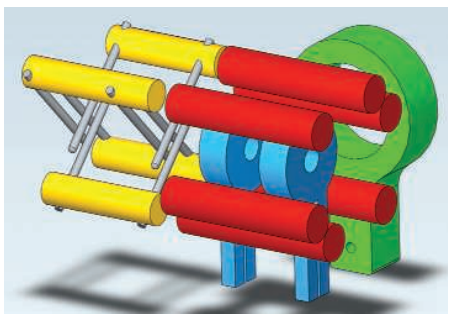
Although it is not uncommon to forget to swing by the grocer's after work only to realize not having done so after arriving at one's front door, it is a quite different experience to have recovered an apparently forgotten memory decades later, especially one pertaining to childhood sexual abuse. Geraerts *et al.* have attempted to assess whether these so-called discontinuous memories are as reliable as continuous (that is, never forgotten) memories of abuse, where reliability was defined operationally as the success with which independent interviewers were able to elicit corroborative evidence from another victim of the alleged perpetrator, from the actual abuser, or from a contemporaneous confidant. In a sample of 130 adults (recruited via advertisement) with either discontinuous or continuous memories of abuse, they find no difference in the percentages (roughly 40%) for which corroboration could be obtained, except in cases where the discontinuous memories were recovered during the course of therapy; for these 16 people, it was not possible to substantiate the recalled events. The authors propose that expectations or suggestions arising during therapy may contribute to the "recovery" of false memories. — GJC

Psychol. Sci. **18**, 564 (2007).

PHYSICS

OH Trapped by Magnets

Confining atoms with a combination of optical and magnetic fields has led to the formation of new states of matter and provided a tunable test bed to explore many-body atomic and electronic interactions; however, its extension to molecules has been slow. Ultracold molecules (milikelvin temperatures and below) are of interest for a number of additional applications, including studies of quantum phase transitions and precision spectroscopy. One approach to confining polar molecules has relied on inhomogeneous electric fields. Sawyer *et al.* present an alternative method that traps molecules magnetically. They demonstrate the technique on hydroxyl (OH) radicals, which have appreciable magnetic as well as electric dipole moments. Lifetimes in the magnetoelectrostatic trap ranged from 20 to 500 ms, depending on the background pressure. The technique allows the additional degree of freedom of an electrical field to be superimposed onto the trapped molecules and should facilitate further studies in the direction of controlled molecular collisions and chemical reactions. — ISO



Phys. Rev. Lett. **98**, 253002 (2007).

CREDIT: SAWYER *ET AL.*, *PHYS. REV. LETT.* **98**, 253002 (2007)

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<< Developmental Effects of Decapping

The balance between synthesis and degradation controls mRNA abundance. Goeres *et al*. have found that the 5′ to 3′ mRNA degradation pathway involves an mRNA decapping complex and is crucial for seedling development in *Arabidopsis*. The phenotypes of *varicose* (*vcs*) and *trident* (*tdt*) mutants were similar: defective leaf formation with vein defects, short roots with swollen root hairs, and swollen hypocotyls. Confocal microscopy revealed that the shoot apical meristem cells were disorganized in the *vcs* and *tdt* plants and that leaf primordia were absent in seedlings that were 3 days old, which is when the leaf primordia would normally appear. Further analysis suggested that the *tdt* vascular phenotype arose as a consequence of defective formation of the provascular cell specification, which is controlled by auxin signaling, in the hypocotyl-to-cotyledon transition zone. *TDT* encodes a protein homologous to DCP2, which in yeast and mammals is an mRNA decapping enzyme. VCS, which interacts with TDT, appears to be important for localizing TDT to cytoplasmic P bodies, which are sites of mRNA decapping and degradation. However, in *vcs* and *tdt* mutants, not all mRNAs exhibited decreased decay rates, suggesting that this particular mRNA decay pathway was specific to a subset of transcripts. — NRG

Plant Cell **19**, 1549 (2007).

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