Finite element method simulation of an Arabidopsis shoot apical meristem where two cells have been laser-ablated. The color map indicates the von Mises stress (a measure of distortional stress); the white lines mark the directions of maximal principal stress, which are circumferential around the ablated cells, in agreement with experimentally determined microtubule orientations. See page 1650.

Image: Pawel Krupinski/Lund University

EDITORIAL
1609 Reduce Administrative Burden by Alan I. Leshner

LETTERS
Testing the Limits of “Concrete” and “Generic”
J.-C. Mourrat

“Concrete” Examples a Fraction Too Abstract
L. J. Cutrona Jr.

Concrete Examples Must Jibe with Experience
S. K. Reed

Response
J. A. Kaminski et al.

Gene Regulation in Evolution: A History
J. W. Grula

CORRECTIONS AND CLARIFICATIONS
1634

BOOKS ET AL.

Autism’s False Prophets
P. A. Offit, reviewed by C. Lord
Bad Science, Risky Medicine,
and the Search for a Cure

The Fundamentals of Brain Development
J. Stiles, reviewed by M. Sur

POLICY FORUM
1637

Bracing for Islamic Creationism
S. Hameed

NEWS OF THE WEEK
Delays in Mars Mission Will Ripple Across Space Science
1618

A Fresh Start for Embryonic Stem Cells
1619

Sotto Voce, LHC Repair Plan Points to Weaknesses in Original Design
1620

How Kansas Nabbed the New Bio- and Agro-Defense Lab
1620

SCIENCESCOPE
1621

Researchers Could Face More Scrutiny of Outside Income
1622

Malaria Vaccine Comes Another Step Closer
1622

Biosummit Seeks to Draw Obama’s Attention to the Life Sciences
1623

NEWS FOCUS
Crazy Money
1624

>> Science Podcast

FerryBoxes Begin to Make Waves
1627

Logbooks Record Weather’s History

When Juniper and Woody Plants Invade, Water May Retreat
1630

PERSPECTIVES
Stringing Together a Solid State
S. Hartnoll
1639

Chaperone Puts the Brakes On
V. Lukacs-Kornek and S. J. Turley
>> Report p. 1705

Why Can’t We Test Our Way to Absolute Food Safety?
S. Kennedy
1641

On Growth and Force
B. Mulder
>> Research Article p. 1650

An Almost-Complete Movie
G. Diallinas
>> Research Article p. 1655

Clutch Dynamics
Y. Aratyn-Schaus and M. L. Gardel
>> Report p. 1687

Pressing Levers or Pulling Strings?
L. A. Amos
>> Report p. 1691
PHYSICS

Quantum Criticality in the Electrical Resistivity of La$_{2-x}$Sr$_x$CuO$_4$
R. A. Cooper et al.
High magnetic fields can strip away the superconducting regime of a cuprate superconductor, revealing the presence of an enigmatic quantum critical point.
10.1126/science.1165015

CHEMISTRY

Femtosecond XANES Study of the Light-Induced Spin Crossover Dynamics in an Iron(II) Complex
Ch. Bressler et al.
X-ray absorption spectroscopy resolves the dynamics of spin-state interconversions, which take place in less than a picosecond, in a well-studied class of iron compounds.
10.1126/science.1165733

MOLECULAR BIOLOGY

Chromatin-Associated Periodicity in Genetic Variation Downstream of Transcriptional Start Sites
S. Sasaki et al.
The periodic wrapping of DNA around nucleosomes in chromatin determines a periodic variation in mutation type and frequency around transcription start sites in a fish.
10.1126/science.1163183

BIOCHEMISTRY

A Competitive Inhibitor Traps LeuT in an Open-to-Out Conformation
S. K. Singh, C. L. Piscitelli, A. Yamashita, E. Gouaux
A bacterial protein similar to mammalian neurotransmitter transporters is blocked when a competitive inhibitor prevents the formation of the normal intermediate state.

CHEMISTRY

Collective Reactivity of Molecular Chains Self-Assembled on a Surface
The paired sulfur bonds in dimethyldisulfide molecules, which assemble in long chains on gold surfaces, can be rearranged by injecting an electron into the end of the chain.

CHEMISTRY

Mechanism of Threading a Polymer Through a Macrocyclic Ring
A. B. C. Deutman et al.
A polymer threads through a large ring-shaped molecule faster when it is long enough to bind to the outside of the ring first, but not too long that it cannot easily loop into the hole.

CLIMATE CHANGE

A Dynamic Marine Calcium Cycle During the Past 28 Million Years
The isotopic composition of calcium in marine carbonates indicates that the calcium cycle has been dynamic over the past 28 million years and closely linked to climate.
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VOL 322 12 DECEMBER 2008

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A mutation resulting in a lifelong decrease in the expression of a protein that inhibits triglyceride hydrolysis may protect against cardiovascular disease.

IMMUNOLOGY

Regulation of Dendritic Cell Migration by CD74, the MHC Class II–Associated Invariant Chain G. Faure-André et al.

By binding to a myosin, an immune-specific protein known to control antigen processing also regulates the migration of dendritic cells, possibly coordinating the two functions. >> Perspective p. 1640

CELL BIOLOGY

A Role for the ESCRT System in Cell Division in Archaea R. Y. Samson, T. Obita, S. M. Freund, R. L. Williams, S. D. Bell

A class of proteins required for membrane trafficking and cytokinesis in eukaryotes is also unexpectedly required in some Archaea for cell division.

CELL BIOLOGY

De Novo Formation of a Subnuclear Body T. E. Kaiser, R. V. Intine, M. Dundr

The Cajal body, a nuclear structure for small ribonucleoprotein metabolism, can self-assemble from any one of its components immobilized on a substrate.

MOLECULAR BIOLOGY

The Air Noncoding RNA Epigenetically Silences Transcription by Targeting G9a to Chromatin T. Nagano et al.

Air, a large noncoding RNA, interacts with chromatin at a particular promoter, recruiting a histone methyltransferase to silence gene expression in an allele-specific manner.
Cell signaling events play a key role in the induction, regulation, and maintenance of organ development.

**RESEARCH ARTICLE: Analysis of Metagene Portraits Reveals Distinct Transitions During Kidney Organogenesis**


Grouping microarray expression data into metagenes, followed by organization of these gene clusters into self-organizing maps, reveals distinct stages of kidney organogenesis.

**REVIEW: De Novo Organ Formation from Differentiated Cells—Root Nodule Organogenesis**

M. Crespi and F. Frugier

Root nodule organogenesis in legumes is initiated by bacterial signals and directed by plant signaling pathways.

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J. E. Gray, S. Casson, L. Hunt

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