EDITORIAL
313 Accountability and Transparency
Alan I. Leshner

NEWS OF THE WEEK
318 NIH Stimulus Plan Triggers Flood of Applications—and Anxiety
NSF Is Keeping It Simple
320 Study Suggests a Renewable Source of Eggs and Stirs More Controversy
321 Great Oxidation Event Dethroned?
>> Report p. 370
321 From Science’s Online Daily News Site
322 After the Quake, in Search of the Science—or Even a Good Prediction
323 New Push Focuses on Quick Ways to Curb Global Warming
323 From the Science Policy Blog
324 John Holdren Brings More Than Energy to His Role as Science Adviser

NEWS FOCUS
326 Fusion’s Great Bright Hope
A Long, Winding Road to Ignition
What’s Next for ICF?
>> Science Podcast
331 Will Captive Breeding Save Africa’s King of Beasts?
332 How Many Languages? Linguists Discover New Tongues in China

LETTERS
334 Scientists: Listen Up!
J. M. Wetmore et al.
Type 2 Polio Still in Our Midst
L. M. Shulman et al.
Synthesizing Knowledge in the Classroom
N. A. Mayr et al.

When Scientific Data Become Legal Evidence
H. S. Frey
Response
T. Brown et al.

CORRECTIONS AND CLARIFICATIONS
336 TECHNICAL COMMENT ABSTRACTS

BOOKS ET AL.
337 Remix
L. Lessig, reviewed by Y. Benkler
338 Born Digital
J. Palfrey and U. Gasser, reviewed by J. Preece

POLICY FORUM
339 Governance and Environmental Change in the Arctic Ocean
P. A. Berkman and O. R. Young

PERSPECTIVES
341 Emerging onto a Tangled Bank
M. Friedman
>> Report p. 364
342 Less Is More
M. B. Plenio
343 Ceramides—Friend or Foe in Hypoxia?
C. M. Crowder
>> Report p. 381
344 Can Technology Get Your Eyes Back on the Road?
J. D. Lee
346 Two Lipids That Give Direction
J.-F. Côté and K. Vuori
>> Report p. 384
347 Limits to Marine Life
P. G. Brewer and E. T. Peltzer

REVIEW
349 Strengthening Materials by Engineering Coherent Internal Boundaries at the Nanoscale
K. Lu et al.

BREVIA
353 Origin and Radiation of the Earliest Vascular Land Plants
P. Steemans et al.
A discovery of fossil spores suggests that land plants evolved earlier than previously postulated.

CONTENTS continued >>
RESEARCH ARTICLE

354 Optical Deconstruction of Parkinsonian Neural Circuitry
V. Gradinaru et al.
The therapeutic effects of high-frequency stimulation of the subthalamic nucleus result from direct effects on afferent axons.

REPORTS

360 Probing Interactions Between Ultracold Fermions
G. K. Campbell et al.
Laser probing of identical fermions in optical traps introduces distinctions that give rise to collisional signatures.

364 Contrasting Developmental Trajectories in the Earliest Known Tetrapod Forelimbs
V. Callier et al.
Growth of the humerus of Acanthostega shows no functional change during life, whereas that of Ichthyostega shows differences between juvenile and adults.

367 A Ferroelectric Oxide Made Directly on Silicon
M. P. Warusawithana et al.
Thin, strained films of strontium titanate, deposited directly on silicon, form ferroelectric domains that can be patterned.

370 Anomalous Fractionations of Sulfur Isotopes During Thermochemical Sulfate Reduction
Y. Watanabe et al.
Reactions between organic matter and sulfate can fractionate sulfur isotopes in a way that does not depend on mass.

374 Origin of Nucleosynthetic Isotope Heterogeneity in the Solar Protoplanetary Disk
A. Trinquier et al.
Titanium isotope anomalies in meteorites do not reflect heterogeneity of the initial stage of the protoplanetary disk.

377 Atlantic Forcing of Persistent Drought in West Africa
T. M. Shanahan et al.
Severe droughts, lasting from decades to centuries, have occurred repeatedly in West Africa during the past 3000 years.

381 Protection of C. elegans from Anoxia by HYL-2 Ceramide Synthase
V. Menuz et al.
Enzymes that catalyze synthesis of ceramide lipids influence survival of worms during anoxia.

384 Sequential Regulation of DOCK2 Dynamics by Two Phospholipids During Neutrophil Chemotaxis
A. Nishikimi et al.
The signaling lipid phosphatidic acid links chemoattractant signals to directional movement of neutrophils.

387 Rare Variants of IFIH1, a Gene Implicated in Antiviral Responses, Protect Against Type 1 Diabetes
S. Nejentsev et al.
Deep resequencing revealed rare alleles that were significantly associated with protection from diabetes.

389 Local DNA Topography Correlates with Functional Noncoding Regions of the Human Genome
S. C. J. Parker et al.
The molecular shape of DNA, as well as the nucleotide sequence itself, can have functional consequences and constrain evolution.

392 In Vivo Analysis of Dendritic Cell Development and Homeostasis
K. Liu et al.
The developmental pathway of lymphoid dendritic cells from myeloid progenitors is traced in mice.

397 A Contemporary Microbially Maintained Subglacial Ferrous “Ocean”
J. A. Mikucki et al.
Coupled iron-sulfur metabolism has allowed a microbial community to persist for millions of years beneath the Antarctic ice.

400 Recursive Processes in Self-Affirmation: Intervening to Close the Minority Achievement Gap
G. L. Cohen et al.
Reflecting upon and writing down one’s set of important values may buffer against recursive negative thoughts.

403 Mirror Neurons Differentially Encode the Peripersonal and Extrapersonal Space of Monkeys
V. Caggiano et al.
The spatial selectivity of mirror neurons suggests that their role goes beyond understanding actions and extends to generating responses.

407 DNA Binding Site Sequence Directs Glucocorticoid Receptor Structure and Activity
S. H. Meijsing et al.
DNA is a sequence-specific ligand for the glucocorticoid receptor that allosterically modulates this transcription factor’s activity.

CONTENTS continued >>
A Functional Role for Transposases in a Large Eukaryotic Genome
M. Nowacki et al.
The ciliate Oxytricha expresses transposase genes to influence thousands of DNA rearrangements required for proper development. 10.1126/science.1170023

The Nuclear DNA Base 5-Hydroxymethylcytosine Is Present in Purkinje Neurons and the Brain S. Kriaucionis and N. Heintz
The genome of mammals contains appreciable amounts of a previously undescribed modified DNA base. 10.1126/science.1169786

Conversion of 5-Methylcytosine to 5-Hydroxymethylcytosine in Mammalian DNA by MLL Partner TET1 M. Tahiliani et al.
Methylated C bases, an important epigenetic mark in genomic DNA, can be enzymatically converted to 5-hydroxymethylcytosine. 10.1126/science.1170116

Conversion of 5-Methylcytosine to 5-Hydroxymethylcytosine in Mammalian DNA by MLL Partner TET1 M. Tahiliani et al.
Methylated C bases, an important epigenetic mark in genomic DNA, can be enzymatically converted to 5-hydroxymethylcytosine. 10.1126/science.1170116

Response to Comment on “Atmospheric Hydroxyl Radical Production from Electronically Excited NO2 and H2O” S. Car et al.
full text at www.sciencemag.org/cgi/content/full/324/5925/336b

Response to Comment on “Atmospheric Hydroxyl Radical Production from Electronically Excited NO2 and H2O” S. Li et al.
full text at www.sciencemag.org/cgi/content/full/324/5925/336c

SCIENCE ONLINE

Proteasomal Regulation of the Hypoxic Response Modulates Aging in C. elegans R. Mehta et al.
Induction of the hypoxic response in a worm slows aging and enhances resistance to proteotoxicity. 10.1126/science.1173507

Dance Contest with the Embryos
307
Podcast to hear about

What You See Is What You Feel
Ongoing impacts are revealing what may be Blasting for Ice on Mars
Study suggests early humans were poor climbers.

Our Ancestors Were No Swingers

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

EDITORIAL GUIDE: The Protein Dynamics of Cell Signaling
W. Wong and N. R. Gough
Changes in the conformation, binding partners, or localization of signaling proteins affect the flow of information through signaling cascades.

Mesoderm invagination during gastrulation is controlled by mechanical cues that promote Fog signaling and redistribution of a motor protein.

PERSEPCTIVE: Arrestin Times for Developing Antipsychotics and β-Blockers M. D. Houslay
Conformation determines G protein–independent signaling through β-arrestins.

PERSEPCTIVE: HIV Infection of T Cells—Actin-In and Actin-Out Y. Liu et al.
The coordinated activities of various actin-binding proteins facilitate entry of HIV into T cells.

MEETING REPORT: Visualizing Immune System Complexity M. L. Dustin
From individual molecules to cells in animals, imaging has brought incredible insight to immunology.

PRESENTATION: Molecular Origin and Functional Consequences of Digital Signaling and Hysteresis During Ras Activation in Lymphocytes A. K. Chakraborty et al.
Simulations, theory, and experiments reveal a potential molecular mechanism for digital signaling and short-term molecular memory in lymphocytes.

SCIENCE CAREERS
www.sciencecareers.org/career_magazine
Free Career Resources for Scientists

Tooling Up: The Business Development Career Track D. Jensen
Ph.D. scientists working in business development scout for new technologies and plan new initiatives.

In the Trenches: Science for Humanitarian Aid R. Mejia
Humanitarian relief organizations need scientists to work in regions experiencing wars or natural disasters.

From the Archives: The Academic Scientists’ Toolkit J. Austin
Today’s faculty must know research but must also have all the skills of a manager.

Science Policy News and Analysis

blogs.sciencemag.org/scienceinsider
Free Weekly Show
Download the 17 April Science Podcast to hear about improving minority student performance, laser fusion at the National Ignition Facility, and more.

ORIGINS BLOG
blogs.sciencemag.org/origins
A History of Beginnings

SCIENCE PODCAST
www.sciencemag.org/multimedia/podcast
Free Weekly Show
Download the 17 April Science Podcast to hear about improving minority student performance, laser fusion at the National Ignition Facility, and more.

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-4178. Single-copy sales: $10.00 current issue, $15.00 back issue prepaid. includes surface postage, bulk rates on request. Canadian and other countries (air assist delivery) $185. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254-88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A.

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-4178. Single-copy sales: $10.00 current issue, $15.00 back issue prepaid. includes surface postage, bulk rates on request. Canadian and other countries (air assist delivery) $185. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254-88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A.