

EDITORIAL

- 501 Europe Rethinks Education
Pierre Léna

NEWS OF THE WEEK

- 506 Research Wolves of Yellowstone Killed in Hunt
- 507 Life and Death Play Out on the Skins of Frogs
>> Report p. 582
- 508 Scientists Line Up Against Dam That Would Alter Protected Wetlands
- 509 From *Science's* Online Daily News Site
- 510 Archaeologists Alarmed by Turkey's Proposed Dig Rules
- 510 Hong Kong's Darwin Defenders Declare Victory in Teaching Fracas
- 511 From the *Science* Policy Blog

NEWS FOCUS

- 512 Race for the Heavens
The Colossus of Europe
>> Science Podcast
- 516 Another Biofuels Drawback: The Demand for Irrigation
The Promise of Drought-Tolerant Corn
>> Policy Forum p. 527; Science Express Report by J. M. Melillo et al.
- 518 Sex and Social Structure

LETTERS

- 521 Defending Freedom in Iran's Universities
A. Gorji
Restructure Conflicting Grant Incentives
S. C. Moosavi
Stay Tuned for Multimedia Browsing
M. Pasquali
The Antidote to Bias in Research
D. B. Allison
Focus on Enhancing Phytochemical Content
J. Sooby and X. Zhao
- 522 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

- 524 The Fallen Sky
C. Cokinos, reviewed by D. S. Lauretta
- 525 Moral Panics and the Copyright Wars
W. Patry, reviewed by P. Samuelson

POLICY FORUMS

- 526 Parallel Pursuit of Near-Term and Long-Term Climate Mitigation
S. C. Jackson
- 527 Fixing a Critical Climate Accounting Error
T. D. Searchinger et al.
>> News story p. 516; Science Express Report by J. M. Melillo et al.; Science Podcast

PERSPECTIVES

- 529 Glimpsing the Weak Magnetic Field of Light
H. Giessen and R. Vogelgesang
>> Report p. 550
- 530 A New Virus for Old Diseases?
J. M. Coffin and J. P. Stoye
>> Report p. 585
- 531 A Lunar Waterworld
P. G. Lucey
>> Reports pp. 562, 565, and 568
- 532 Carbenes in Action
M. Albrecht
>> Reports pp. 556 and 559
- 533 Rejoice—RNAi for Yeast
D. Moazed
>> Research Article p. 544

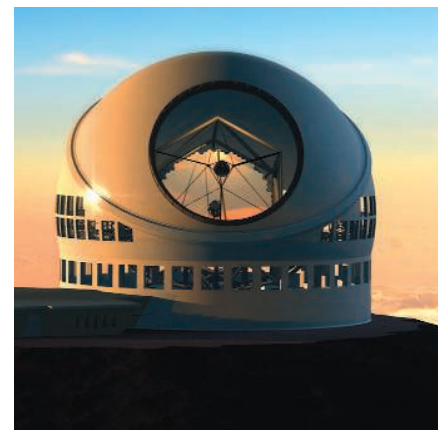
REVIEW

- 535 Lab Experiments Are a Major Source of Knowledge in the Social Sciences
A. Falk and J. J. Heckman

BREVIA

- 539 Smallest Algae Thrive As the Arctic Ocean Freshens
W. K. W. Li et al.
In the Arctic Ocean, phytoplankton cell sizes have decreased with warming temperatures and fresher surface waters.

CONTENTS continued >>

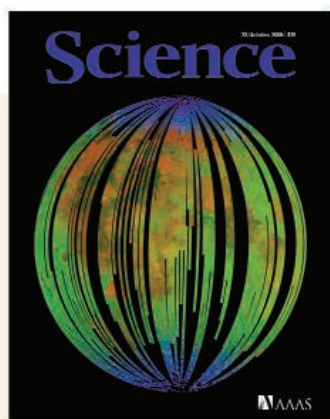


page 512



page 524

Downloaded from <http://science.sciencemag.org/> on February 20, 2021



COVER

A three-color mosaic derived from the Moon Mineralogy Mapper (M^3) near-infrared spectrometer. Orange and pink colors illustrate the distribution of iron-bearing minerals. Green represents the surface brightness at 2.4 micrometers. Blue indicates the presence of small amounts of surficial OH and H_2O that are most prominent at these viewing geometries at cooler, higher latitudes. See page 568.

Image: NASA/ISRO/Brown University/R. N. Clark, USGS

DEPARTMENTS

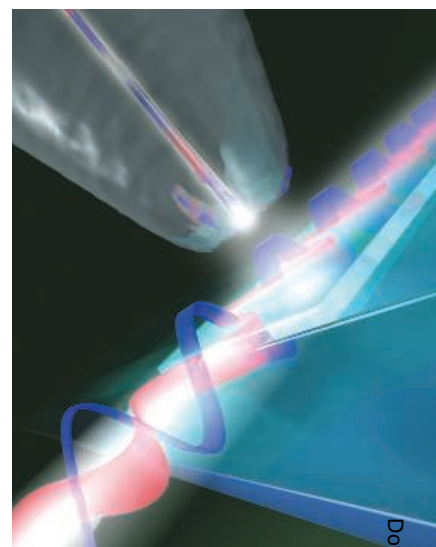
- 498 This Week in *Science*
503 Editors' Choice
504 *Science* Staff
505 Random Samples
601 New Products
602 *Science* Careers

RESEARCH ARTICLES

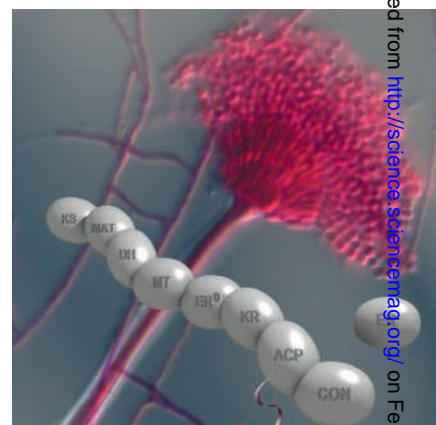
- 540 **Intraspecific Polymorphism to Interspecific Divergence: Genetics of Pigmentation in *Drosophila***
P. J. Wittkopp et al.
Color-determining genes in flies show an ancestral polymorphism that contributes to variation, both within and between species.
- 544 **RNAi in Budding Yeast**
I. A. Drinnenberg et al.
Although the *Saccharomyces cerevisiae* lineage has lost RNA interference, the pathway can be restored by adding genes from *S. castellii*.
>> *Perspective p. 533*
- REPORTS**
- 550 **Probing the Magnetic Field of Light at Optical Frequencies**
M. Burresi et al.
A split-ring resonator coupled to a scanning probe is used to measure the weak magnetic component of light.
>> *Perspective p. 529*
- 553 **Characterization of a Rhodium(I) σ -Methane Complex in Solution**
W. H. Bernskoetter et al.
A loosely bound complex of rhodium and methane has been observed by low-temperature nuclear magnetic resonance spectroscopy.
- 556 **Isolation of a C5-Deprotonated Imidazolium, a Crystalline "Abnormal" N-Heterocyclic Carbene**
E. Aldeco-Perez et al.
A stable cyclic molecule has been prepared with an unusually positioned divalent carbon.
>> *Perspective p. 532*
- 559 **Carbenes As Catalysts for Transformations of Organometallic Iron Complexes**
V. Lavallo and R. H. Grubbs
Carbenes that are useful for organic catalysis are shown to promote organometallic reactions as well.
>> *Perspective p. 532*
- 562 **Detection of Adsorbed Water and Hydroxyl on the Moon**
R. N. Clark
- 565 **Temporal and Spatial Variability of Lunar Hydration As Observed by the Deep Impact Spacecraft**
J. M. Sunshine et al.
- 568 **Character and Spatial Distribution of OH/H₂O on the Surface of the Moon Seen by M³ on Chandrayaan-1**
C. M. Pieters et al.
Space-based spectroscopic measurements provide evidence for water or hydroxyl (OH) on the surface of the Moon.
>> *Perspective p. 531*

- 572 **Smoothered Mutation Confers Resistance to a Hedgehog Pathway Inhibitor in Medulloblastoma**
R. L. Yauch et al.
A mutation that prevents binding of a promising drug lead to its target protein confers resistance in a human brain tumor.
- 575 **A Cdc20-APC Ubiquitin Signaling Pathway Regulates Presynaptic Differentiation**
Y. Yang et al.
The ubiquitin ligase Cdc20-APC is required for proper synapse formation in the developing rat brain.
- 578 **Metagenome of a Versatile Chemolithoautotroph from Expanding Oceanic Dead Zones**
D. A. Walsh et al.
An abundant microbe in oxygen-deficient oceanic waters reveals its redox-driven niche specialization.
- 582 **Pathogenesis of Chytridiomycosis, a Cause of Catastrophic Amphibian Declines**
J. Voyles et al.
A fungal disease that is associated with frog mortality causes changes in electrolyte transport across the skin.
>> *News story p. 507; Science Podcast*
- 585 **Detection of an Infectious Retrovirus, XMRV, in Blood Cells of Patients with Chronic Fatigue Syndrome**
V. C. Lombardi et al.
Two-thirds of a sample of 101 U.S. patients with chronic fatigue syndrome harbor an infectious retrovirus in their blood cells.
>> *Perspective p. 530*
- 589 **Complete Reconstitution of a Highly Reducing Iterative Polyketide Synthase**
S. M. Ma et al.
Reconstitution of catalytic function provides insight into how multifunctional enzymes synthesize important natural products.
- 592 **PTP σ Is a Receptor for Chondroitin Sulfate Proteoglycan, an Inhibitor of Neural Regeneration**
Y. Shen et al.
Mouse neurons that lack a receptor for inhibitory proteoglycans show improved regeneration.
- 596 **Using Neural Measures of Economic Value to Solve the Public Goods Free-Rider Problem**
I. Krajbich et al.
Neuroimaging measures of individuals' valuation of public goods suggests a path to a coherent public goods economy.

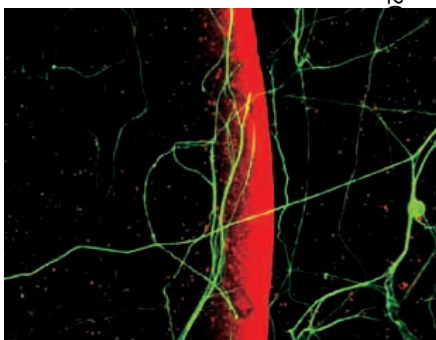
CONTENTS continued >>



pages 529 & 550



page 589



page 592

SCIENCEONLINE

SCIENCEEXPRESS

www.sciencexpress.org

Structural Mechanism of Abscisic Acid Binding and Signaling by Dimeric PYR1

N. Nishimura et al.

The plant hormone responsible for drought tolerance signals by inducing conformational changes in its dimeric protein receptor.
10.1126/science.1181829

Altered Heterochromatin Binding by a Hybrid Sterility Protein in *Drosophila* Sibling Species

J. J. Bayes and H. S. Malik

A male sterility protein localizes to evolutionarily dynamic loci within heterochromatin and leads to their decondensation.
10.1126/science.1181756

Planarian Hh Signaling Regulates Regeneration Polarity and Links Hh Pathway Evolution to Cilia

J. C. Rink et al.

Analysis of the Hedgehog signaling pathway in planaria suggests an ancestral association of this signaling pathway and cilia function.
10.1126/science.1178712

Indirect Emissions from Biofuels: How Important?

J. M. Melillo et al.

Land use changes associated with biofuel production are predicted to increase greenhouse gas emissions.
10.1126/science.1180251
>> *News story p. 516; Policy Forum p. 527*

Nanoplasmonic Probes of Catalytic Reactions

E. M. Larsson et al.

Reactant concentrations can be measured as plasmon frequency shifts for model catalysts grown on nanoscale gold disks.
10.1126/science.1176593

SCIENCENOW

www.sciencenow.org

Highlights From Our Daily News Coverage

Black Hole Conditions, Right Here on Earth

Scientists replicate an accretion-disk environment in the lab.

Trust Is Only Skin Deep

When they know others are watching, beautiful people trust more.

Lasers Impart Life Lessons in Flies

Researchers create new memories with the flip of a switch.

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

EDITORIAL GUIDE: Focus Issue—Addressing Complicated Questions in Neuroscience

N. R. Gough

Multiple approaches are needed to understand brain biology and pathology.

RESEARCH ARTICLE: A Noisy Paracrine Signal Determines the Cellular NF- κ B Response to Lipopolysaccharide

T. K. Lee et al.

A low concentration paracrine TNF- α signal contributes to the variability in NF- κ B activation dynamics in the response to lipopolysaccharide.

RESEARCH ARTICLE: Two Mechanistically and Temporally Distinct NF- κ B Activation Pathways in IL-1 Signaling

K. Yamazaki et al.

The cooperative activation of NF- κ B by two distinct pathways that diverge at TRAF6 critically contributes to the IL-1-dependent inflammatory response.

RESEARCH ARTICLE: STIM2 Regulates Capacitive Ca²⁺ Entry in Neurons and Plays a Key Role in Hypoxic Neuronal Cell Death

A. Berna-Erro et al.

Neurons lacking the calcium sensor STIM2 are protected from hypoxia-induced cell death.

PERSPECTIVE: Emerging Miniaturized Proteomic Technologies to Study Cell Signaling in Clinical Samples

T. S. Gujral and G. MacBeath

Assessing the state of signaling networks in limited quantity samples may facilitate personalized medical care.

PERSPECTIVE: Schizophrenia—The “BLOC” May Be in the Endosomes

P. V. Ryder and V. Faundez

Genetic polymorphisms that affect processes regulated by or participating in endosomal trafficking may increase susceptibility to schizophrenia.

REVIEW: G Protein–Coupled Receptors, Cholinergic Dysfunction, and A β Toxicity in Alzheimer’s Disease

A. Thathiah and B. De Strooper

β -amyloid may induce neurodegeneration by affecting G protein–coupled receptor signaling.

SCIENCE CAREERS

www.sciencecareers.org/career_magazine

Free Career Resources for Scientists

Special Feature: Getting—and Not Getting—Tenure

Science Careers Staff

Find out how to get tenure, and what some people do when they don’t.

Advice on Achieving Tenure

C. Trower

An expert on tenure describes the best practices for getting tenure.

Life After Rejection

S. Carpenter

You’ve been denied tenure—now what?

Perspective: A Simpler Life

V. Long

A recently rejected physics professor rediscovers the pleasures of carrots and carpentry.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

COMMENTARY: What the Patient Should Order

R. D. Kush

Clinical information from the doctor’s office should be harnessed to inform health care decisions.

PERSPECTIVE: Computational Genetic Mapping in Mice—The Ship Has Sailed

M. Zheng et al.

Computational mapping can be used for discovery and repurposing of existing drugs.

RESEARCH ARTICLE: Radioprotection in Normal Tissue and Delayed Tumor Growth by Blockade of CD47 Signaling

J. Maxhimer et al.

Inhibition of a membrane receptor protects normal tissue from radiation injury and delays tumor growth.

RESEARCH ARTICLE: Slow Elimination of Multidrug-Resistant Tuberculosis

C. Dye and B. G. Williams

The spread of drug-resistant TB can be reversed through better treatment and diagnosis.

SCIENCE PODCAST

www.sciencemag.org/multimedia/podcast
Free Weekly Show

Download the 23 October *Science* Podcast to hear about fixing a climate accounting error, a pathogenic threat to frogs, big telescope plans, and more.

ORIGINS BLOG

blogs.sciencemag.org/origins

A History of Beginnings

SCIENCE INSIDER

blogs.sciencemag.org/scienceinsider

Science Policy News and Analysis

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2009 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$146 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$835; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. 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 20090-6178. **Single-copy sales:** \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075. *Science* is indexed in the *Reader’s Guide to Periodical Literature* and in several specialized indexes.



ADVANCING SCIENCE. SERVING SOCIETY

Science

326 (5952)

Science **326** (5952), 498-601.

ARTICLE TOOLS

<http://science.sciencemag.org/content/326/5952>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2009 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.