

## EDITORIAL

- 1319 The Climate in Copenhagen  
*Sir David King*

## NEWS OF THE WEEK

- 1328 International Centers and Donors Warily Eye Sweeping Changes
- 1329 Stolen E-mails Turn Up Heat on Climate Change Rhetoric
- 1330 Sea-Floor Study Gives Plumes From the Deep Mantle a Boost  
*>> Report p. 1388*
- 1331 European Union Selects Unknown for Top Science Post
- 1331 From the *Science* Policy Blog
- 1332 Web Site Matches U.S. Scientists With Teachers Looking for Help
- 1333 Stem Cell Center to Rise in Biology Hub
- 1333 From *Science's* Online Daily News Site

## NEWS FOCUS

- 1334 ORIGINS  
On the Origin of Tomorrow  
*>> Science Podcast*
- 1337 Could They All Be Prion Diseases?  
Acting Like a Prion Isn't Always Bad
- 1340 Can Science Keep Alaska's Bering Sea Pollock Fishery Healthy?
- 1342 Seeking a Shortcut to the High-Energy Frontier

## LETTERS

- 1344 Biofuels: Social Benefits  
*L. Rist et al.*
- Biofuels: By-Products  
*T. M. Biksey and F. Wu*
- Biofuels: Algae  
*J. E. Duffy et al.*
- Biofuels: Forests and Carbon  
*P. E. Kauppi and L. Saikku*

- Biofuels: Beware Crop Residues  
*R. Lal and D. Pimentel*
- Biofuels: Steer Clear of Degraded Land  
*J. H. Spangenberg and J. Settele*
- Response  
*D. Tilman et al.*

## 1346 CORRECTIONS AND CLARIFICATIONS

## BOOKS ET AL.

- 1347 Science for All  
*P. J. Bowler, reviewed by M. Baldwin*
- 1348 Imagine Science Film Festival  
*A. Gambis, artistic director, reviewed by C. Bohannon et al.*

## POLICY FORUM

- 1350 The End of Deforestation in the Brazilian Amazon  
*D. Nepstad et al.*

## PERSPECTIVES

- 1352 Nascent Proteins Caught in the Act  
*M. Kampmann and G. Blobel*  
*>> Research Article p. 1369; Report p. 1412*
- 1353 Biodiversity Under Global Change  
*S. L. Collins*  
*>> Report p. 1399*
- 1355 Nailing Down Nickel for Electrocatalysis  
*M. Hambourger and T. A. Moore*  
*>> Report p. 1384*
- 1356 How Plant Cells Go to Sleep for a Long, Long Time  
*M. R. Sussman and G. N. Phillips Jr.*  
*>> Research Article p. 1373*
- 1357 Quantum Nonlocality: How Does Nature Do It?  
*N. Gisin*
- 1359 Retrospective: Paul C. Zamecnik (1912–2009)  
*K. J. Isselbacher*

## ESSAY

- 1360 GE Prize Essay: The Molecular Basis of Size Differences  
*M. A. Crickmore*

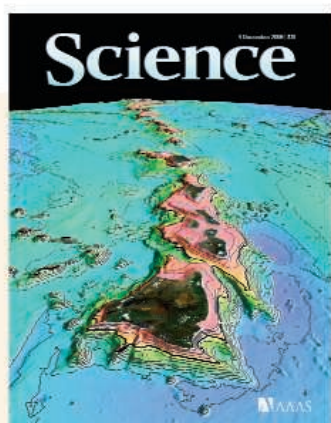
CONTENTS continued >>



page 1334



page 1348



## COVER

Topography of the Hawaiian Islands and surrounding sea floor, from ship soundings and satellite altimetry displayed using Google Earth. A Report on page 1388 describes images of the deep structure of the Hawaiian hot spot obtained from a large-aperture network of ocean bottom and land seismometers. Global bathymetry overlays for Google Earth are available at [http://topex.ucsd.edu/WWW\\_html/mar\\_topo.html](http://topex.ucsd.edu/WWW_html/mar_topo.html).

Image: David Sandwell/University of California, San Diego; Paul Wessel/University of Hawaii

## DEPARTMENTS

- 1315 This Week in *Science*
- 1321 Editors' Choice
- 1324 *Science* Staff
- 1327 Random Samples
- 1428 New Products
- 1429 *Science* Careers

## REVIEW

- 1362 Epidemic Dynamics at the Human-Animal Interface  
*J. O. Lloyd-Smith et al.*

## BREVIA

- 1368 Harnessing Carbon Payments to Protect Biodiversity  
*O. Venter et al.*

A model shows that REDD (reducing emissions from deforestation and degradation) can be extended to biodiversity conservation.

## RESEARCH ARTICLES

- 1369 Structure of Monomeric Yeast and Mammalian Sec61 Complexes Interacting with the Translating Ribosome  
*T. Becker et al.*

A single copy of a protein-conducting channel molecule provides a conduit for polypeptide translocation across membranes.

>> *Perspective p. 1352; Report p. 1412*

- 1373 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.

>> *Perspective p. 1356*

## REPORTS

- 1379 A Population of Compact Elliptical Galaxies Detected with the Virtual Observatory  
*I. Chilingarian et al.*

A sample of elliptical systems provides evidence that disruption of galaxies plays an important role in their evolution.

- 1382 On the Elusive Twelfth Vibrational State of Beryllium Dimer  
*K. Patkowski et al.*

Theoretical calculations support a previous spectroscopic assignment of the highest vibrational level of the beryllium dimer.

- 1384 From Hydrogenases to Noble Metal-Free Catalytic Nanomaterials for H<sub>2</sub> Production and Uptake  
*A. Le Goff et al.*

A nickel electrocatalyst supported on carbon nanotubes shows promising activity for proton-hydrogen interconversion in water.

>> *Perspective p. 1355*

- 1388 Mantle Shear-Wave Velocity Structure Beneath the Hawaiian Hot Spot  
*C. J. Wolfe et al.*

Extensive seismological data support a mantle plume origin for the Hawaiian volcanic hot spot.

>> *News story p. 1330*

- 1391 Tracking the Variable North Atlantic Sink for Atmospheric CO<sub>2</sub>

*A. J. Watson et al.*

Data from instrumented commercial ships reveal substantial interannual variations of carbon dioxide flux between the ocean and the air.

- 1394 Coupling of CO<sub>2</sub> and Ice Sheet Stability Over Major Climate Transitions of the Last 20 Million Years

*A. K. Tripati et al.*

Changes in global sea level and atmospheric carbon dioxide levels were similar during the past 20 million years.

- 1397 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.

- 1399 Elevated CO<sub>2</sub> Reduces Losses of Plant Diversity Caused by Nitrogen Deposition  
*P. B. Reich*

In a 10-year field experiment, elevated atmospheric carbon dioxide halved nitrogen-induced reductions in grassland plant species richness.

>> *Perspective p. 1353; Science Podcast*

- 1403 The Insect Neuropeptide PTTH Activates Receptor Tyrosine Kinase Torso to Initiate Metamorphosis

*K. F. Rewitz et al.*

The receptor of the *Drosophila* brain hormone that initiates metamorphosis is identified.

- 1406 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.

- 1410 Promoting Interest and Performance in High School Science Classes

*C. S. Hulleman and J. M. Harackiewicz*

Spotlighting curriculum relevance improves high school outcomes.

- 1412 Structural Insight into Nascent Polypeptide Chain-Mediated Translational Stalling

*B. Seidelt et al.*

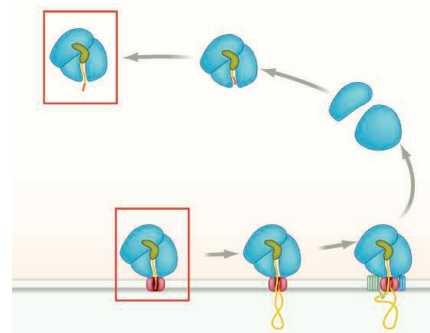
Individual polypeptide nascent chains can adopt distinct conformations within the ribosome exit tunnel.

>> *Perspective p. 1352; Research Article p. 1369*

- 1415 A Crystal Structure of the Bifunctional Antibiotic Simocyclinone D8, Bound to DNA Gyrase

*M. J. Edwards et al.*

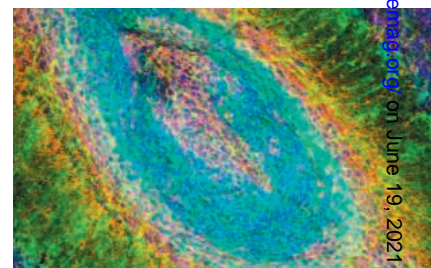
The molecular mechanism is revealed by which an antibiotic prevents DNA binding by a bacterial DNA gyrase.



pages 1352, 1369, & 1412



page 1391



page 1424

- 1419 GABAergic Hub Neurons Orchestrate Synchrony in Developing Hippocampal Networks  
*P. Bonifazi et al.*

A model for the topology of brain networks incorporates a morphofunctional description of neuronal hubs.

- 1424 Deletion of Atoh1 Disrupts Sonic Hedgehog Signaling in the Developing Cerebellum and Prevents Medulloblastoma  
*A. Flora et al.*

A transcription factor regulates signaling in the developing mouse cerebellum and also influences cancer formation.

CONTENTS continued >>

## SCIENCEONLINE

## SCIENCEEXPRESS

[www.sciencexpress.org](http://www.sciencexpress.org)

**Dendritic Mechanisms Underlying Rapid Synaptic Activation of Fast-Spiking Hippocampal Interneurons**

*H. Hu et al.*

Potassium channel enrichment in the dendrites of hippocampal basket cells defines a mechanism of neural network function.

10.1126/science.1177876

**Therapeutic Silencing of MicroRNA-122 in Primates with Chronic Hepatitis C Virus Infection**

*R. E. Lanford et al.*

Targeting a microRNA required for hepatitis C virus infection reduces disease symptoms in chimpanzees.

10.1126/science.1178178

>> [Science Podcast](#)

**Targeted 3' Processing of Antisense Transcripts Triggers *Arabidopsis* FLC Chromatin Silencing**

*F. Liu et al.*

A backward transcript of the *FLOWERING LOCUS C* gene of *Arabidopsis* is involved in regulation of the sense-strand transcription.

10.1126/science.1180278

**Iron Partitioning and Density Changes of Pyrolite in Earth's Lower Mantle**

*T. Irifune et al.*

Increasing the compositional complexity of mantle samples causes an electronic spin transition to occur at lower pressures.

10.1126/science.1181443

## SCIENCENOW

[www.sciencenow.org](http://www.sciencenow.org)

Highlights From Our Daily News Coverage

**Coral Reefs Act Like Sunscreen**

Skeletons absorb UV light to protect inhabitants.

**Do Titan's Lakes Migrate South for the Winter?**

Orbital cycles of Saturn's moon could be causing lakes to pull up stakes.

**Americans' Eating Habits More Wasteful Than Ever**

Nearly 40% of U.S. food ends up in the garbage, study says.

## SCIENCE SIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)

The Signal Transduction Knowledge Environment

**EDITORIAL GUIDE: Living by the Numbers**

*M. B. Yaffe*

Articles should be judged on their own merit, not the impact factor of the journal in which they are published.

**RESEARCH ARTICLE: Protein Kinase G Controls Brown Fat Cell Differentiation and Mitochondrial Biogenesis**

*B. Haas et al.*

PKG regulates differentiation and thermogenic function in brown adipose tissue.

**RESEARCH ARTICLE: RIAM Regulates the Cytoskeletal Distribution and Activation of PLC- $\gamma$ 1 in T cells**

*N. Patsoukis et al.*

RIAM, an adaptor protein that regulates integrin signaling, is found to also function in T cell receptor-proximal signaling.

**PROTOCOL: Quantitative Analysis of Protein-Lipid Interactions Using Tryptophan Fluorescence**

*C. A. Kraft et al.*

The intrinsic fluorescence of tryptophan can be used to quantify the interaction between proteins and lipids.

## PODCAST

*A. Pfeifer and A. M. VanHook*

Protein kinase G is required for the differentiation and fat-burning function of brown adipose tissue.

## SCIENCE CAREERS

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)

Free Career Resources for Scientists

**Translating Lupus**

*K. Hede*

An encounter with a lupus patient crystallized one scientist's concept of "translational research."

**Taken for Granted: NIH's Dr. Ruth**

*B. L. Benderly*

Ruth L. Kirschstein's life of service provides a powerful example for young scientists.

**Mind Matters: In Defense of Downtime**

*I. S. Levine*

Working longer does not necessarily mean getting more done.

**CTSciNet: The Clinical and Translational Science Network**

Experience the leading social career resource for clinical and translational scientists.

## SCIENCE TRANSLATIONAL MEDICINE

[www.sciencetranslationalmedicine.org](http://www.sciencetranslationalmedicine.org)

Integrating Medicine and Science

**EDITORIAL: Peer-to-Peer Sharing Spurs Scientific Innovation**

*E. A. Zerhouni*

Changes in pharmaceutical industry practices can accelerate discoveries.

**COMMENTARY: A Call for Sharing—Adapting Pharmaceutical Research to New Realities**

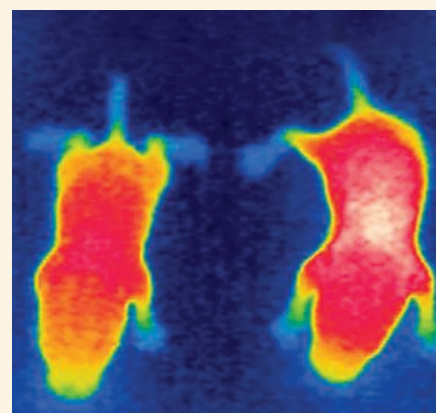
*B. H. Munos et al.*

Collaborations stand to gain from loosening intellectual property restrictions.

**RESEARCH ARTICLE: Identification of an Autoantigen Demonstrates a Link Between Interstitial Lung Disease and a Defect in Central Tolerance**

*A. K. Shum et al.*

A defect in immune tolerance may underlie lung damage in autoimmune diseases.



## SCIENCE SIGNALING

Brown fat and body temperature.

## SCIENCE PODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

Free Weekly Show

Download the 4 December *Science* Podcast to hear about a microRNA target for treating hepatitis C, the combined effects of nitrogen and CO<sub>2</sub> on plant diversity, the future of evolution, and more.

## ORIGINS BLOG

[blogs.sciencemag.org/origins](http://blogs.sciencemag.org/origins)

A History of Beginnings

## SCIENCE INSIDER

[blogs.sciencemag.org/scienceinsider](http://blogs.sciencemag.org/scienceinsider)

Science Policy News and Analysis

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