

## EDITORIAL

- 12 Promoting Scientific Standards  
*Bruce Alberts*

## NEWS OF THE WEEK

- 18 Obama Backs New Launcher and Bigger NASA Budget
- 19 Senate Looms as Bigger Hurdle After Copenhagen
- 20 Protests by Staff, Advisers Rattle Australian Synchrotron
- 21 From *Science's* Online Daily News Site
- 22 U.K. Physicists Cry Foul at Major Budget Cuts
- 22 Errors in Chemistry Claims Cast Doubt on Reactome Paper
- 23 From the *Science* Policy Blog
- 24 Recession Hits Some Sciences Hard at Florida State University
- 25 Embryo Ruling Keeps Stem Cell Research Legal

## NEWS FOCUS

- 26 In the Afterglow of the Big Bang  
*>> Science Podcast*

## LETTERS

- 30 Bushmeat Hunting and Climate: An Indirect Link  
*P. A. Jansen et al.*  
Gray Wolves Not Out of the Woods Yet  
*J. T. Bruskotter et al.*  
Patents: A Threat to Innovation?  
*M. Manocaran*  
Response  
*S. J. H. Graham and M. J. Higgins*  
Let Top Students Go Forth and Prosper  
*G. Madhavan and B. A. Oakley*

## BOOKS ET AL.

- 33 Lizards in an Evolutionary Tree  
*J. B. Losos, reviewed by R. G. Gillespie*
- 34 Don't Be Such a Scientist *R. Olson;*  
Am I Making Myself Clear? *C. Dean,*  
*reviewed by P. Kareiva*
- 34 Browsings

## POLICY FORUM

- 36 Opportunities for Research and NIH  
*F. S. Collins*

## PERSPECTIVES

- 38 Molecular Donuts and Donut Holes  
*K. H. Whitmire*  
*>> Report p. 72*
- 39 Serendipitous Astronomy  
*K. R. Lang*
- 41 Janus Catalysts Direct Nanoparticle Reactivity  
*D. J. Cole-Hamilton*  
*>> Report p. 68*
- 42 Some Enzymes Just Need a Space of Their Own  
*S. Kang and T. Douglas*  
*>> Report p. 81*
- 43 Brain Activity to Rely On?  
*D. S. Schwarzkopf and G. Rees*  
*>> Report p. 97*
- 45 Retrospective:  
Rossiter H. Crozier (1943–2009)  
*J. J. Boomsma and P. Pamilo*

## REVIEW

- 46 Lipid Rifts As a Membrane-Organizing Principle  
*D. Lingwood and K. Simons*

CONTENTS continued >>

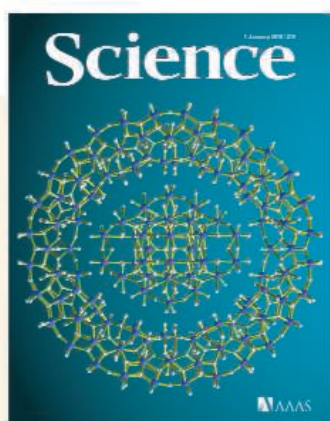


page 26



page 34

Downloaded from www.sciencemag.org on April 9, 2020



## COVER

Crystal structure of a molybdenum oxide nanowheel, 2.6 nanometers in diameter, around a smaller molybdenum oxide cluster. *Miras et al.* (page 72; related Perspective page 38) used a controlled-flow reactor to show that the central core serves as a transient template for the self-assembly of the nanowheel and is ultimately ejected to yield a hollow finished product.

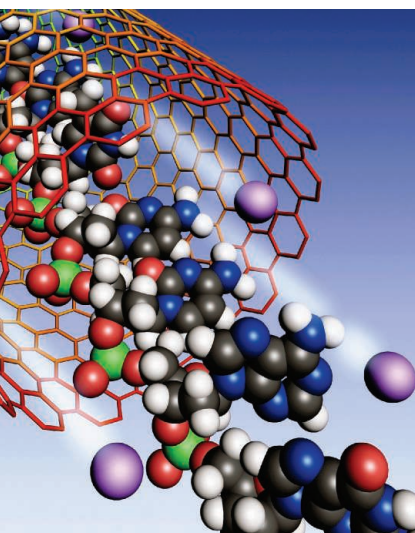
*Image: Leroy Cronin, Ryo Tsunashima, Haralampos Miras/University of Glasgow*

## DEPARTMENTS

- 10 This Week in *Science*
- 13 Editors' Choice
- 16 *Science* Staff
- 17 Random Samples
- 100 New Products
- 101 *Science* Careers



page 33



page 64



pages 42 &amp; 81

## BREVIA

- 51 **Masquerade: Camouflage Without Crypsis**  
*J. Skelhorn et al.*  
Caterpillars masquerading as twigs are misidentified by chick predators as inanimate objects, rather than remaining undetected.  
>> *Science Podcast*

## RESEARCH ARTICLE

- 52 **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.

## REPORTS

- 58 **An Unusually Fast-Evolving Supernova**  
*D. Poznanski et al.*  
The distinctive properties of this supernova suggest that it is of a kind predicted by theory but not previously observed.
- 60 **Polarization-Induced Hole Doping in Wide-Band-Gap Uniaxial Semiconductor Heterostructures**  
*J. Simon et al.*  
A compositional gradient of two semiconductors creates an electronic polarization that ionizes and activates dopant atoms.
- 64 **Translocation of Single-Stranded DNA Through Single-Walled Carbon Nanotubes**  
*H. Liu et al.*  
Transfer of DNA by electrophoresis through some carbon nanotubes is accompanied by giant current pulses.
- 68 **Solid Nanoparticles That Catalyze Biofuel Upgrade Reactions at the Water/Oil Interface**  
*S. Crossley et al.*  
Oxide nanoparticles bearing carbon nanotubes and functionalized with palladium act as both emulsifiers and catalysts.  
>> *Perspective p. 41*
- 72 **Unveiling the Transient Template in the Self-Assembly of a Molecular Oxide Nanowheel**  
*H. N. Miras et al.*  
Use of a flow reactor reveals a key intermediate in the formation of a molybdenum oxide nanostructure.  
>> *Perspective p. 38*

- 75 **Synchronous Deglacial Overturning and Water Mass Source Changes**  
*N. L. Roberts et al.*  
Large-scale ocean circulation changed in different ways during a millennial-scale climate event.
- 78 **Human Genome Sequencing Using Unchained Base Reads on Self-Assembling DNA Nanoarrays**  
*R. Drmanac et al.*  
A low-cost sequencing technique advances us closer to the goal of the \$1000 human genome.
- 81 **Structure and Mechanisms of a Protein-Based Organelle in *Escherichia coli***  
*S. Tanaka et al.*  
Structures of the shell proteins from a bacterial organelle help to explain how it functions in metabolizing ethanolamine.  
>> *Perspective p. 42*
- 84 **The Tasmanian Devil Transcriptome Reveals Schwann Cell Origins of a Clonally Transmissible Cancer**  
*E. P. Murchison et al.*  
Sequencing the Tasmanian devil facial tumor disease provides a potential diagnostic marker.  
>> *Science Podcast*
- 88 **O-Mannosyl Phosphorylation of Alpha-Dystroglycan Is Required for Laminin Binding**  
*T. Yoshida-Moriguchi et al.*  
A posttranslational sugar modification required to prevent certain dystrophies is identified and characterized.
- 91 **The Rate and Molecular Spectrum of Spontaneous Mutations in *Arabidopsis thaliana***  
*S. Ossowski et al.*  
Rapid sequencing technologies allow a more accurate calculation of the mutation rate for plants.
- 94 **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.
- 97 **Reproducibility Distinguishes Conscious from Nonconscious Neural Representations**  
*A. Schurger et al.*  
Analysis of functional magnetic resonance imaging data reveals that neural activation patterns are more reproducible for seen versus unseen objects.  
>> *Perspective p. 43*

## SCIENCEONLINE

## SCIENCEEXPRESS

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

**Detection of Gamma-Ray Emission from the Vela Pulsar Wind Nebula with AGILE**

*A. Pellizzoni et al.*

Pulsar wind nebulae could account for some of the yet unidentified Galactic gamma-ray sources.  
10.1126/science.1183844

**$^{238}\text{U}/^{235}\text{U}$  Variations in Meteorites: Extant  $^{247}\text{Cm}$  and Implications for Pb-Pb Dating**

*G. A. Brennecka et al.*

Variable abundances of meteorite isotopes may require correcting the lead-based age of the solar system by 5 million years.  
10.1126/science.1180871

**Darwinian Evolution of Prions in Cell Culture**

*J. Li et al.*

When propagated in vitro, prion strains demonstrate adaptability and selection.  
10.1126/science.1183218

**Protein PRDM9 Is a Major Determinant of Meiotic Recombination Hotspots in Humans and Mice**

*F. Baudat et al.*

10.1126/science.1183439

**Drive Against Hotspot Motifs in Primates Implicates the PRDM9 Gene in Meiotic Recombination**

*S. Myers et al.*

10.1126/science.1182363

**Prdm9 Controls Activation of Mammalian Recombination Hotspots**

*E. D. Parvanov et al.*

A chromatin-modifying enzyme functions in the determination of recombination loci within the genome.

10.1126/science.1181495

## SCIENCE NOW

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

Highlights From Our Daily News Coverage

**When Fire Approaches, Chimps Keep Their Cool**

Primates clear an important hurdle in humanlike mastery of fire.

**Seasick? Try Controlling Your Breathing**

Changing your breathing pattern may delay the onset of nausea at sea.

**Hand Size—Not Sex—Determines Sense of Touch**

Women's fingers are more sensitive, but that's just because they are smaller than men's are.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

**RESEARCH ARTICLE: Regulation of Epidermal Growth Factor Receptor Trafficking by Lysine Deacetylase HDAC6**

*Y. Lissanu Deribe et al.*

HDAC6 sets a brake that slows down the delivery of activated epidermal growth factor receptors to the degradative compartment.

**RESEARCH ARTICLE: Tumor Suppression by PTEN Requires the Activation of the PKR-eIF2 $\alpha$  Phosphorylation Pathway**

*Z. Mounir et al.*

PTEN provides a link between tumor suppression and the inhibition of protein synthesis independently of its regulation of PI3K signaling.

**RESEARCH ARTICLE: Cbl Controls EGFR Fate by Regulating Early Endosome Fusion**

*G. D. Visser Smit et al.*

The E3 ubiquitin ligase Cbl mediates the fusion of early endosomes necessary to target EGFR for lysosomal degradation.

**PERSPECTIVE: Channeling Calcium—A Shared Mechanism for Exocytosis-Endocytosis Coupling**

*S. S. Vogel*

Exocytotic insertion of calcium channels can couple exocytosis with endocytosis.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

**A Scientist's Infectious Enthusiasm**

*S. Webb*

Benjamin tenOver is an unconventional virologist who is working to make his discoveries clinically relevant.

**Coming to America: Doing a Postdoc in the U.S.**

*L. Laursen*

The logistics can be intimidating, but a postdoc in the United States is rewarding.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

**PERSPECTIVE: PPAR $\gamma$  Activation—A Potential Treatment for Pulmonary Hypertension**

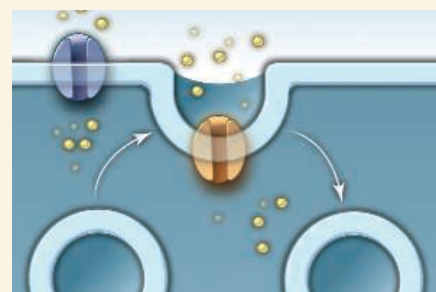
*G. Hansmann and R. T. Zamanian*

A new target is identified to thwart heart failure.

**PERSPECTIVE:  $\alpha_2\text{A}$ -Adrenergic Receptors in the Genetics, Pathogenesis, and Treatment of Type 2 Diabetes**

*S. B. Liggitt*

Results originating from rat genetics make a compelling case for the ADRA2A locus and type 2 diabetes in humans.



## SCIENCE SIGNALING

Coupling exocytosis with endocytosis.

**RESEARCH ARTICLE: Measurement and Clinical Monitoring of Human Lymphocyte Clonality by Massively Parallel V-D-J Pyrosequencing**

*S. D. Boyd et al.*

Rapid sequencing of immune receptor loci can provide direct detection and tracking of immune diversity.

**REPORT: Seasonal Influenza Vaccine Provides Priming for A/H1N1 Influenza Immunization**

*G. Del Giudice et al.*

A vaccine currently used to protect against H1N1 is more effective when co-injected with an adjuvant and seasonal flu vaccine.

## SCIENCE PODCAST

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

Free Weekly Show

Download the 1 January *Science* Podcast to hear about caterpillars masquerading as twigs, the chief scientist of Russia's Space Research Institute, and clues to cancer in Tasmanian devils.

## 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

**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 © 2010 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): \$910; 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

**327 (5961)**

*Science* **327** (5961), 10-100.

**ARTICLE TOOLS**

<http://science.sciencemag.org/content/327/5961>

**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 © 2010 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.