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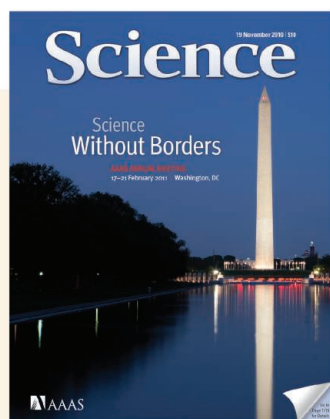
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## COVER

View of the Washington Monument in Washington, DC, site of the AAAS Annual Meeting, 17 to 21 February 2011. The meeting's theme—*Science Without Borders*—integrates the practice of science, in both research and teaching, which uses multidisciplinary approaches to problem-solving, crosses conventional borders, and takes into consideration the diversity of investigators and students. The preliminary program begins on page 1118.

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- 1065**  $\gamma$ -Secretase Gene Mutations in Familial Acne Inversa  
*B. Wang et al.*  
Mutations causing a rare skin disease reveal a signaling pathway that is a drug target for Alzheimer's disease.  
>> *Perspective p. 1055*

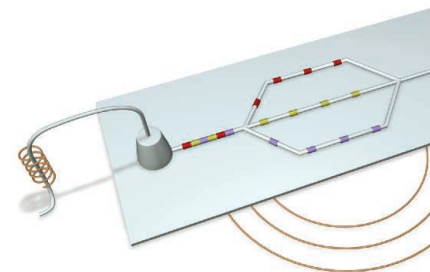
## RESEARCH ARTICLE

- 1066** Structures of the CXCR4 Chemokine GPCR with Small-Molecule and Cyclic Peptide Antagonists  
*B. Wu et al.*  
Five crystal structures provide insight into chemokine and HIV-1 recognition.

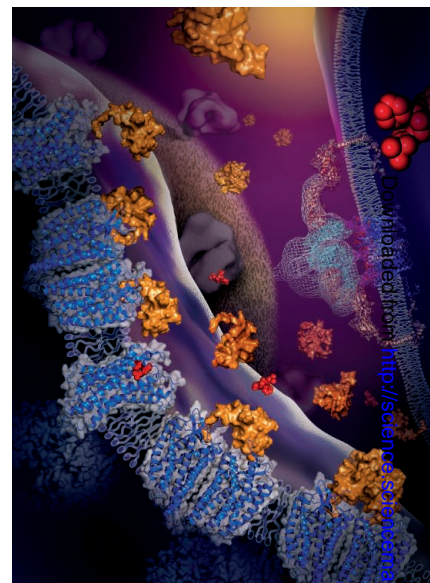
## REPORTS

- 1072** The Uncertainty Principle Determines the Nonlocality of Quantum Mechanics  
*J. Oppenheim and S. Wehner*  
The two central elements of quantum theory, once assumed to be distinct concepts, are shown to be linked.  
>> *Science Podcast*
- 1075** Faster Interprotein Electron Transfer in a [Myoglobin, b<sub>5</sub>] Complex with a Redesigned Interface  
*P. Xiong et al.*  
Faster electron transfer in a redesigned protein complex provides insights into the role of conformational distributions.
- 1078** Zooming In on Microscopic Flow by Remotely Detected MRI  
*V. S. Bajaj et al.*  
A magnetic resonance imaging system allows finer analysis of fluid flow.  
>> *Perspective p. 1056*
- 1081** Probing the Ultimate Limit of Fiber-Optic Strain Sensing  
*G. Gagliardi et al.*  
The precisely spaced teeth of an optical frequency comb can be used as a highly accurate strain gauge.
- 1084** Loss of Carbon from the Deep Sea Since the Last Glacial Maximum  
*J. Yu et al.*  
Carbon loss from the ocean to the atmosphere and terrestrial biosphere occurred at different rates in the last deglaciation.
- 1088** Glacial Silicic Acid Concentrations in the Southern Ocean  
*M. J. Ellwood et al.*  
Silicon isotope distributions in sponges contain the signature of ocean nutrient distributions during the last glacial period.
- 1091** Structure of the Human Dopamine D3 Receptor in Complex with a D2/D3 Selective Antagonist  
*E. Y. T. Chien et al.*  
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- 1095** Mcl-1 Is Essential for Germinal Center Formation and B Cell Memory  
*I. Vikstrom et al.*  
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- 1099** Interdependence of Cell Growth and Gene Expression: Origins and Consequences  
*M. Scott et al.*  
Simple mathematical models describe the relationship between bacterial replication, cellular resources, and protein expression.  
>> *Perspective p. 1058*
- 1102** Symbiotic Bacterium Modifies Aphid Body Color  
*T. Tsuchida et al.*  
Infection with a symbiotic bacterium leads to a spectacular phenotypic change in its host, making red aphids turn green.
- 1104** PiggyBac Transposon Mutagenesis: A Tool for Cancer Gene Discovery in Mice  
*R. Rad et al.*  
Mutations induced by a transposable element in mice can be used to identify cancer-causing genes.
- 1108** Calcium-Permeable AMPA Receptor Dynamics Mediate Fear Memory Erasure  
*R. L. Clem and R. L. Huganir*  
The subunit composition of AMPA receptors at lateral amygdala synapses changes after the acquisition of associative fear.
- 1113** Universality in the Evolution of Orientation Columns in the Visual Cortex  
*M. Kaschube et al.*  
Analysis of evolutionarily divergent species highlights constraint on brain structure imposed by self-organizing neural networks.  
>> *Perspective p. 1059*

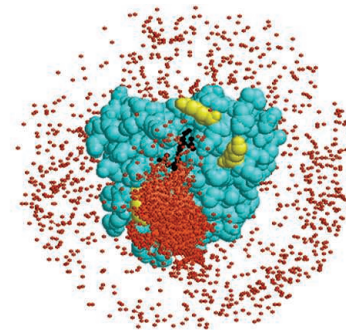
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### A Giant Planet Around a Metal-Poor Star of Extragalactic Origin

*J. Setiawan et al.*

A planet is observed to orbit a star whose properties are different from those of all other known planet-hosting stars.

10.1126/science.1193342

### Evidence of Supersolidity in Rotating Solid Helium

*H. Choi et al.*

Measurements on rotating frozen helium support the formation of a quantum, or supersolid, phase.

10.1126/science.1196409

>> *News story p. 1033*

### Plasticity of Animal Genome Architecture Unmasked by Rapid Evolution of a Pelagic Tunicate

*F. Denoëud et al.*

A metazoan genome departs from the organization that appears rigidly established in other animal phyla.

10.1126/science.1194167

>> *Science Podcast*

### Glucose and Weight Control in Mice with a Designed Ghrelin O-Acyltransferase Inhibitor

*B. P. Barnett et al.*

A drug inhibiting the activation of ghrelin, a peptide that promotes weight gain, has beneficial metabolic effects in mice.

10.1126/science.1196154

### *Arabidopsis* Type I Metacaspases Control Cell Death

*N. S. Coll et al.*

An ancient link between cell death control and innate immune receptor function has been discovered in plants.

10.1126/science.1194980

## TECHNICALCOMMENTS

### Comment on "Single-Crystal X-ray Structure of 1,3-Dimethylcyclobutadiene by Confinement in a Crystalline Matrix"

*D. Scheschke*

Full text at [www.sciencemag.org/cgi/content/ful/330/6007/1047-c](http://www.sciencemag.org/cgi/content/ful/330/6007/1047-c)

### Comment on "Single-Crystal X-ray Structure of 1,3-Dimethylcyclobutadiene by Confinement in a Crystalline Matrix"

*I. V. Alabugin et al.*

Full text at [www.sciencemag.org/cgi/content/ful/330/6007/1047-d](http://www.sciencemag.org/cgi/content/ful/330/6007/1047-d)

### Response to Comments on "Single-Crystal X-ray Structure of 1,3-Dimethylcyclobutadiene by Confinement in a Crystalline Matrix"

*Y.-M. Legrand et al.*

Full text at [www.sciencemag.org/cgi/content/ful/330/6007/1047-e](http://www.sciencemag.org/cgi/content/ful/330/6007/1047-e)

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Can Google Predict the Stock Market?

New analysis shows a connection between search terms and stock market activity.

### Large Size Didn't Keep Pterosaurs Grounded

Group argues that ancient reptiles flew just fine, despite their massive weight.

### Neandertal Children Developed on the Fast Track

Tooth analysis suggests that our close cousins matured faster than we did.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

### RESEARCH ARTICLE: Solution of the Structure of the TNF-TNFR2 Complex

*Y. Mukai et al.*

Structural differences in the binding of tumor necrosis factor to its two receptors may aid in the development of receptor-specific therapeutics.

### RESEARCH ARTICLE: Activation of STIM1-Orai1 Involves an Intramolecular Switching Mechanism

*M. K. Korzeniowski et al.*

### PERSPECTIVE: Calcium Signaling by STIM and Orai—Intimate Coupling Details Revealed

*Y. Wang et al.*

An intramolecular interaction within the protein STIM1 prevents untimely refilling of intracellular calcium stores.

### PERSPECTIVE: Frizzled Signaling—Gα<sub>o</sub> and Rab5 at the Crossroads of the Canonical and PCP Pathways?

*D. Strutt and J.-P. Vincent*

Rab5, a key effector of endocytosis, binds to Frizzled proteins and modulates their trafficking and signaling.

## SCIENCE CAREERS

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

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*E. Pain*

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*D. Jensen*

With the right attitude and actions, you can rise to the top on interview day.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

### PERSPECTIVE: News from the Brain—The GPR124 Orphan Receptor Directs Brain-Specific Angiogenesis

*E. Dejana and D. Nyqvist*

A G protein-coupled receptor may represent a new therapeutic target for vascular pathologies in the central nervous system.

### RESEARCH ARTICLE: Identification of Hematopoietic Stem Cell-Specific miRNAs Enables Gene Therapy of Globoid Cell Leukodystrophy

*B. Gentner et al.*

Hematopoietic stem cell-specific microRNAs regulate transgene expression in mice with a lysosomal storage disorder.

### RESEARCH ARTICLE: Femtosecond Laser-Assisted Cataract Surgery with Integrated Optical Coherence Tomography

*D. V. Palanker et al.*

An image-guided, femtosecond laser creates accurate cuts in the eye to improve cataract surgery.

## SCIENCE PODCAST

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

Free Weekly Show

Download the 19 November *Science* Podcast to hear about science in Russia, animal genome plasticity, linking uncertainty with nonlocality in quantum mechanics, and more.

## SCIENCE INSIDER

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

Science Policy News and Analysis

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