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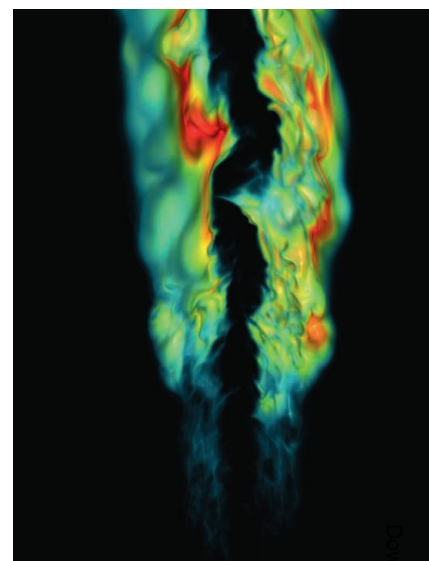
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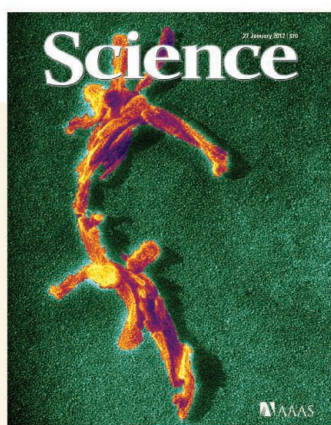


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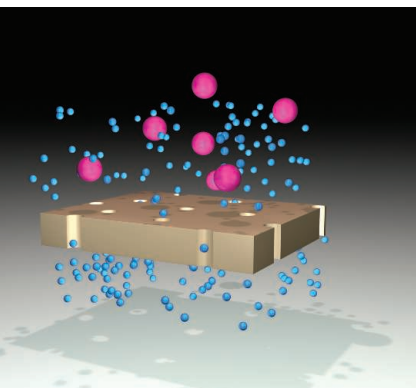
## COVER

False-colored transmission electron micrograph of a prion [average dimensions: ~150 nanometers (nm) long, 10 nm thick], the infectious protein responsible for deadly brain diseases in animals and humans. Although cross-species prion transmission may show no detectable sign of disease in the brain, lymphoid tissue is much more susceptible to infection. This discovery may be relevant when assessing the public health risks of exposure to animal prions and silent carriers of prion disease. See page 472.

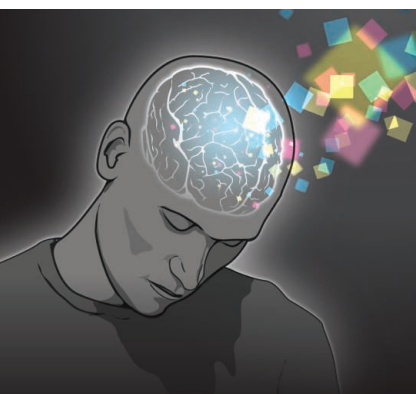
Image: Eye of Science/Photo Researchers, Inc.

## DEPARTMENTS

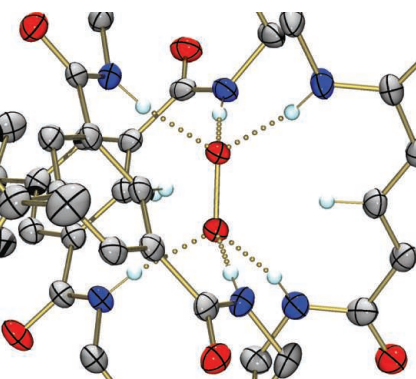
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>> *Perspective p. 410; Science Podcast*
- 432 Crystal Structure of the Human Two-Pore Domain Potassium Channel K2P1  
*A. N. Miller and S. B. Long*
- 436 Crystal Structure of the Human K2P TRAAK, a Lipid- and Mechano-Sensitive K<sup>+</sup> Ion Channel  
*S. G. Brohawn et al.*  
Structural features provide a basis for understanding gating and ion conduction of these channels.  
>> *Perspective p. 416*
- 450 Reversible Reduction of Oxygen to Peroxide Facilitated by Molecular Recognition  
*N. Lopez et al.*  
The highly reactive peroxide dianion (O<sub>2</sub><sup>2-</sup>) can be captured and stabilized by hydrogen bonding in a molecular box.
- 453 A Long-Lived Lunar Core Dynamo  
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- 457 The Molecular Diversity of Adaptive Convergence  
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Replicate *Escherichia coli* lines show multiple convergent adaptations via different mutations in response to high temperature.
- 461 Centrosome Loss in the Evolution of Planarians  
*J. Azimzadeh et al.*  
Analysis of centriole assembly in planaria gives insight into the evolution and function of the centrosome in animal cells.
- 464 Global Correlations in Tropical Tree Species Richness and Abundance Reject Neutrality  
*R. E. Ricklefs and S. S. Renner*  
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- 467 Heavy Livestock Grazing Promotes Locust Outbreaks by Lowering Plant Nitrogen Content  
*A. J. Cease et al.*  
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>> *Science Podcast*
- 469 Depth Perception from Image Defocus in a Jumping Spider  
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To jump exact distances to capture prey, spiders, like computers, use defocus as a major cue for depth perception.  
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Antigen distribution across activated B cells influences B-T lymphocyte interactions.  
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- 442 Unimpeded Permeation of Water Through Helium-Leak-Tight Graphene-Based Membranes  
*R. R. Nair et al.*  
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- 444 Ultrafast Viscous Permeation of Organic Solvents Through Diamond-Like Carbon Nanosheets  
*S. Karan et al.*  
Membranes made from diamond-like carbon are used to rapidly separate organic compounds.  
>> *Perspective p. 413*
- 447 An All-Silicon Passive Optical Diode  
*L. Fan et al.*  
A silicon-based device is developed that allows the asymmetric propagation of light.

## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Lithium Isotope History of Cenozoic Seawater: Changes in Silicate Weathering and Reverse Weathering

*S. Misra and P. N. Froelich*

Historical changes in the lithium isotope ratio in seawater imply episodes of tectonic uplift and carbon dioxide drawdown.

10.1126/science.1214697

### Mountains, Weathering, and Climate

*A. Paytan*

10.1126/science.1218342

### Epithelial Nitration by a Peroxidase/NOX5 System Mediates Mosquito Antiplasmodial Immunity

*G. de Almeida Oliveira et al.*

Expression of nitric oxide synthase followed by peroxidase activity makes *Plasmodium* visible to the insect's complement system.

10.1126/science.1209678

### Unique Processing During a Period of High Excitation/Inhibition Balance in Adult-Born Neurons

*A. Marin-Burgin et al.*

A specific set of functional properties can be attributed to immature granule cells developing in the hippocampus.

10.1126/science.1214956

### Evolutionarily Assembled cis-Regulatory Module at a Human Ciliopathy Locus

*J. H. Lee et al.*

Mutation in either of a pair of neighboring, coordinately expressed genes causes indistinguishable human disease.

10.1126/science.1213506

### Unraveling the Spin Polarization of the $\nu = 5/2$ Fractional Quantum Hall State

*L. Tiemann et al.*

Nuclear magnetic resonance shows that an exotic state of matter may have the properties necessary for error-free quantum computing.

10.1126/science.1216697

## TECHNICALCOMMENTS

### Comment on "Dynamics of Dpp Signaling and Proliferation Control"

*G. Schwank et al.*

Full text at [www.sciencemag.org/cgi/content/ful/335/6067/401-b](http://www.sciencemag.org/cgi/content/ful/335/6067/401-b)

### Response to Comment on "Dynamics of Dpp Signaling and Proliferation Control"

*O. Wartlick et al.*

Full text at [www.sciencemag.org/cgi/content/ful/335/6067/401-c](http://www.sciencemag.org/cgi/content/ful/335/6067/401-c)

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Embryonic Stem Cells Appear Safe, May Help Eye Disease

The first published results for a clinical trial using stem cells give this field a boost.

<http://scim.ag/Eye-Disease>

### Mapping the Psychedelic Brain

The active ingredient in magic mushrooms disrupts communication between brain regions.

<http://scim.ag/Psychedelic-Brain>

### Stem Cells Build a Better Rat Penis

A new approach could help men with injuries or deformities.

<http://scim.ag/Stem-Cells>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

24 January issue: <http://scim.ag/ss012412>

### RESEARCH ARTICLE: A Phosphorylated Pseudokinase Complex Controls Cell Wall Synthesis in Mycobacteria

*C. L. Gee et al.*

### PERSPECTIVE: A Pseudokinase Debut at the Mycobacterial Cell Wall

*D. F. Warner and V. Mizrahi*

A serine-threonine kinase targets a pseudokinase to control the synthesis of the cell wall of the bacterium that causes tuberculosis.

### RESEARCH ARTICLE: Extracellular $\text{Ca}^{2+}$ Acts as a Mediator of Communication from Neurons to Glia

*A. Torres et al.*

### PERSPECTIVE: Depletion of Extracellular $\text{Ca}^{2+}$ Prompts Astroglia to Moderate Synaptic Network Activity

*D. A. Rusakov*

Local decreases in extracellular calcium trigger signaling events in astrocytes that activate inhibitory neurotransmission.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

25 January issue: <http://scim.ag/stm012512>

### COMMENTARY: Triggers for Research Ethics Consultation

*M. Havard et al.*

Research ethics consultation services can help scientists to address ethical and societal issues that go beyond the purview of existing regulatory frameworks.

### COMMENTARY: A Virtual National Laboratory for Reengineering Clinical Translational Science

*D. M. Dilts et al.*

The CTSA Consortium has developed a national testbed that can be used for evaluating approaches aimed at reducing wasted efforts and speeding clinical trial completion.

### RESEARCH ARTICLE: Molecular Diagnosis of Infantile Mitochondrial Disease with Targeted Next-Generation Sequencing

*S. E. Calvo et al.*

Applying next-generation sequencing to 42 infants with mitochondrial disease highlights both the potential and the challenge of using this technology in clinical diagnosis.

### RESEARCH ARTICLE: Surgical Stress Resistance Induced by Single Amino Acid Deprivation Requires *Gcn2* in Mice

*W. Peng et al.*

A protein-free diet or one missing certain amino acids can protect against kidney and liver damage due to ischemia in mice.

### RESEARCH ARTICLE: Teplizumab Induces Human Gut-Tropic Regulatory Cells in Humanized Mice and Patients

*F. Waldron-Lynch et al.*

Humanized mice can be successfully used as a preclinical testing platform to identify the mechanism of action of immunotherapies in humans.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### Your Voice: Your Passport to Authority

*S. Louët*

An authoritative voice can be a definite asset in a scientific career.

<http://scim.ag/VoiceCoach>

### HHMI's International Early-Career Scientists

*E. Pain*

Three awardees discuss how HHMI support will help them pursue their careers in China, Spain, and Portugal.

[http://scim.ag/HHMI\\_International](http://scim.ag/HHMI_International)

### Experimental Error: The Top 10 Worst Things About Working in a Lab

*A. Ruben*

Lab work left you feeling dissatisfied? Our Experimental Error columnist feels your pain.

[http://scim.ag/EE\\_WorstThings](http://scim.ag/EE_WorstThings)

## SCIENCEPODCAST

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

Free Weekly Show

On the 27 January *Science* Podcast: repeatability in natural selection, livestock grazing and locust outbreaks, new frontiers in supercomputing, and more.

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