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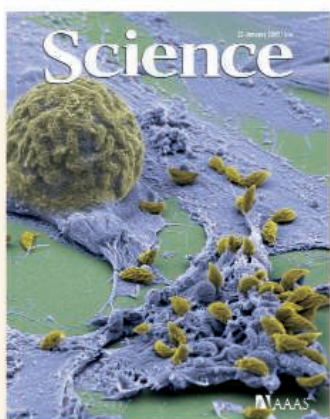


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- 474 Membrane Fusion: Grappling with SNARE and SM Proteins  
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Human cells infected with the protozoan parasite *Toxoplasma gondii* visualized by scanning electron microscopy. In the foreground are parasites (yellow-green) rupturing out of a dying host cell (blue); in the background is an intact host cell containing a large parasite-filled vacuole. See page 530.

*Image: Sasha Meshinchi, Michael Robinson, Bjorn Kaf sack, and Vern Carruthers*

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G. Etiopie and P. Ciccioli

Natural gas seepage contributes far more methane, ethane, and propane to the atmosphere than formerly realized.

## RESEARCH ARTICLE

## 479 Language Phylogenies Reveal Expansion Pulses and Pauses in Pacific Settlement

R. D. Gray et al.

Geographical distribution of Austronesian languages reveals the rate and direction of migrations from Taiwan 5200 years ago.

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## 483 An Entanglement Filter

R. Okamoto et al.

A useful tool for quantum information processing transmits entangled photons only when they have the same polarization.

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## 486 Quantum teleportation Between Distant Matter Qubits

S. Olmschenk et al.

Transporting quantum states between trapped ions one meter apart may enable local storage of information in quantum memories.

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## 489 Femtosecond XANES Study of the Light-Induced Spin Crossover Dynamics in an Iron(II) Complex

Ch. Bressler et al.

X-ray absorption spectroscopy resolves the dynamics of spin-state interconversions, which take place in less than a picosecond, in a well-studied class of iron compounds.

## 492 Complementary Active Sites Cause Size-Selective Reactivity of Aluminum Cluster Anions with Water

P. J. Roach et al.

Water dissociates at similar active sites on anionic aluminum clusters that have different sizes and electronic structure.

## 495 Brown Clouds over South Asia: Biomass or Fossil Fuel Combustion?

Ö. Gustafsson et al.

Biomass burning accounts for at least one-half of carbon-rich aerosols in the Asian atmospheric brown cloud that forms each winter.

>> *Perspective p. 470*

## 498 Genetic Interactions Between Transcription Factors Cause Natural Variation in Yeast

J. Gerke et al.

Adaptive differences in yeast sporulation arise from single-nucleotide mutations in transcription factors regulating sex.

502 Different T Cell Receptor Signals Determine CD8<sup>+</sup> Memory Versus Effector Development

E. Teixeira et al.

Point mutations in the T cell receptor decide the fate of killer T cells and the development of immunological memory.

>> *Perspective p. 466*505 Secondary Replicative Function of CD8<sup>+</sup> T Cells That Had Developed an Effector Phenotype

O. Bannard et al.

Killer T cells that developed during a primary antiviral response can become memory T cells in secondary infections.

>> *Perspective p. 466*509 Electron Cryomicroscopy of *E. coli* Reveals Filament Bundles Involved in Plasmid DNA Segregation

J. Salje et al.

The actin-like filaments that power movement of DNA during bacterial cell division form small bundles of three to five filaments near the nucleoid.

>> *Perspective p. 472*

## 512 Alternative Zippering as an On-Off Switch for SNARE-Mediated Fusion

C. G. Giraud et al.

A structural motif in the protein complexin may act as a switch during membrane fusion.

>> *Review p. 474*

## 516 Complexin Controls the Force Transfer from SNARE Complexes to Membranes in Fusion

A. Maximov et al.

The protein complexin may act as a force-transferring switch during membrane fusion.

>> *Review p. 474*

## 521 Widespread Increase of Tree Mortality Rates in the Western United States

P. J. van Mantgem et al.

Regional warming is contributing to the recent acceleration of tree deaths seen in undisturbed forests of the western U.S.

>> *News story p. 447; Science Podcast*

## 524 The Sphingolipid Transporter Spns2 Functions in Migration of Zebrafish Myocardial Precursors

A. Kawahara et al.

Normal heart development in zebrafish requires the function of a lipid transporter in a membrane surrounding the yolk, a tissue outside of the embryo proper.

## 527 The Peopling of the Pacific from a Bacterial Perspective

Y. Moodley et al.

The geographical distribution of strains of a specific human pathogen helps to define patterns of colonization out of Taiwan.

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## 530 Rapid Membrane Disruption by a Perforin-Like Protein Facilitates Parasite Exit from Host Cells

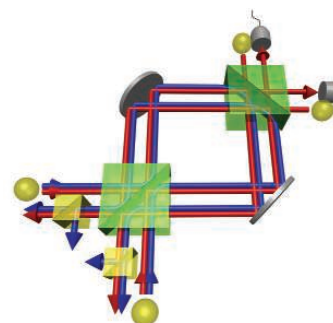
B. F. C. Kafsack et al.

The human and animal parasite that causes toxoplasmosis escapes from host cells by using a perforin-like protein to make holes in the intracellular vacuole in which it resides.

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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Coherence Factors in a High- $T_c$ Cuprate Probed by Quasi-Particle Scattering off Vortices

*T. Hanaguri et al.*

The momentum-dependent coherence factors in a high-temperature superconductor are revealed by introducing magnetic vortices.

10.1126/science.1166138

### The Formation of Warm Dense Matter: Experimental Evidence for Electronic Bond Hardening in Gold

*R. Ernstorfer et al.*

Injecting energy into a gold film can create a transient excited state with stronger bonds prior to melting.

10.1126/science.1162697

### Analysis of the *Drosophila* Segmentation Network Identifies a JNK Pathway Factor Overexpressed in Kidney Cancer

*J. Liu et al.*

A developmental marker in fruit flies also acts as a marker of renal cell cancer in humans.

10.1126/science.1157669

### Axon Regeneration Requires a Conserved MAP Kinase Pathway

*M. Hammarlund et al.*

Axon regeneration in adult nematode worms has distinct signals that are independent of earlier developmental programs.

10.1126/science.1165527

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Extinct Tiger Lives On in Close Relative

Caspian tiger is essentially the same subspecies as Siberian tiger.

### The Brain's Pied Piper

Researchers identify neural system that pruds us to conform.

### Care for a Silkworm With Your Tang?

Caterpillars may be on the menu for future space expeditions.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

### PERSPECTIVE: Protein Kinase Activation Loop Autophosphorylation in Cis—Overcoming a Catch-22 Situation

*P. A. Lochhead*

The mechanisms by which kinases activate themselves are still emerging.

### PROTOCOL: Genome to Kinome—Species-Specific Peptide Arrays for Kinome Analysis

*S. Jalal et al.*

Marrying bioinformatics and phosphorylation assays enables the empirical analysis of kinomes of multiple species.

### CONNECTIONS MAP: Neuro2A Differentiation by $G\alpha_{i/o}$ Pathway

*A. Ma'ayan et al.*

Neurite outgrowth can be stimulated by G protein-coupled receptors that signal through  $G\alpha_i$  and  $G\alpha_o$  proteins.

## GLOSSARY

Find out what IRAP, Spred, and DOPA mean in the world of cell signaling.

## SCIENCE CAREERS

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)  
Free Career Resources for Scientists

### Mind Matters: Stress, an Uninvited Lab Visitor

*I. Levine*

Work-related stress is an insidious health hazard.

### Lost in Translation

*C. Rey*

America needs more science writers of color, just as it needs more scientists of color.

### Consulting Experience for Doctoral Students in France

*E. Pain*

A program launched by the French government allows Ph.D. students to sell their skills to nonacademic clients.

## SCIENCEPODCAST

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

Download the 23 January *Science* Podcast to hear about increased tree mortality in the western U.S., human population history in the Pacific, how social networks influence health, and more.

## ORIGINSBLOG

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

A History of Beginnings

## SCIENCEINSIDER

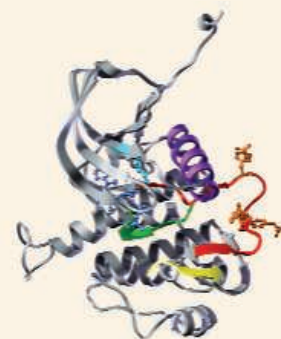
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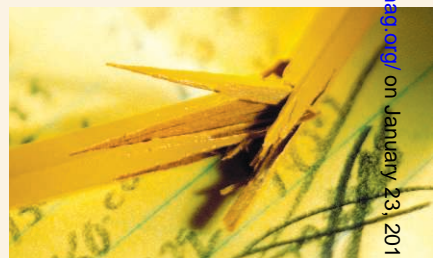
SCIENCENOW

Not gone after all.



SCIENCE SIGNALING

An active kinase.



SCIENCE CAREERS

A hazard in the lab.

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