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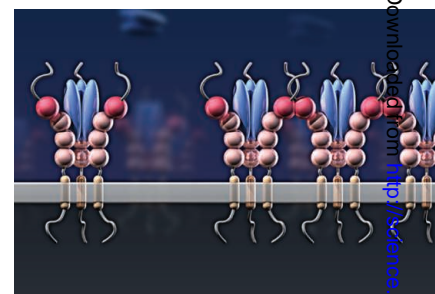
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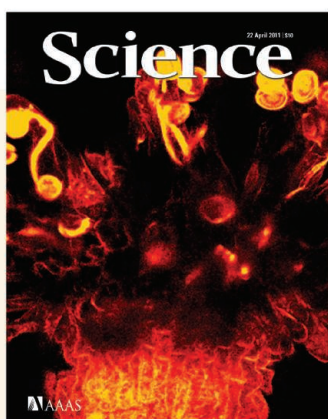


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## COVER

False-colored two-photon microscopy image showing green fluorescent protein–labeled pollen on the stigma (the top of the pistil) of *Arabidopsis thaliana*. On page 434, Michard *et al.* describe a plant signaling mechanism that directs the growth of pollen tubes, which carry sperm cells to the ovule at the base of the pistil, and that is analogous to amino acid–mediated communication commonly observed in animal nervous systems.

Image: *L. Boavida and J. A. Feijó, Instituto Gulbenkian de Ciência and Universidade de Lisboa, Portugal*

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## RESEARCH ARTICLE

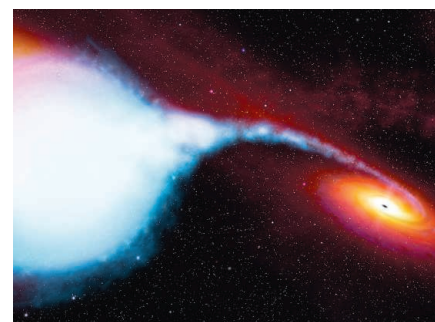
- 434 **Glutamate Receptor–Like Genes Form Ca<sup>2+</sup> Channels in Pollen Tubes and Are Regulated by Pistil *d*-Serine**  
*E. Michard et al.*  
Amino acid modulation of Ca<sup>2+</sup> signaling guides growth of plant pollen tubes.

## REPORTS

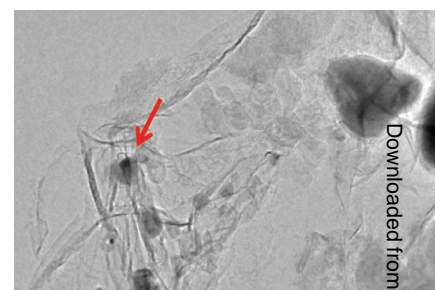
- 438 **Polarized Gamma-Ray Emission from the Galactic Black Hole Cygnus X-1**  
*P. Laurent et al.*  
This gamma-ray emission originates from a jet of relativistic particles that is formed in close proximity to the black hole.  
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- 439 **Selective, Nickel-Catalyzed Hydrogenolysis of Aryl Ethers**  
*A. G. Sergeev and J. F. Hartwig*  
A catalyst that cleaves aryl-oxygen bonds but not carbon-carbon bonds may help improve lignin processing.
- 443 **High-Performance Electrocatalysts for Oxygen Reduction Derived from Polyaniline, Iron, and Cobalt**  
*G. Wu et al.*  
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- 448 **Highly Regioselective Amination of Unactivated Alkanes by Hypervalent Sulfonylimino- $\lambda^3$ -Bromane**  
*M. Ochiai et al.*  
A highly reactive bromine-based reagent can add nitrogen to hydrocarbons without the need for metal catalysts.
- 451 **Global Trends in Wind Speed and Wave Height**  
*I. R. Young et al.*  
Wind speeds over the world's oceans have increased over the past two decades, as have wave heights.
- 455 **Latitudinal Gradients in Greenhouse Seawater  $\delta^{18}\text{O}$ : Evidence from Eocene Sirenian Tooth Enamel**  
*M. T. Clementz and J. O. Sewall*  
Tooth enamel from fossil marine mammals shows that the middle latitudes were wetter in the past than they are today.  
>> *Perspective p. 430*

- 458 **Hippo Pathway Inhibits Wnt Signaling to Restrain Cardiomyocyte Proliferation and Heart Size**  
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>> *Perspective p. 426*
- 462 **Protein Tyrosine Kinase Wee1B Is Essential for Metaphase II Exit in Mouse Oocytes**  
*J. S. Oh et al.*  
Cyclin degradation is not the only mechanism that controls the exit of mouse oocytes from meiosis.
- 465 **A Midzone-Based Ruler Adjusts Chromosome Compaction to Anaphase Spindle Length**  
*G. Neurohr et al.*  
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- 468 **DNA Synthesis Generates Terminal Duplications That Seal End-to-End Chromosome Fusions**  
*M. R. Lowden et al.*  
The fate of chromosomes that become catastrophically fused at their ends is revealed in the nematode worm.
- 472 **Mammalian Genes Are Transcribed with Widely Different Bursting Kinetics**  
*D. M. Suter et al.*  
Real-time monitoring of gene expression reveals transcription kinetics of mammalian genes.
- 475 **Real-Time Observation of Transcription Initiation and Elongation on an Endogenous Yeast Gene**  
*D. R. Larson et al.*  
In yeast, the initiation of gene expression is stochastic and is controlled by transcription factor search times.  
>> *Perspective p. 431*
- 478 **The Growth Factor Progranulin Binds to TNF Receptors and Is Therapeutic Against Inflammatory Arthritis in Mice**  
*W. Tang et al.*  
A growth factor protects against arthritis in mice by blocking tumor necrosis factor–dependent signaling.  
>> *Perspective p. 427*
- 484 **Proteoglycan-Specific Molecular Switch for RPTP $\sigma$  Clustering and Neuronal Extension**  
*C. H. Coles et al.*  
One receptor binds two different types of proteoglycan at the same site but with divergent outcomes.

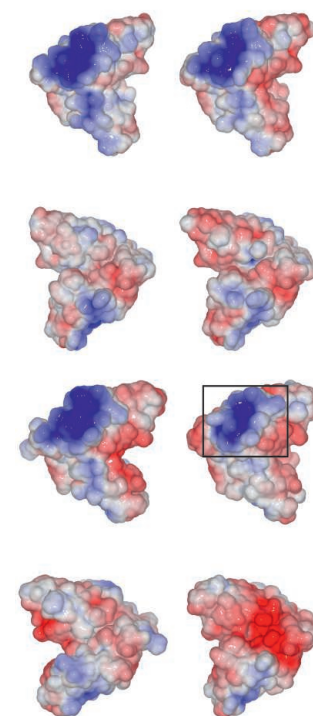
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Massive CO<sub>2</sub> Ice Deposits Sequestered in the South Polar Layered Deposits of Mars

R. J. Phillips et al.

Radar measurements reveal a substantial buried deposit of CO<sub>2</sub> in the south pole of Mars.

10.1126/science.1203091

>> [Science Podcast](#)

### Cold-Trapping Mars' Atmosphere

P. C. Thomas

10.1126/science.1205169

### Impact of Polar Ozone Depletion on Subtropical Precipitation

S. M. Kang et al.

The Antarctic ozone hole has led to increased summertime precipitation in the subtropics of the Southern Hemisphere.

10.1126/science.1202131

### Comparative Functional Genomics of the Fission Yeasts

N. Rhind et al.

A combined analysis of genome sequence, structure, and expression gives insights into fission yeast biology.

10.1126/science.1203357

### The Toll-Like Receptor 2 Pathway Establishes Colonization by a Commensal of the Human Microbiota

J. L. Round et al.

Signaling through innate immune receptors promotes commensal bacteria colonization of the gut.

10.1126/science.1206095

### Spatial Coupling of mTOR and Autophagy Augments Secretory Phenotypes

M. Narita et al.

A cellular compartment allows simultaneous protein synthesis and degradation.

10.1126/science.1205407

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Hospitals Engaging in Risky Use of Clotting Drug

Analyses find that off-label use of rFVIIa may hurt patients.

<http://scim.ag/clotting-drug>

### Mass Killings of Gazelles Marked Rise of Human Civilization

Scientists find evidence that animals were slaughtered in long stone traps.

<http://scim.ag/mass-killing>

### How Much Did the Dodo Really Weigh? Researchers engage in a battle of the bulge over the long-extinct bird.

<http://scim.ag/dodo-weight>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

19 April issue: <http://scim.ag/ss041911>

### RESEARCH ARTICLE: Inhibitory ITAM Signaling Traps Activating Receptors with the Phosphatase SHP-1 to Form Polarized "Inhibisome" Clusters

S. Pfirsch-Maisonnas et al.

### PERSPECTIVE: How ITAMs Inhibit Signaling

L. B. Ivashkiv

Receptors with activating motifs are captured in inhibitory intracellular compartments and thereby prevented from signaling.

### RESEARCH ARTICLE: ERKs Induce Expression of the Transcriptional Repressor Blimp-1 and Subsequent Plasma Cell Differentiation

T. Yasuda et al.

### PERSPECTIVE: pERKING Up the BLIMP in Plasma Cell Differentiation

D. M. Allman and M. P. Cancro

The differentiation of B cells into antibody-producing plasma cells requires extracellular signal-regulated kinases.

### NETWATCH: PTMScout

Analyze mass spectrometry data and compare your results to published data sets; in Protein Databases.

### NETWATCH: The Virtual Cell

Build models and run simulations of cell biological processes; in Modeling Tools.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### Experimental Error: Forging a Head

A. Ruben

Scientific hoaxes can be fun (when they are harmless) while also serving a serious function: exposing failures of scientists' most important tool, their skepticism.

<http://scim.ag/forgingahead>

### Finding a Niche in Food and Health Research

R. Berkowitz

Three researchers on food and health describe how they developed careers in the field.

<http://scim.ag/foodandhealthcareers>

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

20 April issue: <http://scim.ag/stm042011>

### EDITORIAL: Gene Therapy for Parkinson's Disease Shows Promise

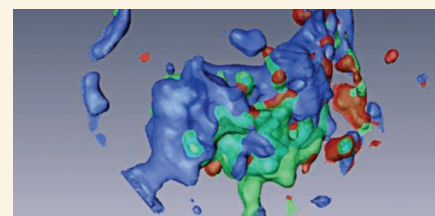
A. Björklund and T. Björklund

A gene therapy trial for Parkinson's disease met its primary endpoint, but challenges remain.

### PERSPECTIVE: HIV-1 Vaccines and Adaptive Trial Designs

L. Corey et al.

Development of an HIV vaccine could be accelerated by testing candidate vaccines using adaptive clinical trial designs.



## SCIENCE SIGNALING

Sequestered in an inhibisome.

### PERSPECTIVE: Biomarkers for Parkinson's Disease

T. B. Sherer

Identifying much-needed biomarkers for detecting early Parkinson's disease will accelerate drug development.

### REPORT: Electronic Medical Records for Genetic Research—Results of the eMERGE Consortium

A. N. Kho et al.

Clinical data captured in electronic medical records accurately identify cases and controls for genome-wide association studies.

### RESEARCH ARTICLE: The Fate and Toxicity of Raman-Active Silica-Gold Nanoparticles in Mice

A. S. Thakor et al.

Gold-core nanoparticles designed for imaging by Raman spectroscopy in patients are generally nontoxic in mice.

## SCIENCE PODCAST

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

Free Weekly Show

On the 22 April *Science* Podcast: large deposits of frozen CO<sub>2</sub> on Mars, cheaper high-performance fuel cell catalysts, cleaning up the Ganges River, and more.

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

Science Policy News and Analysis

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