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## COVER

An *Arabidopsis thaliana* seedling with downy mildew disease, caused by the oomycete pathogen *Hyaloperonospora arabidopsidis*. Four Reports beginning on page 1540 present comparative genomic analyses of several plant pathogens that shed light on their biology, including their virulence, dependence upon their host, and host specificity. Included are pathogens responsible for economically devastating diseases in crop plants. Also see the related Perspective on page 1486.

Photo: Ryan Anderson and John McDowell, Virginia Polytechnic Institute and State University

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*H. M. Pereira et al.*  
>> *Research Article p. 1503*

## BREVIA

- 1502 Slow Earthquakes Linked Along Dip in the Nankai Subduction Zone  
*H. Hirose et al.*  
Three types of temporally linked slow earthquakes may limit nearby buildup of stress.

## RESEARCH ARTICLE

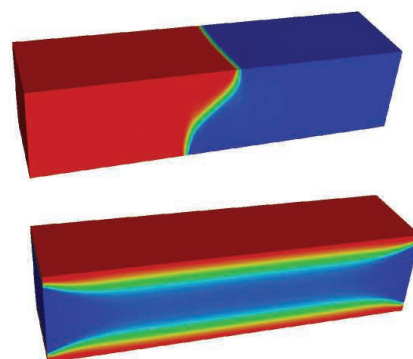
- 1503 The Impact of Conservation on the Status of the World's Vertebrates  
*M. Hoffmann et al.*  
Though the threat of extinction is increasing, overall declines would have been worse in the absence of conservation.  
>> *Review p. 1496*

## REPORTS

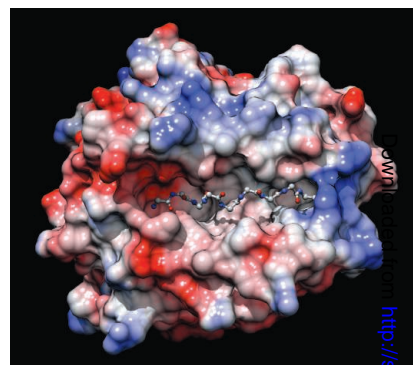
- 1510 Toroidal Dipolar Response in a Metamaterial  
*T. Kaelberer et al.*  
A material that embeds metal wire loops in a dielectric has properties consistent with an exotic electromagnetic excitation.
- 1512 Evidence of Supersolidity in Rotating Solid Helium  
*H. Choi et al.*  
Measurements on rotating frozen helium support the formation of a quantum, or supersolid, phase.
- 1515 In Situ Observation of the Electrochemical Lithiation of a Single SnO<sub>2</sub> Nanowire Electrode  
*J. Y. Huang et al.*  
Transmission electron microscopy reveals dimensional changes in a tin oxide nanowire as it intercalates lithium.  
>> *Perspective p. 1485*
- 1520 Optomechanically Induced Transparency  
*S. Weis et al.*  
Radiation pressure is used to manipulate the optical properties of an optomechanical system.
- 1523 A Determination of the Cloud Feedback from Climate Variations over the Past Decade  
*A. E. Dessler*  
The climate-cloud feedback is positive, supporting current ideas about how atmospheric carbon dioxide affects global temperature.  
>> *News story p. 1465; Science Podcast*

- 1527 Stochastic Late Accretion to Earth, the Moon, and Mars  
*W. F. Bottke et al.*  
Random impacts led to the late delivery of highly siderophile elements (noble metals) during the growth of these bodies.
- 1530 Thought for Food: Imagined Consumption Reduces Actual Consumption  
*C. K. Morewedge et al.*  
Imagining eating a food caused subsequent actual consumption of that food to decline.  
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- 1533 Sex Determination in the Social Amoeba *Dictyostelium discoideum*  
*G. Bloomfield et al.*  
The three mating types of a model eukaryote are regulated by two small soluble proteins.  
>> *Perspective p. 1487*
- 1536 Nebulin and N-WASP Cooperate to Cause IGF-1-Induced Sarcomeric Actin Filament Formation  
*K. Takano et al.*  
An alternative signaling mechanism for nucleating unbranched actin filaments is required for skeletal muscle maturation.  
>> *Perspective p. 1491*
- 1540 Genome Evolution Following Host Jumps in the Irish Potato Famine Pathogen Lineage  
*S. Raffaele et al.*
- 1543 Genome Expansion and Gene Loss in Powdery Mildew Fungi Reveal Tradeoffs in Extreme Parasitism  
*P. D. Spanu et al.*
- 1546 Pathogenicity Determinants in Smut Fungi Revealed by Genome Comparison  
*J. Schirawski et al.*
- 1549 Signatures of Adaptation to Obligate Biotrophy in the *Hyaloperonospora arabidopsidis* Genome  
*L. Baxter et al.*  
A group of papers analyzes pathogen genomes to find the roots of virulence, opportunism, and life-style determinants.  
>> *Perspective p. 1486*
- 1551 The Major Genetic Determinants of HIV-1 Control Affect HLA Class I Peptide Presentation  
*The International HIV Controllers Study*  
MHC class I alleles are the major genetic determinants associated with people able to control HIV infection without therapy.  
>> *Perspective p. 1488*

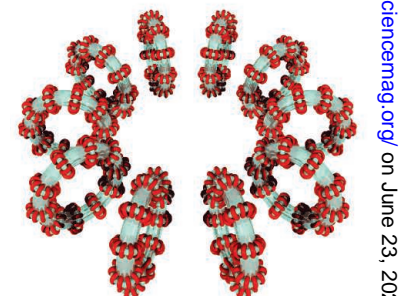
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Direct Conversion of *C. elegans* Germ Cells into Specific Neuron Types

*B. Tursun et al.*

Removal of a chromatin factor allows transcription factors to reprogram germ cells into neurons.

10.1126/science.1199082

### Rotational Movement of the Formin mDia1 Along the Double Helical Strand of an Actin Filament

*H. Mizuno et al.*

Visualization of formin protein rotating along an actin filament gives insight into how it promotes actin assembly.

10.1126/science.1197692

### Decreased Clearance of CNS $\beta$ -Amyloid in Alzheimer's Disease

*K. G. Mawuenyega et al.*

Alzheimer's disease is associated with reduced  $\beta$ -amyloid clearance from the brain.

10.1126/science.1197623

### Universal Quantum Viscosity in a Unitary Fermi Gas

*C. Cao et al.*

Viscosity studies of an ultracold gas of  $^6\text{Li}$  atoms in two temperature regimes enable comparison with a string theory limit.

10.1126/science.1195219

### Tunable Field-Control over the Binding Energy of Single Dopants by a Charged Vacancy in GaAs

*D. H. Lee and J. A. Gupta*

The electrostatic field of manganese atoms in gallium arsenide depends on its distance from a nearby arsenic vacancy site.

10.1126/science.1197434

## SCIENCE NOW

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

Highlights From Our Daily News Coverage

### How Swine Flu Killed the Healthy

New research suggests that patients' own immune systems could have turned against them.

### Killer Whales Mimic Friends and Foes

Orcas that do not share the same dialect can still copy one another's calls.

### Did Climate Change Drive Prehistoric Culture Change?

Early Americans may have dramatically altered their life-styles in response to new weather patterns.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

### EDITORIAL GUIDE: Focus Issue—Metabolic Signals

*W. Wong*

Complementing the 3 December *Science* special issue, this issue highlights signaling pathways with roles in metabolism.

### RESEARCH ARTICLE: A Kinase-Independent Role for Unoccupied Insulin and IGF-1 Receptors in the Control of Apoptosis

*J. Boucher et al.*

### PERSPECTIVE: Dependence Receptors—The Trophic Theory Revisited

*P. Mehlen*

Cells lacking both insulin and IGF-1 receptors are resistant to apoptosis.

### RESEARCH ARTICLE: Regulation of the 26S Proteasome Complex During Oxidative Stress

*X. Wang et al.*

## PODCAST

*L. Huang and A. M. VanHook*

Oxidative stress triggers release of the core catalytic subunit of the yeast 26S proteasome, enabling degradation of toxic oxidized proteins.

### PERSPECTIVE: Lipid Signaling and Homeostasis—PA Is Better than PA-H, But What About Those PIPs?

*N. T. Ktistakis*

Phosphatidic acid links changes in pH triggered by glucose metabolism to phospholipid biogenesis in yeast.

### RESEARCH RESOURCE: ATM-Dependent and -Independent Dynamics of the Nuclear Phosphoproteome After DNA Damage

*A. Bensimon et al.*

Quantitative phosphoproteomics suggests kinases other than ATM participate in the initial phase of the cellular response to DNA double-strand breaks.

### PROTOCOL: Planar Patch Clamp Approach to Characterize Ionic Currents from Intact Lysosomes

*M. Schieder et al.*

Glass chips and gentle isolation are the keys to recording channels from intracellular organelles.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### Serving a Nation's Health

*V. Raper*

Scientists working in and around the United Kingdom's National Health Service can make a direct impact on public health.

### Joining NSF's Culture of Communication

*R. Hoover*

A rhetorician reports the results of his research on communicating with the National Science Foundation.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

### EDITORIAL: Summun Bonum

*C. Ash*

Scientists and policy-makers must achieve a public consensus about the value of vaccination to individuals and society.

### REVIEW: Lost in Translation—Neuropsychiatric Drug Development

*R. E. Becker and N. H. Greig*

The sluggish pace of new drug development for neuropsychiatric diseases can be partly attributed to faulty clinical trial design.

### RESEARCH ARTICLE: Gene from a Psoriasis Susceptibility Locus Primes the Skin for Inflammation

*R. Wolf et al.*

Psoriasis candidate genes promote susceptibility to skin inflammation and provide new therapeutic targets.

### RESEARCH ARTICLE: Maternal Plasma DNA Sequencing Reveals the Genome-Wide Genetic and Mutational Profile of the Fetus

*Y. M. D. Lo et al.*

Sequencing plasma DNA from a pregnant woman permits prenatal genome-wide scanning for mutations in fetal DNA.

### MEETING REPORT: A Crisis of Public Confidence in Vaccines

*S. Black and R. Rappuoli*

This meeting report summarizes the outcome of a meeting held in July 2010 in Siena, Italy.

## SCIENCE PODCAST

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

Free Weekly Show

Download the 10 December *Science* Podcast to hear about the cloud-climate feedback, how thinking about food reduces consumption, using DNA to fight fishing fraud, and more.

## SCIENCE INSIDER

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Science Policy News and Analysis

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