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## COVER

An adult *Caenorhabditis elegans* nematode, ~1 millimeter long, pictured along with eggs and young worms. *C. elegans* is the first multicellular organism to have its genome fully sequenced, followed by the fruit fly *Drosophila melanogaster*. High-resolution genomic analyses presented on pages 1775 and 1787 provide new insights into the organization, structure, and function of the genomes of these organisms. See the related Editorial on page 1724 and Perspective on page 1758.

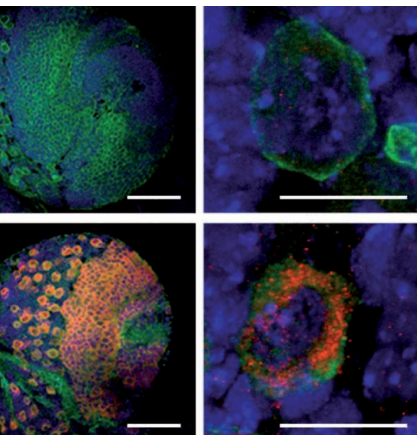
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## REVIEW

- 1768** Has the Microbiota Played a Critical Role in the Evolution of the Adaptive Immune System?  
*Y. K. Lee and S. K. Mazmanian*

## BREVIA

- 1774** 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.

## RESEARCH ARTICLES

- 1775** Integrative Analysis of the *Caenorhabditis elegans* Genome by the modENCODE Project  
*M. B. Gerstein et al.*  
Extensive analysis of the *Caenorhabditis elegans* genome reveals regions highly occupied by multiple transcription factors.
- 1787** Identification of Functional Elements and Regulatory Circuits by *Drosophila* modENCODE  
*The modENCODE Consortium et al.*  
The *Drosophila* modENCODE project demonstrates the functional regulatory network of flies.  
>> *Editorial p. 1724; Perspective p. 1758*

## REPORTS

- 1797** High-Flux Solar-Driven Thermochemical Dissociation of CO<sub>2</sub> and H<sub>2</sub>O Using Nonstoichiometric Ceria  
*W. C. Chueh et al.*  
Solar heating of ceric oxide enables a cycle for conversion of carbon dioxide to carbon monoxide or water to hydrogen.
- 1801** Spin Hall Effect Transistor  
*J. Wunderlich et al.*  
Manipulation of the spin degree of freedom of electrons is used to build a spin transistor without magnetic materials.
- 1804** Brownian Motion of Stiff Filaments in a Crowded Environment  
*N. Fakhri et al.*  
The thermal motion of single-walled carbon nanotubes is used to track the dynamic motion of stiff macromolecules.
- 1807** 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.
- 1810** Dynamics of Magnetic Domain Walls Under Their Own Inertia  
*L. Thomas et al.*  
The current-induced motion of magnetic domain walls is controlled by the length of the current pulse.
- 1813** Cassini Finds an Oxygen–Carbon Dioxide Atmosphere at Saturn's Icy Moon Rhea  
*B. D. Teolis et al.*  
Rhea's atmosphere is maintained by chemical decomposition of surface water ice under irradiation from Saturn's magnetosphere.  
>> *Perspective p. 1755*
- 1816** Structures of C3b in Complex with Factors B and D Give Insight into Complement Convertase Formation  
*F. Forneris et al.*  
A double-safety-catch mechanism controls amplification of the complement cascade during immune responses.
- 1820** Hsp90 and Environmental Stress Transform the Adaptive Value of Natural Genetic Variation  
*D. F. Jarosz and S. Lindquist*  
A molecular chaperone both buffers and potentiates the adaptive nature of genetic variation in yeast.
- 1824** Ectopic Expression of Germline Genes Drives Malignant Brain Tumor Growth in *Drosophila*  
*A. Janic et al.*  
Inactivation of germline genes suppresses brain tumor growth in *Drosophila*.  
>> *Perspective p. 1761*
- 1827** A Pollen Factor Linking Inter- and Intraspecific Pollen Rejection in Tomato  
*W. Li and R. T. Chetelat*  
The inability to cross with distant relatives in the nightshade family is linked to mechanisms preventing self-pollination.
- 1830** The Social Sense: Susceptibility to Others' Beliefs in Human Infants and Adults  
*A. M. Kovács et al.*  
Knowledge of what others believe is present in 7-month-old infants.
- 1834** Siah Regulation of Pard3A Controls Neuronal Cell Adhesion During Germinal Zone Exit  
*J. K. Famulski et al.*  
A ubiquitination cascade regulates formation of cell adhesions that immature neurons require in the developing mouse brain.  
>> *Perspective p. 1754*

## SCIENCEONLINE

## SCIENCEEXPRESS

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

**Crystal Structure of the Eukaryotic 40S Ribosomal Subunit in Complex with Initiation Factor 1**  
*J. Rabl et al.*

The structure provides insight into how protein synthesis is initiated and into the evolution of the eukaryotic ribosome.

10.1126/science.1198308

**Phosphorylation of ULK1 (hATG1) by AMP-Activated Protein Kinase Connects Energy Sensing to Mitophagy**

*D. F. Egan et al.*

A protein kinase links energy stores to control of autophagy.

10.1126/science.1196371

**Induction of Colonic Regulatory T Cells by Indigenous *Clostridium* Species**

*K. Atarashi et al.*

Bacteria of the genus *Clostridium* promote the induction of suppressor T cells in the colons of mice.

10.1126/science.1198469

**LysM-Type Mycorrhizal Receptor Recruited for Rhizobium Symbiosis in Nonlegume *Parasponia***  
*R. Op den Camp et al.*

*Parasponia* uses a mycorrhizal signaling receptor essential for arbuscle formation to control rhizobium nodule symbiosis.

10.1126/science.1198181

**Intramembrane Cleavage of AMA1 Triggers *Toxoplasma* to Switch from an Invasive to a Replicative Mode**

*J. M. Santos et al.*

Membrane proteins govern a change from invasion to replication of an intracellular parasite.

10.1126/science.1199284

## SCIENCENOW

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

Highlights From Our Daily News Coverage

**What Makes Glaciers Shake?**

Geologists probe the cause of icequakes.

**Fearless Woman Lacks Key Part of Brain**

Study suggests that the amygdala plays a crucial role in fear, but not other emotions.

**A Dog's Growl Announces Its Size**

Canines know how big their foes are just by listening to them.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

**RESEARCH ARTICLE: The Mammalian MAPK/ERK Pathway Exhibits Properties of a Negative Feedback Amplifier**  
*O. E. Sturm et al.*

Analysis of ERK pathway circuitry suggests appropriate targets for inhibition, providing a guide for drug development.

**RESEARCH ARTICLE: Cyclic GMP and Protein Kinase G Control a Src-Containing Mechanosome in Osteoblasts**

*H. Rangaswami et al.*

**PERSPECTIVE: Mechanosomes Carry a Loaded Message**

*J. P. Bidwell and F. M. Pavalko*

Drugs that activate protein kinase G could mimic the bone-building effects of mechanical stimulation.

**RESEARCH RESOURCE: Phosphoproteomic Analysis Reveals Interconnected System-Wide Responses to Perturbations of Kinases and Phosphatases in Yeast**

*B. Bodenmiller et al.*

**PODCAST**

*B. Bodenmiller et al.*

Targeted removal of individual enzymes elicits changes throughout the entire network of kinases and phosphatases in yeast.

**PERSPECTIVE: T Cell Receptor Signaling Kinetics Takes the Stage**

*Y. Sykulev*

The kinetics of TCR signaling influence the quality of the T cell response.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

**The Best of Science Careers, 2010**

*Science Careers Staff*

It was a difficult year for careers in science, but another good year for Science Careers.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

**EDITORIAL: 2010: Awards Show What Translation Can Accomplish**

*S. Desmond-Hellmann*

Four of the most coveted awards in science celebrate truly translational research.

**COMMENTARY: Advancing Translational Research Collaborations**

*L. M. Portilla et al.*

Barriers to collaboration among academia, government, and industry must be identified and overcome to maximize the clinical return on the investment in science.

**MEETING REPORT: Training the Translational Scientist**

*R. D. Jackson et al.*

**MEETING REPORT: Collaborations Among Academia, Government, and Industry in the Diagnostics Space: Barriers and Some Ideas for Solutions**

*G. Evans and F. Austin*

**MEETING REPORT: Development of the First Inhaled Antibiotic for the Treatment of Cystic Fibrosis**

*L. M. Rose and R. Neale*

**MEETING REPORT: Working with the CTSA Consortium: What We Bring to the Table**  
*S. J. Steele*

**MEETING REPORT: Academic/Industry Challenges for Medical Device Development**

*J. H. Linehan and A. Chaney*

These five meeting reports from an NIH forum held in 2010 on promoting collaborations among stakeholders in translational medicine discuss impediments to such partnerships and ways to overcome them.

**RESEARCH ARTICLE: Calreticulin Is the Dominant Pro-Phagocytic Signal on Multiple Human Cancers and Is Counterbalanced by CD47**

*M. P. Chao et al.*

Calreticulin-induced phagocytosis of cancer cells can be counterbalanced by CD47 expression.

**REPORT: Short-Term Monotherapy in HIV-Infected Patients with a Virus Entry Inhibitor Against the gp41 Fusion Peptide**

*W.-G. Forssmann et al.*

A natural HIV-1 entry inhibitor targeting the gp41 fusion peptide shows antiviral potency in a Phase I/II clinical trial.

## SCIENCEPODCAST

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