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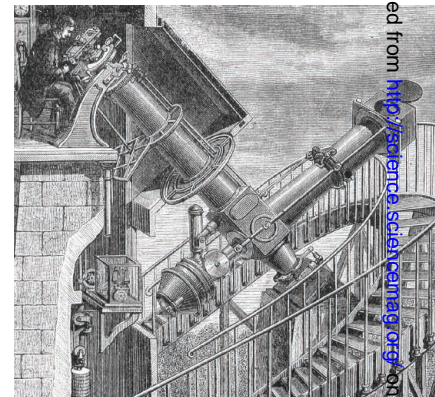
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- 1161 Heavy Fermions and Quantum Phase Transitions  
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False-colored scanning electron micrograph showing the shedding of superficial cells in the urogenital tract of a female mouse (magnification ~3000×). Exfoliation of epithelial cells inhibits microbial colonization of the mucosa. On page 1197, Muenzner *et al.* report how specialized pathogens suppress this host defense to successfully establish a firm foothold in their host.

*Image: Jochen Hentschel and Christof R. Hauck/Lehrstuhl Zellbiologie, Universität Konstanz, Germany*

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- 1167** Chlorine Isotope Fractionation in the Stratosphere  
*J. C. Laube et al.*  
Isotope fractionation in a common refrigerant may provide insights into the mechanism of stratospheric ozone depletion.

## RESEARCH ARTICLES

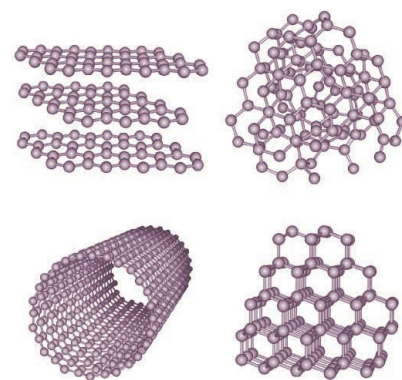
- 1168** Effectiveness and Safety of Tenofovir Gel, an Antiretroviral Microbicide, for the Prevention of HIV Infection in Women  
*Q. Abdool Karim et al.*  
Tenofovir in a vaginal gel formulation shows significant protection against HIV infection in a randomized control trial.
- 1175** Spiroindolones, a Potent Compound Class for the Treatment of Malaria  
*M. Rottmann et al.*  
High-throughput screening has offered up an oral antimalarial drug and pointers to its mechanism of action.  
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## REPORTS

- 1180** Detection of C<sub>60</sub> and C<sub>70</sub> in a Young Planetary Nebula  
*J. Cami*  
Hydrogen-poor conditions allow fullerenes to form in space.  
>> *Perspective p. 1159*
- 1182** Real-Time Dynamics of Single Vortex Lines and Vortex Dipoles in a Bose-Einstein Condensate  
*D. V. Freilich et al.*  
The temporal evolution of vortices in a superfluid is revealed by imaging an ultracold atomic cloud undergoing free fall.
- 1185** Plastic Accumulation in the North Atlantic Subtropical Gyre  
*K. L. Law et al.*  
The amount of plastic debris in the surface waters of the western North Atlantic Ocean has plateaued over the past 22 years.
- 1188** Graphene Visualizes the First Water Adlayers on Mica at Ambient Conditions  
*K. Xu et al.*  
Water trapped between mica and graphene layers at ambient conditions was imaged with atomic force microscopy.  
>> *Perspective p. 1157*

- 1191** The Shifting Balance of Diversity Among Major Marine Animal Groups  
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- 1194** The Spread of Behavior in an Online Social Network Experiment  
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An online experiment shows how network structure affects the spread of health behavior.  
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- 1197** Human-Restricted Bacterial Pathogens Block Shedding of Epithelial Cells by Stimulating Integrin Activation  
*P. Muenzner et al.*  
Bacterial colonization of the mucosa is facilitated if the microbes engage a human receptor that counteracts epithelial exfoliation.
- 1201** Signaling Kinase AMPK Activates Stress-Promoted Transcription via Histone H2B Phosphorylation  
*D. Bungard et al.*  
The energy sensor AMPK facilitates gene transcription by localizing to chromatin and phosphorylating histone H2B.  
>> *Perspective p. 1158*
- 1205** The Junctional Adhesion Molecule JAML Is a Costimulatory Receptor for Epithelial  $\gamma\delta$  T Cell Activation  
*D. A. Witherden et al.*  
A costimulatory receptor for immune cells in the skin is identified.
- 1210** The Molecular Interaction of CAR and JAML Recruits the Central Cell Signal Transducer PI3K  
*P. Verdino et al.*  
Ligand engagement and initiation of signaling has been imaged for a costimulatory receptor for immune cells in the skin.  
>> *Perspective p. 1154*
- 1215** Glutamine Deamidation and Dysfunction of Ubiquitin/NEDD8 Induced by a Bacterial Effector Family  
*J. Cui et al.*  
Pathogenic bacterial proteins interfere with eukaryotic ubiquitination pathways to induce cytopathic effects.

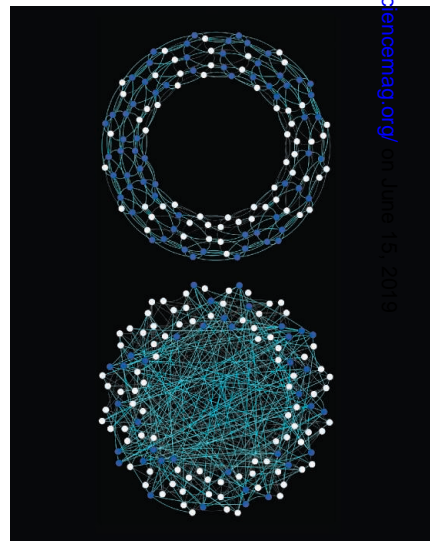
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

**Piezo1 and Piezo2 Are Essential Components of Distinct Mechanically Activated Cation Channels**

*B. Coste et al.*

Cation channel genes encode for a transducer molecule that converts mechanical stimuli into cell signaling.

10.1126/science.1193270

**A Critical Role for LTA<sub>4</sub>H in Limiting Chronic Pulmonary Neutrophilic Inflammation**

*R. J. Snelgrove et al.*

Cigarette smoke promotes lung inflammation by hindering an enzyme that degrades an immune cell chemoattractant.

10.1126/science.1190594

**The Genetic and Molecular Basis for Sunscreen Biosynthesis in Cyanobacteria**

*E. P. Balskus and C. T. Walsh*

A gene cluster encodes a four-enzyme pathway that uses an unusual mechanism to synthesize small-molecule sunscreens.

10.1126/science.1193637

**Observing Supernova 1987A with the Refurbished Hubble Space Telescope**

*K. France et al.*

Images of the remnants of a stellar explosion reveal details of fast astrophysical shock waves.

10.1126/science.1192134

**A New Mixing Diagnostic and Gulf Oil Spill Movement**

*I. Mezić et al.*

An ocean model can account for the trajectory and fragmentation of the recent Gulf of Mexico oil spill.

10.1126/science.1194607

## SCIENCE NOW

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

Highlights From Our Daily News Coverage

**Quantum Physicists Dream Up Smallest Possible Refrigerator**

One or two quantum particles are enough to approach absolute zero.

**The First Feast?**

Researchers find evidence for the earliest symbolic meal 12,000 years ago in Israel.

**'Hunting for Conservation' Backfires**

Overeager trophy hunters may be the biggest threat to African lions.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

**EDITORIAL GUIDE: Focus Issue—Systems Analysis of Protein Phosphorylation**

*N. R. Gough and J. F. Foley*

Kinases and phosphatases are stars in the signaling universe.

**RESEARCH RESOURCE: Comprehensive Expression Profiles of Genes for Protein Tyrosine Phosphatases in Immune Cells**

*Y. Arimura and J. Yagi*

Gene expression analysis suggests that protein tyrosine phosphatases exhibit immune cell-specific expression profiles.

**RESEARCH RESOURCE: Collection and Motif-Based Prediction of Phosphorylation Sites in Human Viruses**

*D. Schwartz and G. M. Church*

A database of known phosphorylation sites on viral proteins also enables the prediction of other potential sites.

**PROTOCOL: Targeting the Reversibly Oxidized Protein Tyrosine Phosphatase Superfamily**

*B. Boivin et al.*

Mildly acidic pH and degassed buffers are the keys to successfully identifying redox-sensitive tyrosine phosphatases.

**NETWATCH: Viral Post-Translational Modification Database (virPTM)**

Browse a collection of demonstrated and predicted phosphorylation sites in proteins of viruses that infect humans; in Protein Databases.

**NETWATCH: PHOSIDA Posttranslational Modification Database**

Browse and search a database of phosphorylation, acetylation, and N-glycosylation sites determined by mass spectrometry; in Protein Databases.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

**Taken for Granted: The New California Postdoc Contract**

*B. Benderly*

After lengthy talks and some strategic arm-twisting, the University of California comes to terms with its postdoc union.

**In Person: How Our Adventures Led to Careers in Science**

*K. Jardine and A. Jardine*

Science and outdoor activities form a positive feedback loop for scientists Kolby and Angela Jardine.

**Science Careers Blog**

*Science Careers Staff*

Find advice, opinions, news, funding opportunities, and links to other career-related resources.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

**PERSPECTIVE: Molecular Profiling—Moving Away from Tumor Philately**

*J. S. Reis-Filho et al.*

Cutting-edge technologies that deliver diverse molecular data may dramatically alter breast cancer characterization and treatment.

**PERSPECTIVE: Translational Medicine and the Value of Biomarker Qualification**

*F. M. Goodsaid and D. L. Mendrick*

The U.S. Food and Drug Administration's new process for biomarker qualification developed from a need for better biomarkers of renal injury.

**RESEARCH ARTICLE: Platelet CD154 Potentiates Interferon- $\alpha$  Secretion by Plasmacytoid Dendritic Cells in Systemic Lupus Erythematosus**

*P. Duffau et al.*

In the autoimmune disease lupus, platelets activated by self-antigens contribute to pathology by triggering the secretion of interferon from immune cells.

**RESEARCH ARTICLE: Overlap and Effective Size of the Human CD8<sup>+</sup> T Cell Receptor Repertoire**

*H. S. Robins et al.*

The adaptive immune system is far less diverse, and the interpersonal overlap of T-cell receptor repertoires is thousands of times larger, than expected.

## SCIENCE PODCAST

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Download the 3 September *Science* Podcast to hear about how social network structure affects the spread of behavior, challenging the mammoth-killer impact hypothesis, your letters to *Science*, and more.

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