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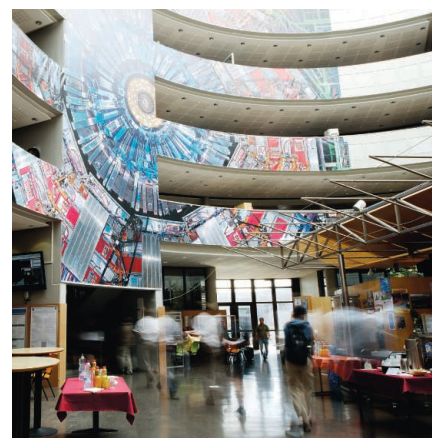
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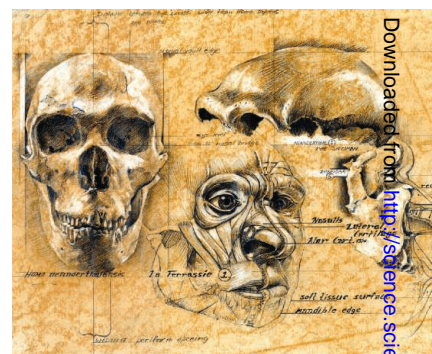
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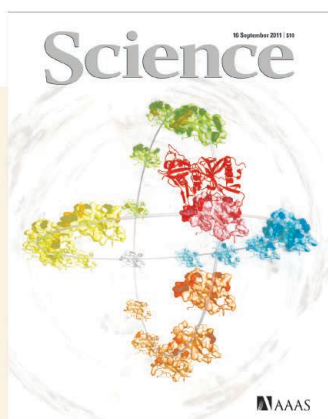
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## COVER

Maturation of human antibodies from germline recombinant (gray ribbon structure), along four lineages (orange, yellow, green, and blue), into potent neutralizers of HIV-1. A mature antibody variable domain is shown binding its target, HIV-1 envelope glycoprotein gp120 (red ribbon structure). Deep sequencing and structural bioinformatics of the antibody repertoires of HIV-infected individuals uncover the genetic record for the development of broadly neutralizing HIV-1 immunity. See page 1593.

*Image: Jonathan Stuckey/Vaccine Research Center, National Institute of Allergy and Infectious Diseases/NIH*

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- 1592 **Compatibility with Killer Explains the Rise of RNAi-Deficient Fungi**  
*I. A. Drinnenberg et al.*  
Yeast can compensate for the loss of RNA interference by becoming killer yeast through the acquisition of a killer virus.

## RESEARCH ARTICLES

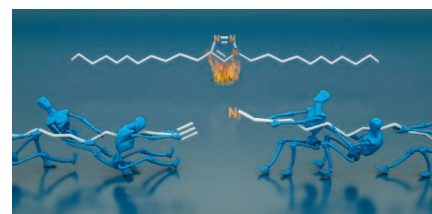
- 1593 **Focused Evolution of HIV-1 Neutralizing Antibodies Revealed by Structures and Deep Sequencing**  
*X. Wu et al.*  
Broadly neutralizing antibodies to HIV with similar specificities can be found in multiple HIV-infected individuals.  
>> *Perspective p. 1589; Report p. 1633*
- 1602 **Kepler-16: A Transiting Circumbinary Planet**  
*L. R. Doyle et al.*  
An exoplanet has been observed, comparable in size and mass to Saturn, that orbits a pair of stars.  
>> *Science Podcast*

## REPORTS

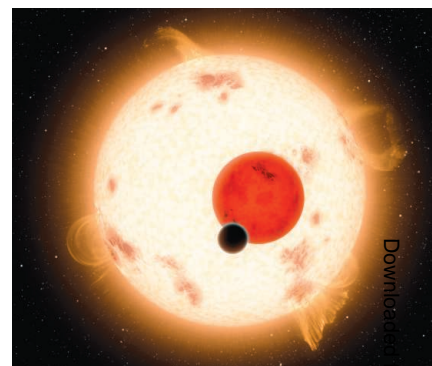
- 1606 **Unclicking the Click: Mechanically Facilitated 1,3-Dipolar Cycloreversions**  
*J. N. Brantley et al.*  
Application of ultrasound can cleanly reverse a widely used chemical coupling reaction.  
>> *Perspective p. 1582*
- 1609 **Primary Alcohols from Terminal Olefins: Formal Anti-Markovnikov Hydration via Triple Relay Catalysis**  
*G. Dong et al.*  
Three catalysts create alcohols by guiding water to attack carbon-carbon bonds in the opposite sense than it normally would.
- 1613 **Selective Catalytic C–H Alkylation of Alkenes with Alcohols**  
*D.-H. Lee et al.*  
A ruthenium catalyst forms carbon-carbon bonds between olefins and alcohols while liberating only water as a by-product.
- 1616 **Soil Nitrite as a Source of Atmospheric HONO and OH Radicals**  
*H. Su et al.*  
Biogenic nitrite in soils is an important source of atmospheric HONO and OH.  
>> *Perspective p. 1586*

- 1619 **A Diverse Assemblage of Late Cretaceous Dinosaur and Bird Feathers from Canadian Amber**  
*R. C. McKellar et al.*  
Late Cretaceous amber entombs both dinosaur protofeathers and avian feathers of modern aspect.
- 1622 **Trace Metals as Biomarkers for Eumelanin Pigment in the Fossil Record**  
*R. A. Wogelius et al.*  
X-ray maps of fossil feather pigments reveal color patterning in extinct bird species.  
>> *Perspective p. 1590*
- 1627 **Faking Giants: The Evolution of High Prey Clearance Rates in Jellyfishes**  
*J. L. Acuña et al.*  
Jellyfish process prey at the same rates as fish, suggesting that a shift to jellyfish-dominated systems is possible.
- 1630 **Pyrazinamide Inhibits Trans-Translation in *Mycobacterium tuberculosis***  
*W. Shi et al.*  
The target of a first-line tuberculosis drug that acts against persister bacteria is identified.  
>> *Perspective p. 1583*
- 1633 **Sequence and Structural Convergence of Broad and Potent HIV Antibodies That Mimic CD4 Binding**  
*J. F. Scheid et al.*  
Anti-HIV broadly neutralizing antibodies with similar specificities and modes of binding were found in multiple HIV-infected individuals.  
>> *Perspective p. 1589; Research Article p. 1593*
- 1637 **Yeast Rrn7 and Human TAF1B Are TFIIB-Related RNA Polymerase I General Transcription Factors**  
*B. A. Knutson and S. Hahn*
- 1640 **TAF1B Is a TFIIB-Like Component of the Basal Transcription Machinery for RNA Polymerase I**  
*S. Naidu et al.*  
RNA polymerase I uses a transcription factor IIB-related protein for transcription, similar to the known requirement for polymerase II and III.
- 1642 **Role for the Membrane Receptor Guanylyl Cyclase-C in Attention Deficiency and Hyperactive Behavior**  
*R. Gong et al.*  
A receptor for gut hormones also functions in the brain, where its loss affects attention.
- 1647 **Control of Local Protein Synthesis and Initial Events in Myelination by Action Potentials**  
*H. Wake et al.*  
Axons signal through both glutamate and adenosine triphosphate release to regulate their insulating wraps.  
>> *Perspective p. 1587*

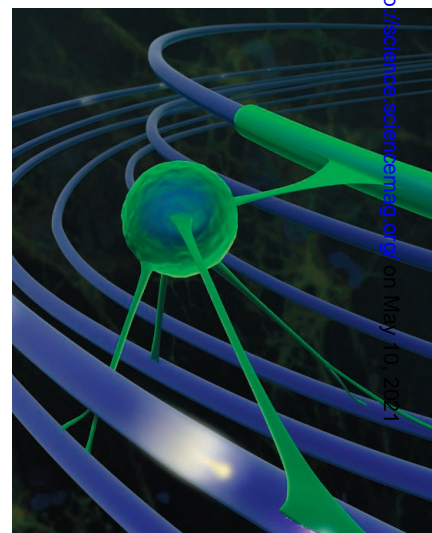
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Deep Mantle Cycling of Oceanic Crust: Evidence from Diamonds and Their Mineral Inclusions

*M. J. Walter et al.*

Tiny minerals trapped inside Brazilian diamonds show that Earth's carbon cycle extends down to the lower mantle.

10.1126/science.1209300

>> [Science Podcast](#)

### The Influence of Nonlinear Mesoscale Eddies on Near-Surface Oceanic Chlorophyll

*D. B. Chelton et al.*

Large ocean eddies are the cause of some sea surface height and chlorophyll anomalies previously ascribed to Rossby waves.

10.1126/science.1208897

### Information Transduction Capacity of Noisy Biochemical Signaling Networks

*R. Cheong et al.*

Noise limits information transfer through a single signaling pathway in a single cell to just one bit.

10.1126/science.1204553

### Acetylcholine-Synthesizing T Cells Relay Neural Signals in a Vagus Nerve Circuit

*M. Rosas-Ballina et al.*

A neural circuit that involves a specialized population of memory T cells regulates the immune response.

10.1126/science.1209985

### Functional Innervation of Hepatic iNKT Cells Is Immunosuppressive Following Stroke

*C. H. Y. Wong et al.*

Neurotransmitters relay immunosuppressive signals to natural killer T cells after stroke.

10.1126/science.1210301

### Transgenerational Epigenetic Instability Is a Source of Novel Methylation Variants

*R. J. Schmitz et al.*

Spontaneous methylation rates that may affect phenotype in the plant *Arabidopsis* are higher than the mutation rate.

10.1126/science.1212959

## TECHNICALCOMMENTS

### Comment on "A Test of the Snowball Theory for the Rate of Evolution of Hybrid Incompatibilities"

*D. A. Barbash*

Full text at [www.sciencemag.org/cgi/content/full/333/6049/1576-b](http://www.sciencemag.org/cgi/content/full/333/6049/1576-b)

### Response to Comment on "A Test of the Snowball Theory for the Rate of Evolution of Hybrid Incompatibilities"

*D. R. Matute et al.*

Full text at [www.sciencemag.org/cgi/content/full/333/6049/1576-c](http://www.sciencemag.org/cgi/content/full/333/6049/1576-c)

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Lasker Awards Honors for Studies of Protein Folding, Malaria Drug

Scientists who discovered a cell 'machine' involved in protein folding and a life-saving treatment for malaria are this year's recipients.

[http://scim.ag/\\_Laskers](http://scim.ag/_Laskers)

### Glowing Kittens Fight Feline AIDS

Researchers find an easier way to make genetically modified cats.

<http://scim.ag/glowcats>

### The Sky Is Falling! But No Big Deal

The UARS satellite will soon fall to Earth, but then, everything eventually does.

<http://scim.ag/UARSfall>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

13 September issue: <http://scim.ag/ss091311>

### RESEARCH ARTICLE: Protein Arginine Methyltransferase 5 Regulates ERK1/2 Signal Transduction Amplitude and Cell Fate Through CRAF

*P. Andreu-Pérez et al.*

## PODCAST

*J. A. Recio and A. M. VanHook*

Arginine methylation of RAF determines the response to growth factors that activate the same cascade.

### RESEARCH ARTICLE: Feedback Circuits Monitor and Adjust Basal Lck-Dependent Events in T Cell Receptor Signaling

*J. R. Schoenborn et al.*

Signaling molecules downstream of the TCR are poised to rapidly respond to receptor activation.

### TEACHING RESOURCE: Systems Biology—Biomedical Modeling

*E. A. Sobie et al.*

### TEACHING RESOURCE: Introduction to Statistical Methods to Analyze Large Data Sets—Principal Components Analysis

*N. R. Clark and A. Ma'ayan*

### TEACHING RESOURCE: Introduction to Statistical Methods for Analyzing Large Data Sets—Gene-Set Enrichment Analysis

*N. R. Clark and A. Ma'ayan*

### TEACHING RESOURCE: Introduction to Network Analysis in Systems Biology

*A. Ma'ayan*

Lecture notes and problem sets provide materials for teaching systems biology.

### PERSPECTIVE: Met Receptor—A Moving Target

*M. J. Clague*

Endosomal recycling pathways dictate the signaling capacity of wild-type or mutant Met receptor.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

14 September issue: <http://scim.ag/stm091411>

### COMMENTARY: What Can a UN Health Summit Do?

*R. A. Nugent and D. T. Jamison*

A meeting on noncommunicable diseases will address this major threat to global health.

### COMMENTARY: Biomedical Innovation in Academic Institutions—Mitigating Conflict of Interest

*L. L. Nelsen and B. E. Bierer*

Conflicts of interest must be managed for universities and their medical centers to maintain public trust.

### RESEARCH ARTICLE: $G\alpha_s$ -Biased $\beta_2$ -Adrenergic Receptor Signaling from Restoring Synchronous Contraction in the Failing Heart

*K. Chakir et al.*

Synchronizing abnormal contraction in the failing heart permanently alters  $\beta_2$ -adrenergic signaling.

### RESEARCH ARTICLE: Engineering the Growth Factor Microenvironment with Fibronectin Domains to Promote Wound and Bone Tissue Healing

*M. M. Martino et al.*

A fibronectin fragment enhances the regenerative effects of growth factors in animal models.

### RESEARCH ARTICLE: Donor Myocardial Infarction Impairs the Therapeutic Potential of Bone Marrow Cells by an Interleukin-1-Mediated Inflammatory Response

*X. Wang et al.*

Inflammation after heart attack impairs the ability of bone marrow cells to improve cardiac function.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### Tooling Up: Are You Likable?

*D. Jensen*

Maybe it's wrong, but your success in the job search depends partly on how much people like you.

[http://scim.ag/TU\\_Likable](http://scim.ag/TU_Likable)

### Research Careers at Community Colleges?

*M. Price*

Science faculty at community colleges are finding ways to fit research into their jobs.

[http://scim.ag/CC\\_Research](http://scim.ag/CC_Research)

>> *News story p. 1572*

## SCIENCE PODCAST

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

Free Weekly Show

On the 16 September *Science* Podcast: a planet orbiting two stars, the depths of Earth's carbon cycle, life at the world's largest particle accelerator, and more.

## SCIENCE INSIDER

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

Science Policy News and Analysis

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