

EDITORIAL

- 1459 Harmonizing Global Science
Alan I. Leshner and Vaughan Turekian

NEWS OF THE WEEK

- 1464 Rejection of Anthrax Study Kicks Up a Dust Storm in Oklahoma
- 1465 Deforestation Moves to the Fore in Copenhagen
- 1466 Chagnon Critics Overstepped Bounds, Historian Says
- 1467 NIH Approves First New Lines; Many More on the Way
- 1467 From *Science's* Online Daily News Site
- 1468 Plans for London 'Cathedral of Science' Unveiled
- 1468 β -Thalassemia Treatment Succeeds, With a Caveat
- 1469 From the *Science* Policy Blog
- 1470 SNP Study Supports Southern Migration Route to Asia
>> Report p. 1541
- 1471 Internet Blockade in Xinjiang Puts a Strain on Science

NEWS FOCUS

- 1472 Sunlight in Your Tank
Biomass Fuel Starts to See the Light
>> Science Podcast
- 1476 HIV Natural Resistance Field Finally Overcomes Resistance
- 1478 What's for Dinner? Researchers Seek Our Ancestors' Answers

LETTERS

- 1480 Political Pressure's Effect on Repository Sites
I. J. Winograd
Response
R. C. Ewing and F. N. von Hippel

- Not Much Novel Under the Sun
R. B. Schonberger and S. H. Rosenbaum
Medical Report's Static Charge Sparks Shock
J. A. Katz
Response
R. Alpern and S. Long

1482 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

- 1483 Enticing Tales of Science—Some Suggestions from 2009
- 1486 Two from Japan
C. Kay

POLICY FORUM

- 1487 Sustainable Floodplains Through Large-Scale Reconnection to Rivers
J. J. Opperman et al.
>> Science Podcast

PERSPECTIVES

- 1489 A Strongly Driven Spin
B. D. Gerardot and P. Öhberg
>> Report p. 1520
- 1490 Two Missions, One Microquasar
G. F. Bignami
>> Report p. 1512
- 1491 DNA Binding Made Easy
D. F. Voytas and J. K. Joung
>> Brevia p. 1501; Research Article p. 1509
- 1493 A New Look at Aging Aerosols
M. O. Andreae
>> Report p. 1525
- 1494 A Reinnervating MicroRNA
R. H. Brown
>> Report p. 1549

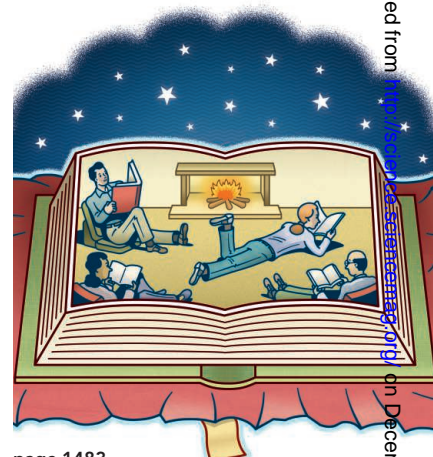
REVIEW

- 1496 Lumpers and Splitters: Darwin, Hooker, and the Search for Order
J. Endersby

CONTENTS continued >>



page 1472



page 1483



COVER

Viewed from the inside of a fractured rice leaf, cells of the rice pathogenic bacterium *Xanthomonas oryzae* pv. *oryzicola* invade through a stoma. *Xanthomonas* species inject host cells with unusual DNA binding proteins called transcription activator–like (TAL) effectors to up-regulate genes important for infection. Two studies in this issue (pages 1501 and 1509; related Perspective, page 1491) decipher TAL effector target specificity and show that new specificities can be engineered.

Image: Adam Bogdanove and Harry Horner/Iowa State University; false color: Yael Kats/Science

DEPARTMENTS

- 1455 This Week in *Science*
- 1460 Editors' Choice
- 1462 *Science* Staff
- 1463 Random Samples
- 1559 New Products
- 1560 *Science* Careers

BREVIA

- 1501 **A Simple Cipher Governs DNA Recognition by TAL Effectors**
M. J. Moscou and A. J. Bogdanove
Xanthomonas bacteria use an amino acid–based code to target effector molecules to specific DNA sequences.
>> *Perspective p. 1491*; *Research Article p. 1509*

RESEARCH ARTICLES

- 1502 **Cell-Specific Information Processing in Segregating Populations of Eph Receptor Ephrin–Expressing Cells**
C. Jørgensen et al.
A proteomic strategy elucidates signaling networks between cells communicating through ephrin proteins and their receptors.
- 1509 **Breaking the Code of DNA Binding Specificity of TAL-Type III Effectors**
J. Boch et al.
Artificial effectors with new specificities have been constructed that mimic proteins injected into plant cells by pathogens.
>> *Perspective p. 1491*; *Brevia p. 1501*

REPORTS

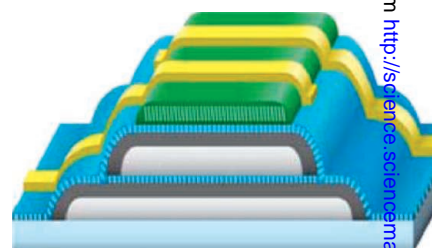
- 1512 **Modulated High-Energy Gamma-Ray Emission from the Microquasar Cygnus X-3**
The Fermi LAT Collaboration
Gamma-ray emission from the jet of an accreting binary star system is correlated with the jet's radio emission.
>> *Perspective p. 1490*
- 1516 **Organic Nonvolatile Memory Transistors for Flexible Sensor Arrays**
T. Sekitani et al.
An array of organic-based flash memory–type devices is demonstrated as a pixelated pressure sensor.
- 1520 **Gigahertz Dynamics of a Strongly Driven Single Quantum Spin**
G. D. Fuchs et al.
Fast spin-flips are observed in the nitrogen vacancy centers in diamond.
>> *Perspective p. 1489*
- 1522 **Meteorite Kr in Earth's Mantle Suggests a Late Accretionary Source for the Atmosphere**
G. Holland et al.
Heavy noble gases acquired during Earth's formation contributed little to the evolution of Earth's atmosphere.

- 1525 **Evolution of Organic Aerosols in the Atmosphere**
J. L. Jimenez et al.
Organic aerosols are not compositionally static, but they evolve dramatically within hours to days of their formation.
>> *Perspective p. 1493*
- 1530 **A Complete Skeleton of a Late Triassic Saurischian and the Early Evolution of Dinosaurs**
S. J. Nesbitt et al.
A complete theropod from New Mexico implies that early dinosaurs dispersed widely, perhaps originating from South America.
>> *Science Podcast*
- 1533 **An Analytical Solution to the Kinetics of Breakable Filament Assembly**
T. P. J. Knowles et al.
The growth kinetics of amyloid fibrils and related self-assembly phenomena are revealed by analytical theory.
- 1538 **Altered Heterochromatin Binding by a Hybrid Sterility Protein in *Drosophila* Sibling Species**
J. J. Bayes and H. S. Malik
A male sterility protein localizes to evolutionarily dynamic loci within heterochromatin and leads to their decondensation.
- 1541 **Mapping Human Genetic Diversity in Asia**
The HUGO Pan-Asian SNP Consortium
Genetic analyses of Asian peoples suggest that the continent was populated through a single migration event.
>> *News story p. 1470*
- 1546 **Positively Selected *G6PD*-Mahidol Mutation Reduces *Plasmodium vivax* Density in Southeast Asians**
C. Louicharoen et al.
Positive selection acts on a hemolytic anemia–causing mutation that affects the proliferation of a blood parasite in humans.
- 1549 **MicroRNA-206 Delays ALS Progression and Promotes Regeneration of Neuromuscular Synapses in Mice**
A. H. Williams et al.
A small noncoding RNA promotes nerve-muscle interactions in response to motor neuron injury and slows disease progression.
>> *Perspective p. 1494*
- 1554 **Norbin Is an Endogenous Regulator of Metabotropic Glutamate Receptor 5 Signaling**
H. Wang et al.
The protein Norbin regulates accumulation of a neurotransmitter receptor in mouse brain cell membranes.

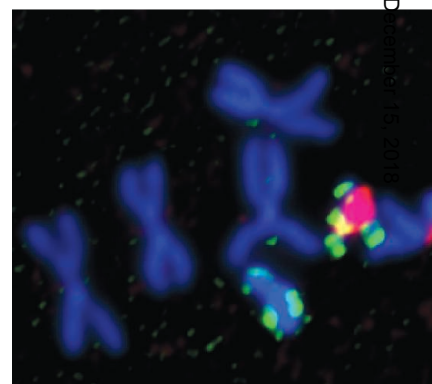
CONTENTS continued >>



page 1487



page 1516



page 1538

SCIENCEONLINE

SCIENCEEXPRESS

www.sciencexpress.org

Adaptive Evolution of Pelvic Reduction in Sticklebacks by Recurrent Deletion of a *Pitx1* Enhancer

Y. F. Chan et al.

Loss of a tissue-specific enhancer explains multiple parallel losses of the pelvic girdle in stickleback populations.
10.1126/science.1182213

Tuberculous Granuloma Induction via Interaction of a Bacterial Secreted Protein with Host Epithelium

H. E. Volkman et al.

Epithelial cells play a role in tubercular granuloma formation and mycobacterial virulence.
10.1126/science.1179663

Global Analysis of Short RNAs Reveals Widespread Promoter-Proximal Stalling and Arrest of Pol II in *Drosophila*

S. Nechaev et al.

The initially transcribed sequence plays a key role in inducing polymerase stalling.
10.1126/science.1181421

Iapetus: Unique Surface Properties and a Global Color Dichotomy from Cassini Imaging

T. Denk et al.

10.1126/science.1177088

Formation of Iapetus' Extreme Albedo Dichotomy by Exogenically Triggered Thermal Ice Migration

J. R. Spencer and T. Denk

Thermal migration of water ice explains the observed color asymmetry of Saturn's unusual moon, Iapetus.
10.1126/science.1177132

SCIENCE NOW

www.sciencenow.org

Highlights From Our Daily News Coverage

Lose Genes, Gain Weight

Some obese patients are missing a chunk of one of their chromosomes.

Why Your Older Brother Didn't Share

Sibling pecking order makes firstborns less cooperative than their siblings.

An Introduction to Monkey Grammar?

Primates produce new alarm calls in a way that might resemble human language.

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: Only a Subset of Met-Activated Pathways Are Required to Sustain Oncogene Addiction

A. Bertotti et al.

Cells addicted to different oncogenic receptor tyrosine kinases develop common downstream mechanisms to sustain malignancy.

RESEARCH ARTICLE: Delivery of microRNA-126 by Apoptotic Bodies Induces CXCL12-Dependent Vascular Protection

A. Zernecke et al.

Apoptotic endothelial cells release microRNA-containing microvesicles to modulate the responses of neighboring cells and reduce atherosclerosis in mice.

REVIEW: Cracking the Phosphatase Code: Docking Interactions Determine Substrate Specificity

J. Roy and M. S. Cyert

Studies of the motifs that guide interactions between phosphatases and cellular proteins provide insight into phosphatase selectivity.

JOURNAL CLUB: To Be $\gamma\delta$ or Not to Be $\gamma\delta$? Signaling Pathways in $\alpha\beta$ Versus $\gamma\delta$ T Cell Maturation

J. K. Archbold

The role of Notch signaling in human T cell maturation is substantially different from that in the mouse.

NETWATCH: Domain Club Browser

Proteomic analysis organizes proteins into domain clubs that share similar domain composition; in Protein Databases.

NETWATCH: SMART (Simple Modular Architecture Research Tool)

Explore protein domains and compare domain architecture; in Protein Databases.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

Dealing With a Lab Leader's Death

S. Coelho

The death of a principal investigator leaves behind a scientific gap, practical problems, and grieving colleagues.

A Killer Whale Biologist Vocalizes

V. Venkatraman

Ari Daniel Shapiro is leaving scientific research to produce radio programs about science and the people who do science.

In Person: A Dream Lab in Romania

T. Luchian

1989 was a momentous year for Romania, but it was not until the mid-2000s that Tudor Luchian found resources to establish a cutting-edge lab at home.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

PERSPECTIVE: Parallel Paths to Predictive Biomarkers in Oncology—Uncoupling of Emergent Biomarker Development and Phase III Trial Execution

R. Sikorski and B. Yao

Predictive biomarkers can be integrated into phase III clinical trials by a variety of approaches.

COMMENTARY: Traversing the Valley of Death—A Guide to Assessing Prospects for Translational Success

B. S. Collier and R. M. Califf

Rigorous methods are required to move basic science into effective therapies.

RESEARCH ARTICLE: A Role for VAV1 in Experimental Autoimmune Encephalomyelitis and Multiple Sclerosis

M. Jagodic et al.

Rat genetics implicates a new gene in the etiology of multiple sclerosis in European populations.

SCIENCE PODCAST

www.sciencemag.org/multimedia/podcast
Free Weekly Show

Download the 11 December *Science* Podcast to hear about a newly discovered Late Triassic dinosaur, sustainable floodplain management, solar fuels, and more.

ORIGINS BLOG

blogs.sciencemag.org/origins
A History of Beginnings

SCIENCE INSIDER

blogs.sciencemag.org/scienceinsider
Science Policy News and Analysis

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2009 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$146 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$835; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. **Printed in the U.S.A.**

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. **Postmaster:** Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. **Single-copy sales:** \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.



ADVANCING SCIENCE. SERVING SOCIETY

Science

326 (5959)

Science **326** (5959), 1455-1559.

ARTICLE TOOLS

<http://science.sciencemag.org/content/326/5959>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.