

SPECIAL SECTION

Disease Prevention

INTRODUCTION

1466 It Takes More Than an Apple a Day

NEWS

1468 Task Force's Prevention Advice Proves Hard to Swallow
Public Health Measures in Disease Prevention
>> *Science Podcast*

1471 Will an Aspirin a Day Keep Cancer Away?
Wondering How the Wonder Drug Works

1473 Tackling America's Eating Habits, One Store at a Time
>> *Science Podcast*

1476 Uncertain Verdict as Vitamin D Goes on Trial

1479 Chronic Disease Vaccines Need Shot in the Arm

REVIEW

1482 Can Noncommunicable Diseases Be Prevented? Lessons from Studies of Populations and Individuals
M. Ezzati and E. Riboli

PERSPECTIVES

1488 Preventing Alzheimer's Disease
D. J. Selkoe
>> *Science Podcast*

1492 Changing Human Behavior to Prevent Disease: The Importance of Targeting Automatic Processes
T. M. Marteau et al.

1495 Fetal and Early Childhood Undernutrition, Mortality, and Lifelong Health
C. K. Lutter and R. Lutter

1499 Double Burden of Noncommunicable and Infectious Diseases in Developing Countries
I. C. Bygbjerg

1501 Why a Macroeconomic Perspective Is Critical to the Prevention of Noncommunicable Disease
R. Smith
>> *Science Podcast*

>> *Editorial p. 1433; Policy Forum p. 1456; Science Careers; and videos at www.sciencemag.org/special/prevention*

EDITORIAL

1433 Prevention and Cost Control
Ezekiel Emanuel
>> *Disease Prevention section p. 1466*

NEWS OF THE WEEK

1438 A roundup of the week's top stories

NEWS & ANALYSIS

1441 New XMRV Studies Bring Closure—and Fresh Dispute

1442 Warped Light Reveals Infant Galaxy on the Brink of the 'Cosmic Dawn'

1443 Did Neandertals Truly Bury Their Dead?

1444 Ignition Facility Misses Goal, Ponders New Course

1446 An Enterprising Time for HIV Vaccine Research

1447 Cancers Join List of Illnesses Linked to 9/11 Attacks

NEWS FOCUS

1448 China's Sharp Focus on Biometrics

1450 Despite Setbacks, Optimism on Drugs for Hepatitis C

LETTERS

1452 Friends in Fungi
G. D. A. Werner and E. T. Kiers
Political Science in Peril
A. Lupia

1453 The BUZZ: Honorary Authorship

1453 TECHNICAL COMMENT ABSTRACTS

1453 CORRECTIONS AND CLARIFICATIONS



page 1448

BOOKS ET AL.

1454 Interop
J. Palfrey and U. Gasser, reviewed by L. DeNardis

1455 Wild Hope
A. Balmford, reviewed by D. McCauley

POLICY FORUM

1456 Global Indicators and Targets for Noncommunicable Diseases
S. Y. Angell et al.
>> *Disease Prevention section p. 1466*

PERSPECTIVES

1458 A Measurable Planetary Boundary for the Biosphere
S. W. Running

1459 Nanometer-Scale Printing
J. A. Rogers
>> *Report p. 1517*

1460 Versatility from Protein Disorder
M. M. Babu et al.

1462 Thermally Responsive Pulsating Nanotubules
W. Zhang and T. Aida
>> *Report p. 1521*

1463 Emerging Anatomy of the BAP1 Tumor Suppressor System
A. E. White and J. W. Harper
>> *Report p. 1541*

1464 Moving and the Neighborhood Glass Ceiling
R. J. Sampson
>> *Research Article p. 1505*

CONTENTS continued >>



COVER

A vending machine filled with healthy substitutes for highly processed foods. Affluence paved the way for technology and medicines to combat infection, but even well-off nations have communities that are increasingly plagued by noncommunicable diseases, including cancer, type 2 diabetes, and Alzheimer's disease. Addressing this huge prospective burden of long-term disease is a priority in the design of a new generation of preventative strategies, including healthier eating. See our special section beginning on page 1466.

Image: Mike Kemp/Getty Images

DEPARTMENTS

- 1431 This Week in *Science*
- 1434 Editors' Choice
- 1436 *Science* Staff
- 1557 New Products
- 1558 *Science* Careers

RESEARCH ARTICLE

- 1505 Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults**
J. Ludwig et al.
 Moving from a poor to a less poor residential environment makes people feel good for a long time.
 >> *Perspective p. 1464*

REPORTS

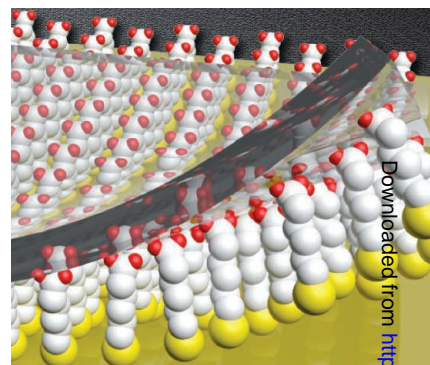
- 1511 Kepler-47: A Transiting Circumbinary Multiplanet System**
J. A. Orosz et al.
 Data from the Kepler space telescope reveal two small planets orbiting a pair of two low-mass stars.
- 1514 Quantum-Enhanced Optical-Phase Tracking**
H. Yonezawa et al.
 A quantum mechanical technique is developed to enhance the phase tracking of photons.
- 1517 Subtractive Patterning via Chemical Lift-Off Lithography**
W.-S. Liao et al.
 Oxidized silicone-rubber stamps can pattern bare regions on gold surfaces by removing hydroxyl-terminated alkane thiols.
 >> *Perspective p. 1459*
- 1521 Pulsating Tubules from Noncovalent Macrocycles**
Z. Huang et al.
 Nanoscale tubes expand and contract with temperature changes through loose association of their constituent building blocks.
 >> *Perspective p. 1462*
- 1526 A Crystalline Singlet Phosphinonitrene: A Nitrogen Atom–Transfer Agent**
F. Dielmann et al.
 A phosphorus fragment supports an otherwise uncoordinated nitrogen atom in a stable motif previously seen only with metals.
- 1529 A Fully Size-Resolved Perspective on the Crystallization of Water Clusters**
C. C. Pradzynski et al.
 Infrared spectroscopy of water clusters of increasing size indicates the onset of an ice-like structure at around 275 molecules.

- 1532 Structural Basis for Microtubule Binding and Release by Dynein**
W. B. Redwine et al.
 The molecular motor dynein uses conformational changes within its microtubule-binding domain to modulate track affinity.
- 1536 Specifying and Sustaining Pigmentation Patterns in Domestic and Wild Cats**
C. B. Kaelin et al.
 The genes specifying tabby cat coat patterns also affect big cats, including king cheetahs.
- 1541 Loss of the Tumor Suppressor BAP1 Causes Myeloid Transformation**
A. Dey et al.
 The de-ubiquitinating enzyme BAP1 is implicated in myelodysplastic syndrome.
 >> *Perspective p. 1463*
- 1546 Unicellular Cyanobacterium Symbiotic with a Single-Celled Eukaryotic Alga**
A. W. Thompson et al.
 A nitrogen-fixing cyanobacterium that lacks photosynthesis and the tricarboxylic acid cycle possesses a tiny phytoplankton symbiont.
- 1550 Disruption of Reconsolidation Erases a Fear Memory Trace in the Human Amygdala**
T. Agren et al.
 Interfering with memory formation at the right moment removes the signature of fear memories in human brain imaging studies.
- 1553 Acute Gastrointestinal Infection Induces Long-Lived Microbiota-Specific T Cell Responses**
T. W. Hand et al.
 Enteric infections induce lasting adaptive immunity against commensal bacteria that may play a role in intestinal problems.

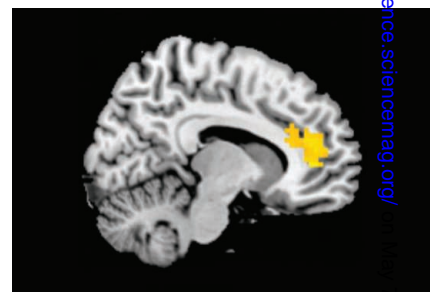
CONTENTS continued >>



page 1454



pages 1459 & 1517



page 1550

SCIENCEONLINE

SCIENCEEXPRESS

www.scienceexpress.org

Elemental Mapping by Dawn Reveals Exogenic H in Vesta's Regolith

T. H. Prettyman et al.

10.1126/science.1225354

Pitted Terrain on Vesta and Implications for the Presence of Volatiles

B. W. Denevi et al.

Analysis of data from the Dawn spacecraft implies that asteroid Vesta is rich in volatiles.

10.1126/science.1225374

A Golden Spike for Planetary Science

R. P. Binzel

10.1126/science.1228328

Detecting Causality in Complex Ecosystems

G. Sugihara et al.

A new method, based on nonlinear state space reconstruction, can distinguish causality from correlation.

10.1126/science.1227079

Genomic Variation in Seven Khoe-San Groups Reveals Adaptation and Complex African History

C. M. Schlebusch et al.

Cutting-edge genomic approaches test hypotheses about the roots of human history in southern African indigenous populations.

10.1126/science.1227721

Germ Cell Migration Across Sertoli Cell Tight Junctions

B. E. Smith and R. E. Braun

Syncytial germ cell chains span a network of transient compartments to cross the blood-testis barrier in adult mice.

10.1126/science.1219969

TECHNICAL COMMENTS

Comment on "A Common Pesticide Decreases Foraging Success and Survival in Honey Bees"

J. E. Cresswell and H. M. Thompson

Full text at www.sciencemag.org/cgi/content/full/337/6101/1453-b

Response to Comment on "A Common Pesticide Decreases Foraging Success and Survival in Honey Bees"

M. Henry et al.

Full text at www.sciencemag.org/cgi/content/full/337/6101/1453-c

SCIENCE NOW

www.sciencenow.org

Highlights From Our Daily News Coverage

Whodunit? Crows Ask That Question, Too

New Caledonian crows, like humans, can reason about hidden causes.

<http://scim.ag/Crows-Question>

Plight of the Bumblebee

Did invader insects bring deadly disease to South American bees?

<http://scim.ag/Plight-Bumblebee>

Early Isolation Impairs Brain Connections

Childhood neglect stunts the brain's 'insulating' cells.

http://scim.ag/Insulating_Cells

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment
18 September issue: <http://scim.ag/ss091812>

RESEARCH ARTICLE: Charting the Landscape of Tandem BRCT Domain-Mediated Protein Interactions

N. T. Woods et al.

Building a protein-protein interaction network mediated by the BRCT domain reveals players in the DNA damage response.

PERSPECTIVE: Modulating Mitochondrial Intracellular Location as a Redox Signal

M. P. Murphy

Hypoxia induces the redistribution of mitochondria to promote transcriptional responses to low oxygen.

REVIEW: Pseudogenes—Newly Discovered Players in Human Cancer

L. Poliseno

Pseudogenes can have multiple, diverse functions, affecting not only their parental genes but also unrelated genes.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

19 September issue: <http://scim.ag/stm091912>

RESEARCH ARTICLE: Effects of STX209 (Arbaclofen) on Neurobehavioral Function in Children and Adults with Fragile X Syndrome: A Randomized, Controlled, Phase 2 Trial

E. M. Berry-Kravis et al.

Administration of a selective GABA_B agonist to individuals with fragile X syndrome improves their deficits in social avoidance, a core symptom of the disease.

RESEARCH ARTICLE: Reversal of Disease-Related Pathologies in the Fragile X Mouse Model by Selective Activation of GABA_B Receptors with Arbaclofen

C. Henderson et al.

Pharmacological activation of the GABA_B receptor with arbaclofen in a mouse model of fragile X syndrome corrects neuronal defects associated with the disease.

RESEARCH ARTICLE: A Paper-Based Multiplexed Transaminase Test for Low-Cost, Point-of-Care Liver Function Testing

N. R. Pollock et al.

A paper-based, multiplexed microfluidic assay allows rapid, semiquantitative, visual measurement of transaminases in clinical specimens.

PERSPECTIVE: Patient-Empowerment Interactive Technologies

C. S. Bruggers et al.

Health-promoting video games are emerging as nonpharmacological tools to help patients manage their diseases.

PERSPECTIVE: Childhood Disorders of the Synapse—Challenges and Opportunities

V. Hughes et al.

New research directions are needed to accelerate the development of new treatments for autism and related disorders.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

Documenting Exposure for Disease Prevention

E. Pain

Epidemiologist Emilie Council studies the health implications of environmental carcinogen exposure.

<http://scim.ag/EmilieCouncil>

>> *Disease Prevention* section p. 1466

Tooling Up: What's Your Question?

D. Jensen

Never mind answering questions—what questions should you ask at a job interview?

<http://scim.ag/WhatsYourQuestion>

myIDP: So You Think You Have Skills

J. Hobin et al.

Figuring out what you know—and what you need to know—is essential in training for a science career.

<http://scim.ag/myIDPSkills>

SCIENCE PODCAST

www.sciencemag.org/multimedia/podcast

Free Weekly Show

On the 21 September *Science* Podcast: a special show on preventing noncommunicable disease, including the economics of prevention, government recommendations, combating Alzheimer's, and grocery studies.

SCIENCE INSIDER

news.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 © 2012 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): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; 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 #R1254 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 \$30.00 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

337 (6101)

Science **337** (6101), 1431-1557.

ARTICLE TOOLS

<http://science.sciencemag.org/content/337/6101>

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. The title *Science* is a registered trademark of AAAS.

Copyright © 2012 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.