

15

26 WHEN TWO REACTIONS BECOME ONE
Merging two fundamental reactions of organoboron compounds provides a new platform for catalysis
By J. W. B. Fyfe and A. J. B. Watson
▶ REPORT P. 70

28 THE EVOLUTION OF ANTIEVOLUTION POLICIES AFTER KITZMILLER V. DOVER
A phylogeny identifies ancestors of modern creationist legislation
By N. J. Matzke

30 THE SCREAMS OF A STAR BEING RIPPED APART
A star being devoured by a black hole provides a route to study accretion and jet formation
By G. C. Bower
▶ REPORT P. 62

32 THE POWER OF CROWDS
Combining humans and machines can help tackle increasingly hard problems
By P. Michelucci and J. L. Dickinson

34 MICROBES IN A KNIGHT'S ARMOR
Bacteria studded with nanoparticles produce acetate from carbon dioxide and sunlight
By V. Müller
▶ REPORT P. 74

BOOKS ET AL.
35 NEWTON'S APPLE AND OTHER MYTHS ABOUT SCIENCE
R. L. Numbers and K. Kampourakis, Eds.
reviewed by J. Endersby



NEWS

IN BRIEF

8 News at a glance

IN DEPTH

10 RESEARCH AGENCIES REVEL IN FINAL 2016 BUDGET

NIH gets \$2 billion hike, NASA and DOE science grow, NSF avoids restrictive language
By J. Mervis

12 AS EBOLA EPIDEMIC DRAWS TO A CLOSE, A THIN SCIENTIFIC HARVEST

Thirteen clinical trials in West Africa have yielded only one unequivocally positive result
By J. Cohen and M. Enserink

13 SPERM RNA FRAGMENTS MODIFY OFFSPRING METABOLISM

Molecules transfer mouse paternal parental traits to progeny
By M. Leslie

14 FUNDING FOR KEY DATA RESOURCES IN JEOPARDY

NIH genome institute wants to scale back support of human and model organism databases
By J. Kaiser

15 CALIFORNIA STEM CELL AGENCY PLOTS A RACE TO THE CLINIC

CIRM lays out endgame and prospects for new money
By K. Servick

FEATURE

16 UNFILLED VIALS

Scientifically feasible vaccines against major diseases are stalled for lack of funds. *Science* names 10 top candidates that need a boost
By J. Cohen

INSIGHTS

LETTERS

20 NEXTGEN VOICES: POLITICAL PRIORITIES

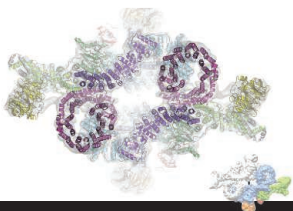
PERSPECTIVES

24 ILLUMINATING ANHEDONIA

Optogenetics and fMRI reveal the brain circuitry of anhedonia
By T. W. Robbins
▶ REPORT P. 41

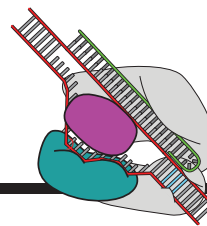
25 SEEING mTORC1 SPECIFICITY

Structural information reveals how a multiprotein complex responds to amino acid abundance
By G. R. Buel and J. Blenis
▶ RESEARCH ARTICLES PP. 43, 48, & 53



48

A complex key to growth and metabolism



84

More precise genome editing

36 THE DEATH OF CANCER

By V. T. DeVita Jr. and E. DeVita-Raeburn, reviewed by A. Woolfson

36 PATTERNS OF THE UNIVERSE

By A. Bellos and E. Harriss

RESEARCH

IN BRIEF

37 From *Science* and other journals

REVIEW

40 ANTIBIOTIC RESISTANCE

Multidrug evolutionary strategies to reverse antibiotic resistance *M. Baym* et al.

REVIEW SUMMARY; FOR FULL TEXT: dx.doi.org/10.1126/science.aad3292

RESEARCH ARTICLES

41 NEURAL CIRCUITS

Prefrontal cortical regulation of brainwide circuit dynamics and reward-related behavior *E. A. Ferenczi* et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT: dx.doi.org/10.1126/science.aac9698

► PERSPECTIVE P. 24

42 BEHAVIORAL GENETICS

Epigenetic (re)programming of caste-specific behavior in the ant *Camponotus floridanus* *D. F. Simola* et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT: dx.doi.org/10.1126/science.aac6633

► VIDEO

METABOLISM

43 Sestrin2 is a leucine sensor for the mTORC1 pathway *R. L. Wolfson* et al.

48 Architecture of human mTOR complex 1 *C. H. S. Aylett* et al.

53 Structural basis for leucine sensing by the Sestrin2-mTORC1 pathway *R. A. Saxton* et al.

► PERSPECTIVE P. 25

REPORTS

58 3D PRINTING

Additive manufacturing of polymer-derived ceramics *Z. C. Eckel* et al.

► VIDEO

62 BLACK HOLE PHYSICS

A radio jet from the optical and x-ray bright stellar tidal disruption flare ASASSN-14li *S. van Velzen* et al.

► PERSPECTIVE P. 30

65 ASTROCHEMISTRY

Statistical ortho-to-para ratio of water desorbed from ice at 10 kelvin *T. Hama* et al.

68 MEMBRANES

Sieving hydrogen isotopes through two-dimensional crystals *M. Lozada-Hidalgo* et al.

70 ORGANIC CHEMISTRY

Catalytic conjunctive cross-coupling enabled by metal-induced metallate rearrangement *L. Zhang* et al.

► PERSPECTIVE P. 26

74 MICROBIAL ENGINEERING

Self-photosensitization of nonphotosynthetic bacteria for solar-to-chemical production *K. K. Sakimoto* et al.

► PERSPECTIVE P. 34

VIROLOGY

77 An orthopoxvirus-based vaccine reduces virus excretion after MERS-CoV infection in dromedary camels *B. L. Haagmans* et al.

81 Co-circulation of three camel coronavirus species and recombination of MERS-CoVs in Saudi Arabia *J. S. M. Sabir* et al.

84 GENOME EDITING

Rationally engineered Cas9 nucleases with improved specificity *I. M. Slaymaker* et al.

88 PROTEIN TRANSLOCATION

Structure of the Sec61 channel opened by a signal sequence *R. M. Voorhees* and *R. S. Hegde*

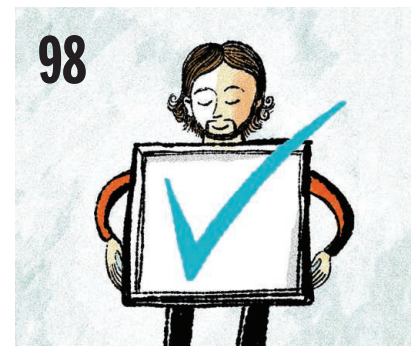
DEPARTMENTS

7 EDITORIAL

New members of the family *By Marcia McNutt*

98 WORKING LIFE

Beyond the tick boxes *By Artaza Gilani*



ON THE COVER



Vials of experimental vaccines against severe acute respiratory syndrome, Marburg virus, and chikungunya sit on ice at the Vaccine Pilot Plant run by the U.S. National Institutes of Health in Frederick, Maryland. In the wake of the Ebola epidemic in West Africa, a growing number of researchers and public health advocates are arguing that more should be done to aggressively advance vaccines that have weak commercial markets but appear feasible. See page 16. Photo: © Ken Garrett

Science Staff 6
New Products 92
Science Careers 93

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 © 2016 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): \$165 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$1522. Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$89. 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: \$15.00 current issue, \$20.00 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 \$35.00 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.

Science

351 (6268)

Science **351** (6268), 7-98.

ARTICLE TOOLS

<http://science.sciencemag.org/content/351/6268>

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.