

# CONTENTS

5 FEBRUARY 2016 • VOLUME 351 • ISSUE 6273

## NEWS

### IN BRIEF

540 News at a glance

### IN DEPTH

543 **THE RACE FOR A ZIKA VACCINE IS ON**  
Researchers see many approaches—but vaccine likely will take years *By J. Cohen*

544 **RISKY REACTOR FUEL TO LINGER**  
Getting highly enriched uranium out of research reactors will stretch to at least 2035, U.S. study concludes *By A. Cho*

545 **GOOD GRADES FOR GERMANY'S PROJECT TO BUILD AN IVY LEAGUE HERE**  
The Excellence Initiative is on the right track, a panel says *By G. Vogel*

546 **KAROLINSKA TO REOPEN INQUIRY INTO SURGEON'S WORK**  
Television documentary raises new questions about Paolo Macchiarini's trachea implants *By G. Vogel*

547 **JAPANESE SATELLITE TARGETS THE X-RAY UNIVERSE**  
Galaxy cluster gases, active galactic nuclei, and supernova remnants on ASTRO-H agenda *By D. Normile*

### 548 CALLING ALL FAILED REPLICATION EXPERIMENTS

New journal will publish methods, data, and results *By J. Kaiser*

### FEATURES

549 **WHAT MAKES DARPA TICK?**  
The stellar reputation of this small but mighty defense agency rests on the unparalleled clout of its program managers *By J. Mervis*

553 **Biology came late, and arrived with a bang**  
*By J. Mervis*

## INSIGHTS

### PERSPECTIVES

554 **THE MITE THAT JUMPED, THE BEE THAT TRAVELED, THE DISEASE THAT FOLLOWED**  
Global expansion and trade contributed to the declining health of honeybees *By E. M. Villalobos*  
► REPORT P. 594

556 **THROTTLING BACK THE HEART'S MOLECULAR MOTOR**  
A small molecule inhibits mutated forms of myosin that cause cardiac hypertrophy *By D. M. Warshaw*  
► REPORT P. 617



564

Good riddance to race in research?

### 558 ADDRESSING AN ANTIFERROMAGNETIC MEMORY

Antiferromagnets could form a stable and robust platform for future spintronic technology *By C. Marrows*  
► REPORT P. 587

559 **AGING, ALOPECIA, AND STEM CELLS**  
Intrinsic epigenetic status and extrinsic environmental factors affect hair follicle stem cells *By M. Lei and C.-M. Chuong*  
► RESEARCH ARTICLE P. 575; REPORT P. 613

561 **NANOPARTICLES MEET THEIR STICKY ENDS**  
Hierarchical DNA structures direct the crystallization of gold nanoparticles *By A. R. Tuo*  
► REPORTS PP. 579 & 582

562 **ICE SHEET IN PERIL**  
Radar data reveal how sensitive the Greenland Ice Sheet is to long-term climatic changes *By C. S. Hvidberg*  
► REPORT P. 590

564 **TAKING RACE OUT OF HUMAN GENETICS**  
Engaging a century-long debate about the role of race in science *By M. Yudell et al.*  
► PODCAST

566 **ALFRED GILMAN (1941–2015)**  
A Nobel laureate's work on G proteins illuminated how signals are transmitted into cells *By M. Simon*

### BOOKS ET AL.

567 **BREAD WINE CHOCOLATE**  
*By S. Sethi, reviewed by C. Kemp*

568 **THE MOST WANTED MAN IN CHINA**  
*By F. Lizhi, reviewed by I. A. Lerch*

### LETTERS

569 **EDITORIAL RETRACTION**  
*By M. McNutt*

569 **SOCIAL COST OF CARBON: DOMESTIC DUTY**  
*By A. Fraas et al.*

Science Staff.....	538
New Products.....	622
Information for Authors.....	624
Science Careers.....	626

sciencemag.org SCIENCE

547



Superhot gas in Andromeda, a prime target for the new ASTRO-H x-ray satellite.



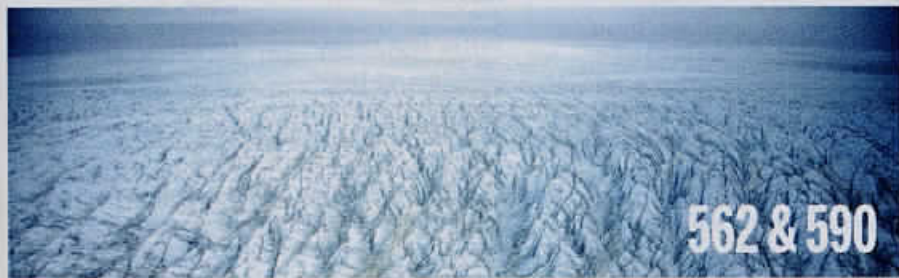
561, 579, & 582

Golden lattices stitched by DNA



608

An enzyme that defends bacteria



**569 FALSE POSITIVES ARE STATISTICALLY INEVITABLE**

By R. D. Fricker Jr.

**570 PSYCHOSOCIAL FACTORS KEY TO HEALTHY AGING**

By T. D. Cosco

**RESEARCH**

**IN BRIEF**

571 From *Science* and other journals

**REVIEW**

**574 BATTERIES**

Why do batteries fail? M. R. Palacin and A. de Guibert

REVIEW SUMMARY; FOR FULL TEXT: [dx.doi.org/10.1126/science.1253292](https://doi.org/10.1126/science.1253292)

**RESEARCH ARTICLE**

**575 STEM CELLS**

Hair follicle aging is driven by transepidermal elimination of stem cells via COL17A1 proteolysis  
H. Matsumura et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT: [dx.doi.org/10.1126/science.aad4395](https://doi.org/10.1126/science.aad4395)  
► PERSPECTIVE P. 559; REPORT P. 613

**REPORTS**

**576 SUPERCONDUCTIVITY**

Nematicity in stripe-ordered cuprates probed via resonant x-ray scattering  
A. J. Achkar et al.

**MATERIALS SCIENCE**

579 Transmutable nanoparticles with reconfigurable surface ligands  
Y. Kim et al.

582 Diamond family of nanoparticle superlattices W. Liu et al.  
► PERSPECTIVE P. 561

**587 SPINTRONICS**

Electrical switching of an antiferromagnet P. Wadley et al.  
► PERSPECTIVE P. 558

**590 ICE SHEETS**

Holocene deceleration of the Greenland Ice Sheet J. A. MacGregor et al.  
► PERSPECTIVE P. 562

**594 HONEYBEE DISEASE**

Deformed wing virus is a recent global epidemic in honeybees driven by *Varroa* mites L. Wilfert et al.  
► PERSPECTIVE P. 554; PODCAST

**597 FOREST MANAGEMENT**

Europe's forest management did not mitigate climate warming K. Naudts et al.  
► REPORT P. 600

**600 CLIMATE CHANGE**

Biophysical climate impacts of recent changes in global forest cover  
R. Alkama and A. Cescatti  
► REPORT P. 597

**604 CANCER THERAPEUTICS**

Allele-specific inhibitors inactivate mutant KRAS G12C by a trapping mechanism P. Lito et al.

**608 STRUCTURAL BIOLOGY**

Structures of aminoarabinose transferase ArnT suggest a molecular basis for lipid A glycosylation  
V. I. Petrou et al.

**613 STEM CELLS**

Foxc1 reinforces quiescence in self-renewing hair follicle stem cells  
L. Wang et al.  
► PERSPECTIVE P. 559;  
RESEARCH ARTICLE P. 575

**617 HEART DISEASE**

A small-molecule inhibitor of sarcomere contractility suppresses hypertrophic cardiomyopathy in mice E. M. Green et al.  
► PERSPECTIVE P. 556

**DEPARTMENTS**

**539 EDITORIAL**

Strength in members  
By Rush Holt

**630 WORKING LIFE**

Retire the letter of reference  
By Rima Wilkes

**ON THE COVER**



Immunofluorescence image showing hair follicles in a resting stage. An old hair (right) is accompanied by a new hair (left), which awaits growth initiation signals.

When the resting follicular stem cells are triggered to self-renew, they also transiently activate a gene network to limit cell division. Understanding these dynamic mechanisms will help to harness multipotent stem cells for regenerative medicine. See page 613. A second paper (page 575) describes how DNA damage triggers stem cell depletion and hair loss.  
Image: L. Wang and R. Yi

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 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) \$65; other countries (air mail delivery) \$89. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #R1254 88122. Publications Mail Agreement Number: 1059624. 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.