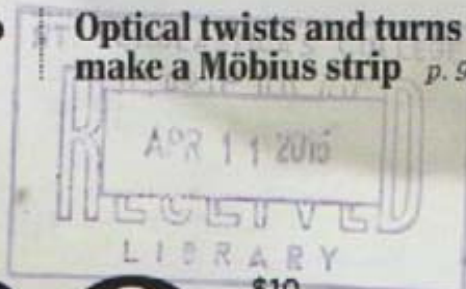


Should research animals  
get names? p. 941

RNA interference targets Colorado  
potato beetle pp. 950 & 991

Optical twists and turns  
make a Möbius strip p. 964



\$10  
27 FEBRUARY 2015  
sciencemag.org

# Science

AAAS



## *Locked in*

Blocking an ion channel  
keeps Ebola virus from  
escaping cell vesicles

pp. 947 & 995

# CONTENTS

27 FEBRUARY 2015 • VOLUME 347 • ISSUE 6225



## 945 & 998

How wheat got to Britain

## NEWS

### IN BRIEF

930 Roundup of the week's news

### IN DEPTH

#### 932 PLUMES ON EUROPA TEASE NASA MISSION PLANNERS

Astrobiologists covet chance to sample subterranean ocean, but plumes may come and go *By E. Hand*

#### 933 NEW JITTERS OVER MEGAQUAKES IN HIMALAYAS

Large earthquakes in teeming region could strike anywhere, anytime *By P. Pulla*

#### 934 AS NEW BOTULISM THREAT IMPLODES, MORE QUESTIONS

Secrecy around "toxin H" hampered research, government scientists say *By M. Enserink*

#### 936 RESEARCH AT KEW OVERHAULED FOR LEANER TIMES

World-leading collection focuses on its strengths following critical reviews and budget cuts *By E. Stokstad*

#### 937 JAPAN LOOKS TO INSTILL GLOBAL MINDSET IN GRADS

New program to internationalize universities hopes to put nation on more competitive footing *By D. Normile*

## FEATURES

#### 938 LINE OF ATTACK

Christopher Korch is adding up the costs of contaminated cell lines *By J. Neimark*

#### 941 WHAT'S IN A NAME?

Naming research animals may improve their well-being—or bias experiments *By M. Erard*

► QUIZ: SURVEY

## INSIGHTS

### PERSPECTIVES

#### 944 UNDERSTANDING PARTICLE ACCELERATION IN ASTROPHYSICAL PLASMAS

Simulations reveal new scenarios to accelerate electrons to extremely high energies *By H. Ji and E. Zweibel*

► REPORT P. 974

#### 945 HOW WHEAT CAME TO BRITAIN

Wheat reached Britain from the Near East at least 2000 years before the arrival of wheat farming *By G. Larson*

► REPORT P. 998

#### 947 DELINEATING EBOLA ENTRY

A specific calcium channel is required for Ebola virus to infect a cell *By D. Falzarano and H. Feldmann*

► REPORT P. 955



## 944 & 974

#### 948 AN UNEXPECTED COST OF SEX

Coevolution of male and female mosquitoes influences whether mosquitoes transmit human malaria *By S. H. Alonzo*

► REPORT P. 985

#### 949 SHAPE-SHIFTING LIQUID CRYSTALS

A new approach to photopatterning liquid crystals produces programmable, shape-shifting soft solids *By R. Verduzco*

► REPORT P. 982

#### 950 INSECTICIDAL RNA, THE LONG AND SHORT OF IT

Transgenic plants that express insect-specific RNA in chloroplasts kill pests through RNA interference *By S. Whyard*

► REPORT P. 991

#### 952 WHY THE PACIFIC IS COOL

Natural ocean variability modulates global warming *By B. B. Booth*

► REPORT P. 988

#### 953 PREDICTION, PRECAUTION, AND POLICY UNDER GLOBAL CHANGE

Emphasize robustness, monitoring, and flexibility *By D. E. Schindler and R. Hilborn*

### BOOKS ET AL.

#### 955 ADVENTURES IN THE ANTHROPOCENE

*By G. Vince, reviewed by H. Young*

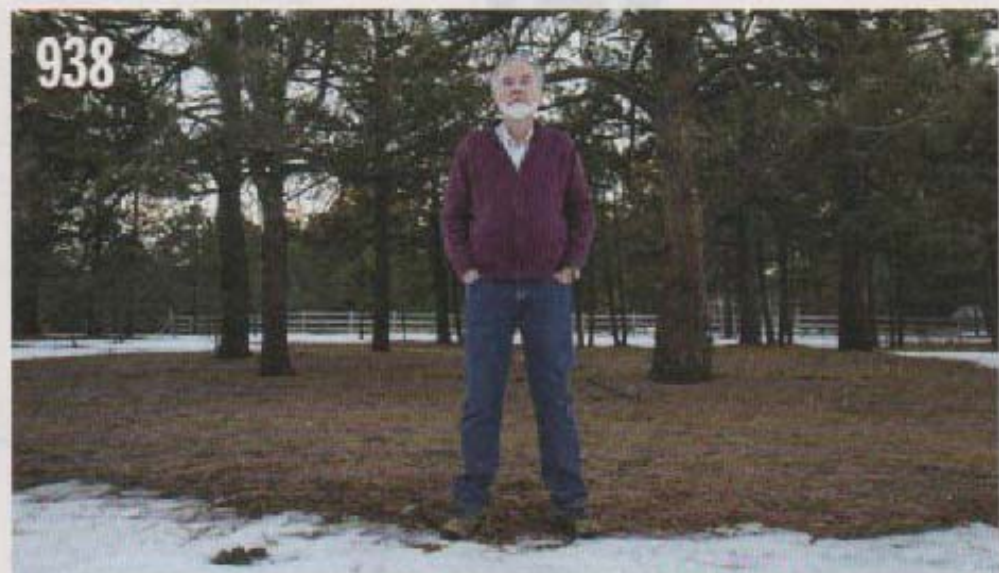
#### 956 THE INNOVATORS

*By W. Isaacson, reviewed by D. Greenbaum and M. Gerstein*

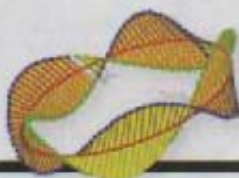
### LETTERS

#### 957 REINDEER EWENKI'S FADING CULTURE

*By J. Wang et al.*



Science Staff .....	926
AAAS News & Notes .....	959
New Products .....	1022
Science Careers .....	1023



**957 GENETIC PRIVACY: TRUST IS NOT ENOUGH**

By *D. Gurwitz*

**958 NAVIGATING MASSIVE OPEN ONLINE COURSES**

By *A. O. Savi et al.*

**DEPARTMENTS**

**929 EDITORIAL**

Wider attention for GOF science

By *Harvey V. Fineberg*

**1038 WORKING LIFE**

Follow your star

By *Elisabeth Pain*

## RESEARCH

**IN BRIEF**

960 From *Science* and other journals

**REVIEW**

**963 SUSTAINABILITY**

Systems integration for global sustainability *J. Liu et al.*

REVIEW SUMMARY. FOR FULL TEXT: [dx.doi.org/10.1126/science.1258832](http://dx.doi.org/10.1126/science.1258832)

**REPORTS**

**964 OPTICS**

Observation of optical polarization Möbius strips *T. Bauer et al.*

**967 SOLAR CELLS**

Electron-hole diffusion lengths > 175  $\mu\text{m}$  in solution-grown  $\text{CH}_3\text{NH}_3\text{PbI}_3$  single crystals *Q. Dong et al.*

**970 WATER SPLITTING**

Metal-free efficient photocatalyst for stable visible water splitting via a two-electron pathway *J. Liu et al.*

**974 PLASMA PHYSICS**

Stochastic electron acceleration during spontaneous turbulent reconnection in a strong shock wave *Y. Matsumoto et al.*

► PERSPECTIVE P. 944

**978 SURFACE CHEMISTRY**

Probing the transition state region in catalytic CO oxidation on Ru *H. Öström et al.*

**982 ACTUATING MATERIALS**

Voxelated liquid crystal elastomers *T. H. Ware et al.*

► PERSPECTIVE P. 949

**985 MOSQUITO BIOLOGY**

Evolution of sexual traits influencing vectorial capacity in anopheline mosquitoes *S. N. Mitchell et al.*

► PERSPECTIVE P. 948; PODCAST

**988 CLIMATE CHANGE**

Atlantic and Pacific multidecadal oscillations and Northern Hemisphere temperatures *B. A. Steinman et al.*

► PERSPECTIVE P. 952

**991 PEST CONTROL**

Full crop protection from an insect pest by expression of long double-stranded RNAs in plastids *J. Zhang et al.*

► PERSPECTIVE P. 950

**995 EBOLA VIRUS**

Two-pore channels control Ebola virus host cell entry and are drug targets for disease treatment *Y. Sakurai et al.*

► PERSPECTIVE P. 947

**998 ARCHAEOLOGY**

Sedimentary DNA from a submerged site reveals wheat in the British Isles 8000 years ago *O. Smith et al.*

► PERSPECTIVE P. 945

**1002 STEM CELLS**

m<sup>A</sup> mRNA methylation facilitates resolution of naïve pluripotency toward differentiation *S. Geula et al.*

**1006 CANCER**

TERT promoter mutations and telomerase reactivation in urothelial cancer *S. Borah et al.*

**1010 GENE REGULATION**

Transcribed enhancers lead waves of coordinated transcription in transitioning mammalian cells *E. Arner et al.*

**1014 EVOLUTION**

Evolutionary resurrection of flagellar motility via rewiring of the nitrogen regulation system *T. B. Taylor et al.*

**1017 TRANSCRIPTION**

CTCF establishes discrete functional chromatin domains at the *Hox* clusters during differentiation *V. Narendra et al.*

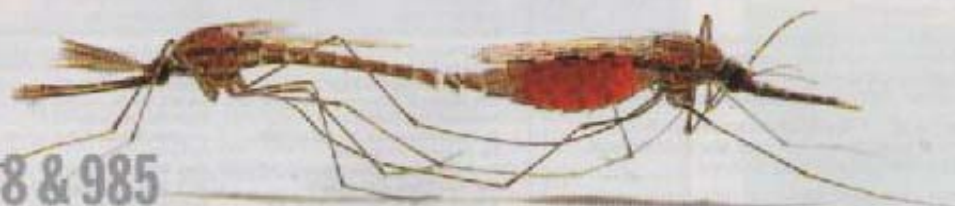
**ON THE COVER**



Ebola virus enters into cells in small vesicles called endosomes. Virus eventually moves into endosomes that have both NPC1 (dark blue rods) and TPC2 (yellow spikes) proteins on their membranes

and then into vesicles with TPC2 only. By disrupting the function of TPC2 with drugs, the virus is locked into the endosome, unable to be released to infect the cell. See pages 947 and 995. *Illustration: Valerie Altounian/Science*

**948 & 985**



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. Periodical postage paid at Washington, DC, and additional mailing offices. Copyright © 2015 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): \$128 (\$76 allocated to subscription). Domestic institutional subscription (51 issues): \$1282. Foreign postage extra. Mexico, Caribbean (surface mail): \$55; other countries (air second-class delivery): \$85. First-class, air-mail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #R123456789. Publications Mail Agreement Number 8069624. 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 96378, Washington, DC 20090-6378. Single-copy sales: \$10.00 current issue; \$15.00 back issue (includes surface postage); bulk rates on request. Authorization to photocopy materials 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.