CONTENTS

CONTENTS continued >>

www.sciencemag.org SCIENCE VOL 320 4 APRIL 2008 7

Published by AAAS

7

DEPARTMENTS

13 Science Online
15 This Week in Science
21 Editors’ Choice
24 Contact Science
27 Random Samples
29 Newsmakers
120 New Products
121 Science Careers

EDITORIAL

19 The Promise of Cancer Research by Bruce Alberts

NEWS OF THE WEEK

Review of Vaccine Failure Prompts a Return to Basics 30
NASA’s Stern Quits Over Mars Exploration Plans 31
Germs Take a Bite Out of Antibiotics 33
>> Report p. 100

SCIENCESCOPE

33 China’s LAMOST Observatory Prepares for the Ultimate Test
34 U.S. Asked to Bolster Ties With China
35 DNA From Fossil Feces Breaks Clovis Barrier
>> Science Express Report by M. T. P. Gilbert et al.

NEWS FOCUS

All in the Stroma: Cancer’s Cosa Nostra 38
American Physical Society Meeting 42
Magnetic Measurements Hint at Toaster Superconductivity
Laser Plays Chemical Matchmaker
Squeeze Play Makes Solid Helium Flow
Puzzling Over a Steller Whodunit 44

LETTERS

Conserving Top Predators in Ecosystems 47
G. Chapron, H. Andrén, O. Liberg
The Role of Fisheries-Induced Evolution 49
Tips for NIH M. Aickin

CORRECTIONS AND CLARIFICATIONS

50

BOOKS ET AL.

Violence A Micro-sociological Theory 51
R. Collins, reviewed by D. D. Laitin

BROWSINGS

52

POLICY FORUM

A Case Study of Personalized Medicine 53
S. H. Katsanis, G. Javitt, K. Hudson

PERSPECTIVES

Toward Understanding Self-Splicing 56
J. A. Piccirilli
>> Research Article p. 77

Blooms Like It Hot 57
H. W. Paerl and J. Huisman

Deconstructing Pluripotency 58
A. G. Bang and M. K. Carpenter
>> Report p. 97

Tel2 Finally Tells One Story 60
M. Chang and J. Lingner

Small-Scale Observations Tell a Cosmological Story 61
P. A. Bland
>> Report p. 91

Creating Musical Variation 62
D. S. Dabby

COVER

Single cobalt atoms (cones) on a stepped platinum substrate (blue), with attached stripes of one atomic layer of cobalt, magnetized up (yellow) or down (red), as imaged by spin-polarized scanning tunneling microscopy. Recording such images at successive magnetic fields enables measurement of the magnetic properties of individual atoms. See page 82.

Image: F. Meier et al.
(illustration: F. Marczinowski)
## ANTHROPOLOGY

**DNA from Pre-Clovis Human Coprolites in Oregon, North America**  
M. T. P. Gilbert et al.  
Fossil human feces from an Oregon cave predate the Clovis culture by about 1000 years, and DNA from the feces marks the presence of Native Americans in North America.  
>> News story p. 37  
10.1126/science.1154116

## PHYSICS

**BREVIA: Fine Structure Constant Defines Visual Transparency of Graphene**  
R. R. Nair et al.  
The transparency of sheets of graphene is quantized in a way that allows a simple determination of the fine structure constant, which relates light and relativistic electrons.  
10.1126/science.1156965

## MEDICINE

**ROS-Generating Mitochondrial DNA Mutations Can Regulate Tumor Cell Metastasis**  
K. Ishikawa et al.  
Mutations in mitochondrial DNA that cause enhanced production of reactive oxygen species can increase the propensity of tumor cells to metastasize.  
10.1126/science.1156906

## RESEARCH ARTICLES

### ARCHAEOLOGY

**Aztec Arithmetic Revisited: Land-Area Algorithms and Acolhua Congruence Arithmetic**  
B. J. Williams and M. del Carmen Jorge y Jorge  
Analysis of ancient property records shows that the Aztecs used common algorithms and a distance standard for calculating land area and specific symbols to represent fractions.

### BIOCHEMISTRY

**Crystal Structure of a Self-Spliced Group II Intron**  
N. Toor, K. S. Keating, S. D. Taylor, A. M. Pyle  
The autocatalytic group II intron contains a network of unusual tertiary RNA interactions that form a metalloflavinzyme active site with parallels to eukaryotic spliceosomes.  
>> Perspective p. 56

### REPORTS

### APPLIED PHYSICS

**Revealing Magnetic Interactions from Single-Atom Magnetization Curves**  
F. Meier, L. Zhou, J. Wiebe, R. Wiesendanger  
A scanning tunneling microscope with a spin-polarized tip can characterize the magnetic properties of single atoms on a nonmagnetic surface.

### CHEMISTRY

**The Roles of Subsurface Carbon and Hydrogen in Palladium-Catalyzed Alkyne Hydrogenation**  
D. Teschner et al.  
The population of hydrogen and carbon within a palladium catalyst governs the hydrogenation of alkynes on its surface.
REPORTS CONTINUED...

GEOCHEMISTRY
The Electrical Conductivity of Post-Perovskite in Earth’s D’ Layer
K. Ohta et al.
A major silicate mineral deep in Earth’s mantle has a high electrical conductivity, causing a sufficiently strong coupling with the core to explain variations in Earth’s rotation.

ASTRONOMY
Graphite Whiskers in CV3 Meteorites
M. Fries and A. Steele
Graphite whiskers, a naturally occurring allotrope of carbon, have been found in primitive grains in several meteorites and may explain spectral features of supernovae.

CLIMATE CHANGE
Covariant Glacial-Interglacial Dust Fluxes in the Equatorial Pacific and Antarctica
G. Winckler et al.
A 500,000-year record shows that more dust, which provides iron and other nutrients, was blown into the equatorial Pacific during glacial periods than during warm periods.

MOLECULAR BIOLOGY
Selective Blockade of MicroRNA Processing by Lin-28
S. R. Viswanathan, G. Q. Daley, R. I. Gregory
A protein necessary for reprogramming skin fibroblasts to pluripotent stem cells is an RNA-binding protein that normally inhibits microRNA processing in embryonic cells.

MICROBIOLOGY
Bacteria Subsisting on Antibiotics
G. Dantas et al.
A wide range of bacteria in the environment, many related to human pathogens, are both resistant to antibiotics and consume them as their only source of carbon for growth.

CELL BIOLOGY
Reversible Compartmentalization of de Novo Purine Biosynthetic Complexes in Living Cells
S. An, R. Kumar, E. D. Sheets, S. J. Benkovic
The enzymes needed for purine biosynthesis cluster in the cytoplasm when cells are depleted of purine but dissociate when the demand for purine is low.

BIOCHEMISTRY
Single-Molecule DNA Sequencing of a Viral Genome
T. D. Harris et al.
The M13 viral genome has been resequenced by a single-molecule method that allows simultaneous sequencing of 280,000 DNA strands of 25 bases with 100 percent coverage.

NEUROSCIENCE
Entrainment of Neuronal Oscillations as a Mechanism of Attentional Selection
P. Lakatos et al.
In monkeys that are paying attention to a rhythmic stimulus, brain oscillations become tuned to the stimulus so that the response in the visual cortex is enhanced.

NEUROSCIENCE
Episodic-Like Memory in Rats: Is It Based on When or How Long Ago?
W. A. Roberts et al.
Unlike humans, who can place past events within a temporal framework, rats can only remember when an event happened by tracking the time elapsed since its occurrence.
Gorgeous trains get no love from peahens.

SCIENCE NOW
www.sciennew.org  DAILY NEWS COVERAGE

Peacock Feathers: That’s So Last Year
Some female birds have lost interest in flashy males.

Traffic Jams Happen, Get Used to It
Physics helps explain bunch-ups on the highway.

Organics in the Mist
Astronomers find an amino acid precursor lurking in an interstellar cloud.

SCIENCE SIGNALING
www.stke.org  THE SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT

REVIEW: Calpain in the CNS—From Synaptic Function to Neurotoxicity
J. Liu, M. Cheng Liu, K. K. W. Wang
Physiological activation of calpains may play a role in memory, whereas pathological activation leads to cell death.

PODCAST
E. M. Adler and J. F. Foley
Mutations in the IGF-1 receptor are associated with longer life span in humans.

SCIENCE CAREERS
www.sciencenow.org/career_development  CAREER RESOURCES FOR SCIENTISTS

Taken for Granted: Help Is on the Way (for Some)
B. Benderly
A flurry of activity on workforce issues in early March did little to ease the problems of young scientists.

A Competitive Fellowship
J. Mervis
Next year, NSF officials hope to launch a novel training program connected to the president’s American Competitiveness Initiative.

Networking Group Seeks to Bridge the Poles
C. Reed
A fledgling organization connects polar scientists.

April 2008 Funding News
J. Fernández
Learn about the latest in research funding opportunities, scholarships, fellowships, and internships.

SCIENCE PODCAST
Download the 4 April Science Podcast to hear about DNA evidence of pre-Clovis people in the Americas, bacteria subsisting on antibiotics, Aztec arithmetic, and more.
www.sciencemag.org/about/podcast.dtl

Separate individual or institutional subscriptions to these products may be required for full-text access.