



COVER

Waiting for a vaccination to curb a meningitis epidemic under way in Koudougou district, Burkina Faso, in March. An affordable new meningitis vaccine in the works promises to prevent, not just control, these frequent epidemics. See page 1710.

Image: Monique Berlier/MVP-PATH

DEPARTMENTS

- 1689 Science Online
- 1691 This Week in *Science*
- 1696 Editors' Choice
- 1698 Contact *Science*
- 1701 Random Samples
- 1703 Newsmakers
- 1790 New Products
- 1791 Science Careers

EDITORIAL

- 1695 Long Road to Reform in France
by *Edouard Brézin and Antoine Triller*
>> *News story p. 1705*

NEWS OF THE WEEK

- Early Stonehenge Pilgrims Came From Afar, With Cattle in Tow 1704
- Despite Protest, CNRS Moves Toward Major Shakeup 1705
>> *Editorial p. 1695*
- Proposed Rule Would Limit Fish Catch but Faces Data Gaps 1706
- House Gives \$400 Million to Four Science Agencies 1706
- ITER Costs Give Partners Pause 1707
- SCIENCE SCOPE** 1707
- Senate Inquiry on Research Conflicts Shifts to Grantees 1708
- 'Biased' Viruses Suggest New Vaccine Strategy for Polio and Other Diseases 1709
>> *Report p. 1784*

NEWS FOCUS

- An Ill Wind, Bringing Meningitis 1710
Costs of Meningitis Outbreaks Are Crippling, Too
Clinical Trials: Dispelling Suspicions, Building Trust in Mali
- Building the Tree of Life, Genome by Genome 1716
>> *Report p. 1763*



1710

LETTERS

- The Verbosity Epidemic *R. F. Grais et al.* 1718
- The Future of the *CMJ* *M. Marušić and A. Marušić*
- The Case Against the *CMJ*'s Editors *N. Čikeš*
- Making Memories, Again *N. Lasry, E. Levy, J. Tremblay*
- Don't Forget the Fungi *S. Goldhor*

CORRECTIONS AND CLARIFICATIONS 1720

BOOKS ET AL.

- The Oxford Book of Modern Science Writing** 1721
R. Dawkins, Ed., reviewed by H. Andersen
- Forensics Under Fire** Are Bad Science and Dueling Experts Corrupting Criminal Justice? 1722
J. Fisher, reviewed by C. M. Bowers

EDUCATION FORUM

- Preschool Programs Can Boost School Readiness 1723
W. T. Gormley Jr., D. Phillips, T. Gayer

PERSPECTIVES

- Metamorphic Proteins 1725
A. G. Murzin
- Arrestin' Movement in Cilia 1726
R. Rohatgi and M. P. Scott
>> *Report p. 1777*
- Himalaya—Carbon Sink or Source? 1727
J. Gaillardet and A. Galy
- The Statistical Mechanics of Strain-Hardened Metals 1729
A. El-Azab
>> *Report p. 1745*
- Electron Relay in Proteins 1730
J. M. Bollinger Jr.
>> *Report p. 1760*



1721

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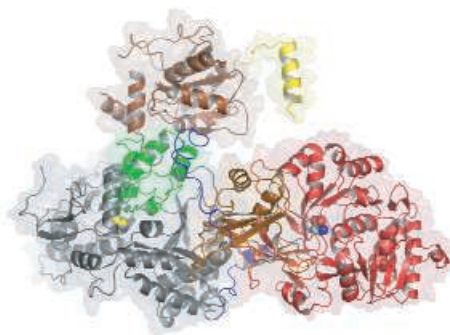
BIOCHEMISTRY

Crystal Structure of the Termination Module of a Nonribosomal Peptide Synthetase

A. Tanovic, S. A. Samel, L.-O. Essen, M. A. Marahiel

A large enzyme complex assembles peptide natural products without ribosomal participation by successive catalytic steps at the end of a flexible, substrate-loaded arm.

10.1126/science.1159850



CHEMISTRY

Measurement of the Distribution of Site Enhancements in Surface-Enhanced Raman Scattering

Y. Fang, N.-H. Seong, D. D. Dlott

The distribution of electric field-enhancing sites on a nanostructured substrate is measured by using the enhanced field to damage those sites.

10.1126/science.1159499

ASTRONOMY

Properties of Gamma-Ray Burst Progenitor Stars

P. Kumar, R. Narayan, J. L. Johnson

Analysis of the x-ray afterglow of intense gamma-ray bursts shows that the bursts result from consumption of the outer part of a dense star and define the star's rotation rate.

10.1126/science.1159003

REVIEW

PHYSICS

Quantum State Engineering and Precision Metrology 1734

J. Ye, H. J. Kimble, H. Katori

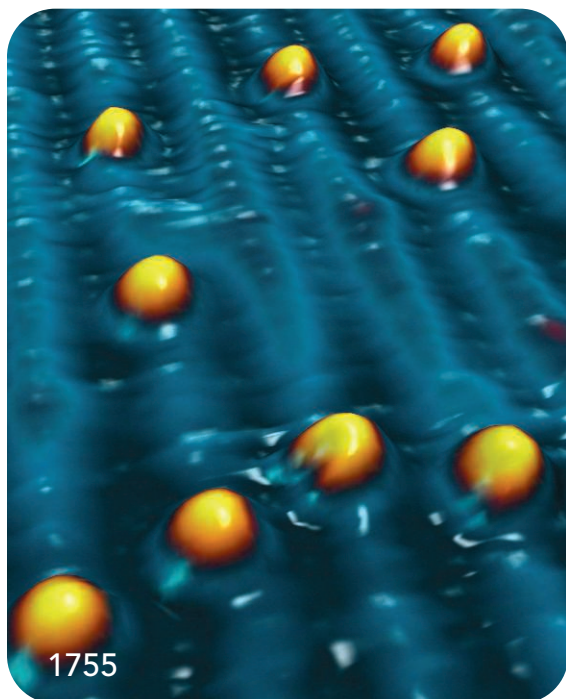
BREVIA

PSYCHOLOGY

Serotonin Modulates Behavioral Reactions to Unfairness 1739

M. J. Crockett et al.

Individuals with low levels of brain serotonin are less likely to accept an unfair offer of money from other players in a laboratory game.



RESEARCH ARTICLE

GEOLOGY

Deep Drilling into the Chesapeake Bay Impact Structure 1740

G. S. Gohn et al.

Drill cores from the Chesapeake Bay impact crater reveal that the impact moved huge blocks of country rock, trapped salty pore water, and still affects microbial communities.

REPORTS

MATERIALS SCIENCE

Dislocation Mean Free Paths and Strain Hardening of Crystals 1745

B. Devincre, T. Hoc, L. Kubin

Simulations of the motions of atomic dislocations in a face-centered cubic metal allow these dynamics to be related to the metal's bulk strength and deformation. >> *Perspective p. 1729*

MATERIALS SCIENCE

Ordered Mesoporous Materials from Metal Nanoparticle-Block Copolymer Self-Assembly 1748

S. C. Warren et al.

A polymer and platinum nanoparticles stabilized with a ligand form large lamellar or inverse hexagonal structures that can be fused to create porous platinum-carbon composites.

ASTRONOMY

Very-High-Energy Gamma Rays from a Distant Quasar: How Transparent Is the Universe? 1752

The MAGIC Collaboration

Observation of gamma rays from a quasar 5 billion light-years away implies that the background light in the universe is consistent with surveys of stars and galaxies.

CHEMISTRY

The Role of Interstitial Sites in the Ti3d Defect State in the Band Gap of Titania 1755

S. Wendt et al.

Scanning tunneling microscope data and calculations show that near-surface titanium sites, not bridging oxygen vacancies, determine the useful electronic properties of TiO₂.

CONTENTS continued >>

REPORTS CONTINUED...

CHEMISTRY

Tryptophan-Accelerated Electron Flow Through Proteins 1760
C. Shih et al.

A tryptophan residue placed between a donor and acceptor in a protein acts as a relay and accelerates long-distance electron transfer by more than a factor of 100.

>> *Perspective p. 1730*

EVOLUTION

A Phylogenomic Study of Birds Reveals Their Evolutionary History 1763
S. J. Hackett et al.

Nuclear DNA sequences of 19 loci from 169 bird species lead to a revised phylogenetic tree of avian evolution, in which several well-accepted orders are not monophyletic.

>> *News story p. 1716; Science Podcast*

ECOLOGY

A Significant Upward Shift in Plant Species Optimum Elevation During the 20th Century 1768
J. Lenoir, J. C. Gégout, P. A. Marquet, P. de Ruffray, H. Brisse

A 100-year survey shows that the optimal elevations for growth of plant species in European temperate forests have shifted upward by about 30 meters per decade. >> *Science Podcast*

DEVELOPMENTAL BIOLOGY

Polarization of the *C. elegans* Embryo by RhoGAP-Mediated Exclusion of PAR-6 from Cell Contacts 1771

D. C. Anderson, J. S. Gill, R. M. Cinalli, J. Nance

Exclusion of a regulatory protein from cell-cell contacts in the developing worm allows it to direct the assembly of an asymmetrical cytoskeleton in preparation for gastrulation.

DEVELOPMENTAL BIOLOGY

FGF-Dependent Mechanosensory Organ Patterning in Zebrafish 1774

A. Nechiporuk and D. W. Raible

A fish sensory organ develops when a wave of migrating primordial cells cyclically deposits rosettes of differentiated cells under the influence of fibroblast growth factor.

CELL BIOLOGY

β -Arrestin-Mediated Localization of Smoothed to the Primary Cilium 1777

J. J. Kovacs et al.

β -arrestin, which has several known roles in signaling systems, also links a key receptor to a motor protein so that the receptor can be transported to cilia for sensing environmental cues.

>> *Perspective p. 1726*

MOLECULAR BIOLOGY

Both Catalytic Steps of Nuclear Pre-mRNA Splicing Are Reversible 1782

C.-K. Tseng and S.-C. Cheng

The transesterification splicing reactions performed on RNA by the spliceosome protein complex in eukaryotic cells are reversible.

VIROLOGY

Virus Attenuation by Genome-Scale Changes in Codon Pair Bias 1784

J. R. Coleman et al.

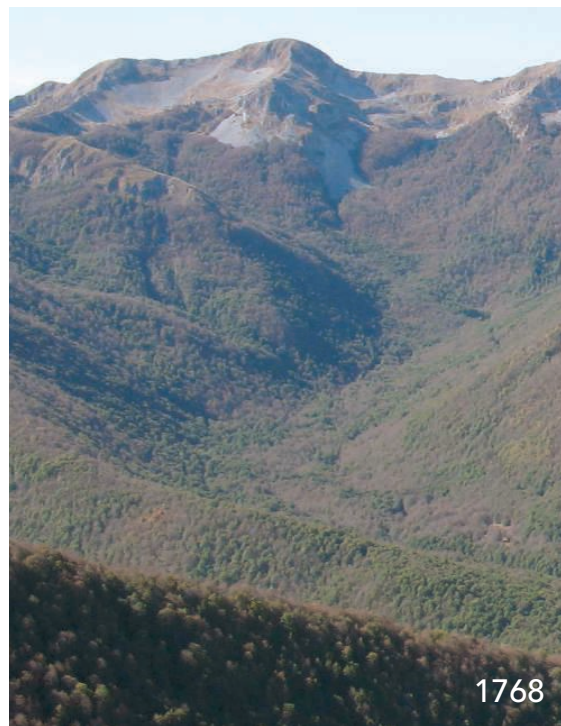
Altering the frequency of the adjacent codons in the poliovirus genome results in an attenuated virus that could form the basis of a vaccine. >> *News story p. 1709*

GENETICS

Paleo-Eskimo mtDNA Genome Reveals Matrilineal Discontinuity in Greenland 1787

M. T. P. Gilbert et al.

Ancient human DNA sequences from Greenland suggest that the earliest inhabitants of the far north were from a lineage distinct from extant Native Americans and Eskimos.



1768



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CONTENTS continued >>



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P. Gosling and B. Noordam

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S. Webb

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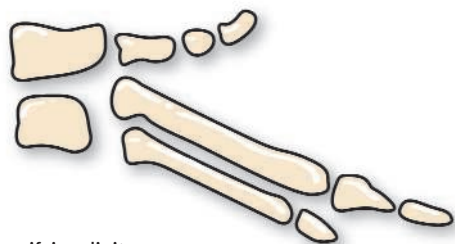
L. Laursen

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PERSPECTIVE: Uncoupling the Role of Sonic Hedgehog in Limb Development—Growth and Specification

P. Francis-West and R. Hill

Sonic hedgehog (Shh) is required for both proliferation and specification of cells in the developing limb bud.

PERSPECTIVE: p53 Brings a New Twist to the Smad Signaling Network

A. Atfi and R. Baron

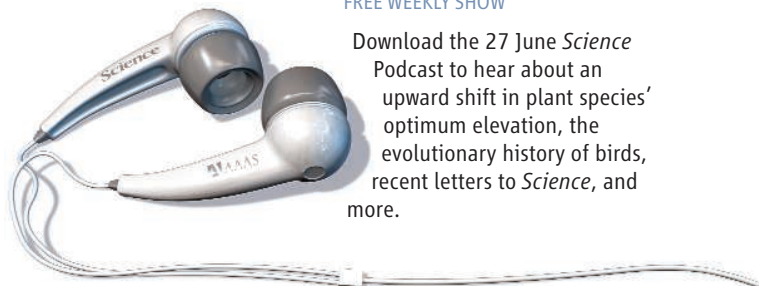
Interactions between p53 and Smad proteins influence the responses to the TGF- β pathway, which may be important for progression of some types of cancer.

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