



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

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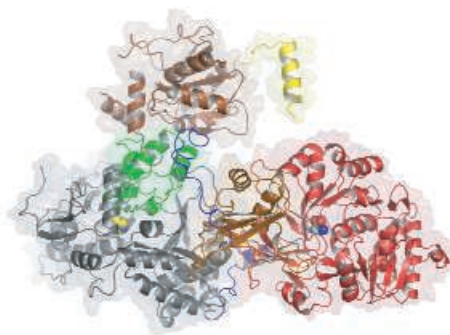
BIOCHEMISTRY

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

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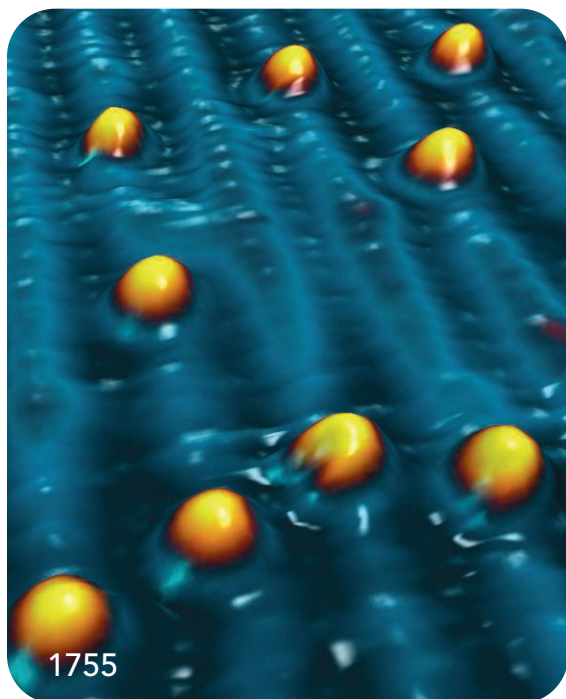
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Deep Drilling into the Chesapeake Bay Impact Structure 1740

G. S. Gohn et al.

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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.

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

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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*

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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*

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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.

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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.

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

J. R. Coleman et al.

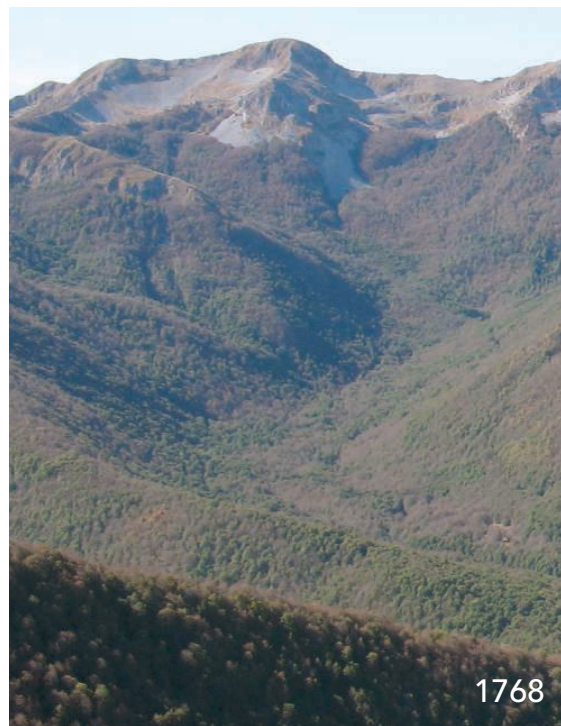
Altering the frequency of the adjacent codons in the poliovirus genome results in an attenuated virus that could form the basis of a vaccine. >> *News story p. 1709*

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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.



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P. Gosling and B. Noordam

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S. Webb

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Creativity and Persistence Overcome Failure

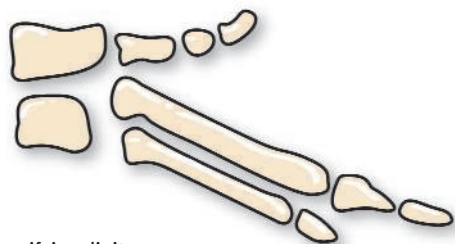
L. Laursen

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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

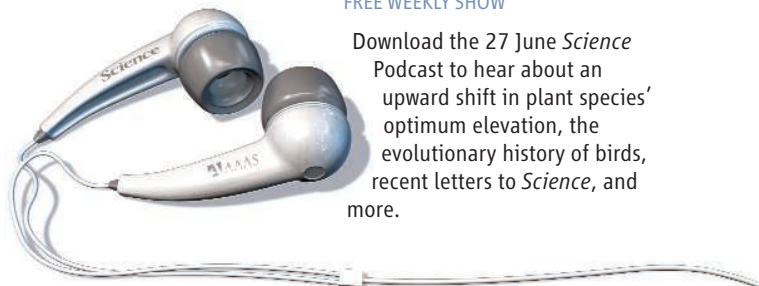
Interactions between p53 and Smad proteins influence the responses to the TGF- β pathway, which may be important for progression of some types of cancer.

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