Cover

A cotton bollworm larva (Helicoverpa armigera) feeds on a cotton boll. Transgenic Bt cotton was designed to resist this and other caterpillar pests. See page 1676.

Image: Nigel Cattlin/Visuals Unlimited Inc.

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A High Phase-Space-Density Gas of Polar Molecules
K.-K. Ni et al.
Raman laser irradiation can cool a cloud of KRb molecules to ultralow translational, vibrational, and rotational temperatures, a step toward forming molecular condensates.
10.1126/science.1163861

IMMUNOLOGY
Innate Immunity in Caenorhabditis elegans Is Regulated by Neurons Expressing NPR-1/GPCR
K. L. Styer et al.
In the nematode Caenorhabditis elegans, sensory neurons surprisingly can inhibit innate immune responses, in part through the mitogen-activated protein kinase signaling pathway.
10.1126/science.1163673

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Comment on “Age and Evolution of the Grand Canyon Revealed by U-Pb Dating of Water Table–Type Speleothems”
J. Pederson et al.
full text at www.sciencemag.org/cgi/content/full/321/5896/1634b
Comment on “Age and Evolution of the Grand Canyon Revealed by U-Pb Dating of Water Table–Type Speleothems”
P. A. Pearthree, J. E. Spencer, J. E. Faulds, P. K. House
full text at www.sciencemag.org/cgi/content/full/321/5896/1634c
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V. Polyak, C. Hill, Y. Asmerom
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BREVIA
CLIMATE CHANGE
Ancient Permafrost and a Future, Warmer Arctic
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The existence of a 700,000-year-old patch of permafrost in sub-Arctic Canada shows that ground ice far from the pole can resist melting during warm intervals.
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CELL BIOLOGY
White Fat Progenitor Cells Reside in the Adipose Vasculature
W. Tang et al.
Adipocytes (fat cells) originate from precursor cells that reside within the walls of the blood vessels that feed fat tissue.
10.1126/science.1156232

CHEMISTRY
Catalytic Conversion of Biomass to Monofunctional Hydrocarbons and Targeted Liquid-Fuel Classes
E. L. Kunkes et al.
A set of two reactors, one that breaks down biomass sugars and a second that directs chain formation, can synthesize various hydrocarbon fuels.
10.1126/science.1159210

REPORTS
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F. Schmitt et al.
Photoemission spectroscopy is extended to reveal the dynamics of correlated electronic phase transitions, showing how ordered electrons “melt” upon heating of TbTe3.
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F. Huo et al.
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4D Electron Diffraction Reveals Correlated Unidirectional Behavior in Zinc Oxide Nanowires
D.-S. Yang, C. Lao, A. H. Zewail
Ultrafast electron diffraction reveals that exciting the electrons of a zinc oxide nanowire causes a sudden extension, more than a hundred times longer than expected from heating.
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GEOCHEMISTRY
Chondrulelike Objects in Short-Period Comet 81P/Wild 2 T. Nakamura et al.
Stardust samples from a comet, thought to be from the outer solar system, include grains like those in chondrules, primitive grains that formed in the inner solar system.

PSYCHOLOGY
Political Attitudes Vary with Physiological Traits D. R. Oxley et al.
Individuals’ views on political issues relate to their physiological reactions to threatening stimuli: Desire to protect their group’s interests correlates with greater reactivity to threat.

MICROBIOLOGY
An Alternative Menaquinone Biosynthetic Pathway Operating in Microorganisms T. Hiratsuka et al.
Some pathogens synthesize the essential vitamin menaquinone by an unusual pathway, presenting a potential target for new antibiotics.

ECOLOGY
Can Catch Shares Prevent Fisheries Collapse? C. Costello, S. D. Gaines, J. Lynham
Global catch statistics since 1950 suggest that fisheries will be half as likely to collapse if fisherman have a sustainability incentive through a guaranteed right of harvest.

EVOLUTION
Parasite Treatment Affects Maternal Investment in Sons T. E. Reed et al.
Mother seabirds that are infected by parasitic nematodes are less able to gather food and feed their fast-growing sons, shifting the sex ratio and affecting population viability.

DEVELOPMENTAL BIOLOGY
Apoptotic Force and Tissue Dynamics During Drosophila Embryogenesis Y. Toyama et al.
During development, programmed cellular death within sheets of cells can generate forces that accelerate tissue fusion; a similar process may apply to wound healing.

MICROBIOLOGY
An Inhibitor of FtsZ with Potent and Selective Anti-Staphylococcal Activity D. J. Haydon et al.
A small synthetic molecule directed against a microbial protein required for cell division protects mice infected with Staphylococcus aureus from death.

ECOLOGY
Suppression of Cotton Bollworm in Multiple Crops in China in Areas with Bt Toxin—Containing Cotton K.-M. Wu, Y.-H. Lu, H.-Q. Feng, Y.-Y. Jiang, J.-Z. Zhao
Planting engineered cotton that expresses a natural toxin reduces pest damage to both the cotton itself and to other crops planted nearby, reducing the need for insecticidal spray.

ECOLOGY
Strength onto Midbrain Dopamine Neurons Reward-Predictive Cues Enhance Excitatory Synaptic Responses in Dopamine Neurons in the Midbrain D. R. Oxley et al.
When a rat learns to associate a cue with a reward, dopamine-containing neurons in the midbrain acquire an enhanced response to that cue through the action of glutamate.

MEDICINE
Clusters of Hyperactive Neurons Near Amyloid Plaques in a Mouse Model of Alzheimer’s Disease M. A. Busche et al.
In a mouse model of Alzheimer’s disease, neurons close to the characteristic deposits of amyloid show high activity, in contrast to the overall reduction in brain function.

MOLECULAR BIOLOGY
Molecular Coupling of Xist Regulation and Pluripotency P. Navarro et al.
X chromosome inactivation in stem cells is reversed, a step in allowing them to become pluripotent, when three factors repress the inactivation RNA.
Mouthful.

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SDF-1 bound to CXCR4.

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RESEARCH ARTICLE: Structural Basis of CXCR4 Sulfotyrosine
Recognition by the Chemokine SDF-1/CXCL12
C. T. Veldkamp, C. Seibert, F. C. Peterson, N. B. De la Cruz,
J. C. Haugner III, H. Basnet, T. P. Sakmar, B. F. Volkman
The structure of SDF-1 bound to an extracellular domain of CXCR4 illustrates
how chemokines recognize receptor sulfotyrosines and helps to identify an
inhibitor of leukocyte chemotaxis.

PROTOCOL: Analysis of Signaling Events by Combining
High-Throughput Screening Technology with Computer-Based
Image Analysis
M. Kodiha, C. M. Brown, U. Stochaj
High-throughput screening and MetaXpress software modules can be
adapted to quantify the subcellular localization of fluorescently labeled
molecules.

PRESENTATION: Dynamic Visualization of Signaling Activities in
Living Cells
M. D. Allen, L. M. DiPilato, B. Ananthanarayanan, R. H. Newman,
Q. Ni, J. Zhang
Engineered fluorescent reporters allow researchers to follow subcellular
activities of signaling components in real time in live cells.

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