



COVER

A metaphorical USB cable transmitting genetic information to “reprogram” cells symbolizes the Breakthrough of the Year for 2008. Advances in the burgeoning field of cellular reprogramming have brought scientists closer to the goal of using stem cells to better understand and someday treat disease. See the special section beginning on page 1766.

Image: Chris Bickel

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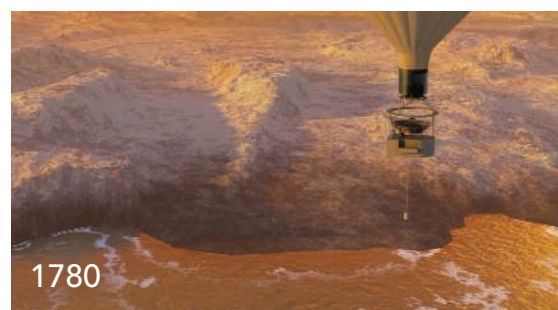
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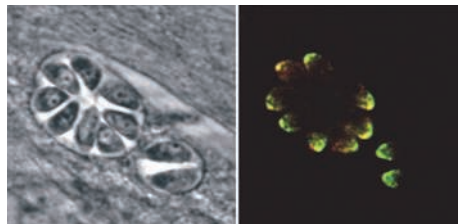
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10.1126/science.1165787

PLANT SCIENCE

Glucosinolate Metabolites Required for an *Arabidopsis* Innate Immune Response

N. K. Clay, A. M. Adio, C. Denoux, G. Jander, F. M. Ausubel

10.1126/science.1164627

A Glucosinolate Metabolism Pathway in Living Plant Cells Mediates Broad-Spectrum Antifungal Defense

P. Bednarek et al.

Plant cells defend against fungal attack through an innate immunity pathway in which infection triggers glucosinolate synthesis, stimulating formation of a protective callose.

10.1126/science.1163732

MICROBIOLOGY

Rapid Membrane Disruption by a Perforin-Like Protein Facilitates Parasite Exit from Host Cells

B. F. C. Kafsack et al.

The human and animal parasite that causes toxoplasmosis escapes from host cells by using a perforin-like protein to make holes in the intracellular vacuole in which it resides.

10.1126/science.1165740

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Electron Cryomicroscopy of *E. coli* Reveals Filament Bundles Involved in Plasmid DNA Segregation

J. Salje, B. Zuber, J. Löwe

The actin-like filaments that power movement of DNA during bacterial cell division form small bundles of three to five filaments near the nucleoid.

10.1126/science.1164346

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M. Krkošek et al.

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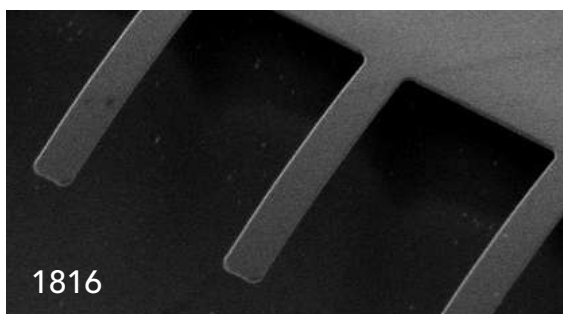
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The change in density during crystallization predicts which copper-zirconium alloys can most easily form a metallic glass.

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A family of transcription factors controls the formation of leaflets and lobes in complex leaves in distantly related plants by controlling outgrowth from leaf margins.

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A way to reactivate a fetal form of γ -globin in adults—by releasing it from repression by an inhibitor—may prove useful for treating certain genetic anemias. >> *Perspective p. 1803*

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- Nascent RNA Sequencing Reveals Widespread Pausing and Divergent Initiation at Human Promoters** 1845

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>> *Perspective p. 1804*



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A. C. Seila et al.

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P. Preker et al.

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Y. He et al.

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C. W. Freudiger et al.

Three-dimensional imaging based on stimulated Raman scattering can detect lipids in living cells and monitor the movement of drugs through the skin.

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A. Colmone et al.

Cancerous immune cells create abnormal microenvironments in bone marrow that attract normal immune precursor cells, disrupting their function and exacerbating disease.

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- Representation of Geometric Borders in the Entorhinal Cortex** 1865

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A previously unknown cell type in the brain's cortex encodes geometric boundaries of the nearby environment, perhaps providing a frame of reference.



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Science in translation.

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Programs Aim to Train Translational Scientists

B. Vastag

New Ph.D. programs in translational medicine provide basic science training and clinical experience.

A Young Scientist at the Forefront of Cell Reprogramming

E. Pain

Curiosity, boldness, and single-mindedness won Austrian scientist Konrad Hochedlinger a place in cell reprogramming, *Science's* Breakthrough of the Year for 2008.

>> *Breakthrough of the Year* section p. 1766 and

www.sciencemag.org/btoy2008/

Tooling Up: The ABCs of Transitioning to Leadership

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From the Archives: Translational Research Careers

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Translational researchers are pushing a fundamental change in the way science has operated for decades.

Visualizing gene expression dynamics.

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MEETING REPORT: Ontologies of Cellular Networks

R. Arp and B. Smith

A meeting of philosophers and biologists reveals the great diversity in ideas about how pathway information can be organized.

PODCAST

J. F. Foley and A. M. VanHook

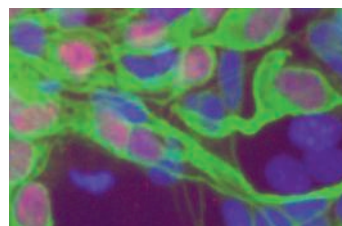
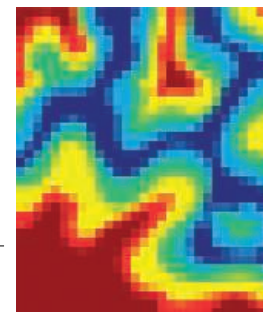
Binding of CD3ε subunits to plasma membrane lipids blocks T cell receptor signaling.

NETWATCH: GEDI, the Gene Expression Dynamics Inspector

Convert microarray data into visual portraits to identify genes that share dynamic expression profiles; in *Bioinformatics Resources*.

NETWATCH: NIH VideoCasting and Podcasting

Watch live and archived NIH-sponsored events; in *Web Broadcasts*.



SCIENCE ONLINE FEATURE

VIDEO: 2008 Breakthrough of the Year

An introduction to some of the work that led studies in reprogramming cells to be tagged the top scientific story for 2008.

>> *Breakthrough of the Year* section p. 1766 and

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Science **322** (5909), 1753-1869.

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