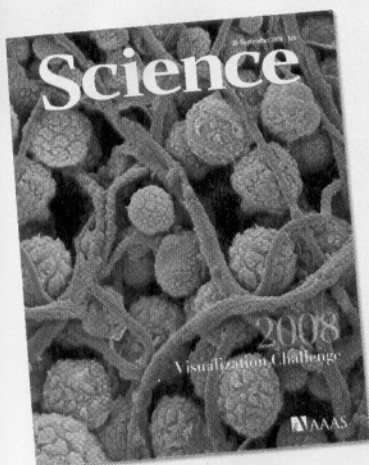




COVER

Boulders and roots, or spores and hyphae? Parallel microscopic and macroscopic worlds merge in this detail from one of the winners of this year's *Science*/NSF International Science & Engineering Visualization Challenge. See the special section beginning on page 1767.

Image: Colleen Champ, with micrographs by Dennis Kunkel

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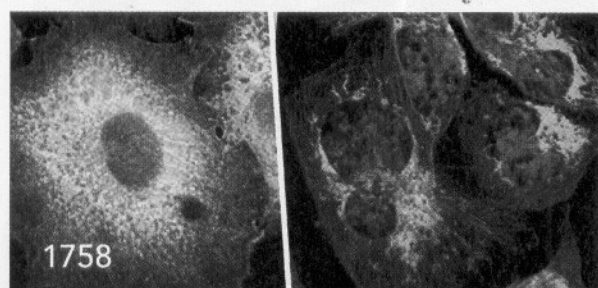
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SCIENCE EXPRESS

www.sciencexpress.org

DEVELOPMENTAL BIOLOGY

Induced Pluripotent Stem Cells Generated Without Viral Integration

M. Stadtfeld, M. Nagaya, J. Utikal, G. Weir, K. Hochedlinger

Transient exposure of mouse fibroblast and liver cells to an adenovirus vector carrying factors that induce pluripotency generates stem cells without viral elements in the genome.

10.1126/science.1162494

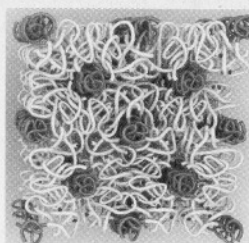
GENETICS

Conservation and Rewiring of Functional Modules Revealed by an Epistasis Map in Fission Yeast

A. Roguev et al.

Comparison of genetic wiring in two types of yeast reveals that protein complexes are conserved, but the interactions between them can change radically between species.

10.1126/science.1162609



MATERIALS SCIENCE

Evolution of Block Copolymer Lithography to Highly Ordered Square Arrays

C. Tang, E. M. Lennon, G. H. Fredrickson, E. J. Kramer, C. J. Hawker

The addition of hydrogen bonding units to two block copolymers leads to a template with square patterns that can be used for manufacturing integrated circuits.

10.1126/science.1162950

PHYSICS

Complete Characterization of Quantum-Optical Processes

M. Lobino, D. Korystov, C. Kupchak, E. Figueroa, B. C. Sanders, A. I. Lvovsky

A method requiring only the light from a laser as an input yields a full characterization of quantum optical processes by probing its effect on classical states.

10.1126/science.1162086

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CHEMISTRY

Assembling Materials with DNA as the Guide

F. A. Aldaye, A. L. Palmer, H. F. Sleiman

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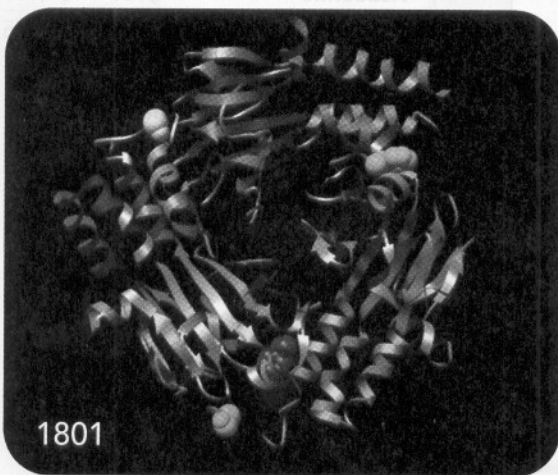
GEOPHYSICS

Magnetic Source Separation in Earth's Outer Core

K. A. Hoffman and B. S. Singer

Analysis of Earth's magnetic field as it has changed and reversed suggests that its dipole arises from a distinct part of the outer core than that of the rest of the field.

>> News story p. 1756



1801

RESEARCH ARTICLES

MEDICINE

Core Signaling Pathways in Human Pancreatic Cancers Revealed by Global Genomic Analyses

S. Jones et al.

1801

Sequencing of DNA mutations shows that the same 12 signaling pathways are disrupted in most pancreatic tumors, suggesting these as key to tumor development.

MEDICINE

An Integrated Genomic Analysis of Human Glioblastoma Multiforme

D. W. Parsons et al.

1807

Comprehensive analysis of mutations in a brain cancer identifies previously unidentified cancer genes and a frequently mutated protein that may serve as a therapeutic marker.

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PHYSICS

Quantum Communication with Zero-Capacity Channels

G. Smith and J. Yard

1812

Two quantum communication channels, each of which is so noisy that it has zero capacity to independently transmit information, can do so when used together.

>> Perspective p. 1783

CHEMISTRY

Synthesis and Solid-State NMR Structural Characterization of ¹³C-Labeled Graphite Oxide

W. Cai et al.

1815

Solid-state nuclear magnetic resonance study of graphite oxide made with 100 percent carbon-13 reveals a complex bonding network involving several carbon species.

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Induced by Atomic Electron-Transfer Reactions

A. E. Bragg, M. C. Cavanagh, B. J. Schwartz

A solvent equilibrates faster around a sodium-electron ion pair formed from Na^+ than from Na^- , violating a widely used approximation for modeling solvent dynamics.

>> *Perspective p. 1789*

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- Mars' Paleomagnetic Field as the Result of a** 1822
Single-Hemisphere Dynamo

S. Stanley, L. Elkins-Tanton, M. T. Zuber, E. M. Parmentier

A model of Mars' early magnetic field with a north-south gradient in heat flow from the core yields a strong field only in the south, explaining the relic magnetism in the crust.

>> *News story p. 1756; Perspective p. 1784*

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- The Structure and Dynamics of Mid-Ocean Ridge** 1825
Hydrothermal Systems

D. Coumou, T. Driesner, C. A. Heinrich

A three-dimensional model shows that mid-ocean hydrothermal systems self-organize into broad warm downflows feeding narrow, pipelike hot upflows.

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- Neodymium-142 Evidence for Hadean Mafic Crust** 1828

J. O'Neil, R. W. Carlson, D. Francis, R. K. Stevenson

An unusual isotopic anomaly in rocks along the Hudson Bay suggests that they formed 4.28 billion years ago and support early formation of a separate reservoir in Earth's mantle.

>> *News story p. 1755; Science Podcast*

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- Infants' Perseverative Search Errors Are Induced by** 1831
Pragmatic Misinterpretation

J. Topál, G. Gergely, Á. Miklósi, Á. Erdőhegyi, G. Csibra

Infants may make mistakes in certain tasks because of the powerful effects of social interaction with an adult, not because of brain immaturity as was previously assumed.

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- Antigen Recognition by Variable Lymphocyte** 1834
Receptors

B. W. Han, B. R. Herrin, M. D. Cooper, I. A. Wilson

The receptor that binds antigens in jawless vertebrates differs from the immunoglobulins of jawed vertebrates and uses a variable concave surface and Carboxyl terminal for recognition.



MEDICINE

- Disruption of the CFTR Gene Produces a Model of** 1837
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C. S. Rogers et al.

Newborn pigs carrying a mutated copy of the gene defective in cystic fibrosis exhibit many features of the human disease and may provide fresh insights for therapy.

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- Seeding and Propagation of Untransformed Mouse** 1841
Mammary Cells in the Lung

K. Podsypanina et al.

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C. Efferson, R. Lalive, E. Fehr

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M. R. Delgado, A. Schotter, E. Y. Ozbay, E. A. Phelps

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