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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
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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F. A. Aldaye, A. L. Palmer, H. F. Sleiman
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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 rather than that of the rest of the field.
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RESEARCH ARTICLES
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Core Signaling Pathways in Human Pancreatic Cancers Revealed by Global Genomic Analyses
S. Jones et al.
Sequencing of DNA mutations shows that the same 12 signaling pathways are disrupted in most pancreatic tumors, suggesting these as key to tumor development.
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MEDICINE
An Integrated Genomic Analysis of Human Glioblastoma Multiforme
D. W. Parsons et al.
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
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.
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CHEMISTRY
Synthesis and Solid-State NMR Structural Characterization of 13C-Labeled Graphite Oxide
W. Cai et al.
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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CHEMISTRY

Linear Response Breakdown in Solvation Dynamics 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

PLANETARY SCIENCE

Mars’ Paleomagnetic Field as the Result of a 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

GEOCHEMISTRY

The Structure and Dynamics of Mid-Ocean Ridge 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.

GEOCHEMISTRY

Neodymium-142 Evidence for Hadean Mafic Crust
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.

PSYCHOLOGY

Infants’ Perseverative Search Errors Are Induced by 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.

BIOCHEMISTRY

Antigen Recognition by Variable Lymphocyte Receptors
B. W. Han, B. R. Herrin, M. D. Cooper, I. A. Wilson
The receptor that binds antigens in jawless vertebrates and uses a variable concave surface and Carboxyl terminal for recognition.

MEDICINE

Disruption of the CFTR Gene Produces a Model of Cystic Fibrosis in Newborn Pigs
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.

GEOPHYSICS

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.

PLANETARY SCIENCE

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PSYCHOLOGY

Understanding Overbidding: Using the Neural Circuitry of Reward to Design Economic Auctions
M. R. Delgado, A. Schotter, E. Y. Ozbay, E. A. Phelps
Brain areas sensitive to loss are selectively engaged during bidding, violating a widely used approximation for modeling solvent dynamics. >> Perspective p. 1789

PSYCHOLOGY

The Coevolution of Cultural Groups and Ingroup Favoritism
C. Efferson, R. Lalive, E. Fehr
Results of a laboratory game show that cultural groups and ingroup favoritism arise spontaneously when individuals display an external marker that predicts their actions.

MEDICINE

Seeding and Propagation of Untransformed Mouse Mammary Cells in the Lung
K. Podsypannia et al.
In mice, normal mammary cells can colonize the lung, suggesting that metastases might arise from displaced normal cells acquiring genetic changes that confer malignancy.

MEDICINE

Understanding Overbidding: Using the Neural Circuitry of Reward to Design Economic Auctions
M. R. Delgado, A. Schotter, E. Y. Ozbay, E. A. Phelps
Brain areas sensitive to loss are selectively engaged during bidding, suggesting that the desire to avoid loss underlies the phenomenon of overbidding. >> Perspective p. 1789
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A potentially deadly fungus was accidentally introduced as part of a breeding program for an endangered amphibian.

Wasps Make Peace With Past Enemies
The insects steer clear of foes they have fought in the past.

Fat Molecule Fights Weight Gain
Compound prevents mice from storing unhealthy fat.

Intracellular colocalization of Grb10 and IGF-1 receptors.

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RESEARCH ARTICLE: Nedd4 Controls Animal Growth by Regulating IGF-1 Signaling
X. R. Cao, N. L. Lill, N. Boase, P. P. Shi, D. R. Croucher, H. Shan, J. Qu, E. M. Sweezer, T. Place, P. A. Kirby, R. J. Daly, S. Kumar, B. Yang
Nedd4 acts through Grb10 to enhance insulin-like growth factor signaling and control animal growth.

PERSPECTIVE: Caspase-2—Vestigial Remnant or Master Regulator?
C. M. Troy and E. M. Ribe
Both mitochondrial-dependent and -independent cell death pathways are mediated by caspase-2.

PODCAST
E. M. Adler, N. R. Gough, A. M. VanHook
Bacteria secrete factors that regulate genes that contribute to virulence.

Dave Jensen tools up his own career.

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Tooling Up: My Career Dissected
D. Jensen
Dave Jensen highlights some of his own career mistakes.

From Watching 'The Expert' to Being an Expert
L. Cahoon
Melanie Lee attributes her success partly to a childhood TV show.

Union Aftershocks in California
C. Rey
Postdocs and others in the University of California system adjust to life with a union.

The Science Careers Web Log
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Here’s where to find information from around the Web on careers in the sciences.

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