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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

REVIEW
CHEMISTRY
Assembling Materials with DNA as the Guide
F. A. Aldaye, A. L. Palmer, H. F. Sleiman

BREVIA
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

RESEARCH ARTICLES
MEDICINE
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.

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.

REPORTS
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.
>> Perspective p. 1783

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.

NEODYMIUM-142 EVIDENCE FOR HADEAN MAFFIC 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.

>> News story p. 1755; Science Podcast

PSYCHOLOGY
Infants’ Perseverative Search Errors Are Induced by Pragmatic Misinterpretation
J. Topál, G. Gergely, Ľ. Miklósi, Ľ. Erdöhegyi, 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.

>> Perspective p. 1785

BIOCHEMISTRY
Antigen Recognition by Variable Lymphocyte Receptors
B. W. Han, B. R. Herrin, M. D. Cooper, J. 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 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.

Seedling and Propagation of Untransformed Mouse Mammary Cells in the Lung
K. Padospanna 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.

>> Perspective p. 1784

Ingroup Favoritism
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 success.

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 in an auction, suggesting that the desire to avoid loss undermines the phenomenon of overbidding.

Retroviruses and Cancer
M. R. Delgado, A. Schotter, E. Y. Ozbay, E. A. Phelps
Newer experiments suggest that retroviral infection of the genome early in life can produce cancer at a later age.

>> News story p. 1759; Perspectives p. 1784

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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.