A mouse embryo at 9 days of gestation, stained for \( \alpha \)-fetoprotein in the liver bud and yolk sac (upper left and right green domains) and for the transcription factor Pdx-1 in the ventral and dorsal pancreas buds (upper and lower red domains). Understanding the basis for organ development can provide insights into disease and stem cell programming. See the special section beginning on page 1489.

Image: Ewa Wandzioch and Ken Zaret
Human Fetal Hemoglobin Expression Is Regulated by the Developmental Stage-Specific Repressor BCL11A
V. G. Sankaran et al.
A way to reactivate a fetal form of γ-globulin in adults—by releasing it from repression by an inhibitor—may prove useful for treating certain genetic anemias.
10.1126/science.1165409

RNA sequencing identifies antisense transcription immediately upstream of genes with transcriptionally engaged RNA polymerase.
10.1126/science.1162228

Active genes produce promoter-localized sense and antisense short RNAs, suggesting frequent transcription by divergently oriented RNA polymerase II complexes at mammalian promoters.
10.1126/science.1162253

How Cold Is Cold Dark Matter?
G. Gilmore

A Curious Antipathy for Water
S. Granick and S. C. Bae

Crops for a Salinized World
J. Rozema and T. Flowers

Controlling Cold-Atom Conductivity
L. Fallani and M. Inguscio

Elements and Evolution
A. D. Anbar

Fat Stress and Liver Resistance
W. Ogawa and M. Kasuga

Competitive Centromeres
D. Charlesworth

The Long-Run Benefits of Punishment
S. Gächter, E. Renner, M. Sefton

Dynamic Proteomics of Individual Cancer Cells in Response to a Drug
A. A. Cohen et al.

Tough, Bio-Inspired Hybrid Materials
E. Munch et al.

Lamellar ice is used as a template to form an aluminum oxide scaffold that can be pressed and filled with a polymer, producing a tough layered structure reminiscent of nacre.

Metallic and Insulating Phases of Repulsively Interacting Fermions in a 3D Optical Lattice
U. Schneider et al.

A cold atom cloud confined to an optical lattice can be tuned from a metal to an insulator.
REPORTS

PHYSICS
Attosecond Ionization and Tunneling Delay Time Measurements in Helium
P. Eckle et al.
A technique based on resolving the momentum of an electron escaping from a helium atom in an elliptically polarized light field clocks tunneling at less than 34 attoseconds.

GEOPHYSICS
Optical Absorption and Radiative Thermal Conductivity Silicate Perovskite to 125 GPa
H. Kepller, L. S. Dubrovinsky, O. Narygin, I. Kantor
At high pressures, silicate perovskite, abundant in Earth’s mantle, is not opaque to optical and infrared light, implying that radiative heat flow is important in the deep Earth.

PLANETARY SCIENCE
Quasi-Periodic Bedding in the Sedimentary Rock Record of Mars
K. W. Lewis et al.
Stereo topographic mapping on Mars shows that some large impact craters were filled with sedimentary rock sequences made up of cyclical packages of meter-scaled beds.

MOLECULAR BIOLOGY
Photoexcited CRY2 Interacts with CIB1 to Regulate Transcription and Floral Initiation in Arabidopsis
H. Liu, X. Yu, K. Li, J. Kleijn, H. Yang, D. Lisiero, C. Lin
Blue light triggers the association of a photoreceptor, transcription factor, and DNA site, thus inducing expression for the gene FT (flowering time) and initiating flowering.

CELL BIOLOGY
A Stress Signaling Pathway in Adipose Tissue Regulates Hepatic Insulin Resistance
G. Sabia et al.
In mice, some detrimental effects of a diet high in fat—insulin resistance, for instance—result from hormonal signals sent from fat cells to the liver. >> Perspective p. 1483

CELL SIGNALING
Inhibition of Rac by the GAP Activity of Centralspindlin Is Essential for Cytokinesis
J. C. Canman et al.
During cell division, a component of the spindle inhibits a small regulatory binding protein, allowing another regulator to constrict a ring between the separating daughter cells.

DEVELOPMENTAL BIOLOGY
Dynamic Analyses of Drosophila Gastrulation Provide Insights into Collective Cell Migration
A. McMahon, W. Supatto, S. E. Fraser, A. Stathopoulos
Live fluorescence imaging of over 1500 cells within a Drosophila embryo during gastrulation reveals that a fibroblast growth factor coordinates cell migration.

NEUROSCIENCE
Astroglial Metabolic Networks Sustain Hippocampal Synaptic Transmission
N. Rouch, A. Koulakoff, V. Abudara, K. Willecke, C. Giaume
The glial astrocytes that surround neurons supply glucose or lactate to excitatory synapses through gap junctions that open when the neurons are active.

NEUROSCIENCE
Activation of Pannexin-1 Hemichannels Augments Aberrant Bursting in the Hippocampus
R. J. Thompson et al.
Activation of a glutamate receptor in hippocampal cells leads to secondary opening of a gap junction–like channel that can contribute to seizure-like bursting.

EVOlUTION
Centromere-Associated Female Meiotic Drive Entails Male Fitness Costs in Monkeyflowers
L. Fishman and A. Saunders
Competition between chromosomal homologs causes non-Mendelian meiotic segregation and fitness polymorphism in a natural monkeyflower population. >> Perspective p. 1484

IMMUNOLOGY
Maternal Alloantigens Promote the Development of Tolerogenic Fetal Regulatory T Cells in Utero
J. E. Mold et al.
Exposure of the human fetus to maternal cells during pregnancy can prompt development of regulatory T cells that prevent responses to non-inherited maternal antigens. >> News story p. 1450; Science Podcast
How will scientists fare in the new administration?

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The Job Outlook for Physician Scientists
K. Hede
Job opportunities make a bright future for scientists with clinical degrees.

Taken for Granted: Can Scientists Believe in Change?
B. L. Benderly
Science is one of many priorities for the new presidential administration.

Beating the Odds
G. Sinha
Cinzia Casiraghi won €1.65 million for setting up her own lab in Germany.

December 2008 Funding News
J. Fernández
Learn about the latest in research funding, scholarships, fellowships, and internships.
Editor's Summary

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