A mouse embryo at 9 days of gestation, stained for α-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

Cell Biology

RNA Seq Stem Cell Library Reveals Widespread Pausing and Divergent Initiation at Human Promoters
L. J. Core, J. J. Waterfall, J. T. Lis
RNA sequencing identifies antisense transcription immediately upstream of genes with transcriptionally engaged RNA polymerase.
10.1126/science.1162228

Cell Biology

Divergent Transcription from Active Promoters
A. C. Seila et al.
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

RNA Exosome Depletion Reveals Transcription Upstream of Active Human Promoters
P. Preker et al.
Highly unstable transcripts exist upstream of active human promoters.
10.1126/science.1164096

The Antisense Transcriptomes of Human Cells
Y. He, B. Vogelstein, V. E. Velculescu, N. Papadopoulos, K. W. Kinzler
The abundance and nonrandom genomic origin of antisense transcripts in human cells suggest that these RNAs are an important feature of gene regulation.
10.1126/science.1163853

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U. Riebesell et al.
full text at www.sciencemag.org/cgi/content/full/322/5907/1466b
Response to Comment on “Phytoplankton Calcification in a High-CO2 World”
M. D. Iglesias-Rodriguez et al.
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S. Gächter, E. Renner, M. Sefton
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In human social groups, punishment of uncooperative behaviors increases teamwork, but the benefits of cooperation only outweigh the costs of punishment after a long time.

Research Articles

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Dynamic Proteomics of Individual Cancer Cells in Response to a Drug
A. A. Cohen et al.
Cells that escape death from a chemotherapy drug express a different array of proteins than do genetically identical cells that die, which may help to inform cancer therapeutics.

Materials Science

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.

Physics

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.
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CELL SIGNALING
A Stress Signaling Pathway in Adipose Tissue Regulates Hepatic Insulin Resistance G. Sabio 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

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
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.

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
It is too soon to conclude that the physiological activities of PPARγ are truly ligand-independent.

PODCAST

S. W. Lee, P. P. Ongusaha, A. M. VanHook
Sam Lee and Pat Ongusaha discuss their research on the mechanisms by which ultraviolet B radiation induces cell death.

GLOSSARY

Find out what TSC, NG2, and ASIC mean in the world of cell signaling.

PREVIEW

Get a sneak peek at articles coming up in the 9 December issue related to this week’s Science special section on organ development.

>> Organ Development section p. 1489 and www.sciencemag.org/organdevelopment/
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