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

A Scientific Approach to Policy

by Bruce Alberts

Three Asian Nations Link Up to Form a Formidable Radio Telescope Array

Ministers Bankroll European Space Agency’s Ambitions

Less Vaccine Can Be More

In Rare Encounter, U.S. and Chinese Scientists Craft Nuclear Glossary

Fetal Immune System Hushes Attacks on Maternal Cells

Treat Everyone Now? A ‘Radical’ Model to Stop HIV’s Spread

Hopping to a Better Protein

Sanctuaries Aim to Preserve a Model Organism’s Wild Type

Philippines Plans Research Revival

Coming Soon to a Knee Near You: Cartilage Like Your Very Own

Spore Show Not Gaming the Science System

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ChemCam’s Cost a Drop in the Mars Bucket

An Order of Plumpy’nut, Hold the Aflatoxins

In Defense of GM Crops

CORRECTIONS AND CLARIFICATIONS
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-globin in adults—by releasing it from repression by an inhibitor—may prove useful for treating certain genetic anemias. 10.1126/science.1165409

NASCENT RNA SEQUENCING 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

DIVERGENT TRANSCRIPTION FROM ACTIVE PROMOTERS
A. C. Selia 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

COMPETITIVE CENTROMERES
D. Charlesworth

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

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.

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 FERMIIONS 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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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. Keppler, L. S. Dubrovinsky, O. Narygina, 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. Klejnert, 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. 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

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.

NEUROSCIENCE

Astroglial Metabolic Networks Sustain Hippocampal Synaptic Transmission
N. Rouach, A. Koulakoff, V. Abudara, K. Willecke, C. Giaume
The glial astrocytes that surround neurons supply glucose or lactate to excitatory synapses though 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
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/
Science 322 (5907), 1431-1570.