Liver cells possess a well-defined morphology and interact in time and space with their neighbors, with the extracellular matrix, and with the bloodstream. A special section starting on page 1205 describes some of the basic tenets of spatial cell biology.

Image: Frank Geisler/Alamy (liver cells); iStockphoto.com (compass rose)
BREVIA
1230 Induced Chromosomal Proximity and Gene Fusions in Prostate Cancer
R.-S. Mani et al.
Androgen signaling facilitates the formation of an oncogenic fusion gene in prostate cancer cells.

RESEARCH ARTICLES
1231 Haploid Genetic Screens in Human Cells Identify Host Factors Used by Pathogens
J. E. Carette et al.
A method identifies human factors required for successful microbial pathogenesis.
1235 Proteome Organization in a Genome-Reduced Bacterium
S. Kühner et al.
The simplified proteome of a bacterium provides insight into the organization of proteins into molecular machines.
   >> Perspective p. 1200; Reports pp. 1263 and 1268

REPORTS
1241 Directed Transport of Atoms in a Hamiltonian Quantum Ratchet
T. Salger et al.
A quantum ratchet, which operates without dissipation, is created with a Bose-Einstein condensate and optical potentials.
1244 Visualizing the 3D Internal Structure of Calcite Single Crystals Grown in Agarose Hydrogels
H. Li et al.
Electron tomography shows that physical interactions may be sufficient to incorporate macromolecules into a calcite crystal.
   >> Perspective p. 1194
1247 Formation of Compositionaly Abrupt Axial Heterojunctions in Silicon-Germanium Nanowires
C.-Y. Wen et al.
A solid alloy catalyst is used to synthesize atomically sharp interfaces in silicon-germanium nanowires.
1250 Selective Phenol Hydrogenation to Cyclohexanone Over a Dual Supported Pd–Lewis Acid Catalyst
H. Liu et al.
The cooperation of two common catalysts unexpectedly facilitates selective synthesis of a commodity chemical compound.
1253 Climate-Driven Basin-Scale Decadal Oscillations of Oceanic Phytoplankton
E. Martinez et al.
Satellite data show that upper ocean chlorophyll and sea surface temperatures are connected on a multidecadal time scale.
1256 Global Signatures and Dynamical Origins of the Little Ice Age and Medieval Climate Anomaly
M. E. Mann et al.
The global pattern of warming that characterized the Medieval Climate Anomaly was a dynamical response to solar forcing.
   >> Science Podcast
1260 Extensive, Recent Intron Gains in Daphnia Populations
W. Li et al.
Interpopulation genome polymorphisms in the water flea, Daphnia, indicate multiple recent intron gains.
1263 Impact of Genome Reduction on Bacterial Metabolism and Its Regulation
E. Yus et al.
Reconstruction of a bacterial metabolic network reveals strategies for metabolic control with a genome of reduced size.
   >> Perspective p. 1200; Research Article p. 1235
1268 Transcriptome Complexity in a Genome-Reduced Bacterium
M. Güell et al.
Sequencing of a tiny bacterium’s RNA reveals many noncoding RNAs and complex gene regulation reminiscent of eukaryotes.
   >> Perspective p. 1200; Research Article p. 1235
1271 Crystal Structure of the Catalytic Core of an RNA-Polymerase Ribozyme
D. M. Shechner et al.
The structure of a ligase ribozyme suggests how RNA might be able to replicate itself.
1275 A High-Resolution Structure of the Pre-microRNA Nuclear Export Machinery
C. Okada et al.
Exportin-5:RanGTP surrounds microRNAs to protect them from degradation as it exports them from the nucleus.
   >> Perspective p. 1195
1279 Crystal Structure of a Nucleocapsid-Like Nucleoprotein-RNA Complex of Respiratory Syncytial Virus
R. G. Tawar et al.
In negative-strand RNA viruses, viral RNA wraps around a nucleocapsid helix with the bases accessible to the viral polymerase.

CONTENTS continued >>
SCIENCEONLINE

RESEARCH ARTICLE: Ca\textsuperscript{2+} Puffs Originate from Pre-Established Stable Clusters of Inositol Trisphosphate Receptors
I. F. Smith et al.
Localized calcium signals called Ca\textsuperscript{2+} puffs arise at pre-established clusters of IP\textsubscript{3}Rs.

PERSPECTIVE: Maintaining Diplomatic Relations Between Mammals and Beneficial Microbial Communities
D. A. Hill and D. Artis
The adaptive immune system compensates if innate mechanisms fail to contain microbes in the mammalian intestine.

PODCAST
T. Pawson and A. M. VanHook
Bioinformatics analysis reveals how protein domain composition correlates with evolutionary change.

SCIENCECAREERS
www.sciencecareers.org/career_magazine
Free Career Resources for Scientists
CAREERS
www.sciencecareers.org
Want to Stop AIDS? Spend Big
In emergency situations, forensic methods need preliminary validation to ensure accurate interpretation.

SCIENCENOW
www.sciencenow.org
Highlights From Our Daily News Coverage
ON THE ORIGIN OF SPECIES BY NATURAL AND SEXUAL SELECTION
G. S. van Doorn et al.
Modeling demonstrates how speciation occurs due to sexual selection.

Tetrahymenolylbate Inhibits Copper Trafficking Proteins Through Metal Cluster Formation
H. M. Alvarez et al.
Complex formation between a copper chaperone and a metallo-drug prevents copper transfer to target enzymes.

On the Origin of Species by Natural and Sexual Selection
G. S. van Doorn et al.
Modeling demonstrates how speciation occurs due to sexual selection.

Visualizing the molecular environments of protein dynamics.

SCIENCE SIGNALING
www.scienceexpress.org
SCIENCEXPRESS
www.sciencexpress.org
Modulated High-Energy Gamma-Ray Emission from the Microquasar Cygnus X-3
The Fermi LAT Collaboration
Gamma-ray emission from the jet of an accreting binary star system is correlated with the jet’s radio emission. 10.1126/science.1182174

Ligand-Enabled Reactivity and Selectivity in a Synthetically Versatile Aryl C–H Olefination
D.-H. Wang et al.
A palladium-based catalyst eliminates the need for halogenated compounds for the formation of carbon-carbon bonds. 10.1126/science.1182512

On the Origin of Species by Natural and Sexual Selection
G. S. van Doorn et al.
Modeling demonstrates how speciation occurs due to sexual selection. 10.1126/science.1181661

>> Science Podcast

SCIENCE SIGNALING
The Signal Transduction Knowledge Environment
RESEARCH ARTICLE: mTORM Regulation and Therapeutic Rejuvenation of Aging Hematopoietic Stem Cells
C. Chen et al.
Rapamycin reverses aging-related declines in hematopoietic stem cell function.

RESEARCH ARTICLE: Eukaryotic Protein Domains as Functional Units of Cellular Evolution
J. Jin et al.
Clustering proteins into groups on the basis of their domain compositions provides insight into protein evolution.

RESEARCH ARTICLE: In Situ Regulation of DC Subsets and T Cells Mediates Tumor Regression in Mice
O. A. Ali et al.
An implanted matrix elicits an immune response network that can eradicate established tumors in mice.

SCIENCE PODCAST
www.sciencemag.org/multimedia/podcast
Free Weekly Show
Download the 27 November Science Podcast to hear about speciation by sexual selection, a medieval climate anomaly, the fate of stimulus funding for science, and more.

ORIGINS BLOG
blogs.sciencemag.org/origins
A History of Beginnings

SCIENCE INSIDER
blogs.sciencemag.org/scienceinsider
Science Policy News and Analysis

SCIENCE
www.sciencemag.org
1157
VOL 326 27 NOVEMBER 2009
Published by AAAS

SCIENCEISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2009 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (US issues) $548 (574 allocated to subscription). Domestic institutional subscription (US issues): 1615. Foreign postage extra: Mexico, Caribbean surface mail $155; other countries (air assist delivery) $585. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #1254 08122. Publications Mail Agreement Number 4009424. Printed in the U.S.A.

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96378, Washington, DC 20090-6178. Single-copy sales: $10.00 current issue, $15.00 back issue price prepaid includes surface postage, bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that $20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science’s 0036-8075. Science is indexed in the Reader’s Guide to Periodical Literature and in several specialized indexes.

AAAS
ADVANCING SCIENCE, SERVING SOCIETY

www.sciencemag.org
Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools**
Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/326/5957

**Permissions**
Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl