Cover
Composite confocal image of an adult planarian (Schmidtea mediterranea) showing a growing colony of dividing cells (red) that initiated from a single, pluripotent stem cell called a clonogenic neoblast (cNeoblast). The ~1-millimeter-long animal is visualized with differential interference contrast microscopy and nuclear staining (blue). The colony is just posterior to the animal brain (nuclei-rich, bi-lobed structure) and eyes (two dark pigmented areas). See page 811.

Credit: Daniel E. Wagner, Irving E. Wang, Peter W. Reddien/Department of Biology, Massachusetts Institute of Technology, Whitehead Institute for Biomedical Research
RESEARCH ARTICLES

811  Clonogenic Neoblasts Are Pluripotent Adult Stem Cells That Underlie Planarian Regeneration  
D. E. Wagner et al.  
A pluripotent adult stem cell underlies flatworms’ amazing regenerative ability.  
>> Perspective p. 799; Report p. 852

816  Computational Design of Proteins Targeting the Conserved Stem Region of Influenza Hemagglutinin  
S. J. Fleishman et al.  
Proteins can be designed that bind to specific patches on target proteins to alter their subsequent interactions.  
>> Perspective p. 801; Science Podcast

REPORTS

821  Interplay of Rotational, Relaxational, and Shear Dynamics in Solid 4He  
E. J. Pratt et al.  
Comprehensive measurements argue against the existence of the exotic supersolid quantum state of frozen helium.

825  Very Large Capacitance Enhancement in a Two-Dimensional Electron System  
L. Li et al.  
Electron correlation effects at the interface of two metal oxides lead to a lower chemical potential and enhance capacitance.

828  Beating Crystallization in Glass-Forming Metals by Millisecond Heating and Processing  
W. L. Johnson et al.  
Resistive heating can be used to rapidly heat a bulk metallic glass without inducing crystallization.

833  Three-Dimensional Orientation Mapping in the Transmission Electron Microscope  
H. H. Liu et al.  
Electron microscopy is used to nondestructively map the three-dimensional grain orientations in nanocrystalline aluminum.

835  Silver-Catalyzed C-C Bond Formation Between Methane and Ethyl Diazacetate in Supercritical CO2  
A. Caballero et al.  
Supercritical carbon dioxide solvent facilitates transformation of the generally inert carbon-hydrogen bonds in methane.

838  Massive CO2 Ice Deposits Sequestered in the South Polar Layered Deposits of Mars  
R. J. Phillips et al.  
Radar measurements reveal a substantial buried deposit of carbon dioxide in the south pole of Mars.  
>> Perspective p. 797

841  Late Mousterian Persistence near the Arctic Circle  
L. Slimak et al.  
Artefacts at a site in the northern Urals dating to about 33,000 years ago suggest a last northern refuge of Neandertals.  
>> News & Analysis story p. 778

845  Experimental Evidence Supports a Sex-Specific Selective Sieve in Mitochondrial Genome Evolution  
P. Innocenti et al.  
Polymorphisms in the organelle genome have little effect in female flies but do alter gene expression in males.  
>> Perspective p. 798

848  Role for piRNAs and Noncoding RNA in de Novo DNA Methylation of the Imprinted Mouse Rasgrf1 Locus  
T. Watanabe et al.  
Small, noncoding PIWI-interacting RNAs regulate the imprinting of a mouse gene.

852  Polarized notum Activation at Wounds Inhibits Wnt Function to Promote Planarian Head Regeneration  
C. P. Petersen and P. W. Reddien  
Local detection of tissue polarity results in selective feedback inhibition of signaling at posterior-facing wounds.  
>> Perspective p. 799; Research Article p. 811

855  Natural Microbe-Mediated Refractoriness to Plasmodium Infection in Anopheles gambiae  
C. M. Cirimotich et al.  
Insect midgut-dwelling bacteria generate reactive oxygen species that inhibit malaria parasite development.

858  Preserved Feedforward But Impaired Top-Down Processes in the Vegetative State  
M. Boly et al.  
Discerning the neural correlates of (un)consciousness sheds light on the mechanisms underlying vegetative states.  
>> News & Analysis story p. 779

862  Improved Learning in a Large-Enrollment Physics Class  
L. Deslauriers et al.  
Encouraging active engagement results in enhanced learning.
Evidence of a Global Magma Ocean in Io’s Interior
K. K. Khurana et al.
Magnetic field measurements made near Jupiter’s moon Io strengthen the evidence for a magma ocean in its interior.
10.1126/science.1201425

Carbon-Based Supercapacitors Produced by Activation of Graphene
Y. Zhu et al.
Activated microwave-exfoliated graphite oxide combined with an ionic liquid can be used to make an enhanced capacitor.
10.1126/science.1200770

Disorder-Enhanced Transport in Photonic Quasicrystals
L. Levi et al.
Optical interference in a photoreflective crystal is used to study light propagation in a controlled disordered system.
10.1126/science.1202977

Local Macrophage Proliferation, Rather Than Recruitment from the Blood, Is a Signature of T12 Inflammation
S. J. Jenkins et al.
Proliferation in situ, rather than immune cell recruitment, drives macrophage expansion in response to parasitic infection.
10.1126/science.1204351

Crystal Structure of the Maltose Transporter in a Pretranslocation Intermediate State
M. L. Oldham and J. Chen
An intermediate structure provides insight into how a transport substrate allosterically activates adenosine triphosphatase activity.
10.1126/science.1200767

SCIENCE SIGNALING
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10 May issue: http://scim.ag/ss051011

RESEARCH ARTICLE: Methylation of a Phosphatase Specifies Dephosphorylation and Degradation of Activated Brassinosteroid Receptors
G. Wu et al.
PERSPECTIVE: PP2A Phosphatases—The “On-Off” Regulatory Switches of Brassinosteroid Signaling
S. Di Rubba et al.
The abundance of brassinosteroid receptors and thus the intensity of brassinosteroid signaling are set by methylation of a protein phosphatase.

RESEARCH ARTICLE: A Peptide-Based Target Screen Implicates the Protein Kinase CK2 in the Global Regulation of Caspase Signaling
J. S. Duncan et al.
PERSPECTIVE: Protein Kinases Curb Cell Death
O. Filhol and C. Cochet
Phosphorylation of caspase substrates by the protein kinase CK2 may underlie its role in tumorigenesis.

GLOSSARY
Find out what AAM, BFA, and cSMAC mean in the world of cell signaling.

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A. Marnett
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http://scim.ag/qualifying_exam

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COMMENTARY: Universal Design of Research—Inclusion of Persons with Disabilities in Mainstream Biomedical Studies
A. S. Williams and S. M. Moore
Simple changes in clinical study design allow individuals with disabilities to participate in and contribute to research.

PERSPECTIVE: Diagnosing the Individual to Control the Epidemic
G. F. Medley
Infection experiments help to elucidate how epidemics propagate through individuals.