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.
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816 Computational Design of Proteins Targeting the Conserved Stem Region of Influenza Hemagglutinin
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Proteins can be designed that bind to specific patches on target proteins to alter their subsequent interactions.
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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.
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841 Late Mousterian Persistence near the Arctic Circle
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Artefacts at a site in the northern Urals dating to about 33,000 years ago suggest a last northern refuge of Neandertals.
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C. P. Petersen and P. W. Reddien
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10.1126/science.1200770

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T. N. Burks et al.
Losartan improves muscle remodeling and protects against immobilization atrophy by mediating pathways critical for muscle homeostasis.

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Y. Dombrowski et al.
In psoriasis, cytosolic DNA in keratinocytes triggers maturation of the cytokine IL-1β via the AIM2 inflammasome.

RESEARCH ARTICLE: In Vivo Liver Regeneration Potential of Human Induced Pluripotent Stem Cells from Diverse Origins
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RESEARCH ARTICLE: Methylation of a Phosphatase Specifies Dephosphorylation and Degradation of Activated Brassinosteroid Receptors
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Perspective: PP2A Phosphatases—The “On-Off” Regulatory Switches of Brassinosteroid Signaling
S. Di Rubbo et al.
The abundance of brassinosteroid receptors and thus the intensity of brassinosteroid signaling are set by methylation of a protein phosphatase.

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O. Filhol and C. Cochet
Phosphorylation of caspase substrates by the protein kinase CK2 may underlie its role in tumorigenesis.

PERSPECTIVE: Global Regulation of Caspase Signaling
J. S. Duncan et al.
An intermediate structure provides insight into how a transport substrate allosterically activates adenine triphosphatase activity.
10.1126/science.1200767

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