A frontal view of the fly brain (blue) showing two groups of dopamine-producing neurons pseudocolored green and magenta. The magenta neurons are engineered to express a light-sensitive protein. Optical signals (symbolized by a magenta beam of light) can selectively report and control the activity of these cells. Miesenböck (page 395) reviews the emerging field of optogenetics in a special section on advances in neuroscience methods starting on page 385.

Confocal images: Adam Claridge-Chang; photomontage: Robert Roorda and Gero Miesenböck
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
<th>Section/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>377</td>
<td>Fantastic Fixers</td>
<td>R. W. Fulweiler</td>
<td></td>
</tr>
<tr>
<td>378</td>
<td>Feeding the Clock</td>
<td>D. M. Suter and U. Schibler</td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Retrospective: Norman Ernest Borlaug (1914–2009)</td>
<td>C. Dowswell</td>
<td></td>
</tr>
<tr>
<td>382</td>
<td>Eppendorf Winner: Evolution and Revolution in Odor Detection</td>
<td>R. Benton</td>
<td></td>
</tr>
<tr>
<td>404</td>
<td>Direct Evidence for Spinal Cord Involvement in Placebo Analgesia</td>
<td>F. Eippert et al.</td>
<td>Functional magnetic resonance imaging of the human spinal cord reveals a mechanism for placebo analgesia.</td>
</tr>
<tr>
<td>405</td>
<td>Phase Transitions, Melting Dynamics, and Solid-State Diffusion in a Nano Test Tube</td>
<td>V. C. Holmberg et al.</td>
<td>A carbon coating allows the thermodynamic behavior of a germanium nanowire to be probed under constant-volume conditions.</td>
</tr>
<tr>
<td>408</td>
<td>The Packing of Granular Polymer Chains</td>
<td>L.-N. Zou et al.</td>
<td>The packing of connected metal rods is used as a model to study the packing behavior of granular materials and polymers.</td>
</tr>
<tr>
<td>411</td>
<td>Dirac Strings and Magnetic Monopoles in the Spin Ice Dy$_2$Ti$_2$O$_7$</td>
<td>D. J. P. Morris et al.</td>
<td></td>
</tr>
<tr>
<td>415</td>
<td>Magnetic Coulomb Phase in the Spin Ice Ho$_2$Ti$_2$O$_7$</td>
<td>T. Fennell et al.</td>
<td>Neutron scattering measurements on two spin-ice compounds show evidence for magnetic monopoles.</td>
</tr>
<tr>
<td>418</td>
<td>Tyrannosaurid Skeletal Design First Evolved at Small Body Size</td>
<td>P. C. Sereno et al.</td>
<td>The distinct features of <em>Tyrannosaurs</em>, such as their large skull and tiny arms, appear in an earlier small-bodied species.</td>
</tr>
<tr>
<td>422</td>
<td>Deep-Sea Archaea Fix and Share Nitrogen in Methane-Consuming Microbial Consortia</td>
<td>A. E. Dekas et al.</td>
<td>Methane-oxidizing bacteria in marine sediments may also be a major factor in ocean nitrogen cycling.</td>
</tr>
<tr>
<td>426</td>
<td>Generation of Functional Ventricular Heart Muscle from Mouse Ventricular Progenitor Cells</td>
<td>I. J. Domian et al.</td>
<td>A combination of tissue engineering and stem cell biology is used to build functional force-generating mouse cardiac tissue.</td>
</tr>
<tr>
<td>430</td>
<td>Generation of Medaka Fish Haploid Embryonic Stem Cells</td>
<td>M. Yi et al.</td>
<td>Stem cells that are haploid can sustain stable growth, pluripotency, and genetic integrity in fish cell cultures.</td>
</tr>
<tr>
<td>433</td>
<td>Complete Resequencing of 40 Genomes Reveals Domestication Events and Genes in Silkworm (<em>Bombyx</em>)</td>
<td>Q. Xia et al.</td>
<td>Silkworm genomes show signatures of selection associated with domestication.</td>
</tr>
<tr>
<td>437</td>
<td>AMPK Regulates the Circadian Clock by Cryptochrome Phosphorylation and Degradation</td>
<td>K. A. Lamia et al.</td>
<td>The protein kinase AMPK couples circadian clocks and metabolism in mammals through effects on a cryptochrome protein.</td>
</tr>
<tr>
<td>440</td>
<td>Teachers’ Participation in Research Programs Improves Their Students’ Achievement in Science</td>
<td>S. C. Silverstein et al.</td>
<td>Students of U.S. high-school teachers given science research experiences show improved success rates on science exams.</td>
</tr>
<tr>
<td>443</td>
<td>The Taste of Carbonation</td>
<td>J. Chandrashekar et al.</td>
<td>The enzyme carbonic anhydrase mediates the taste sensation of carbonated drinks.</td>
</tr>
<tr>
<td>445</td>
<td>Sequential Processing of Lexical, Grammatical, and Phonological Information Within Broca’s Area</td>
<td>N. T. Sahin et al.</td>
<td>Intracranial electrodes record activity in a language-associated area of the brain as words are identified and produced.</td>
</tr>
<tr>
<td>449</td>
<td>Fast Synaptic Subcortical Control of Hippocampal Circuits</td>
<td>V. Varga et al.</td>
<td>A form of subcortical control of cortical information processing is mediated by a synaptic release of serotonin and glutamate.</td>
</tr>
</tbody>
</table>
**SCIENCEONLINE**

**SCIENCEEXPRESS**
www.sciencexpress.org

Global Observations of the Interstellar Interaction from the Interstellar Boundary Explorer (IBEX)
D. J. McComas et al.
10.1126/science.1180906
>> Science Podcast

Width and Variation of the ENA Flux Ribbon Observed by the Interstellar Boundary Explorer
S. A. Fuselier et al.
10.1126/science.1180981

Structures and Spectral Variations of the Outer Heliosphere in IBEX Energetic Neutral Atom Maps
H. O. Funsten et al.
10.1126/science.1180927

Comparison of Interstellar Boundary Explorer Observations with 3D Global Heliospheric Models
N. A. Schwadron et al.
Observations by the Interstellar Boundary Explorer have revealed surprising features in the interaction between the heliosphere and the interstellar medium.
10.1126/science.1180986

Direct Observations of Interstellar H, He, and O by the Interstellar Boundary Explorer
E. Möbius et al.
Detection of H, He, and O flowing into the heliosphere from the interstellar medium tells us about our local interstellar environment.
10.1126/science.1180971

Imaging the Interaction of the Heliosphere with the Interstellar Medium from Saturn with Cassini
S. M. Krimigis et al.
Observations by Cassini show that some of the features revealed by IBEX extend to high energies.
10.1126/science.1181079
>> News story p. 350

PTPβ Is a Receptor for Chondroitin Sulfate Proteoglycan, an Inhibitor of Neural Regeneration
Y. Shen et al.
Mouse neurons that lack a receptor for inhibitory proteoglycans show improved regeneration.
10.1126/science.1178310

The Crystal Structure of the Ribosome Bound to EF-Tu and Aminoacyl-tRNA
T. M. Schmeing et al.
10.1126/science.1179700
>> Science Podcast

The Structure of the Ribosome with Elongation Factor G Trapped in the Posttranslational State
Y.-G. Gao et al.
Crystal structures of the ribosome bound to elongation factors provide insights into translation and decoding.
10.1126/science.1179709
>> News story p. 346

Leaps in Translational Elongation
A. Llijas
10.1126/science.1181511

**SCIENCENOW**
www.sciencenow.org

Highlights From Our Daily News Coverage

Physics? It’s All the Same to Birds and Babies
Rooks can grasp a basic physical principle, but how smart does that make them?

How We Lost Our Diversity
Human ancestors survived two genetic bottlenecks as they spread out of Africa.

Monkey Moms Have Madonna Moments
Rhesus macaques oogle their babies just like human mothers do.

**SCIENCESIGNaling**
www.sciencesignaling.org

The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: MicroRNAs Differentially Regulated by Akt Isoforms Control EMT and Stem Cell Renewal in Cancer Cells
D. Iliopoulos et al.
Akt-dependent induction of a metastatic phenotype may depend on the balance of Akt1 and Akt2.

RESEARCH ARTICLE: Act1, a U-box E3 Ubiquitin Ligase for IL-17 Signaling
C. Liu et al.
The adaptor protein Act1 functions as a ubiquitin ligase to mediate interleukin-17 receptor–dependent activation of nuclear factor-κB.

RESEARCH ARTICLE: Chemical Genetics Identifies c-Src as an Activator of Primitive Ectoderm Formation in Murine Embryonic Stem Cells
M. A. Meyn III and T. E. Smithgall
Kinesin engineered for inhibitor resistance reveal a unique role for c-Src in embryonic stem cell differentiation.

**SCIENCECAREERS**
www.sciencemag.org/career_magazine

Free Career Resources for Scientists

Perspective: Three Crucial Questions When Applying to M.D.-Ph.D. Programs
L. F. Brass
Here are key factors to consider when deciding if an M.D.-Ph.D. is right for you.

Finding Your Way Into Policy Careers in Europe
E. Pain
Getting a policy job in Europe requires choosing a beat and finding your way in.

Tooling Up: Focus Your Industry CV
D. Jensen
Small changes in your CV can yield big rewards.

**SCIENCETRANSLATIONAL MEDICINE**
www.sciencetranslationalmedicine.org

Integrating Medicine and Science

RESEARCH: Dopamine Gene Therapy for Parkinson’s Disease in a Nonhuman Primate Without Associated Dyskinesia
B. Jarrahy et al.

PERSPECTIVE: Gene Therapy for Dopamine Replacement in Parkinson’s Disease
A. Björklund et al.
Delivery of the synthetic enzymes for dopamine to Parkinsonian monkeys in a single vector ameliorates disease symptoms.

PERSPECTIVE: Arvid Carlsson, An Early Pioneer in Translational Medicine
J. K. Andersen
Carlsson discovered the L-dopa treatment for Parkinson’s.

**SCIENCEPODCAST**
www.sciencemag.org-multimedia/podcast
Free Weekly Show
Download the 16 October Science Podcast to hear about the interstellar interaction, KAUST, the taste of carbonation, and more.

**ORIGINSBLOG**
blogs.sciencemag.org/origins
A History of Beginnings

**SCIENCEINSIDER**
blogs.sciencemag.org/scienceinsider
Science Policy News and Analysis

SCIENCE (ISSN 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. 404640) 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 (U.S. issued: 1346, 1374 allocated to subscribers). Domestic institutional subscription (U.S. issued: 1016; Foreign postage extra: Mexico, Caribbean surface mail 155; other countries (air assist delivery) 185. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST # 1254 8812. Publications Mail Agreement Number 4069424. 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 60638, Washington, DC 20090-6383. Single-copy sales: $10.00 current issue, $15.00 back issue 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 is 0036-8075. Science is indexed in the Reader’s Guide to Periodical Literature and in several specialized indexes.

www.sciencemag.org SCIENCE VOL 326 16 OCTOBER 2009

333

Published by AAAS