Honey bees (Apis mellifera), here shown on a honeycomb, form complex societies and interact with one another by means of stereotyped social behaviors. A special section beginning on page 891 explores what genetic approaches have taught us about behavior in bees and other species, including humans.

Image: Don Farrall, Getty Images

SPECIAL SECTION

Genetics of Behavior

INTRODUCTION

From Genes to Social Behavior

NEWS

Parsing the Genetics of Behavior

Wanted: Math Gene

REVIEWS

Genes and Social Behavior

G. E. Robinson, R. D. Fernald, D. F. Clayton

Oxytocin, Vasopressin, and the Neurogenetics of Sociality

Z. R. Donaldson and L. J. Young

Wired for Sex: The Neurobiology of Drosophila Mating Decisions

B. J. Dickson

PERSPECTIVES

Searching for Genes Underlying Behavior: Lessons from Circadian Rhythms

J. S. Takahashi, K. Shimomura, V. Kumar

Biology, Politics, and the Emerging Science of Human Nature

J. H. Fowler and D. Schreiber


DEPARTMENTS

815 Science Online
817 This Week in Science
823 Editors’ Choice
828 Contact Science
831 Random Samples
833 Newsmakers
974 Gordon Research Conferences
978 New Products
979 Science Careers

EDITORIAL

821 The “Neuro” in Neurogenetics
by Story Landis and Thomas R. Insel

>> Genetics of Behavior section p. 891

NEWS OF THE WEEK

Zerhouni’s Parting Message: Make Room for Young Scientists

Rules for Ocean Fertilization Could Repel Companies

Chinese Cave Speaks of a Fickle Sun Bringing Down Ancient Dynasties >> Report p. 940

SCIENCESCOPE

Number of Sequenced Human Genomes Doubles

The Touchy Subject of ‘Race’

Economic Woes Threaten to Deflate Plans for 2009

NEWS FOCUS

17q21.31: Not Your Average Genomic Address

>> Genetics of Behavior section p. 891; Science Podcast

Engineering a Fix for Broken Nervous Systems

The Graying of NIH Research

CONTENTS continued >>
MOLECULAR BIOLOGY
The Air Noncoding RNA Epigenetically Silences Transcription by Targeting G9a to Chromatin
T. Nagano et al.
Air, a large noncoding RNA, interacts with chromatin at a particular promoter, recruiting a histone methyltransferase to silence gene expression in an allele-specific manner. 10.1126/science.1163802

PLANETARY SCIENCE
Long-Lived Volcanism on the Lunar Farside Revealed by SELENE Terrain Camera
J. Haruyama et al.
Images of the Moon by the SELENE spacecraft and revised dates of lava flows by crater counts imply that episodic volcanism on the farside lasted to 2.5 billion years ago. 10.1126/science.1163382

TECHNICAL COMMENT ABSTRACTS
GENETICS
Comment on "Whole-Genome Shotgun Sequencing of Mitochondria from Ancient Hair Shafts"
R. Debruyne, C. Schwarz, H. Poinar
full text at www.sciencemag.org/cgi/content/full/322/5903/857a
Response to Comment on "Whole-Genome Shotgun Sequencing of Mitochondria from Ancient Hair Shafts"
M. T. P. Gilbert, W. Miller, S. C. Schuster
full text at www.sciencemag.org/cgi/content/full/322/5903/857b

TECHNICAL COMMENT ABSTRACTS

ESSAY
Eppendorf Winner: Switching Memories ON and OFF
M. Costa-Mattioli >> Science Podcast

REVIEWS
NEUROSCIENCE
Consciousness and Anesthesia
M. T. Alkire, A. G. Hudetz, G. Tononi
>> Genetics of Behavior section p. 891

BIOCHEMISTRY
Bioactive Contaminants Leach from Disposable Laboratory Plasticware
G. R. McDonald et al.
A lipid molecule and a quaternary ammonium biocide that are used in making plastic labware can contaminate common enzyme and binding assays, altering the results.

RESEARCH ARTICLES

GLOBAL PROTEIN STABILITY PROFILING IN MAMMALIAN CELLS
H.-C. S. Yen, Q. Xu, D. M. Chou, Z. Zhao, S. J. Elledge
Identification of SCF Ubiquitin Ligase Substrates by Global Protein Stability Profiling
H.-C. S. Yen and S. J. Elledge
A method that determines the half lives of all cellular proteins has been used to identify targets of a ubiquitin ligase, which controls the cell cycle through protein degradation. >> Perspective p. 872

APPLIED PHYSICS
Slow Electron Cooling in Colloidal Quantum Dots
A. Pandey and P. Guyot-Sionnest
The lifetime of excited states of electron-hole pairs in CdSe quantum dots can be extended to nanosecond time scales with an electron-insulating ZnSe coating.
REPORTS CONTINUED...

CHEMISTRY
Reaction-Driven Restructuring of Rh-Pd and Pt-Pd Core-Shell Nanoparticles
F. Tao et al.
Reducing or oxidizing conditions segregates rhenium or palladium at the surface of Rh-Pd (but not Pt-Pd) nanoparticles, facilitating the tuning of their catalytic properties.

GEOPHYSICS
Reconstructing Farallon Plate Subduction Beneath North America Back to the Late Cretaceous
L. Liu, S. Spasojević, M. Gurnis
An inverse model, using seismic images of today’s mantle and sediment thicknesses through time, tracks 100 million years of mantle flow beneath western North America. >> Perspective p. 866

PLANETARY SCIENCE
Lack of Exposed Ice Inside Lunar South Pole Shackleton Crater
J. Horuyama et al.
A view into the permanently shaded Shackleton crater from the SELENE (KAGUYA) spacecraft now orbiting the Moon shows that it lacks large visible water-ice deposits.

CLIMATE CHANGE
A Test of Climate, Sun, and Culture Relationships from an 1810-Year Chinese Cave Record
P. Zhang et al.
An 1800-year-long record of the Asian Monsoon from a Chinese stalagmite shows that its strength waned, causing drought, during the end of three prominent dynasties. >> News story p. 837

GEOLOGY
Recycling of Graphite During Himalayan Erosion: A Geological Stabilization of Carbon in the Crust
V. Galv, O. Beyssac, C. France-Lanord, T. EGLinton
Radiocarbon dates on Himalayan sediments show that graphite is preserved, whereas other carbon is oxidized, and that metamorphism stabilizes carbon over geologic time.

DEVELOPMENTAL BIOLOGY
Induced Pluripotent Stem Cells Generated Without Viral Integration
M. Stadtfeld et al.
Transient exposure of mouse fibroblast and liver cells to adenovirus vectors carrying factors that induce pluripotency generates stem cells without viral elements in the genome.

DEVELOPMENTAL BIOLOGY
Generation of Mouse Induced Pluripotent Stem Cells Without Viral Vectors
K. Okita et al.
Pluripotent cells can be created by introducing transcription factor genes into mouse embryonic fibroblasts on a plasmid that does not integrate into the genome.

BIOCHEMISTRY
Insights into Translational Termination from the Structure of RF2 Bound to the Ribosome
A. Weixilaumer et al.
The structure of a release factor bound to an RNA stop codon shows which amino acids form the binding site for U in the first position, A or G in the second, and U in the third. >> Perspective p. 863

PHYSIOLOGY
Fat Metabolism Links Germline Stem Cells and Longevity in C. elegans
M. C. Wang, E. J. O’Rourke, G. Ruvkun
Longevity in C. elegans results from quiescent germline stem cells or reduced insulin signaling is caused by induction of a lipase gene that promotes fat mobilization. >> Perspective p. 865

NEUROSCIENCE
Spontaneous Changes of Neocortical Code for Associative Memory During Consolidation
K. Takehara-Nishiuchi and B. L. McNaughton
Memory-specific firing patterns appear in the medial prefrontal cortex when it becomes essential for memory recall, supporting a role for this region in memory consolidation.

NEUROSCIENCE
Promoting Axon Regeneration in the Adult CNS by Modulation of the PTEN/mTOR Pathway
K. K. Park et al.
Reactivation of a key growth control pathway by experimentally deleting an inhibitor can overcome the inability of severed mouse retinal ganglion cells to regenerate. >> Perspective p. 869

NEUROSCIENCE
PirB Is a Functional Receptor for Myelin Inhibitors of Axonal Regeneration
J. K. Atwal et al.
Proteins embedded in the myelin wrappings of axons inhibit regeneration of injured nerves, in part, by binding to an immunoglobulin-like receptor on growth cones. >> Perspective p. 869

NEUROSCIENCE
“Who” Is Saying “What”? Brain-Based Decoding of Human Voice and Speech
E. Formisano, F. De Martino, M. Bonte, R. Goebel
Distinct patterns of activity elicited in auditory cortex by different vowels and different speakers allows independent identification of who is speaking and what they are saying.
**SCIENCE**

**SCIENCE SIGNALING**

**REVIEW: NAADP—A Universal Ca\[^{2+}\] Trigger**

A. H. Guse and H. C. Lee

NAADP elicits an initial release of calcium, which is subsequently amplified through the action of other calcium messengers.

**ST NETWATCH: The Nobel Prize in Chemistry 2008**

This year’s award went to the scientists who discovered green fluorescent protein and developed it as an experimental tool; in Awards and Announcements.

**ST NETWATCH: ASBMB Interactive Features**

View Awards Lectures and interviews with prominent cell biologists from the American Society for Biochemistry and Molecular Biology; in Web Broadcasts.

**ST NETWATCH: AMBMR Webcasts**

View seminars from the annual meeting of the American Society for Bone and Mineral Research; in Web Broadcasts.

---

**SCIENCE NOW**

**HIGHLIGHTS FROM OUR DAILY NEWS COVERAGE**

**River Dolphin Love Fetishes Not as Advertised**

The boto has quite a reputation—but fortunately the body parts sold at Amazonian markets are fakes.

**Diesel Fuel From a Tree Fungus?**

Microbe’s hydrocarbon stew could one day supplant fossil fuels.

**Ancient Grave May Have Belonged to Shaman**

Find hints at development of religion during crucial time in human history.

---

**SCIENCE CAREERS**

**FREE CAREER RESOURCES FOR SCIENTISTS**

**Taken for Granted: Postdocs and Joe the Plumber**

B. L. Benderly

What early-career scientists can learn from the working class.

**In Person: The Trick to a Rewarding Career**

M. Hermann

Throughout his career, Marc Hermann has always done exactly what he wanted.

**U.K. Visa Changes Mean Closer Scrutiny for Non-European Students**

A. Saini

New U.K. immigration policies impose more rigid requirements than in the past.

**November 2008 Funding News**

J. Fernández

Learn about the latest in research funding, scholarships, fellowships, and internships.

---

**SCIENCE PODCAST**

**FREE WEEKLY SHOW**

Download the 7 November *Science* Podcast to hear about genes and social behavior, switching memories on and off, chromosome 17 and mental disorders, and more.

---

Separate individual or institutional subscriptions to these products may be required for full-text access.