

Cover image: Scanning electron micrograph of conidiophores of *Penicillium chrysogenum*, the mold from which penicillin was isolated. This *Penicillium* species, among others, was used to test a DNA barcoding system to identify fungi. The barcoding technique utilized a segment of the mitochondrial cytochrome *c* oxidase 1 (*COI*) gene, which is the core barcode region for animals that has so far not been assessed in fungi. The development of a fungal DNA barcoding system would provide a major advance in accurate and rapid species identification. See the article by Seifert *et al.* on pages 3901–3906. Image courtesy of Robert A. Samson.

From the Cover

- 3901 DNA barcoding for fungal identification
- 3883 Evolutionary consequences of an invasive grass
- 3913 Visual assay for meiotic recombination
- 3996 Cytokine-induced antiangiogenesis in melanomas
- 4218 Folate biofortification in tomatoes

Contents

THIS WEEK IN PNAS

3669 **In This Issue**

COMMENTARIES

3671 **The role of evolution in the invasion process**

Stephen J. Novak

→ See companion article on page 3883

3673 **Meiosis in living color: Fluorescence-based tetrad analysis in *Arabidopsis***

R. Scott Hawley

→ See companion article on page 3913

3675 **Biofortification of plant-based food: Enhancing folate levels by metabolic engineering**

Dean DellaPenna

→ See companion article on page 4218

INAUGURAL ARTICLE

3677 **Experiments with probe masses**

V. B. Braginsky



Freely available online through the PNAS open access option.

PHYSICAL SCIENCES

APPLIED MATHEMATICS

4008 **Mathematical modeling of cell population dynamics in the colonic crypt and in colorectal cancer**



Matthew D. Johnston, Carina M. Edwards, Walter F. Bodmer, Philip K. Maini, and S. Jonathan Chapman

APPLIED PHYSICAL SCIENCES

4014 **Predicting response to breast cancer neoadjuvant chemotherapy using diffuse optical spectroscopy**



Albert Cerussi, David Hsiang, Natasha Shah, Rita Mehta, Amanda Durkin, John Butler, and Bruce J. Tromberg

CHEMISTRY

3681 **Antibody-catalyzed anaerobic destruction of methamphetamine**

Yang Xu, Mark S. Hixon, Noboru Yamamoto, Laura A. McAllister, Anita D. Wentworth, Paul Wentworth, Jr., and Kim D. Janda

3687 **Electrostatic gating of a nanometer water channel**

Jingyuan Li, Xiaojing Gong, Hangjun Lu, Ding Li, Haiping Fang, and Ruhong Zhou

3693 **A hexahistidine-Zn²⁺-dye label reveals STIM1 surface exposure**




Christina T. Hauser and Roger Y. Tsien

3698 **Mechanism of metal-independent decomposition of organic hydroperoxides and formation of alkoxy radicals by halogenated quinones**


Ben-Zhan Zhu, Hong-Tao Zhao, Balaraman Kalyanaraman, Jun Liu, Guo-Qiang Shan, Yu-Guo Du, and Balz Frei

- 3703 **Gallium (III) triflate catalyzed efficient Strecker reaction of ketones and their fluorinated analogs**
G. K. Surya Prakash, Thomas Mathew, Chiradeep Panja, Stevens Alconcel, Habiba Vaghoo, Clement Do, and George A. Olah
- 3707 **Scanning tunneling microscopy of the formation, transformation, and property of oligothiophene self-organizations on graphite and gold surfaces**
Zhi-Yong Yang, Hui-Min Zhang, Cun-Ji Yan, Shan-Shan Li, Hui-Juan Yan, Wei-Guo Song, and Li-Jun Wan

ENVIRONMENTAL SCIENCES

- 3713 **Solar influence on climate during the past millennium: Results from transient simulations with the NCAR Climate System Model**
 Caspar M. Ammann, Fortunat Joos, David S. Schimel, Bette L. Otto-Bliesner, and Robert A. Tomas

GEOPHYSICS

- 3719 **Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current**
 John A. Barth, Bruce A. Menge, Jane Lubchenco, Francis Chan, John M. Bane, Anthony R. Kirincich, Margaret A. McManus, Karina J. Nielsen, Stephen D. Pierce, and Libe Washburn

MATHEMATICS

- 3725 **Lifting cusp forms to Maass forms with an application to partitions**
Kathrin Bringmann and Ken Ono

PHYSICS

- 3677 **Experiments with probe masses**
V. B. Braginsky
- 3732 **Unified picture of the oxygen isotope effect in cuprate superconductors**
Xiao-Jia Chen, Viktor V. Struzhkin, Zhigang Wu, Hai-Qing Lin, Russell J. Hemley, and Ho-kwang Mao
- 3835 **On the mechanism of wing size determination in fly development**
Lars Hufnagel, Aurelio A. Teleman, Hervé Rouault, Stephen M. Cohen, and Boris I. Shraiman

BIOLOGICAL SCIENCES

ANTHROPOLOGY

- 3736 **Absence of the lactase-persistence-associated allele in early Neolithic Europeans**
J. Burger, M. Kirchner, B. Bramanti, W. Haak, and M. G. Thomas

APPLIED BIOLOGICAL SCIENCES

- 3742 **RNA aptamers directed to discrete functional sites on a single protein structural domain**
Hua Shi, Xiaochun Fan, Aarti Sevilimedu, and John T. Lis
- 3747 **Induction of the *celC* operon of *Clostridium thermocellum* by laminaribiose**
Michael Newcomb, Chun-Yu Chen, and J. H. David Wu




BIOCHEMISTRY

- 3681 **Antibody-catalyzed anaerobic destruction of methamphetamine**
Yang Xu, Mark S. Hixon, Noboru Yamamoto, Laura A. McAllister, Anita D. Wentworth, Paul Wentworth, Jr., and Kim D. Janda
- 3753 **Mechanism for inactivation of the mitotic inhibitory kinase Wee1 at M phase**
Kengo Okamoto and Noriyuki Sagata
- 3759 **Structures of the extracellular regions of the group II/III metabotropic glutamate receptors**
Takanori Muto, Daisuke Tsuchiya, Kosuke Morikawa, and Hisato Jingami
- 3765 **Regulation of poly(ADP-ribose) polymerase 1 activity by the phosphorylation state of the nuclear NAD biosynthetic enzyme NMN adenylyl transferase 1**
Felicitas Berger, Corinna Lau, and Mathias Ziegler
- 3771 **Inhibition of regulated proteolysis by RseB**
Brent O. Cezairliyan and Robert T. Sauer

BIOPHYSICS

- 3687 **Electrostatic gating of a nanometer water channel**
Jingyuan Li, Xiaojing Gong, Hangjun Lu, Ding Li, Haiping Fang, and Ruhong Zhou
- 3777 **Direct visualization of *Escherichia coli* chemotaxis receptor arrays using cryo-electron microscopy**
Peijun Zhang, Cezar M. Khursigara, Lisa M. Hartnell, and Sriram Subramaniam
- 3782 **Adhesion mechanisms of the mussel foot proteins mfp-1 and mfp-3**
Qi Lin, Delphine Gourdon, Chengjun Sun, Niels Holten-Andersen, Travers H. Anderson, J. Herbert Waite, and Jacob N. Israelachvili

CELL BIOLOGY

- 3693 **A hexahistidine-Zn²⁺-dye label reveals STIM1 surface exposure**
 Christina T. Hauser and Roger Y. Tsien
- 3787 **Functional role and oncogene-regulated expression of the BH3-only factor Bmf in mammary epithelial anoikis and morphogenesis**
Tobias Schmelzle, Arnaud A. Mailleux, Michael Overholtzer, Jason S. Carroll, Nicole L. Solimini, Eric S. Lightcap, Ole P. Veiby, and Joan S. Brugge
- 3793 **Loss of endocytic clathrin-coated pits upon acute depletion of phosphatidylinositol 4,5-bisphosphate**
 Roberto Zoncu, Rushika M. Perera, Rafael Sebastian, Fubito Nakatsu, Hong Chen, Tamas Balla, Guillermo Ayala, Derek Toomre, and Pietro V. De Camilli
- 3799 **Trophoblast cell activation by trophinin ligation is implicated in human embryo implantation**
 Kazuhiro Sugihara, Daijiro Sugiyama, James Byrne, Don P. Wolf, Kevin P. Lowitz, Yoichi Kobayashi, Maryam Kabir-Salmani, Daita Nadano, Daisuke Aoki, Shiro Nozawa, Jun Nakayama, Tomas Mustelin, Erkki Ruoslahti, Naoto Yamaguchi, and Michiko N. Fukuda
- 3805 **Cross-talk between Chk1 and Chk2 in double-mutant thymocytes**
Kathrin Zaugg, Yu-Wen Su, Patrick T. Reilly, Yasmin Moolani, Carol C. Cheung, Razquallah Hakem, Atsushi Hirao, Stephen J. Elledge, and Tak W. Mak

3811 **Cell-cycle-dependent phosphorylation of the nuclear pore Nup107–160 subcomplex**
Joseph S. Glavy, Andrew N. Krutchinsky, Ileana M. Cristea, Ian C. Berke, Thomas Boehmer, Günter Blobel, and Brian T. Chait

3817 **Heterotrimeric G protein signaling in the *Arabidopsis* unfolded protein response**
Shiyu Wang, Savitha Narendra, and Nina Fedoroff

3823 **E-Syts, a family of membranous Ca²⁺-sensor proteins with multiple C₂ domains**
Sang-Won Min, Wen-Pin Chang, and Thomas C. Südhof


3829 **c-Myb is required for progenitor cell homeostasis in colonic crypts**
Jordane Malaterre, Marina Carpinelli, Matthias Ernst, Warren Alexander, Michael Cooke, Susan Sutton, Sebastian Dworkin, Joan K. Heath, Jon Frampton, Grant McArthur, Hans Clevers, Douglas Hilton, Theo Mantamadiotis, and Robert G. Ramsay

DEVELOPMENTAL BIOLOGY

3835 **On the mechanism of wing size determination in fly development**
Lars Hufnagel, Aurelio A. Teleman, Hervé Rouault, Stephen M. Cohen, and Boris I. Shraiman

3841 **C-type natriuretic peptide regulates blood–testis barrier dynamics in adult rat testes**
Weiliang Xia, Dolores D. Mruk, and C. Yan Cheng


3847 **Linking pattern formation to cell-type specification: Dichaete and Ind directly repress *achaete* gene expression in the *Drosophila* CNS**
Guoyan Zhao, Grace Boekhoff-Falk, Beth A. Wilson, and James B. Skeath

3853 **MafB is required for islet β cell maturation**
 Isabella Artner, Bruno Bianchi, Jeffrey C. Raum, Min Guo, Tomomi Kaneko, Sabine Cordes, Michael Sieweke, and Roland Stein


3859 **Sox17 is essential for the specification of cardiac mesoderm in embryonic stem cells**
Yu Liu, Masanori Asakura, Hironori Inoue, Teruya Nakamura, Motoaki Sano, Zhiyv Niu, Michelle Chen, Robert J. Schwartz, and Michael D. Schneider


3865 **DMY gene induces male development in genetically female (XX) medaka fish**
Masaru Matsuda, Ai Shinomiya, Masato Kinoshita, Aya Suzuki, Tohru Kobayashi, Bindhu Paul-Prasanth, En-lieng Lau, Satoshi Hamaguchi, Mitsuru Sakaizumi, and Yoshitaka Nagahama

3871 **Interaction with the mammary microenvironment redirects spermatogenic cell fate *in vivo***
Corinne A. Boulanger, David L. Mack, Brian W. Booth, and Gilbert H. Smith

3877 **Mechanisms controlling the acquisition of a cardiac phenotype by liver stem cells**
 Barbara J. Muller-Borer, Wayne E. Cascio, Gwyn L. Esch, Hyung-Suk Kim, William B. Coleman, Joe W. Grisham, Page A. W. Anderson, and Nadia N. Malouf

ECOLOGY

3719 **Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current**
 John A. Barth, Bruce A. Menge, Jane Lubchenco, Francis Chan, John M. Bane, Anthony R. Kirincich, Margaret A. McManus, Karina J. Nielsen, Stephen D. Pierce, and Libe Washburn


3883 **Increased genetic variation and evolutionary potential drive the success of an invasive grass**
 Sébastien Lavergne and Jane Molofsky
→ See Commentary on page 3671

3889 **Gene–environment interactions influence ecological consequences of transgenic animals**
L. F. Sundström, M. Löhmus, W. E. Tymchuk, and Robert H. Devlin

ENVIRONMENTAL SCIENCES


3895 **Chlorination of lignin by ubiquitous fungi has a likely role in global organochlorine production**
Patricia Ortiz-Bermúdez, Kolby C. Hirth, Ewald Srebotnik, and Kenneth E. Hammel

EVOLUTION

3901 **Prospects for fungus identification using CO1 DNA barcodes, with *Penicillium* as a test case**
 Keith A. Seifert, Robert A. Samson, Jeremy R. deWaard, Jos Houbraeken, C. André Lévesque, Jean-Marc Moncalvo, Gerry Louis-Seize, and Paul D. N. Hebert

3907 **Adaptive evolution in humans revealed by the negative correlation between the polymorphism and fixation phases of evolution**
Jun Gojobori, Hua Tang, Joshua M. Akey, and Chung-I Wu

GENETICS

3913 **Pollen tetrad-based visual assay for meiotic recombination in *Arabidopsis***
 Kirk E. Francis, Sandy Y. Lam, Benjamin D. Harrison, Alexandra L. Bey, Luke E. Berchowitz, and Gregory P. Copenhagen
→ See Commentary on page 3673

3919 **Filamin B deficiency in mice results in skeletal malformations and impaired microvascular development**
Xianghua Zhou, Fei Tian, Johan Sandzén, Renhai Cao, Emilie Flaberg, Laszlo Szekely, Yihai Cao, Claes Ohlsson, Martin O. Bergo, Jan Borén, and Levent M. Akyürek

3925 **Systematic genome instability screens in yeast and their potential relevance to cancer**
Karen W. Y. Yuen, Cheryl D. Warren, Ou Chen, Teresa Kwok, Phil Hieter, and Forrest A. Spencer

3931 ***Ink4a/Arf* tumor suppressor does not modulate the degenerative conditions or tumor spectrum of the telomerase-deficient mouse**
Christine M. Khoo, Daniel R. Carrasco, Marcus W. Bosenberg, Ji-Hye Paik, and Ronald A. DePinho

3937 **Skeletal overgrowth is mediated by deficiency in a specific isoform of fibroblast growth factor receptor 3**
Veraragavan P. Eswarakumar and Joseph Schlessinger

3943 **KCNQ potassium channel mutations cause cardiac arrhythmias in *Drosophila* that mimic the effects of aging**
Karen Ocorr, Nick L. Reeves, Robert J. Wessells, Martin Fink, H.-S. Vincent Chen, Takeshi Akasaka, Soichiro Yasuda, Joseph M. Metzger, Wayne Giles, James W. Posakony, and Rolf Bodmer

3949 **Targeted deletion of *Wwox* reveals a tumor suppressor function**
Rami I. Aqeilan, Francesco Trapasso, Sadiq Hussain, Stefan Costinean, Dean Marshall, Yuri Pekarsky, John P. Hagan, Nicola Zanesi, Mohamed Kaou, Gary S. Stein, Jane B. Lian, and Carlo M. Croce

- 3955 **Loss of a histone deacetylase dramatically alters the genomic distribution of Spo11p-catalyzed DNA breaks in *Saccharomyces cerevisiae***
 Piotr A. Mieczkowski, Margaret Dominska, Michael J. Buck, Jason D. Lieb, and Thomas D. Petes
- 3961 **Association of a common complement receptor 2 haplotype with increased risk of systemic lupus erythematosus**
 Hui Wu, Susan A. Boackle, Punchong Hanvivadhanakul, Daniela Ulgiati, Jennifer M. Grossman, Youngho Lee, Nan Shen, Lawrence J. Abraham, Timothy R. Mercer, Elly Park, Lee A. Hebert, Brad H. Rovin, Dan J. Birmingham, Deh-Ming Chang, Chung Jen Chen, Deborah McCurdy, Humeira M. Badsha, Bernard Y. H. Thong, Hiok H. Chng, Frank C. Arnett, Daniel J. Wallace, C. Yung Yu, Bevrha H. Hahn, Rita M. Cantor, and Betty P. Tsao
- IMMUNOLOGY**
- 3967 **CD8 tumor-infiltrating lymphocytes are predictive of survival in muscle-invasive urothelial carcinoma**
 Padmanee Sharma, Yu Shen, Sijin Wen, Sachiko Yamada, Achim A. Jungbluth, Sacha Gnjjatic, Dean F. Bajorin, Victor E. Reuter, Harry Herr, Lloyd J. Old, and Eiichi Sato
- 3973 **Innate response to self-antigen significantly exacerbates burn wound depth**
 Freeman Suber, Michael C. Carroll, and Francis D. Moore, Jr.
- 3978 **Stable masking by H-2D^d cis ligand limits Ly49A relocalization to the site of NK cell/target cell contact**
 Jonathan Back, Anick Chalifour, Leonardo Scarpellino, and Werner Held
- 3984 **Invariant NKT cells sustain specific B cell responses and memory**
 Grazia Galli, Paola Pittoni, Elena Tonti, Carmine Malzone, Yasushi Uematsu, Marco Tortoli, Domenico Maione, Gianfranco Volpini, Oretta Finco, Sandra Nuti, Simona Tavarini, Paolo Dellabona, Rino Rappuoli, Giulia Casorati, and Sergio Abrignani
- 3990 **Immunotherapeutic activity of a conjugate of a Toll-like receptor 7 ligand**
 Christina C. N. Wu, Tomoko Hayashi, Kenji Takabayashi, Mojgan Sabet, Donald F. Smee, Donald D. Guiney, Howard B. Cottam, and Dennis A. Carson
- 3996 **Endogenous IL-12 triggers an antiangiogenic program in melanoma cells**
 Irma Airoidi, Emma Di Carlo, Claudia Cocco, Giuseppe Taverniti, Tommaso D'Antuono, Emanuela Ognio, Morihiko Watanabe, Domenico Ribatti, and Vito Pistoia
- 4002 **Restriction of endogenous T cell antigen receptor β rearrangements to $\nu\beta 14$ through selective recombination signal sequence modifications**
 Cherry Wu, Sheila Ranganath, Megan Gleason, Barbara B. Woodman, Tiffany M. Borjeson, Frederick W. Alt, and Craig H. Bassing
- MEDICAL SCIENCES**
- 4008 **Mathematical modeling of cell population dynamics in the colonic crypt and in colorectal cancer**
 Matthew D. Johnston, Carina M. Edwards, Walter F. Bodmer, Philip K. Maini, and S. Jonathan Chapman
- 4014 **Predicting response to breast cancer neoadjuvant chemotherapy using diffuse optical spectroscopy**
 Albert Cerussi, David Hsiang, Natasha Shah, Rita Mehta, Amanda Durkin, John Butler, and Bruce J. Tromberg
- 4020 **WNK4 regulates activity of the epithelial Na⁺ channel *in vitro* and *in vivo***
 Aaron M. Ring, Sam X. Cheng, Qiang Leng, Kristopher T. Kahle, Jesse Rinehart, Maria D. Lalioti, Heather M. Volkman, Frederick H. Wilson, Steven C. Hebert, and Richard P. Lifton
- 4025 **An SGK1 site in WNK4 regulates Na⁺ channel and K⁺ channel activity and has implications for aldosterone signaling and K⁺ homeostasis**
 Aaron M. Ring, Qiang Leng, Jesse Rinehart, Frederick H. Wilson, Kristopher T. Kahle, Steven C. Hebert, and Richard P. Lifton
- 4030 **Fusion of proinsulin-producing bone marrow-derived cells with hepatocytes in diabetes**
 Mineko Fujimiya, Hideto Kojima, Masumi Ichinose, Ryohachi Arai, Hiroshi Kimura, Atsunori Kashiwagi, and Lawrence Chan
- 4036 **A target-selected *Apc*-mutant rat kindred enhances the modeling of familial human colon cancer**
 James M. Amos-Landgraf, Lawrence N. Kwong, Christina M. Kendzierski, Mark Reichelderfer, Jose Torrealba, Jamey Weichert, Jill D. Haag, Kai-Shun Chen, Jordy L. Waller, Michael N. Gould, and William F. Dove
- 4042 **Spatial navigation deficit in amnesic mild cognitive impairment**
 Jakub Hort, Jan Laczó, Martin Vyhánek, Martin Bojar, Jan Bureš, and Kamil Vlček
- 4048 **Hedgehog signaling maintains a tumor stem cell compartment in multiple myeloma**
 Craig D. Peacock, Qiuju Wang, Gregory S. Gesell, Ian M. Corcoran-Schwartz, Evan Jones, Jynho Kim, Wendy L. Devereux, Jonathan T. Rhodes, Carol A. Huff, Philip A. Beachy, D. Neil Watkins, and William Matsui
- 4054 **The nuclear function of p53 is required for PUMA-mediated apoptosis induced by DNA damage**
 Peng Wang, Jian Yu, and Lin Zhang
- 4060 **Identification of STAT3 as a substrate of receptor protein tyrosine phosphatase T**
 Xiaodong Zhang, Ailan Guo, Jianshi Yu, Anthony Possemato, Yueting Chen, Weiping Zheng, Roberto D. Polakiewicz, Kenneth W. Kinzler, Bert Vogelstein, Victor E. Velculescu, and Zhenghe John Wang
- 4065 **Steroid receptor coactivator 3 is a coactivator for myocardin, the regulator of smooth muscle transcription and differentiation**
 Hui Joyce Li, Zaffar Haque, Qing Lu, Li Li, Richard Karas, and Michael Mendelsohn
- 4071 **A phase I clinical trial with monoclonal antibody ch806 targeting transitional state and mutant epidermal growth factor receptors**
 Andrew M. Scott, Fook-Thean Lee, Niall Tebbutt, Rebecca Herbertson, Sanjeev S. Gill, Zhanqi Liu, Effie Skrinou, Carmel Murone, Timothy H. Saunderson, Bridget Chappell, Anthony T. Papenfuss, Aurora M. T. Poon, Wendie Hopkins, Fiona E. Smyth, Duncan MacGregor, Lawrence M. Cher, Achim A. Jungbluth, Martin W. Brechbiel, Roger Murphy, Antony W. Burgess, Eric W. Hoffman, Terrance G. Johns, and Lloyd J. Old

4077 **α -Lipoic acid attenuates LPS-induced inflammatory responses by activating the phosphoinositide 3-kinase/Akt signaling pathway**
Wei-Jian Zhang, Hao Wei, Tory Hagen, and Balz Frei

4083 **Adenosine regulation of alveolar fluid clearance**
Phillip Factor, Gökhan M. Mutlu, Lan Chen, Jameel Mohameed, Alexander T. Akhmedov, Fan Jing Meng, Tamas Jilling, Erin Rachel Lewis, Meshell D. Johnson, Anna Xu, Daniel Kass, Janice M. Martino, Amy Bellmeyer, John S. Albazi, Charles Emala, H. T. Lee, Leland G. Dobbs, and Sadis Matalon

4089 **Transgenic cyclin E triggers dysplasia and multiple pulmonary adenocarcinomas**
Yan Ma, Steven Fiering, Candice Black, Xi Liu, Ziqiang Yuan, Vincent A. Memoli, David J. Robbins, Heather A. Bentley, Gregory J. Tsongalis, Eugene Demidenko, Sarah J. Freemantle, and Ethan Dmitrovsky

4095 **Selective gene silencing in activated leukocytes by targeting siRNAs to the integrin lymphocyte function-associated antigen-1**
Dan Peer, Pengcheng Zhu, Christopher V. Carman, Judy Lieberman, and Motomu Shimaoka

4101 **Molecular diagnosis of pituitary adenoma predisposition caused by aryl hydrocarbon receptor-interacting protein gene mutations**
Marianthi Georgitsi, Anniina Raitila, Auli Karhu, Karoliina Tuppurainen, Markus J. Mäkinen, Outi Vierimaa, Ralf Paschke, Wolfgang Saeger, Rob B. van der Luijt, Timo Sane, Mercedes Robledo, Ernesto De Menis, Robert J. Weil, Anna Wasik, Grzegorz Zielinski, Olga Lucewicz, Jan Lubinski, Virpi Launonen, Pia Vahteristo, and Lauri A. Aaltonen

4106 **Antitumor activity of MLN8054, an orally active small-molecule inhibitor of Aurora A kinase**
Mark G. Manfredi, Jeffrey A. Ecsedy, Kristan A. Meetze, Suresh K. Balani, Olga Burenkova, Wei Chen, Katherine M. Galvin, Kara M. Hoar, Jessica J. Huck, Patrick J. LeRoy, Emily T. Ray, Todd B. Sells, Bradley Stringer, Stephen G. Stroud, Tricia J. Vos, Gabriel S. Weatherhead, Deborah R. Wysong, Mengkun Zhang, Joseph B. Bolen, and Christopher F. Claiborne

MICROBIOLOGY

4112 **DgrA is a member of a new family of cyclic diguanosine monophosphate receptors and controls flagellar motor function in *Caulobacter crescentus***
Matthias Christen, Beat Christen, Martin G. Allan, Marc Folcher, Paul Jenö, Stephan Grzesiek, and Urs Jenal

4118 **Distinct roles of haptoglobin-related protein and apolipoprotein L-I in trypanolysis by human serum**
Benoit Vanhollebeke, Marianne J. Nielsen, Yoshihisa Watanabe, Philippe Truc, Luc Vanhamme, Kazunori Nakajima, Soren K. Moestrup, and Etienne Pays

4124 ***Escherichia coli* enzyme IIA^{Ntr} regulates the K⁺ transporter TrkA**
Chang-Ro Lee, Seung-Hyon Cho, Mi-Jeong Yoon, Alan Peterkofsky, and Yeong-Jae Seok

4130 **HIV-1 Vpr function is mediated by interaction with the damage-specific DNA-binding protein DDB1**
Bärbel Schröfelbauer, Yoshiyuki Hakata, and Nathaniel R. Landau

4136 **Attenuated virulence of a *Francisella* mutant lacking the lipid A 4'-phosphatase**
Xiaoyuan Wang, Anthony A. Ribeiro, Ziqiang Guan, Soman N. Abraham, and Christian R. H. Raetz

4142 **Separation of receptor-binding and profusogenic domains of glycoprotein D of herpes simplex virus 1 into distinct interacting proteins**
Guoying Zhou and Bernard Roizman

NEUROSCIENCE

4147 **Inhibition of Cdk5 in the nucleus accumbens enhances the locomotor-activating and incentive-motivational effects of cocaine**
Jane R. Taylor, Wendy J. Lynch, Hayde Sanchez, Peter Olausson, Eric J. Nestler, and James A. Bibb

4153 **Cortical area size dictates performance at modality-specific behaviors**
Axel Leingärtner, Sandrine Thuret, Todd T. Kroll, Shen-Ju Chou, J. Leigh Leasure, Fred H. Gage, and Dennis D. M. O'Leary

4159 **Regulation of Alzheimer's disease amyloid- β formation by casein kinase I**
Marc Flajolet, Gen He, Myriam Heiman, Angie Lin, Angus C. Nairn, and Paul Greengard

4165 **Stimulus-specific competitive selection in macaque extrastriate visual area V4**
Mazyar Fallah, Gene R. Stoner, and John H. Reynolds

4170 **Ischemic insults promote epigenetic reprogramming of μ opioid receptor expression in hippocampal neurons**
Luigi Formisano, Kyung-Min Noh, Takahiro Miyawaki, Toshihiro Mashiko, Michael V. L. Bennett, and R. Suzanne Zukin

4176 **PSD-95 is required for activity-driven synapse stabilization**
Ingrid Ehrlich, Matthew Klein, Simon Rumpel, and Roberto Malinow

4182 **Ablation of D1 dopamine receptor-expressing cells generates mice with seizures, dystonia, hyperactivity, and impaired oral behavior**
Ilse Gantois, Ke Fang, Luning Jiang, Daniela Babovic, Andrew J. Lawrence, Vincenzo Ferreri, Yaroslav Teper, Bianca Jupp, Jenna Ziebell, Cristina M. Morganti-Kossmann, Terence J. O'Brien, Rachel Nally, Günter Schütz, John Waddington, Gary F. Egan, and John Drago

4188 **A coherent neurobiological framework for functional neuroimaging provided by a model integrating compartmentalized energy metabolism**
Agnès Aubert, Luc Pellerin, Pierre J. Magistretti, and Robert Costalat

4194 **Neuronal growth and survival mediated by eIF5A, a polyamine-modified translation initiation factor**
Yunfei Huang, Daniel S. Higginson, Lynda Hester, Myung Hee Park, and Solomon H. Snyder


PHYSIOLOGY

4200 **The proton pumping pathway of bovine heart cytochrome c oxidase**
Kunitoshi Shimokata, Yukie Katayama, Haruka Murayama, Makoto Suematsu, Tomitake Tsukihara, Kazumasa Muramoto, Hiroshi Aoyama, Shinya Yoshikawa, and Hideo Shimada

4206 **Urocortin 3 regulates glucose-stimulated insulin secretion and energy homeostasis**
Chien Li, Peilin Chen, Joan Vaughan, Kuo-Fen Lee, and Wylie Vale


4212 **Two forms of single-vesicle astrocyte exocytosis imaged with total internal reflection fluorescence microscopy**
David N. Bowser and Baljit S. Khakh

PLANT BIOLOGY

4218 **Folate biofortification of tomato fruit**
 Rocío I. Díaz de la Garza, Jesse F. Gregory III, and Andrew D. Hanson
→ See Commentary on page 3675

4223 ***Arabidopsis* SNI1 and RAD51D regulate both gene transcription and DNA recombination during the defense response**
Wendy E. Durrant, Shui Wang, and Xinnian Dong

POPULATION BIOLOGY

4228 **Using DNA to track the origin of the largest ivory seizure since the 1989 trade ban**
 Samuel K. Wasser, Celia Mailand, Rebecca Booth, Benezeth Mutayoba, Emily Kisamo, Bill Clark, and Matthew Stephens

PSYCHOLOGY

4234 **Functional and morphometric brain dissociation between dyslexia and reading ability**
Fumiko Hoeft, Ann Meyler, Arvel Hernandez, Connie Juel, Heather Taylor-Hill, Jennifer L. Martindale, Glenn McMillon, Galena Kolchugina, Jessica M. Black, Afroz Faizi, Gayle K. Deutsch, Wai Ting Siok, Allan L. Reiss, Susan Whitfield-Gabrieli, and John D. E. Gabrieli

CORRECTIONS

CELL BIOLOGY

4240 **Lack of myostatin results in excessive muscle growth but impaired force generation**
Helge Amthor, Raymond Macharia, Roberto Navarrete, Markus Schuelke, Susan C. Brown, Anthony Otto, Thomas Voit, Francesco Muntoni, Gerta Vrbóva, Terence Partridge, Peter Zammit, Lutz Bunker, and Ketan Patel

MEDICAL SCIENCES

4240 **NOTCH1 directly regulates *c-MYC* and activates a feed-forward-loop transcriptional network promoting leukemic cell growth**
Teresa Palomero, Wei Keat Lim, Duncan T. Odom, Maria Luisa Sulis, Pedro J. Real, Adam Margolin, Kelly C. Barnes, Jennifer O'Neil, Donna Neuberg, Andrew P. Weng, Jon C. Aster, Francois Sigaux, Jean Soulier, A. Thomas Look, Richard A. Young, Andrea Califano, and Adolfo A. Ferrando

xv–xvii Author Index

xviii Subscription Form

xix Classified Advertisements