

**Cover image:** Pictured is a microbial mat growing near White Creek in Yellowstone National Park. These microbial communities produce lipids with unusually large variations in their deuterium content. Zhang et al. show that such variations likely relate to the different metabolic pathways employed by the microbes and suggest that deuterium variations in ancient lipids could be used to identify pathways of energy metabolism active in the past. See the Feature Article by Xinning Zhang et al. on pages 12580–12586. Image by Alex Sessions.

## From the Cover

- 12580 Bacterial lipids and metabolism
- 12706 Enhancing ribosomal frameshifting
- 12712 Hepatitis C virus channel structure
- 12794 Standardizing plant DNA barcodes
- 13010 Parkinson's progression mechanism

## Contents

### THIS WEEK IN PNAS

12563 **In This Issue**

### LETTER (ONLINE ONLY)

E84 **Duality of salience in dopamine neurons**  
David H. Root, David J. Barker, and Sisi Ma

### COMMENTARIES

12565 **Isotopic remembrance of metabolism past**  
David L. Valentine  
→ See companion article on page 12580

12567 **Plugging the holes in hepatitis C virus antiviral therapy**  
Stephen D. C. Griffin  
→ See companion article on page 12712

12569 **A botanical macroscope**  
Jesse H. Ausubel  
→ See companion article on page 12794

 Free online through the PNAS open access option.

12571 **Is Parkinson's disease a prion disorder?**

C. Warren Olanow and Stanley B. Prusiner  
→ See companion article on page 13010

### INAUGURAL ARTICLE

12573 **Basal lamina strengthens cell membrane integrity via the laminin G domain-binding motif of  $\alpha$ -dystroglycan**  
 Renzhi Han, Motoi Kanagawa, Takako Yoshida-Moriguchi, Erik P. Rader, Rainer A. Ng, Daniel E. Michele, David E. Muirhead, Stefan Kunz, Steven A. Moore, Susan T. Iannaccone, Katsuya Miyake, Paul L. McNeil, Ulrike Mayer, Michael B. A. Oldstone, John A. Faulkner, and Kevin P. Campbell

### FEATURE ARTICLE

12580 **Large D/H variations in bacterial lipids reflect central metabolic pathways**  
Xinning Zhang, Aimee L. Gillespie, and Alex L. Sessions  
→ See Commentary on page 12565


### PHYSICAL SCIENCES

#### APPLIED PHYSICAL SCIENCES


12587 **Ultrasensitive detection of nitric oxide at 5.33  $\mu$ m by using external cavity quantum cascade laser-based Faraday rotation spectroscopy**  
Rafał Lewicki, James H. Doty III, Robert F. Curl, Frank K. Tittel, and Gerard Wysocki

- 12897 **Long-term survival following a single treatment of kidney tumors with multiwalled carbon nanotubes and near-infrared radiation**  
Andrew Burke, Xuanfeng Ding, Ravi Singh, Robert A. Kraft, Nicole Levi-Polyachenko, Marissa Nichole Rylander, Chris Szot, Cara Buchanan, Jon Whitney, Jessica Fisher, Heather C. Hatcher, Ralph D'Agostino, Jr., Nancy D. Kock, P. M. Ajayan, David L. Carroll, Steven Akman, Frank M. Torti, and Suzy V. Torti

#### CHEMISTRY

- 12593 **Solvation in protein (un)folding of melittin tetramer–monomer transition**  
Christina M. Othon, Oh-Hoon Kwon, Milo M. Lin, and Ahmed H. Zewail
- 12599 **Real-time molecular monitoring of chemical environment in obligate anaerobes during oxygen adaptive response**  
 Hoi-Ying N. Holman, Eleanor Wozei, Zhang Lin, Luis R. Comolli, David A. Ball, Sharon Borglin, Matthew W. Fields, Terry C. Hazen, and Kenneth H. Downing
- 12605 **Single homopolypeptide chains collapse into mechanically rigid conformations**  
Lorna Dougan, Jingyuan Li, Carmen L. Badilla, B. J. Berne, and Julio M. Fernandez
- 12658 **Top-down high-resolution mass spectrometry of cardiac myosin binding protein C revealed that truncation alters protein phosphorylation state**  
Ying Ge, Inna N. Rybakova, Qingge Xu, and Richard L. Moss

#### ENGINEERING

- 12611 **Mechanical tension contributes to clustering of neurotransmitter vesicles at presynaptic terminals**  
 Scott Siechen, Shengyuan Yang, Akira Chiba, and Taher Saif
- 12617 **Acoustically driven programmable liquid motion using resonance cavities**  
Sean M. Langelier, Dustin S. Chang, Ramsey I. Zeitoun, and Mark A. Burns

#### ENVIRONMENTAL SCIENCES

- 12580 **Large D/H variations in bacterial lipids reflect central metabolic pathways**  
Xinning Zhang, Aimee L. Gillespie, and Alex L. Sessions  
→ See Commentary on page 12565

#### GEOLOGY

- 12623 **Shock-synthesized hexagonal diamonds in Younger Dryas boundary sediments**  
Douglas J. Kennett, James P. Kennett, Allen West, G. James West, Ted E. Bunch, Brendan J. Culleton, Jon M. Erlandson, Shane S. Que Hee, John R. Johnson, Chris Mercer, Feng Shen, Marilee Sellers, Thomas W. Stafford, Jr., Adrienne Stich, James C. Weaver, James H. Wittke, and Wendy S. Wolbach
- 12629 **Surviving mass extinction by bridging the benthic/planktic divide**  
Kate F. Darling, Ellen Thomas, Simone A. Kasemann, Heidi A. Seears, Christopher W. Smart, and Christopher M. Wade

#### GEOPHYSICS

- 12634 **The elastic modulus, percolation, and disaggregation of strongly interacting, intersecting antiplane cracks**  
P. M. Davis and L. Knopoff

#### PHYSICS

- 12640 **Scaling laws of human interaction activity**  
Diego Rybski, Sergey V. Buldyrev, Shlomo Havlin, Fredrik Liljeros, and Hernán A. Makse

#### SOCIAL SCIENCES

#### ECONOMIC SCIENCES

- 13136 **Ecosocial consequences and policy implications of disease management in East African agropastoral systems**  
Andrew Paul Gutierrez, Gianni Gilioli, and Johann Baumgärtner

#### BIOLOGICAL SCIENCES

#### ANTHROPOLOGY

- 12623 **Shock-synthesized hexagonal diamonds in Younger Dryas boundary sediments**  
Douglas J. Kennett, James P. Kennett, Allen West, G. James West, Ted E. Bunch, Brendan J. Culleton, Jon M. Erlandson, Shane S. Que Hee, John R. Johnson, Chris Mercer, Feng Shen, Marilee Sellers, Thomas W. Stafford, Jr., Adrienne Stich, James C. Weaver, James H. Wittke, and Wendy S. Wolbach
- 12646 **Orangutans employ unique strategies to control branch flexibility**  
Susannah K. S. Thorpe, Roger Holder, and Robin H. Crompton

#### APPLIED BIOLOGICAL SCIENCES

- 12652 **Targeting an antimicrobial effector function in insect immunity as a pest control strategy**  
Mark S. Bulmer, Ido Bachelet, Rahul Raman, Rebeca B. Rosengaus, and Ram Sasisekharan

#### BIOCHEMISTRY

- 12658 **Top-down high-resolution mass spectrometry of cardiac myosin binding protein C revealed that truncation alters protein phosphorylation state**  
Ying Ge, Inna N. Rybakova, Qingge Xu, and Richard L. Moss
- 12664 **A model for DNA polymerase switching involving a single cleft and the rim of the sliding clamp**  
Justin M. H. Heltzel, Robert W. Maul, Sarah K. Scouten Ponticelli, and Mark D. Sutton
- 12670 **BMP signaling pathway is required for commitment of C3H10T1/2 pluripotent stem cells to the adipocyte lineage**  
Haiyan Huang, Tan-Jing Song, Xi Li, Lingling Hu, Qun He, Mei Liu, M. Daniel Lane, and Qi-Qun Tang
- 12676 **Control of p53 multimerization by Ubc13 is JNK-regulated**  
Ivan Topisirovic, Gustavo J. Gutierrez, Meifan Chen, Ettore Appella, Katherine L. B. Borden, and Ze'ev A. Ronai
- 12682 **The JNKs differentially regulate RNA polymerase III transcription by coordinately modulating the expression of all TFIIB subunits**  
Shuping Zhong and Deborah L. Johnson

- 12688 **Structural transitions within human Rad51 nucleoprotein filaments**  
Ragan B. Robertson, Dana N. Moses, YoungHo Kwon, Pamela Chan, Peter Chi, Hannah Klein, Patrick Sung, and Eric C. Greene
- 12694 **Acetate produced in the mitochondrion is the essential precursor for lipid biosynthesis in procyclic trypanosomes**  
Loïc Rivière, Patrick Moreau, Stefan Allmann, Matthias Hahn, Marc Biran, Nicolas Plazolles, Jean-Michel Franconi, Michael Boshart, and Frédéric Bringaud
- 12700 **Molecular mechanism of membrane constriction and tubulation mediated by the F-BAR protein Paccin/Syndapin**  
Qi Wang, Marcos V. A. S. Navarro, Gary Peng, Evan Molinelli, Shih Lin Goh, Bret L. Judson, Kanagalaghatta R. Rajashankar, and Holger Sondermann

#### BIOPHYSICS AND COMPUTATIONAL BIOLOGY

- 12593 **Solvation in protein (un)folding of melittin tetramer–monomer transition**  
Christina M. Othon, Oh-Hoon Kwon, Milo M. Lin, and Ahmed H. Zewail
- 12706 **Triplex structures in an RNA pseudoknot enhance mechanical stability and increase efficiency of –1 ribosomal frameshifting**  
Gang Chen, Kung-Yao Chang, Ming-Yuan Chou, Carlos Bustamante, and Ignacio Tinoco, Jr.
- 12712 **The 3-dimensional structure of a hepatitis C virus p7 ion channel by electron microscopy**  
Philipp Luik, Chee Chew, Jussi Aittoniemi, Jason Chang, Paul Wentworth, Jr, Raymond A. Dwek, Philip C. Biggin, Catherine Vénien-Bryan, and Nicole Zitzmann  
→ See Commentary on page 12567
- 12717 **Why kinesin is so processive**  
Erdal Toprak, Ahmet Yildiz, Melinda Tonks Hoffman, Steven S. Rosenfeld, and Paul R. Selvin
- 12723 **Nucleotide-dependent conformational states of actin**  
Jim Pfaendtner, Davide Branduardi, Michele Parrinello, Thomas D. Pollard, and Gregory A. Voth
- 12729 **Cluster size regulates protein sorting in the immunological synapse**  
Niña C. Hartman, Jeffrey A. Nye, and Jay T. Groves
- 12735 **Predicting weakly stable regions, oligomerization state, and protein–protein interfaces in transmembrane domains of outer membrane proteins**  
Hammad Naveed, Ronald Jackups Jr., and Jie Liang
- 12741 **Transcriptome of embryonic and neonatal mouse cortex by high-throughput RNA sequencing**  
Xinwei Han, Xia Wu, Wen-Yu Chung, Tao Li, Anton Nekrutenko, Naomi S. Altman, Gong Chen, and Hong Ma

#### CELL BIOLOGY

- 12573 **Basal lamina strengthens cell membrane integrity via the laminin G domain-binding motif of  $\alpha$ -dystroglycan**  
Renzhi Han, Motoi Kanagawa, Takako Yoshida-Moriguchi, Erik P. Rader, Rainer A. Ng, Daniel E. Michele, David E. Muirhead, Stefan Kunz, Steven A. Moore, Susan T. Iannaccone, Katsuya Miyake, Paul L. McNeil, Ulrike Mayer, Michael B. A. Oldstone, John A. Faulkner, and Kevin P. Campbell

- 12747 **Fibroblast growth factor–2 regulates the stability of nuclear bodies**  
Alexander-Francisco Bruns, Jeroen van Bergeijk, Christina Lorbeer, Anna Nölle, Julia Jungnickel, Claudia Grothe, and Peter Claus
- 12753 **Intramitochondrial calcium regulation by the FHIT gene product sensitizes to apoptosis**  
Alessandro Rimessi, Saverio Marchi, Carmen Fotino, Anna Romagnoli, Kay Huebner, Carlo M. Croce, Paolo Pinton, and Rosario Rizzuto
- 12759 **Stoichiometric and temporal requirements of Oct4, Sox2, Klf4, and c-Myc expression for efficient human iPSC induction and differentiation**  
Eirini P. Papapetrou, Mark J. Tomishima, Stuart M. Chambers, Yvonne Mica, Evan Reed, Jayanthi Menon, Viviane Tabar, Qianxing Mo, Lorenz Studer, and Michel Sadelain
- 12765 **Mrc1 phosphorylation in response to DNA replication stress is required for Mec1 accumulation at the stalled fork**  
Maria L. Naylor, Ju-mei Li, Alex J. Osborn, and Stephen J. Elledge
- 12771 **Basal cells as stem cells of the mouse trachea and human airway epithelium**  
Jason R. Rock, Mark W. Onaitis, Emma L. Rawlins, Yun Lu, Cheryl P. Clark, Yan Xue, Scott H. Randell, and Brigid L. M. Hogan

#### DEVELOPMENTAL BIOLOGY

- 12776 **Heterozygosity for a Bub1 mutation causes female-specific germ cell aneuploidy in mice**  
Shawn Leland, Prabakaran Nagarajan, Aris Polyzos, Sharon Thomas, George Samaan, Robert Donnell, Francesco Marchetti, and Sundaresan Venkatachalam
- 12782 **Dendrites of cerebellar granule cells correctly recognize their target axons for synaptogenesis in vitro**  
Shoko Ito and Masatoshi Takeichi

#### ECOLOGY

- 12788 **Global warming benefits the small in aquatic ecosystems**  
Martin Daufresne, Kathrin Lengfellner, and Ulrich Sommer
- 12794 **A DNA barcode for land plants**  
CBOL Plant Working Group  
→ See Commentary on page 12569
- 12798 **Maternally invested carotenoids compensate costly ectoparasitism in the hihi**  
John G. Ewen, Rose Thorogood, Patricia Brekke, Phillip Cassey, Filiz Karadas, and Doug P. Armstrong
- 12803 **Extreme diversity in noncalcifying haptophytes explains a major pigment paradox in open oceans**  
Hui Liu, Ian Probert, Julia Uitz, Hervé Claustre, Stéphane Aris-Brosou, Miguel Frada, Fabrice Not, and Colomban de Vargas
- 12809 **Life history plasticity magnifies the ecological effects of a social wasp invasion**  
Erin E. Wilson, Lynne M. Mullen, and David A. Holway


#### ENVIRONMENTAL SCIENCES

- 12814 **High diversity of fungi in air particulate matter**  
Janine Fröhlich-Nowoisky, Daniel A. Pickersgill, Viviane R. Després, and Ulrich Pöschl

## EVOLUTION

- 12629 **Surviving mass extinction by bridging the benthic/planktic divide**  
Kate F. Darling, Ellen Thomas, Simone A. Kasemann, Heidi A. Seears, Christopher W. Smart, and Christopher M. Wade
- 12820 **Protein targeting into secondary plastids of chlorarachniophytes**  
Yoshihisa Hirakawa, Kisaburo Nagamune, and Ken-ichiro Ishida
- 12826 **Whole-proteome phylogeny of large dsDNA virus families by an alignment-free method**  
Guohong Albert Wu, Se-Ran Jun, Gregory E. Sims, and Sung-Hou Kim

## GENETICS

- 12832 **Structure-based discovery and description of plant and animal *Helitrons***  
Lixing Yang and Jeffrey L. Bennetzen
- 12838 **Three susceptible loci associated with primary open-angle glaucoma identified by genome-wide association study in a Japanese population**  
Masakazu Nakano, Yoko Ikeda, Takazumi Taniguchi, Tomohito Yagi, Masahiro Fuwa, Natsue Omi, Yuichi Tokuda, Masami Tanaka, Kengo Yoshii, Masaaki Kageyama, Shigeta Naruse, Akira Matsuda, Kazuhiko Mori, Shigeru Kinoshita, and Kei Tashiro
- 12843 **Suppressor of gamma response 1 (*SOG1*) encodes a putative transcription factor governing multiple responses to DNA damage**  
Kaoru Yoshiyama, Phillip A. Conklin, Neil D. Huefner, and Anne B. Britt
- 12849 **DNA wrapping is required for DNA damage recognition in the *Escherichia coli* DNA nucleotide excision repair pathway**  
 Hailin Wang, Meiling Lu, Moon-shong Tang, Bennett Van Houten, J. B. Alexander Ross, Michael Weinfeld, and X. Chris Le

- 12855 **Characterization and distribution of retrotransposons and simple sequence repeats in the bovine genome**  
David L. Adelson, Joy M. Raison, and Robert C. Edgar
- 12861 **Photocrosslinking of human telomeric G-quadruplex loops by *anti* cyclobutane thymine dimer formation**  
Dian G. T. Su, Huafeng Fang, Michael L. Gross, and John-Stephen A. Taylor

## IMMUNOLOGY

- 12867 **DNA-triggered innate immune responses are propagated by gap junction communication**  
Suraj J. Patel, Kevin R. King, Monica Casali, and Martin L. Yarmush
- 12873 **NOD2 contributes to cutaneous defense against *Staphylococcus aureus* through  $\alpha$ -toxin-dependent innate immune activation**  
Petr Hruz, Annelies S. Zinkernagel, Gabriela Jenikova, Gregory J. Botwin, Jean-Pierre Hugot, Michael Karin, Victor Nizet, and Lars Eckmann

- 12879 **Genetic and antibody-mediated reprogramming of natural killer cell missing-self recognition in vivo**  
Caroline Sola, Pascale André, Céline Lemmers, Nicolas Fuseri, Cécile Bonnafous, Mathieu Bléry, Nicolai R. Wagtman, François Romagné, Eric Vivier, and Sophie Ugolini
- 12885 **IL-9 induces differentiation of T<sub>H</sub>17 cells and enhances function of FoxP3<sup>+</sup> natural regulatory T cells**  
Wassim Elyaman, Elizabeth M. Bradshaw, Catherine Uyttenhove, Valérie Dardalhon, Amit Awasthi, Jaime Imitola, Estelle Bettelli, Mohamed Oukka, Jacques van Snick, Jean-Christophe Renauld, Vijay K. Kuchroo, and Samia J. Khoury
- 12891 **High-affinity lamprey VLRA and VLRB monoclonal antibodies**  
Satoshi Tasumi, C. Alejandro Velikovsky, Gang Xu, S. Annie Gai, K. Dane Wittrup, Martin F. Flajnik, Roy A. Mariuzza, and Zeev Pancer

## MEDICAL SCIENCES

- 12897 **Long-term survival following a single treatment of kidney tumors with multiwalled carbon nanotubes and near-infrared radiation**  
Andrew Burke, Xuanfeng Ding, Ravi Singh, Robert A. Kraft, Nicole Levi-Polyachenko, Marissa Nichole Rylander, Chris Szot, Cara Buchanan, Jon Whitney, Jessica Fisher, Heather C. Hatcher, Ralph D'Agostino, Jr., Nancy D. Kock, P. M. Ajayan, David L. Carroll, Steven Akman, Frank M. Torti, and Suzy V. Torti
- 12903 **Met induces mammary tumors with diverse histologies and is associated with poor outcome and human basal breast cancer**  
Marisa G. Ponzo, Robert Lesurf, Stephanie Petkiewicz, Frances P. O'Malley, Dushanthi Pinnaduwege, Irene L. Andrulis, Shelley B. Bull, Naila Chughtai, Dongmei Zuo, Margarita Souleimanova, David Germain, Atilla Omeroglu, Robert D. Cardiff, Michael Hallett, and Morag Park
- 12909 **Met induces diverse mammary carcinomas in mice and is associated with human basal breast cancer**  
Carrie R. Graveel, Jack D. DeGroot, Yanli Su, Julie Koeman, Karl Dykema, Samuel Leung, Jacqueline Snider, Sherri R. Davies, Pamela J. Swiatek, Sandra Cottingham, Mark A. Watson, Matthew J. Ellis, Robert E. Sigler, Kyle A. Furge, and George F. Vande Woude
- 12915 **Anti-VEGF single-chain antibody GLAF-1 encoded by oncolytic vaccinia virus significantly enhances antitumor therapy**  
Alexa Frentzen, Yong A. Yu, Nanhai Chen, Qian Zhang, Stephanie Weibel, Viktoria Raab, and Aladar A. Szalay
- 12921 **Inactivating germ-line and somatic mutations in polypeptide *N*-acetylgalactosaminyltransferase 12 in human colon cancers**  
Kishore Guda, Helen Moinova, Jian He, Oliver Jamison, Lakshmeswari Ravi, Leanna Natale, James Lutterbaugh, Earl Lawrence, Susan Lewis, James K. V. Willson, John B. Lowe, Georgia L. Wiesner, Giovanni Parmigiani, Jill Barnholtz-Sloan, Dawn W. Dawson, Victor E. Velculescu, Kenneth W. Kinzler, Nikolas Papadopoulos, Bert Vogelstein, Joseph Willis, Thomas A. Gerken, and Sanford D. Markowitz
- 12926 **Induction of cerebral  $\beta$ -amyloidosis: Intracerebral versus systemic A $\beta$  inoculation**  
Yvonne S. Eisele, Tristan Bolmont, Mathias Heikenwalder, Franziska Langer, Laura H. Jacobson, Zheng-Xin Yan, Klaus Roth, Adriano Aguzzi, Matthias Staufenbiel, Lary C. Walker, and Mathias Jucker

- 12932 **The AMPK agonist AICAR inhibits the growth of EGFRvIII-expressing glioblastomas by inhibiting lipogenesis**  
 Deliang Guo, Isabel J. Hildebrandt, Robert M. Prins, Horacio Soto, Mary M. Mazzotta, Julie Dang, Johannes Czernin, John Y.-J. Shyy, Andrew D. Watson, Michael Phelps, Caius G. Radu, Timothy F. Cloughesy, and Paul S. Mischel
- 12938 **Identification of genes conferring resistance to 5-fluorouracil**  
 Byoung Kwon Yoo, Rachel Gredler, Nicollaq Vozhilla, Zao-zhong Su, Dong Chen, Talitha Forcier, Khalid Shah, Utsav Saxena, Ulla Hansen, Paul B. Fisher, and Devanand Sarkar
- 12944 **Genomic analysis reveals few genetic alterations in pediatric acute myeloid leukemia**  
 Ina Radtke, Charles G. Mullighan, Masami Ishii, Xiaoping Su, Jinjun Cheng, Jing Ma, Ramapriya Ganti, Zhongling Cai, Salil Goorha, Stanley B. Pounds, Xueyuan Cao, Caroline Obert, Jianling Armstrong, Jinghui Zhang, Guangchun Song, Raul C. Ribeiro, Jeffrey E. Rubnitz, Susana C. Raimondi, Sheila A. Shurtleff, and James R. Downing
- 12950 **Acquired copy number alterations in adult acute myeloid leukemia genomes**  
 Matthew J. Walter, Jacqueline E. Payton, Rhonda E. Ries, William D. Shannon, Hrishikesh Deshmukh, Yu Zhao, Jack Baty, Sharon Heath, Peter Westervelt, Mark A. Watson, Michael H. Tomasson, Rakesh Nagarajan, Brian P. O’Gara, Clara D. Bloomfield, Krzysztof Mrózek, Rebecca R. Selzer, Todd A. Richmond, Jacob Kitzman, Joel Geoghegan, Peggy S. Eis, Rachel Maupin, Robert S. Fulton, Michael McLellan, Richard K. Wilson, Elaine R. Mardis, Daniel C. Link, Timothy A. Graubert, John F. DiPersio, and Timothy J. Ley
- 12956 **Role of human noncoding RNAs in the control of tumorigenesis**  
 Ling Li, Tingting Feng, Yingying Lian, Guangfeng Zhang, Alan Garen, and Xu Song
- 12962 **Simultaneous inactivation of Par-4 and PTEN in vivo leads to synergistic NF- $\kappa$ B activation and invasive prostate carcinoma**  
 Pablo J. Fernandez-Marcos, Shadi Abu-Baker, Jayashree Joshi, Anita Galvez, Elias A. Castilla, Marta Cañamero, Manuel Collado, Carmen Saez, Gema Moreno-Bueno, Jose Palacios, Michael Leitges, Manuel Serrano, Jorge Moscat, and Maria T. Diaz-Meco
- 12968 **Inactivation of CDK2 is synthetically lethal to MYCN over-expressing cancer cells**  
 Jan J. Molenaar, Marli E. Ebus, Dirk Geerts, Jan Koster, Fieke Lamers, Linda J. Valentijn, Ellen M. Westerhout, Rogier Versteeg, and Huib N. Caron
- 12974 **A critical role for phosphatase haplodeficiency in the selective suppression of deletion 5q MDS by lenalidomide**  
 Sheng Wei, Xianghong Chen, Kathy Rocha, P. K. Epling-Burnette, Julie Y. Djeu, Qing Liu, John Byrd, Lubomir Sokol, Nick Lawrence, Roberta Pireddu, Gordon Dewald, Ann Williams, Jaroslaw Maciejewski, and Alan List
- MICROBIOLOGY**
- 12580 **Large D/H variations in bacterial lipids reflect central metabolic pathways**  
 Xinning Zhang, Aimee L. Gillespie, and Alex L. Sessions  
 See Commentary on page 12565
- 12599 **Real-time molecular monitoring of chemical environment in obligate anaerobes during oxygen adaptive response**  
 Hoi-Ying N. Holman, Eleanor Wozel, Zhang Lin, Luis R. Comolli, David A. Ball, Sharon Borglin, Matthew W. Fields, Terry C. Hazen, and Kenneth H. Downing
- 12980 **The fatal fungal outbreak on Vancouver Island is characterized by enhanced intracellular parasitism driven by mitochondrial regulation**  
 Hansong Ma, Ferry Hagen, Dov J. Stekel, Simon A. Johnston, Edward Sionov, Rama Falk, Itzhack Polacheck, Teun Boekhout, and Robin C. May
- 12986 **Biological and immunological characteristics of hepatitis E virus-like particles based on the crystal structure**  
 Tetsuo Yamashita, Yoshio Mori, Naoyuki Miyazaki, R. Holland Cheng, Masato Yoshimura, Hideaki Unno, Ryoichi Shima, Kohji Moriishi, Tomitake Tsukihara, Tian Cheng Li, Naokazu Takeda, Tatsuo Miyamura, and Yoshiharu Matsuura
- 12992 **Structure of the hepatitis E virus-like particle suggests mechanisms for virus assembly and receptor binding**  
 Tom S. Y. Guu, Zheng Liu, Qiaozhen Ye, Douglas A. Mata, Kunpeng Li, Changcheng Yin, Jingqiang Zhang, and Yizhi Jane Tao
- 12998 **Host-derived glucose and its transporter in the obligate intracellular pathogen *Toxoplasma gondii* are dispensable by glutaminolysis**  
 Martin Blume, Dayana Rodriguez-Contreras, Scott Landfear, Tobias Fleige, Dominique Soldati-Favre, Richard Lucius, and Nishith Gupta
- 13004 **Preerythrocytic, live-attenuated *Plasmodium falciparum* vaccine candidates by design**  
 Kelley M. VanBuskirk, Matthew T. O’Neill, Patricia De La Vega, Alexander G. Maier, Urszula Krzych, Jack Williams, Megan G. Dowler, John B. Sacci, Jr., Niwat Kangwanransan, Takafumi Tsuboi, Norman M. Kneteman, Donald G. Heppner, Jr., Brant A. Murdock, Sebastian A. Mikolajczak, Ahmed S. I. Aly, Alan F. Cowman, and Stefan H. I. Kappe
- NEUROSCIENCE**
- 12611 **Mechanical tension contributes to clustering of neurotransmitter vesicles at presynaptic terminals**  
 Scott Siechen, Shengyuan Yang, Akira Chiba, and Taher Saif
- 13010 **Inclusion formation and neuronal cell death through neuron-to-neuron transmission of  $\alpha$ -synuclein**  
 Paula Desplats, He-Jin Lee, Eun-Jin Bae, Christina Patrick, Edward Rockenstein, Leslie Crews, Brian Spencer, Eliezer Masliah, and Seung-Jae Lee  
 See Commentary on page 12571
- 13016 **Marijuana craving in the brain**  
 Francesca M. Filbey, Joseph P. Schacht, Ursula S. Myers, Robert S. Chavez, and Kent E. Hutchison
- 13022 **Subcortical differentiation of stop consonants relates to reading and speech-in-noise perception**  
 Jane Hornickel, Erika Skoe, Trent Nicol, Steven Zecker, and Nina Kraus
- 13028 **Gain in sensitivity and loss in temporal contrast of STDP by dopaminergic modulation at hippocampal synapses**  
 Ji-Chuan Zhang, Pak-Ming Lau, and Guo-Qiang Bi
- 13034 **Bilateral visual field maps in a patient with only one hemisphere**  
 Lars Muckli, Marcus J. Naumer, and Wolf Singer

- 13040 **Correspondence of the brain's functional architecture during activation and rest**  
Stephen M. Smith, Peter T. Fox, Karla L. Miller, David C. Glahn, P. Mickle Fox, Clare E. Mackay, Nicola Filippini, Kate E. Watkins, Roberto Toro, Angela R. Laird, and Christian F. Beckmann
- 13046 **Dynamic sensitivity of area V4 neurons during saccade preparation**  
Xue Han, Sherry X. Xian, and Tirin Moore
- 13052 **Repression of  $\alpha$ -synuclein expression and toxicity by microRNA-7**  
Eunsung Junn, Kang-Woo Lee, Byeong Seon Jeong, Teresa W. Chan, Joo-Young Im, and M. Maral Mouradian
- 13058 **Kalirin regulates cortical spine morphogenesis and disease-related behavioral phenotypes**  
Michael E. Cahill, Zhong Xie, Michelle Day, Maria V. Barbolina, Courtney A. Miller, Craig Weiss, Jelena Radulovic, J. David Sweatt, John F. Disterhoft, D. James Surmeier, and Peter Penzes
- 13064 **Selective induction of neocortical GABAergic neurons by the PDK1-Akt pathway through activation of Mash1**  
Koji Oishi, Kenji Watatani, Yasuhiro Itoh, Hideyuki Okano, François Guillemot, Kazunori Nakajima, and Yukiko Gotoh
- 13070 **Presynaptic peptidergic modulation of olfactory receptor neurons in *Drosophila***  
Rickard Ignell, Cory M. Root, Ryan T. Birse, Jing W. Wang, Dick R. Nässel, and Åsa M. E. Winther

#### PHARMACOLOGY

- 13076 **Leptin derived from adipocytes in injured peripheral nerves facilitates development of neuropathic pain via macrophage stimulation**  
Takehiko Maeda, Norikazu Kiguchi, Yuka Kobayashi, Toshihiko Ikuta, Masanobu Ozaki, and Shiroh Kishioka


#### PHYSIOLOGY

- 13082 **A recombinant N-terminal domain fully restores deactivation gating in N-truncated and long QT syndrome mutant hERG potassium channels**  
Ahleah S. Gustina and Matthew C. Trudeau
- 13088 **Impaired defense mechanism against inflammation, hyperalgesia, and airway hyperreactivity in somatostatin 4 receptor gene-deleted mice**  
Zsuzsanna Helyes, Erika Pintér, Katalin Sándor, Krisztián Elekes, Ágnes Bánvölgyi, Dániel Keszthelyi, Éva Szőke, Dániel M. Tóth, Zoltán Sándor, László Kereskai, Gábor Pozsgai, Jeremy P. Allen, Piers C. Emson, Adrienn Markovics, and János Szolcsányi
- 13094 **Duodenal acidity "sensing" but not epithelial HCO<sub>3</sub><sup>-</sup> supply is critically dependent on carbonic anhydrase II expression**  
Markus Sjöblom, Anurag Kumar Singh, Wen Zheng, Jian Wang, Bi-guang Tuo, Anja Krabbenhöft, Brigitte Riederer, Gerolf Gros, and Ursula Seidler
- 13100 **Leptin-mediated changes in hepatic mitochondrial metabolism, structure, and protein levels**  
 Amandeep Singh, Martin Wirtz, Nadeene Parker, Matthew Hogan, John Strahler, George Michailidis, Sarah Schmidt, Antonio Vidal-Puig, Sabrina Diano, Philip Andrews, Martin D. Brand, and Jeffrey Friedman

#### PLANT BIOLOGY

- 13106 **Short actin-based mechanism for light-directed chloroplast movement in *Arabidopsis***  
Akeo Kadota, Noboru Yamada, Noriyuki Suetsugu, Mana Hirose, Chieko Saito, Keiko Shoda, Satoshi Ichikawa, Takatoshi Kagawa, Akihiko Nakano, and Masamitsu Wada
- 13112 **Singlet oxygen-dependent translational control in the *tigrina-d.12* mutant of barley**  
Dhriti Khandal, Iga Samol, Frank Buhr, Stephan Pollmann, Holger Schmidt, Stephan Clemens, Steffen Reinbothe, and Christiane Reinbothe
- 13118 **Sucrose synthase affects carbon partitioning to increase cellulose production and altered cell wall ultrastructure**  
Heather D. Coleman, Jimmy Yan, and Shawn D. Mansfield
- 13124 **Normal growth of *Arabidopsis* requires cytosolic invertase but not sucrose synthase**  
D. H. Paul Barratt, Paul Derbyshire, Kim Findlay, Marilyn Pike, Nikolaus Wellner, John Lunn, Regina Feil, Clare Simpson, Andrew J. Maule, and Alison M. Smith

#### PSYCHOLOGY

- 13130 **Positional averaging explains crowding with letter-like stimuli**  
 John A. Greenwood, Peter J. Bex, and Steven C. Dakin

#### SUSTAINABILITY SCIENCE

- 13136 **Ecosocial consequences and policy implications of disease management in East African agropastoral systems**  
Andrew Paul Gutierrez, Gianni Gilioli, and Johann Baumgärtner

#### CORRECTIONS

##### BIOPHYSICS AND COMPUTATIONAL BIOLOGY

- 13142 **Systematic identification of cell cycle-dependent yeast nucleocytoplasmic shuttling proteins by prediction of composite motifs**  
Shunichi Kosugi, Masako Hasebe, Masaru Tomita, and Hiroshi Yanagawa

##### MEDICAL SCIENCES

- 13143 **A farnesyltransferase inhibitor prevents both the onset and late progression of cardiovascular disease in a progeria mouse model**  
Brian C. Capell, Michelle Olive, Michael R. Erdos, Kan Cao, Dina A. Faddah, Urraca L. Tavarez, Karen N. Conneely, Xuan Qu, Hong San, Santhi K. Ganesh, Xiaoyan Chen, Hedwig Avallone, Frank D. Kolodgie, Renu Virmani, Elizabeth G. Nabel, and Francis S. Collins

ix–xi Author Index

xii Subscription Form