IN BRIEF

A Petunia Twist on the ABC Model of Floral Organ Specification 2237

Jennifer Mach

Alternative Splicing Links the Circadian Clock to Cold Tolerance 2238

Nancy R. Hofmann

Evolution of the Circadian Clock in a Whole-Genome Context 2239

Nancy R. Hofmann

COMMENTARY

From Bench to Bountiful Harvests: A Road Map for the Next Decade of Arabidopsis Research 2240

Irene Lavagi, Mark Estelle, Wolfram Weckwerth, Jim Beynon, and Ruth M. Bastow

Taking the Next Step: Building an Arabidopsis Information Portal 2248

The International Arabidopsis Informatics Consortium

Reading the Second Code: Mapping Epigenomes to Understand Plant Growth, Development, and Adaptation to the Environment 2257

The EPIC Planning Committee

PERSPECTIVE

Tackling Drought Stress: RECEPTOR-LIKE KINASES Present New Approaches 2262


REVIEW

Plant Peroxisomes: Biogenesis and Function 2279

Jianping Hu, Alison Baker, Bonnie Bartel, Nicole Linka, Robert T. Mullen, Sigrun Reumann, and Bethany K. Zolman

RESEARCH ARTICLES

Redefining C and D in the Petunia ABC 2305

Klaas Heijmans, Kai Ament, Anneke S. Rijpkema, Jan Zethof, Mieke Wolters-Arts, Tom Gerats, and Michiel Vandenbussche

According to the ABC(DE) model for flower development, C-genes are required for stamen and carpel development and floral determinacy, whereas D-genes were proposed to be required for ovule identity. Both C- and D-genes belong to the AGA-MOUS subfamily of MADS box transcription factors. Heijmans et al. (pages 2305–2317) investigated the role of the two C-type and two D-type MADS box proteins in petunia (Petunia hybrida) and show that the C- and D-genes overlap functionally in determining ovule identity and in floral termination. In addition, the two C-genes overlap largely in stamen and carpel identity specification, unlike the pronounced subfunctionalization observed in other species. The cover image shows the inside of an ovary (ovary walls removed) of a triple mutant line in which the function of both D-genes (FLORAL BINDING PROTEIN7 [FBP7] and FBP11) and one of the two C-genes (PETUNIA MADS BOX GENE3) has been disrupted, leading to the development of a giant ovary and the homeotic conversion of the ovules into carpel-like structures.
Leaf Asymmetry as a Developmental Constraint Imposed by Auxin-Dependent Phyllotactic Patterning

Daniel H. Chitwood, Lauren R. Headland, Aashish Ranjan, Ciera C. Martinez, Siobhan A. Braybrook, Daniel P. Koenig, Cris Kuhlemeyer, Richard S. Smith, and Neelima R. Sinha

Antisense Inhibition of the 2-Oxoglutarate Dehydrogenase Complex in Tomato Demonstrates Its Importance for Plant Respiration and during Leaf Senescence and Fruit Maturation

Wagner L. Araújo, Takayuki Toyoh, Sonia Osor, Marc Lohse, Ilse Balbo, Ina Krahmer, Agata Sienkiewicz-Porzecek, Björn Usadel, Adriano Nunes-Nesi, and Alisdair R. Fernie

A shrunk-2 Transgene Increases Maize Yield by Acting in Maternal Tissues to Increase the Frequency of Seed Development

L. Curtis Hannah, Brandon Futch, James Bing, Janine R. Shaw, Susan Bohdehn, Jon D. Stewart, Robert Beiriger, Nikolaos Georgelis, and Thomas Greene

Epistatic Natural Allelic Variation Reveals a Function of AGAMOUS-LIKE6 in Auxillary Bud Formation in Arabidopsis

Xueqiu Huang, Sigi Effgen, Rhonda Christiane Meyer, Klaus Theres, and Maarten Koornneef

Nicotianamine Functions in the Phloem-Based Transport of Iron to Sink Organs, in Pollen Development and Pollen Tube Growth in Arabidopsis

Mara Schuler, Ruben Relian-Alvarez, Claudia Fink-Staube, Javier Abadía, and Petra Bauer

Gsp1 Triggers the Sexual Developmental Program Including Inheritance of Chloroplast DNA and Mitochondrial DNA in Chlamydomonas reinhardtii

Yoshiki Nishimura, Toshiharu Shikanai, Soichi Nakamura, Makiko Kawai-Yamada, and Hirofumi Uchimiy

Preferential Retention of Circadian Clock Genes during Diploidization Following Whole Genome Triplication in Brassica rapa

Ping Lou, Jian Wu, Feng Cheng, Laura G. Cressman, Xiaowu Wang, and C. Robertson McClung

A Self-Regulatory Circuit of CIRCADIAN CLOCK-ASSOCIATED1 Underlies the Circadian Clock Regulation of Temperature Responses in Arabidopsis

Pil Joon Seo, Mi-Jeong Park, Mi-Hye Lim, Sang-Gyu Kim, Minyoung Lee, Ian T. Baldwin, and Chung-Mo Park

Metabolism and Growth in Arabidopsis Depend on the Daytime Temperature but Are Temperature-Compensated against Cool Nights

Eva-Theresa Pyl, Maria Piques, Alexander Ivakov, Waltraud Schulze, Hirofumi Ishihara, Mark Stitt, and Ronan Sulpic

TIME FOR COFFEE Represses Accumulation of the MYC2 Transcription Factor to Provide Time-of-Day Regulation of Jasmonate Signaling in Arabidopsis

Jieun Shin, Katharina Heidrich, Alfredo Sanchez-Villarreal, Jane E. Parker, and Seth J. Davis

Arabidopsis PPR/PYR/RCAR Receptors Play a Major Role in Quantitative Regulation of Stomatal Aperture and Transcriptional Response to Abscisic Acid

Miguel Gonzalez-Guzmán, Gaston A. Pizzio, Regina Antoni, Francisco Vera-Sirera, Ebe Merilo, George W. Bassel, Maria A. Fernández, Michael J. Holdsworth, Miguel Angel Perez-Amador, Hannes Kollist, and Pedro L. Rodriguez

A PPR6-Type Phosphatase Holoenzyme Directly Regulates PIN Phosphorylation and Auxin Efflux in Arabidopsis

Mingjian Dai, Chen Zhang, Urszula Kania, Fang Chen, Qin Xue, Tyr Corday, Gang Li, Genji Qin, Michelle Wakeley, William Terzaghi, Jianmin Wan, Yunde Zhao, Jian Xu, Jiří Friml, Xing Wang Deng, and Haiyang Wang

Auxin Controls Arabidopsis Adventitious Root Initiation by Regulating Jasmonic Acid Homeostasis

Laurent Gutierrez, Gaëlle Mongelard, Kristyna Flokova, Daniel B. Pácurar, Ondřej Novák, Paul Staswick, Mariusz Kowalczyk, Monica Pácurar, Hervé Demainy, Gaia Geiss, and Catherine Bellini

The Recent Evolution of a Symbiotic Ion Channel in the Legume Family Altered Ion Conductance and Improved Functionality in Calcium Signaling

Muthusubramanian Venkateswaran, Ana Cosme, Lu Han, Mari Banba, Kenneth A. Satyshur, Enrico Schleiff, Martin Parniske, Haruko Imazumi-Anraku, and Jean-Michel Ané
A Plasma Membrane Receptor Kinase, GHR1, Mediates Abscisic Acid- and Hydrogen Peroxide-Regulated Stomatal Movement in Arabidopsis

Deping Hua, Cun Wang, Junna He, Hui Liao, Ying Duan, Ziqiang Zhu, Yan Guo, Zhizhong Chen, and Zhizhong Gong

DWARF AND LOW-TILLERING Acts as a Direct Downstream Target of a GSK3/SHAGGY-Like Kinase to Mediate Brassinosteroid Responses in Rice

Hongning Tong, Linchuan Liu, Yun Jia, Lin Du, Yanhai Yin, Qian Qian, Liuhuang Zhu, and Chengcai Chu

Ethylene Signaling Negatively Regulates Freezing Tolerance by Repressing Expression of CBF and Type-A ARR Genes in Arabidopsis

Yiting Shi, Shouwei Tian, Lingyuan Hou, Xiaozhen Huang, Xiaoyan Zhang, Hongwei Guo, and Shuhua Yang

Identification of a Photosystem II Phosphatase Involved in Light Acclimation in Arabidopsis

Iga Samol, Alexey Shapiguzov, Björn Ingelsson, Geoffrey Fucile, Michèle Crévecoeur, Alexander V. Vener, Jean-David Rochaix, and Michel Goldschmidt-Clermont

Degradation of Arabidopsis CRY2 Is Regulated by SPA Proteins and Phytochrome A

Guido Weidler, Sven zur Oven-Krockhaus, Michael Heunemann, Christian Orth, Frank Schleifenbaum, Klaus Harter, Ute Hoecker, and Alfred Batschauer

Demethylesterification of the Primary Wall by PECTIN METHYLESTERASE3 Provides Mechanical Support to the Arabidopsis Stem

Shoko Hongo, Kaori Sato, Ryusuke Yokoyama, and Kazuhiko Nishitani

Arabidopsis MYC2 Interacts with DELLA Proteins in Regulating Sesquiterpene Synthase Gene Expression

Gao-Jie Hong, Yue-Yi Xue, Ying-Bo Mao, Ling-Jian Wang, and Xiao-Ya Chen

Fe Sparing and Fe Recycling Contribute to Increased Superoxide Dismutase Capacity in Iron-Starved Chlamydomonas reinhardtii


Crystal Structure of Arabidopsis Cyclophilin38 Reveals a Previously Uncharacterized Immunophilin Fold and a Possible Autoinhibitory Mechanism

Dileep Vasudevan, Aigen Fu, Sheng Luan, and Kunchithapadam Swaminathan

Dual Location of the Mitochondrial Preprotein Transporters B14.7 and Tim23-2 in Complex I and the TIM17:23 Complex in Arabidopsis Links Mitochondrial Activity and Biogenesis

Yan Wang, Chris Carrie, Estelle Giraud, Dina Elhafez, Reena Narsai, Owen Duncan, James Whelan, and Monika W. Murcha

Structure of Soybean P-Cyanoalanine Synthase and the Molecular Basis for Cyanide Detoxification in Plants

Hankuil Yi, Matthew Juergens, and Joseph M. Jez

The Plant Cell (ISSN 1040-4651, online ISSN 1532-298X) is published monthly (one volume per year) by the American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768, and is produced by Dartmouth Journal Services, Waterbury, VT. The institutional price for the print and online versions is based on type of institution; contact institution@aspb.org. A subscription includes both The Plant Cell and Plant Physiology; single copies may be purchased for $95 each, plus $10 shipping (U.S.) or $12 (outside U.S.). Members of the American Society of Plant Biologists may subscribe to The Plant Cell for $240. Nonmember individuals may subscribe for $375. For matters regarding subscriptions, contact Suzanne Cholwek, ASPB, 15501 Monona Drive, Rockville, MD 20855-2768; telephone 301/296-0926; fax 301/251-6740; e-mail scholwek@aspb.org. Notify ASPB in writing within 3 months (domestic) or 6 months (foreign) of issue date, and defective copies or copies lost in the mail will be replaced. Send all inquiries regarding display advertising to FASEB AdNet, 9650 Rockville Pike, Bethesda, MD 20814-3998; telephone 301/634-7791; fax 301/634-7153; e-mail adnet@faseb.org. Periodicals postage paid at Rockville, MD 20850, and at additional mailing offices.

Postmaster: Send address changes to The Plant Cell, American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768. The online version of The Plant Cell is available at www.plantcell.org.

Permission to Reprint: Permission to make digital or hard copies of part or all of a work published in The Plant Cell is granted without fee for personal or classroom use provided that copies are not made or distributed for profit or commercial advantage and that copies bear the full citation and the following notice on the first page: “Copyright American Society of Plant Biologists.” For all other kinds of copying, request permission in writing from Nancy A. Winchester, Publications Director, ASPB headquarters.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>eTOCs</td>
<td>Sign up for eTOCs at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a></td>
</tr>
<tr>
<td>CiteTrack Alerts</td>
<td>Sign up for CiteTrack Alerts at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a></td>
</tr>
<tr>
<td>Subscription Info</td>
<td>Subscription Information for <em>The Plant Cell</em> and <em>Plant Physiology</em> is available at: <a href="http://www.aspb.org/publications/subscriptions.cfm">http://www.aspb.org/publications/subscriptions.cfm</a></td>
</tr>
</tbody>
</table>