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On the Cover: The identification of the genetic network controlling progress through the plant cell cycle has opened the doors to numerous investigations in which expression of these genes has been altered and the outcome on plant development observed. These investigations have addressed the fundamental question of the relationship between overall size and shape of an organ and the proliferation of an organ's constituent cells. An underlying assumption of these investigations has been that the altered frequency of cell division resulting from these manipulations causes the changes in organ size and shape observed. In this issue, Kuwabara et al. (2196–2206) have manipulated the expression of genes involved in the G1/S phase transition of the plant cell cycle and performed a quantitative temporal and spatial analysis of the patterns of cell division and the changes in leaf morphology that occur. Their results indicate that although changes of cell division frequency are induced, these changes occur after changes in leaf shape. In contrast, there was a tight correlation between the timing of altered cell size resulting from these manipulations and altered leaf form. The results indicate that altered cell division frequency does not underpin leaf morphogenesis but that the influence of cell cycle regulators on the cell size at which division occurs may play an important role in mediating the genetic control of leaf shape. The image shows an *Arabidopsis thaliana* leaf in which new cell plates are visualized by aniline blue staining. Quantification of cell plate distribution by Asuka Kuwabara, coupled with the use of image analysis tools developed by Andreas Backhaus and the analysis of patterns in different genetic backgrounds generated by Robert Malinowski, enabled this work.

ON THE INSIDE

Peter V. Minorsky

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UPDATES

^[W]AtIPD: A Curated Database of Arabidopsis Isoprenoid Pathway Models and Genes for Isoprenoid Network Analysis. *Eva Vranová, Matthias Hirsch-Hoffmann, and Wilhelm Gruissem*

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- ^{[W][OA]}Differential Molecular Responses of Rice and Wheat Coleoptiles to Anoxia Reveal Novel Metabolic Adaptations in Amino Acid Metabolism for Tissue Tolerance. *Rachel N. Shingaki-Wells, Shaobai Huang, Nicolas L. Taylor, Adam J. Carroll, Wenxu Zhou, and A. Harvey Millar* 1706
- ^{[C][W]}CESA5 Is Required for the Synthesis of Cellulose with a Role in Structuring the Adherent Mucilage of Arabidopsis Seeds. *Stuart Sullivan, Marie-Christine Ralet, Adeline Berger, Eugene Diatloff, Volker Bischoff, Martine Gonneau, Annie Marion-Poll, and Helen M. North* 1725

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- ^[W]Distinctive Photosystem II Photoinactivation and Protein Dynamics in Marine Diatoms. *Hongyan Wu, Amanda M. Cockshutt, Avery McCarthy, and Douglas A. Campbell* 2184

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- ^{[W][OA]}Extracellular Nucleotides and Apyrases Regulate Stomatal Aperture in Arabidopsis. *Greg Clark, Devin Fraley, Iris Steinebrunner, Andrew Cervantes, James Onyirimba, Angela Liu, Jonathan Torres, Wenqiang Tang, Joshua Kim, and Stanley J. Roux* 1740
- ^{[C][W]}Altering Trehalose-6-Phosphate Content in Transgenic Potato Tubers Affects Tuber Growth and Alters Responsiveness to Hormones during Sprouting. *Stefan Debast, Adriano Nunes-Nesi, Mohammad R. Hajirezaei, Jörg Hofmann, Uwe Sonnwald, Alisdair R. Fernie, and Frederik Börnke* 1754
- ^[W]Nuclear Localization and Interaction with COP1 Are Required for STO/BBX24 Function during Photomorphogenesis. *Huili Yan, Katrin Marquardt, Martin Indorf, Dominic Jutt, Stefan Kircher, Gunther Neuhaus, and Marta Rodríguez-Franco* 1772
- ^{[W][OA]}Assembly and Sorting of the Tonoplast Potassium Channel AtTPK1 and Its Turnover by Internalization into the Vacuole. *Marie Maîtrejean, Michael M. Wudick, Camilla Voelker, Bhakti Prinsi, Bernd Mueller-Roeber, Katrin Czempinski, Emanuela Pedrazzini, and Alessandro Vitale* 1783
- ^{[W][OA]}Jasmonate Controls Polypeptide Patterning in Undamaged Tissue in Wounded Arabidopsis Leaves. *Aurélie Gfeller, Katja Baerenfaller, Jorge Loscos, Aurore Chételat, Sacha Baginsky, and Edward E. Farmer* 1797
- ^{[W][OA]}The Cytokinin Receptors of Arabidopsis Are Located Mainly to the Endoplasmic Reticulum. *Klaas Wulfetange, Sergey N. Lomin, Georgy A. Romanov, Andrea Stolz, Alexander Heyl, and Thomas Schmölling* 1808

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- ^{[C][W]}A Hormonal Regulatory Module That Provides Flexibility to Tropic Responses. *Javier Gallego-Bartolomé, Chitose Kami, Christian Fankhauser, David Alabadí, and Miguel A. Blázquez* 1819
- ^{[C][W][OA]}The *thick aleurone1* Mutant Defines a Negative Regulation of Maize Aleurone Cell Fate That Functions Downstream of *defective kernel1*. *Gibum Yi, Adrienne M. Lauter, M. Paul Scott, and Philip W. Becraft* 1826
- ^{[C][W][OA]}CAST AWAY, a Membrane-Associated Receptor-Like Kinase, Inhibits Organ Abscission in Arabidopsis. *Christian A. Burr, Michelle E. Leslie, Sara K. Orłowski, Iris Chen, Catherine E. Wright, Mark J. Daniels, and Sarah J. Liljegren* 1837
- ^{[W][OA]}Cytokinin Interplay with Ethylene, Auxin, and Glucose Signaling Controls Arabidopsis Seedling Root Directional Growth. *Sunita Kushwah, Alan M. Jones, and Ashvarya Laxmi* 1851
- ^{[C][W][OA]}WEREWOLF, a Regulator of Root Hair Pattern Formation, Controls Flowering Time through the Regulation of FT mRNA Stability. *Eunjo Seo, Jihyeon Yu, Kook Hui Ryu, Myeong Min Lee, and Ilha Lee* 1867
- ^{[W][OA]}AUXIN UP-REGULATED F-BOX PROTEIN1 Regulates the Cross Talk between Auxin Transport and Cytokinin Signaling during Plant Root Growth. *Xiaohua Zheng, Nathan D. Miller, Daniel R. Lewis, Matthew J. Christians, Kwang-Hee Lee, Gloria K. Muday, Edgar P. Spalding, and Richard D. Vierstra* 1878
- ^{[C][W][OA]}A Mechanistic Link between STM and CUC1 during Arabidopsis Development. *Silvana V. Spinelli, Ana Paula Martin, Ioana L. Viola, Daniel H. Gonzalez, and Javier F. Palatnik* 1894

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- [W][OA] Heterosis in Rice Seedlings: Its Relationship to Gibberellin Content and Expression of Gibberellin Metabolism and Signaling Genes. *Qian Ma (马谦), Peter Hedden, and Qifa Zhang (张启发)* 1905
- [W] A Shift toward Smaller Cell Size via Manipulation of Cell Cycle Gene Expression Acts to Smoothen Arabidopsis Leaf Shape. *Asuka Kuwabara, Andreas Backhaus, Robert Malinowski, Marion Bauch, Lee Hunt, Toshiyuki Nagata, Nick Monk, Guido Sanguinetti, and Andrew Fleming* 2196
- [C][W][OA] The Medicago *FLOWERING LOCUS T* Homolog, *MtFTa1*, Is a Key Regulator of Flowering Time. *Rebecca E. Laurie, Payal Diwadkar, Mauren Jaudal, Lulu Zhang, Valérie Hecht, Jiangqi Wen, Million Tadege, Kirankumar S. Mysore, Joanna Putterill, James L. Weller, and Richard C. Macknight* 2207
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- [W] Proline Accumulation Is Inhibitory to Arabidopsis Seedlings during Heat Stress. *Wei-Tao Lv, Bin Lin, Min Zhang, and Xue-Jun Hua* 1921
- [W][OA] Light History Influences the Response of the Marine Cyanobacterium *Synechococcus* sp. WH7803 to Oxidative Stress. *Nicolas Blot, Daniella Mella-Flores, Christophe Six, Gildas Le Corguillé, Christophe Boutte, Anne Peyrat, Annabelle Monnier, Morgane Ratin, Priscillia Gourvil, Douglas A. Campbell, and Laurence Garczarek* 1934
- [W][OA] Arabidopsis SUMO E3 Ligase *SIZ1* Is Involved in Excess Copper Tolerance. *Chyi-Chuann Chen, Yong-Yi Chen, I-Chien Tang, Hong-Ming Liang, Chong-Cheong Lai, Jeng-Min Chiou, and Kuo-Chen Yeh* 2225
- [W][OA] Phosphorylation of SOS3-Like Calcium-Binding Proteins by Their Interacting SOS2-Like Protein Kinases Is a Common Regulatory Mechanism in Arabidopsis. *Wenming Du, Huixin Lin, She Chen, Yisheng Wu, Jun Zhang, Anja T. Fuglsang, Michael G. Palmgren, Weihua Wu, and Yan Guo* 2235
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- [W] Tissue-Specific Differences in Cytosine Methylation and Their Association with Differential Gene Expression in Sorghum. *Meishan Zhang, Chunming Xu, Diter von Wettstein, and Bao Liu* 1955
- [W][OA] Evolution of the PEBP Gene Family in Plants: Functional Diversification in Seed Plant Evolution. *Anna Karlgren, Niclas Gyllenstrand, Thomas Källman, Jens F. Sundström, David Moore, Martin Lascoux, and Ulf Lagercrantz* 1967
- [C][W] Conserved and Divergent Rhythms of Crassulacean Acid Metabolism-Related and Core Clock Gene Expression in the Cactus *Opuntia ficus-indica*. *Izaskun Mallona, Marcos Egea-Cortines, and Julia Weiss* 1978
- [C][W] Increase in Tomato Locule Number Is Controlled by Two Single-Nucleotide Polymorphisms Located Near *WUSCHEL*. *Stéphane Muñoz, Nicolas Ranc, Emmanuel Botton, Aurélie Bérard, Sophie Rolland, Philippe Duffé, Yolande Carretero, Marie-Christine Le Paslier, Corinne Delalande, Mondher Bouzayen, Dominique Brunel, and Mathilde Causse* 2244
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- [W][OA] Stars and Symbiosis: MicroRNA- and MicroRNA*-Mediated Transcript Cleavage Involved in Arbuscular Mycorrhizal Symbiosis. *Emanuel A. Devers, Anja Branscheid, Patrick May, and Franziska Krajinski* 1990
- [C][W][OA] The Pepper E3 Ubiquitin Ligase *RING1* Gene, *CaRING1*, Is Required for Cell Death and the Salicylic Acid-Dependent Defense Response. *Dong Hyuk Lee, Hyong Woo Choi, and Byung Kook Hwang* 2011
- [C][W] Virus-Induced Necrosis Is a Consequence of Direct Protein-Protein Interaction between a Viral RNA-Silencing Suppressor and a Host Catalase. *Jun-ichi Inaba, Bo Min Kim, Hanako Shimura, and Chikara Masuta* 2026
- [C][W][OA] *Sporisorium reilianum* Infection Changes Inflorescence and Branching Architectures of Maize. *Hassan Ghareeb, Annette Becker, Tim Iven, Ivo Feussner, and Jan Schirawski* 2037
- [C][W][OA] The Arabidopsis Mitochondria-Localized Pentatricopeptide Repeat Protein PGN Functions in Defense against Necrotrophic Fungi and Abiotic Stress Tolerance. *Kristin Laluk, Synan AbuQamar, and Tesfaye Mengiste* 2053
- [W][OA] Overexpression of Arabidopsis *ACBP3* Enhances NPR1-Dependent Plant Resistance to *Pseudomonas syringae* pv *tomato* DC3000. *Shi Xiao and Mee-Len Chye* 2069
- [W][OA] Novel Acidic Sesquiterpenoids Constitute a Dominant Class of Pathogen-Induced Phytoalexins in Maize. *Alisa Huffaker, Fatma Kaplan, Martha M. Vaughan, Nicole J. Dafeo, Xinzhi Ni, James R. Rocca, Hans T. Alborn, Peter E.A. Teal, and Eric A. Schmelz* 2082

[C][W][OA] Interfamily Transfer of Tomato *Ve1* Mediates *Verticillium* Resistance in Arabidopsis. *Emilie F. Fradin, Ahmed Abd-El-Halim, Laura Masini, Grardiy C.M. van den Berg, Matthieu H.A.J. Joosten, and Bart P.H.J. Thomma* 2255

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[W][OA] BBX32, an Arabidopsis B-Box Protein, Functions in Light Signaling by Suppressing HY5-Regulated Gene Expression and Interacting with STH2/BBX21. *Hans E. Holtan, Simona Bandong, Colleen M. Marion, Luc Adam, Shiv Tiwari, Yu Shen, Julin N. Maloof, Don R. Maszle, Masa-aki Ohto, Sasha Preuss, Rob Meister, Marie Petracek, Peter P. Repetti, T. Lynne Reuber, Oliver J. Ratcliffe, and Rajnish Khanna* 2109

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