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 (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.
RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

[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

BIOENERGETICS AND PHOTOSYNTHESIS


CELL BIOLOGY AND SIGNAL TRANSDUCTION


[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


[C]WOA Cytokinin Interplay with Ethylene, Auxin, and Glucose Signaling Controls Arabidopsis Seedling Root Directional Growth. Sunita Kushwah, Alan M. Jones, and Ashverya Laxmi 1851

[C]WOA WEREWOLF, a Regulator of Root Hair Pattern Formation, Controls Flowering Time through the Regulation of FT mRNA Stability. Eunjoo Seo, Jihyeon Yu, Kook Hui Ryu, Myeong Min Lee, and Ilha Lee 1867


[C]WOA A Mechanistic Link between STM and CUC1 during Arabidopsis Development. Silvana V. Spinelli, Ana Paula Martin, Ivana L. Viola, Daniel H. Gonzalez, and Javier F. Palatnik 1894

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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

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

The Medicago FLOWERING LOCUS T Homolog, MtFTa1, Is a Key Regulator of Flowering Time. Rebecca E. Laurie, Payal Diwadkar, Mauren Jaudal, Liu Zhang, Valérie Hecht, Jiangqi Wen, Million Tadege, Kirankumar S. Mysore, Joanna Putterill, James L. Weller, and Richard C. Macknight 2207

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

Proline Accumulation Is Inhibitory to Arabidopsis Seedlings during Heat Stress. Wei-Tao Lv, Bin Lin, Min Zhang, and Xue-Jun Hua 1921

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 Garzarek 1934

Arabidopsis SUMO E3 Ligase SIZ1 Is Involved in Excess Copper Tolerance. Chyi-Chuann Chen, Yong-Yi Chen, I-Chien Tang, Hong-Ming Liang, Chong-Cheng Lai, Jeng-Min Chiu, and Kuo-Chen Yeh 2225

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

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

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


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

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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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

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

Sporisorium reilianum Infection Changes Inflorescence and Branching Architectures of Maize. Hassan Ghareeb, Annette Becker, Tim Ivan, Ivo Feussner, and Jan Schirawski 2037

The Arabidopsis Mitochondria-Localized Pentatricopeptide Repeat Protein PGN Functions in Defense against Necrotrophic Fungi and Abiotic Stress Tolerance. Kristin Laluk, Syman AbuQamar, and Tesfaye Mengiste 2053

Overexpression of Arabidopsis ACBP3 Enhances NPR1-Dependent Plant Resistance to Pseudomonas syringae pv tomato DC3000. Shi Xiao and Mee-Len Chye 2069

Novel Acidic Sesquiterpenoids Constitute a Dominant Class of Pathogen-Induced Phytoalexins in Maize. Alisa Huffaker, Fatma Kaplan, Martha M. Vaughan, Nicole J. Dafoe, Xinzhi Ni, James R. Rocca, Hans T. Alborn, Peter E.A. Teal, and Eric A. Schmelz 2082
Interfamily Transfer of Tomato Ve1 Mediates Verticillium Resistance in Arabidopsis. Emilie F. Fradin, Ahmed Abd-El-Halim, Laura Masini, Grardy C.M. van den Berg, Matthieu H.A.J. Joosten, and Bart P.H.J. Thomma

Perturbation of spermine synthase Gene Expression and Transcript Profiling Provide New Insights on the Role of the Tetraamine Spermine in Arabidopsis Defense against Pseudomonas viridiflava. María Elisa Gonzalez, Francisco Marco, Eugenio Gómez Minguet, Pedro Carrasco-Solís, Miguel Angel Blázquez, Juan Carbonell, Oscar Adolfo Ruíz, and Fernando Luis Pieckenstain

New Insights into the Properties of Pubescent Surfaces: Peach Fruit as a Model. Victoria Fernández, Mohamed Khayet, Pablo Montero-Prado, José Alejandro Heredia-Guerrero, Georgios Liakopoulos, George Karabourniotis, Víctor del Río, Eva Domínguez, Ignacio Tacchini, Cristina Nérín, Jesús Val, and Antonio Heredia

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, Shio Tsuchi, Yu Shen, Julin N. Maloof, Don R. Masle, Masa-aki Ohto, Sasha Preuss, Rob Meister, Marie Petracek, Peter P. Repetti, T. Lynne Reuber, Oliver J. Ratcliffe, and Rajnish Khanna

Rapid, Organ-Specific Transcriptional Responses to Light Regulate Photomorphogenic Development in Dicot Seedlings. Ying Li, Kankshita Swaminathan, and Matthew E. Hudson

Structure and Expression Profile of the Phosphate Pht1 Transporter Gene Family in Mycorrhizal Populus trichocarpa. Verónica Loth-Pereda, Elena Orsini, Pierre-Emmanuel Courtys, Frédéric Lota, Annette Kohler, Loïc Diss, Damien Blaudze, Michel Chalot, Uwe Nehls, Marcel Bucher, and Francis Martin


Model-Based Analysis of Arabidopsis Leaf Epidermal Cells Reveals Distinct Division and Expansion Patterns for Pavement and Guard Cells. Leila Kheibarshekan Asl, Stijn Dhondt, Véronique Boudolf, Gerrit T.S. Beemster, Tom Beeckman, Dirk Inzé, Willy Gouvits, and Lieven De Veylder

Cyanide, a Coproduct of Plant Hormone Ethylene Biosynthesis, Contributes to the Resistance of Rice to Blast Fungus. S. Seo, I. Mitsuhashi, J. Feng, T. Iwai, M. Hasegawa, and Y. Ohashi

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