

The electronic form of this issue, available as of April 11, 2006, at [www.plantphysiol.org](http://www.plantphysiol.org), is considered the journal of record.

**On the Cover:** Plant respiratory electron transport chains contain two terminal oxidases: cytochrome C and the cyanide-resistant alternative oxidase (AOX). Transfer of electrons to cytochrome C is linked to the formation of a proton gradient that drives ATP production. In contrast, electron transport to the AOX diverges from the phosphorylating pathway at ubiquinone. The potential for ATP production is reduced and the extra energy is released as heat. It has long been assumed that the AOX is responsible for heat production in thermogenic plants, but demonstrating this has been difficult. In addition, the discovery of plant uncoupling proteins has presented a possible alternative for heat production in plants. In this issue, Watling et al. (pp. 1367–1373) used oxygen isotope discrimination to show that electron fluxes through the AOX increased during thermogenesis in the floral receptacle of the sacred lotus (*Nelumbo nucifera*). The large yellow receptacle, where the bulk of heating occurs, can be seen at the center of the lotus flower on the cover. Cover photograph by David Hollingworth. Cover layout by Ash Csikos.

## ON THE INSIDE

*Peter V. Minorsky* 1137

## HIGH IMPACT

*Aleel K. Grennan* 1139

## GENOME ANALYSIS

<sup>[W]</sup>MEKHLA, a Novel Domain with Similarity to PAS Domains, Is Fused to Plant Homeodomain-Leucine Zipper III Proteins. *Krishanu Mukherjee and Thomas R. Bürglin* 1142

<sup>[W]</sup>Integrating Membrane Transport with Male Gametophyte Development and Function through Transcriptomics. *Kevin W. Bock, David Honys, John M. Ward, Senthilkumar Padmanaban, Eric P. Nawrocki, Kendal D. Hirschi, David Twell, and Heven Sze* 1151

<sup>[W]</sup>Partial Shotgun Sequencing of the *Boechera stricta* Genome Reveals Extensive Microsynteny and Promoter Conservation with Arabidopsis. *Aaron J. Windsor, M. Eric Schranz, Nataša Formanová, Steffi Gebauer-Jung, John G. Bishop, Domenica Schnabelrauch, Juergen Kroymann, and Thomas Mitchell-Olds* 1169

<sup>[W]</sup>A Comparative Genomics Strategy for Targeted Discovery of Single-Nucleotide Polymorphisms and Conserved-Noncoding Sequences in Orphan Crops. *F.A. Feltus, H.P. Singh, H.C. Lohithaswa, S.R. Schulze, T.D. Silva, and A.H. Paterson* 1183

<sup>[W]</sup>Characterization of 43 Non-Protein-Coding mRNA Genes in Arabidopsis, Including the MIR162a-Derived Transcripts. *Judith Hirsch, Vincent Lefort, Marion Vankersschaver, Adnane Boualem, Antoine Lucas, Claude Thermes, Yves d'Aubenton-Carafa, and Martin Crespi* 1192

## BREAKTHROUGH TECHNOLOGIES

<sup>[W]</sup>Use of Bacterial Quorum-Sensing Components to Regulate Gene Expression in Plants. *Young-Sook You, Heather Marella, Rodolfo Zentella, Yiyong Zhou, Tim Ulmasov, Tuan-Hua David Ho, and Ralph S. Quatrano* 1205

*Continued on next page*

## RESEARCH ARTICLES

### BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

- A Reassessment of Substrate Specificity and Activation of Phytochelatin Synthases from Model Plants by Physiologically Relevant Metals. *Jorge Loscos, Loreto Naya, Javier Ramos, Maria R. Clemente, Manuel A. Matamoros, and Manuel Becana* 1213

### BIOENERGETICS AND PHOTOSYNTHESIS

- Contribution of the Alternative Pathway to Respiration during Thermogenesis in Flowers of the Sacred Lotus. *Jennifer R. Watling, Sharon A. Robinson, and Roger S. Seymour* 1367

### CELL BIOLOGY AND SIGNAL TRANSDUCTION

- Extracellular ATP Induces the Accumulation of Superoxide via NADPH Oxidases in Arabidopsis. *Charlotte J. Song, Iris Steinebrunner, Xuanzhi Wang, Stephen C. Stout, and Stanley J. Roux* 1222

- <sup>[OA]</sup>Mutations in the NB-ARC Domain of I-2 That Impair ATP Hydrolysis Cause Autoactivation. *Wladimir I.L. Tameling, Jack H. Vossen, Mario Albrecht, Thomas Lengauer, Jan A. Berden, Michel A. Haring, Ben J.C. Cornelissen, and Frank L.W. Takken* 1233

- Chemical Imaging of Poplar Wood Cell Walls by Confocal Raman Microscopy. *Notburga Gierlinger and Manfred Schwanninger* 1246

- <sup>[W]</sup>An Ankyrin Repeat-Containing Protein, Characterized as a Ubiquitin Ligase, Is Closely Associated with Membrane-Enclosed Organelles and Required for Pollen Germination and Pollen Tube Growth in Lily. *Jian Huang, Feng Chen, Cecilia Del Casino, Antonella Autino, Mouhua Shen, Shuai Yuan, Jia Peng, Hexin Shi, Chen Wang, Mauro Cresti, and Yiqin Li* 1374

### DEVELOPMENT AND HORMONE ACTION

- <sup>[W]</sup>A Transcriptome-Based Characterization of Habituation in Plant Tissue Culture. *Melissa S. Pischke, Edward L. Huttlin, Adrian D. Hegeman, and Michael R. Sussman* 1255

- <sup>[W]</sup>Ethylene Modulates Flavonoid Accumulation and Gravitropic Responses in Roots of Arabidopsis. *Charles S. Buer, Poornima Sukumar, and Gloria K. Muday* 1384

- HvVRN2* Responds to Daylength, whereas *HvVRN1* Is Regulated by Vernalization and Developmental Status. *Ben Treviskis, Megan N. Hemming, W. James Peacock, and Elizabeth S. Dennis* 1397

- <sup>[W]</sup>The *reb1-1* Mutation of Arabidopsis. Effect on the Structure and Localization of Galactose-Containing Cell Wall Polysaccharides. *Eric Nguema-Ona, Christine Andème-Onzighi, Sophie Aboughe-Angone, Muriel Bardor, Tadashi Ishii, Patrice Lerouge, and Azeddine Driouich* 1406

## ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- An Insight into the Molecular Basis of Salt Tolerance of L-*myo*-Inositol 1-P Synthase (PcINO1) from *Porteresia coarctata* (Roxb.) Tateoka, a Halophytic Wild Rice. *Krishnarup Ghosh Dastidar, Susmita Maitra, Lily Goswami, Debjani Roy, Kali Pada Das, and Arun Lahiri Majumder* 1279
- <sup>[W]</sup>Arabidopsis Hsa32, a Novel Heat Shock Protein, Is Essential for Acquired Thermotolerance during Long Recovery after Acclimation. *Yee-yung Charng, Hsiang-chin Liu, Nai-yu Liu, Fu-chiun Hsu, and Swee-suak Ko* 1297
- <sup>[W]</sup>Comparative Analysis of the Heat Stable Proteome of Radicles of *Medicago truncatula* Seeds during Germination Identifies Late Embryogenesis Abundant Proteins Associated with Desiccation Tolerance. *Julie Boudet, Julia Buitink, Folkert A. Hoekstra, Hélène Rogniaux, Colette Larré, Pascale Satour, and Olivier Leprince* 1418
- <sup>[W]</sup>Transcriptional Profiling Implicates Novel Interactions between Abiotic Stress and Hormonal Responses in *Thellungiella*, a Close Relative of Arabidopsis. *Chui E. Wong, Yong Li, Aurelie Labbe, David Guevara, Paulo Nuin, Brett Whitty, Claudia Diaz, G. Brian Golding, Gordon R. Gray, Elizabeth A. Weretilnyk, Marilyn Griffith, and Barbara A. Moffatt* 1437
- <sup>[W]</sup>The Role of Hydrogen Peroxide-Producing and Hydrogen Peroxide-Consuming Peroxidases in the Leaf Apoplast of Cowpea in Manganese Tolerance. *Marion Maria Fecht-Christoffers, Hendrik Fühns, Hans-Peter Braun, and Walter Johannes Horst* 1451

## GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- Characterization of the Plant-Specific *BREVIS RADIX* Gene Family Reveals Limited Genetic Redundancy Despite High Sequence Conservation. *Georgette C. Briggs, Céline F. Mouchel, and Christian S. Hardtke* 1306
- <sup>[W]</sup>Analysis of Phase of *LUCIFERASE* Expression Reveals Novel Circadian Quantitative Trait Loci in Arabidopsis. *Chiarina Darrah, Bethan L. Taylor, Kieron D. Edwards, Paul E. Brown, Anthony Hall, and Harriet G. McWatters* 1464

## PLANTS INTERACTING WITH OTHER ORGANISMS

- The Geminivirus Nuclear Shuttle Protein NSP Inhibits the Activity of *AfNSI*, a Vascular-Expressed Arabidopsis Acetyltransferase Regulated with the Sink-to-Source Transition. *Miguel F. Carvalho, Robert Turgeon, and Sondra G. Lazarowitz* 1317
- Cholic Acid, a Bile Acid Elicitor of Hypersensitive Cell Death, Pathogenesis-Related Protein Synthesis, and Phytoalexin Accumulation in Rice. *Jinichiro Koga, Hidetoshi Kubota, Shuichi Gomi, Kenji Umemura, Masao Ohnishi, and Toshiaki Kono* 1475
- Adducts of Oxylin Electrophiles to Glutathione Reflect a 13 Specificity of the Downstream Lipoygenase Pathway in the Tobacco Hypersensitive Response. *Céline Davoine, Olivier Falletti, Thierry Douki, Gilles Iacazio, Najla Ennar, Jean-Luc Montillet, and Christian Triantaphylidès* 1484
- <sup>[W]</sup>Defective Long-Distance Auxin Transport Regulation in the *Medicago truncatula super numeric nodules* Mutant. *Giel E. van Noorden, John J. Ross, James B. Reid, Barry G. Rolfe, and Ulrike Mathesius* 1494

## SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

- <sup>[W]</sup>Gain-of-Function Phenotypes of Many *CLAVATA3/ESR* Genes, Including Four New Family Members, Correlate with Tandem Variations in the Conserved *CLAVATA3/ESR* Domain. *Timothy J. Strabala, Philip J. O'Donnell, Anne-Marie Smit, Charles Ampomah-Dwamena, E. Jane Martin, Natalie Netzler, Niels J. Nieuwenhuizen, Brian D. Quinn, Humphrey C.C. Foote, and Keith R. Hudson* 1331
- Light-Regulated, Tissue-Specific, and Cell Differentiation-Specific Expression of the Arabidopsis Fe(III)-Chelate Reductase Gene *AtFRO6*. *Haizhong Feng, Fengying An, Suzhi Zhang, Zhendong Ji, Hong-Qing Ling, and Jianru Zuo* 1345
- <sup>[W]</sup>Interplay between Arabidopsis Activating Factors E2Fb and E2Fa in Cell Cycle Progression and Development. *Rosangela Sozzani, Caterina Maggio, Serena Varotto, Sabrina Canova, Catherine Bergounioux, Diego Albani, and Rino Cella* 1355
- <sup>[OA]</sup>Calmodulin Interacts with and Regulates the RNA-Binding Activity of an Arabidopsis Polyadenylation Factor Subunit. *Kimberly J. Delaney, Ruqiang Xu, Jingxian Zhang, Q. Quinn Li, Kil-Young Yun, Deane L. Falcone, and Arthur G. Hunt* 1507
- 
- ## CORRECTION
- Tocopherols Protect *Synechocystis* sp. Strain PCC 6803 from Lipid Peroxidation. *H. Maeda, Y. Sakuragi, D.A. Bryant, and D. DellaPenna* 1522

<sup>[W]</sup> Indicates Web-only data.

<sup>[OA]</sup> Open Access articles can be viewed online without a subscription.