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On the Cover: Photoconvertible fluorescent proteins are a recent addition to the cell biologists' toolbox. Mathur et al. (pp. 1573–1587) describe several subcellular targeted green-to-red photoconvertible mEosFP probes and discuss their potential applications and caveats. The cover image, taken by Dr. Jaideep Mathur, shows a pair of guard cells from an Arabidopsis plant expressing mEosFP targeted to cortical microtubules. The cells were exposed to an asymmetrically localized beam of violet-blue light for creating the range of hues that is achievable through photoconversion of the green form of mEosFP. Complete photoconversion results in red color, whereas orange-yellow shades represent partial photoconversion. Chlorophyll autofluorescence is clearly discriminated from mEosFP fluorescence and depicted in blue.

ON THE INSIDE

Peter V. Minorsky 1571

BREAKTHROUGH TECHNOLOGIES

^{[W][OA]}mEosFP-Based Green-to-Red Photoconvertible Subcellular Probes for Plants. *Jaideep Mathur, Resmi Radhamony, Alison M. Sinclair, Ana Donoso, Natalie Dunn, Elyse Roach, Devon Radford, S. Mohammad Mohaghegh P., David C. Logan, Ksenija Kokolic, and Neeta Mathur* 1573

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

^{[W][OA]}Increased Phloem Transport of S-Methylmethionine Positively Affects Sulfur and Nitrogen Metabolism and Seed Development in Pea Plants. *Qiumin Tan, Lizhi Zhang, Jan Grant, Pauline Cooper, and Mechthild Tegeder* 1886

^[OA]Metabolic Engineering of Seeds Can Achieve Levels of ω -7 Fatty Acids Comparable with the Highest Levels Found in Natural Plant Sources. *Huu Tam Nguyen, Girish Mishra, Edward Whittle, Scott A. Bevan, Ann Owens Merlo, Terence A. Walsh, and John Shanklin* 1897

BIOENERGETICS AND PHOTOSYNTHESIS

^{[W][OA]}An Arabidopsis Pentatricopeptide Repeat Protein, SUPPRESSOR OF VARIATION7, Is Required for FtsH-Mediated Chloroplast Biogenesis. *Xiayan Liu, Fei Yu, and Steve Rodermel* 1588

^{[C][W]}Evidence for the Existence of One Antenna-Associated, Lipid-Dissolved and Two Protein-Bound Pools of Diadinoxanthin Cycle Pigments in Diatoms. *Bernard Lepetit, Daniela Volke, Matthias Gilbert, Christian Wilhelm, and Reimund Goss* 1905

CELL BIOLOGY AND SIGNAL TRANSDUCTION

^{[W][OA]}*pex5* Mutants That Differentially Disrupt PTS1 and PTS2 Peroxisomal Matrix Protein Import in Arabidopsis. *Bibi Rafeiza Khan and Bethany K. Zolman* 1602

^{[C][W][OA]}Osmoregulation in *Lilium* Pollen Grains Occurs via Modulation of the Plasma Membrane H⁺ ATPase Activity by 14-3-3 Proteins. *Heidi Pertl, Magdalena Pöckl, Christian Blaschke, and Gerhard Obermeyer* 1921

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DEVELOPMENT AND HORMONE ACTION

- [C][W] Cross Talk between the KNOX and Ethylene Pathways Is Mediated by Intron-Binding Transcription Factors in Barley. *Michela Osnato, Maria Rosaria Stile, Yamei Wang, Donaldo Meynard, Serena Curiale, Emmanuel Guiderdoni, Yongxiu Liu, David S. Horner, Pieter B.F. Ouwkerk, Carlo Pozzi, Kai J. Müller, Francesco Salamini, and Laura Rossini* 1616
- [W][OA] A Gain-of-Function Mutation of Arabidopsis CRYPTOCHROME1 Promotes Flowering. *Vivien Exner, Cristina Alexandre, Gesa Rosenfeldt, Pietro Alfarano, Mena Nater, Amedeo Caflisch, Wilhelm Gruissem, Alfred Batschauer, and Lars Hennig* 1633
- [C][W][OA] A Glutathione S-Transferase Regulated by Light and Hormones Participates in the Modulation of Arabidopsis Seedling Development. *Han-Wei Jiang, Ming-Jung Liu, Ing-Chien Chen, Chiung-Huei Huang, Li-Ya Chao, and Hsu-Liang Hsieh* 1646
- [W][OA] Loss of Cytosolic Phosphoglucosyltransferase Compromises Gametophyte Development in Arabidopsis. *Barbara Egli, Katharina Kölling, Claudia Köhler, Samuel C. Zeeman, and Sebastian Streb* 1659
- [C][W][OA] Microarray Analysis of the Abscission-Related Transcriptome in the Tomato Flower Abscission Zone in Response to Auxin Depletion. *Shimon Meir, Sonia Philosoph-Hadas, Srivignesh Sundaesan, K.S. Vijay Selvaraj, Shaul Burd, Ron Ophir, Bettina Kochanek, Michael S. Reid, Cai-Zhong Jiang, and Amnon Lers* 1929
- [W][OA] Reassessing the Role of N-Hydroxytryptamine in Auxin Biosynthesis. *Nathan D. Tivendale, Noel W. Davies, Peter P. Molesworth, Sandra E. Davidson, Jason A. Smith, Edwin K. Lowe, James B. Reid, and John J. Ross* 1957

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- [W][OA] Essential Role of Glutathione in Acclimation to Environmental and Redox Perturbations in the Cyanobacterium *Synechocystis* sp. PCC 6803. *Jeffrey C. Cameron and Himadri B. Pakrasi* 1672
- [W][OA] Photoreceptors CRYPTOCHROME2 and Phytochrome B Control Chromatin Compaction in Arabidopsis. *Martijn van Zanten, Federico Tessadori, Fionn McLoughlin, Reuben Smith, Frank F. Millenaar, Roel van Driel, Laurentius A.C.J. Voesenek, Anton J.M. Peeters, and Paul Fransz* 1686
- [W][OA] Linking the Salt Transcriptome with Physiological Responses of a Salt-Resistant *Populus* Species as a Strategy to Identify Genes Important for Stress Acclimation. *Monika Brinker, Mikael Brosché, Basia Vinocur, Atef Abo-Ogiala, Payam Fayyaz, Dennis Janz, Eric A. Ottow, Andreas D. Cullmann, Joachim Saborowski, Jaakko Kangasjärvi, Arie Altman, and Andrea Polle* 1697
- [C][W] Leaf Senescence Is Accompanied by an Early Disruption of the Microtubule Network in Arabidopsis. *Olivier Keech, Edouard Pesquet, Laurent Gutierrez, Abdul Ahad, Catherine Bellini, Steven M. Smith, and Per Gardeström* 1710

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- [C][W][OA] Comprehensive Analysis of CLE Polypeptide Signaling Gene Expression and Overexpression Activity in Arabidopsis. *JiHyung Jun, Elisa Fiume, Adrienne H.K. Roeder, Ling Meng, Vijay K. Sharma, Karen S. Osmont, Catherine Baker, Chan Man Ha, Elliot M. Meyerowitz, Lewis J. Feldman, and Jennifer C. Fletcher* 1721
- [W][OA] Changes in Transcript Abundance in *Chlamydomonas reinhardtii* following Nitrogen Deprivation Predict Diversion of Metabolism. *Rachel Miller, Guangxi Wu, Rahul R. Deshpande, Astrid Vieler, Katrin Gärtner, Xiaobo Li, Eric R. Moellering, Simone Zäuner, Adam J. Cornish, Bensheng Liu, Blair Bullard, Barbara B. Sears, Min-Hao Kuo, Eric L. Hegg, Yair Shachar-Hill, Shin-Han Shiu, and Christoph Benning* 1737
- [W][OA] Fine Quantitative Trait Loci Mapping of Carbon and Nitrogen Metabolism Enzyme Activities and Seedling Biomass in the Maize IBM Mapping Population. *Nengyi Zhang, Yves Gibon, Amit Gur, Charles Chen, Nicholas Lepak, Melanie Höhne, Zhiwu Zhang, Dallas Kroon, Hendrik Tschoep, Mark Stitt, and Edward Buckler* 1753

- [W][OA] Natural Variation in Arabidopsis Leads to the Identification of REME1, a Pentatricopeptide Repeat-DYW Protein Controlling the Editing of Mitochondrial Transcripts. *Stéphane Bentolila, Walter Knight, and Maureen Hanson* 1966

PLANTS INTERACTING WITH OTHER ORGANISMS

- [C][W] The Arabidopsis Botrytis Susceptible1 Interactor Defines a Subclass of RING E3 Ligases That Regulate Pathogen and Stress Responses. *Hongli Luo, Kristin Laluk, Zhibing Lai, Paola Veronese, Fengming Song, and Tesfaye Mengiste* 1766
- [C][W][OA] Two Putative RNA-Binding Proteins Function with Unequal Genetic Redundancy in the MOS4-Associated Complex. *Jacqueline Monaghan, Fang Xu, Shaohua Xu, Yuelin Zhang, and Xin Li* 1783
- [W] An Effector-Targeted Protease Contributes to Defense against *Phytophthora infestans* and Is under Diversifying Selection in Natural Hosts. *Farnusch Kaschani, Mohammed Shabab, Tolga Bozkurt, Takayuki Shindo, Sebastian Schornack, Christian Gu, Muhammad Ilyas, Joe Win, Sophien Kamoun, and Renier A.L. van der Hoorn* 1794

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

- [W] The Arabidopsis *PR-1* Promoter Contains Multiple Integration Sites for the Coactivator NPR1 and the Repressor SNI1. *Sebastian Pape, Corinna Thurow, and Christiane Gatz* 1805
- [W][OA] Expression and Functional Analyses of *EXO70* Genes in Arabidopsis Implicate Their Roles in Regulating Cell Type-Specific Exocytosis. *Shipeng Li, Gwen M.A. van Os, Shichao Ren, Dali Yu, Tijs Ketelaar, Anne Mie C. Emons, and Chun-Ming Liu* 1819
- [W][OA] Nucleocytoplasmic Distribution of the Arabidopsis Chromatin-Associated HMGB2/3 and HMGB4 Proteins. *Dorthe S. Pedersen, Thomas Merkle, Barbara Marktl, Dorte L. Lildballe, Martin Antosch, Thorsten Bergmann, Katja Tönsing, Dario Anselmetti, and Klaus D. Grasser* 1831
- [W][OA] Reducing Rice Seed Storage Protein Accumulation Leads to Changes in Nutrient Quality and Storage Organelle Formation. *Taiji Kawakatsu, Sakiko Hirose, Hiroshi Yasuda, and Fumio Takaiwa* 1842
- [W][OA] Global Gene Profiling of Laser-Captured Pollen Mother Cells Indicates Molecular Pathways and Gene Subfamilies Involved in Rice Meiosis. *Xiang Tang, Zhi-Yong Zhang, Wen-Juan Zhang, Xing-Ming Zhao, Xuan Li, Dong Zhang, Qiao-Quan Liu, and Wei-Hua Tang* 1855
- [W][OA] C4GEM, a Genome-Scale Metabolic Model to Study C₄ Plant Metabolism. *Cristiana Gomes de Oliveira Dal'Molin, Lake-Ee Quek, Robin William Palfreyman, Stevens Michael Brumbley, and Lars Keld Nielsen* 1871
- [C][W][OA] The Arabidopsis C3H2C3-Type RING E3 Ubiquitin Ligase AtAIRP1 Is a Positive Regulator of an Abscisic Acid-Dependent Response to Drought Stress. *Moon Young Ryu, Seok Keun Cho, and Woo Taek Kim* 1983
- [C][W][OA] Characterization of δ -Guaiene Synthases from Cultured Cells of *Aquilaria*, Responsible for the Formation of the Sesquiterpenes in Agarwood. *Yukie Kumeta and Michiho Ito* 1998

CORRECTIONS

- The Significance of Protein Maturation by Plastidic Type I Signal Peptidase 1 for Thylakoid Development in Arabidopsis Chloroplasts. *R.L. Shipman-Roston, N.J. Ruppel, C. Damoc, B.S. Phinney, and K. Inoue* 2008

[C] Some figures in this article are displayed in color online but in black and white in the print edition.

[W] Indicates Web-only data.

[OA] Open Access articles can be viewed online without a subscription.