FOCUS ISSUE ON PLANT SYSTEMS BIOLOGY

EDITORIAL

Plant Systems Biology. Jacques Joyard and Sheila McCormick

UPDATES

Gene Expression Analysis, Proteomics, and Network Discovery. Sacha Baginsky, Lars Hennig, Philip Zimmermann, and Wilhelm Gruissem

Systems Biology Update: Cell Type-Specific Transcriptional Regulatory Networks. Li Pu and Siobhan Brady

Systems Biology of Organ Initiation at the Shoot Apex. Jan Traas and Françoise Monéger

Metabolic Networks: How to Identify Key Components in the Regulation of Metabolism and Growth. Mark Stitt, Ronan Sulpice, and Joost Keurentjes

A Systems View of Responses to Nutritional Cues in Arabidopsis: Toward a Paradigm Shift for Predictive Network Modeling. Sandrine Ruffel, Gabriel Krouk, and Gloria M. Coruzzi

Signaling between Chloroplasts and the Nucleus: Can a Systems Biology Approach Bring Clarity to a Complex and Highly Regulated Pathway? Hou-Sung Jung and Joanne Chory

Bioinformatic and Systems Biology Tools to Generate Testable Models of Signaling Pathways and Their Targets. Andrea Pitzschke and Heribert Hirt

Hope for Humpty Dumpty: Systems Biology of Cellular Signaling. Sarah M. Assmann

Systems Biology Uncovers the Foundation of Natural Genetic Diversity. Daniel J. Kliebenstein

BREAKTHROUGH TECHNOLOGIES


BIOINFORMATICS


RESEARCH ARTICLES

[WI][O]Epigenetic Regulation of Gene Programs by EMF1 and EMF2 in Arabidopsis. Sang Yeol Kim, T. Zhu, and Z. Renee Sung

[C][WI][O]Large-Scale Reverse Genetics in Arabidopsis: Case Studies from the Chloroplast 2010 Project. Imad Ajjawi, Yan Lu, Linda J. Savage, Shannon M. Bell, and Robert L. Last


On the Cover: The cover shows a jigsaw piece of Vincent van Gogh’s Irises, recognizable but incomplete. This image is meant as an analogy of plant systems biology. To see the big picture, we must understand how all the component parts (gene regulation, proteins, metabolites, ions, changing environmental conditions, etc.) fit together. Updates and research articles in this issue describe progress in applying systems biology approaches to diverse topics of plant biology. Cover photo is by Paul Herzmark and Sheila McCormick (University of California, Berkeley).
Systematic Localization of the Arabidopsis Core Cell Cycle Proteins Reveals Novel Cell Division Complexes. Joanna Boruc, Eeileen Mylle, Maria Duda, Rebecca De Clercq, Stephane Rombauts, Danny Geelen, Pierre Hilson, Dirk Inzé, Daniel Van Damme, and Eugenia Russinova


AraGEM, a Genome-Scale Reconstruction of the Primary Metabolic Network in Arabidopsis. Cristiana Gomes de Oliveira Dal’Molin, Lake-Ee Quek, Robin William Palfreyman, Stevens Michael Brumbley, and Lars Keld Nielsen

A Systems Model of Vesicle Trafficking in Arabidopsis Pollen Tubes. Naohiro Kato, Hongyu He, and Alexander P. Steger


REGULAR ISSUE

ON THE INSIDE
Peter V. Minorsky

BREAKTHROUGH TECHNOLOGIES

Hydrophobin Fusions for High-Level Transient Protein Expression and Purification in Nicotiana benthamiana. Jussi J. Joensuu, Andrew J. Conley, Michael Lienemann, Jim E. Brandle, Markus B. Linder, and Rima Menassa

SCIENTIFIC CORRESPONDENCE

Phosphoenolpyruvate Carboxylase from C4 Leaves Is Selectively Targeted for Inhibition by Anionic Phospholipids. José A. Monreal, Fionn McLoughlin, Cristina Echevarría, Sofia García-Mauriño, and Christa Testerink

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

A Bifunctional Geranyl and Geranylgeranyl Diphosphate Synthase Is Involved in Terpene Oleoresin Formation in Picea abies. Axel Schmidt, Betty Wächtler, Ulrike Temp, Trygve Krekling, Armand Séguin, and Jonathan Gershenzon

An O-Acetylseryne(thiol)ylase Homolog with L-Cysteine Desulphhydrase Activity Regulates Cysteine Homeostasis in Arabidopsis. Consolación Álvarez, Leticia Calo, Luis C. Romero, Irene García, and Cecilia Gotor

Expression of Rapeseed Microsomal Lysophosphatidic Acid Aciyltransferase Isozymes Enhances Seed Oil Content in Arabidopsis. Sylvie Maisonneuve, Jean-Jacques Bessoule, René Lessire, Michel Delseny, and Thomas J. Roscoe

A Putative Phosphatase, LSF1, Is Required for Normal Starch Turnover in Arabidopsis Leaves. Sylviane Comparot-Moss, Oliver Köttig, Michaela Stettler, Christoph Edner, Alexander Graf, Sean E. Weise, Sebastian Streb, Wei-Ling Lu, Daniel MacLean, Sebastian Mahlow, Gerhard Ritte, Martin Steup, Jychian Chen, Samuel C. Zeeman, and Alison M. Smith


The Laforin-Like Dual-Specificity Phosphatase SEX4 from Arabidopsis Hydrolyzes Both C6- and C3-Phosphate Esters Introduced by Starch-Related Dikinases and Thereby Affects Phase Transition of α-Glucans. Mahdi Hejazi, Joerg Fettke, Oliver Köttig, Samuel C. Zeeman, and Martin Steup

BIOENERGETICS AND PHOTOSYNTHESIS

[OA]Thylakoid Protein Phosphorylation in Higher Plant Chloroplasts Optimizes Electron Transfer under Fluctuating Light. Mikko Tikkanen, Michele Grieco, Saijaliisa Kangasjärvi, and Eva-Mari Aro 723


[OA]Divalent Metal Ions in Plant Mitochondria and Their Role in Interactions with Proteins and Oxidative Stress-Induced Damage to Respiratory Function. Yew-Foon Tan, Nicholas O’Toole, Nicolas L. Taylor, and A. Harvey Millar 747

CELL BIOLOGY AND SIGNAL TRANSDUCTION

WallGen, Software to Construct Layered Cellulose-Hemicellulose Networks and Predict Their Small Deformation Mechanics. Hung Kha, Sigrid C. Table, Shankar Kalyanasundaram, and Richard E. Williamson 774


Flexibility contra Stiffness: The Phragmoplast as a Physical Barrier for Beads But Not for Vesicles. Agnieszka Esseling-Ozdoba, Richard A. Kik, André A.M. van Lammeren, J. Mieke Kleijn, and Anne Mie C. Emens 1065

Apyrase (Nucleoside Triphosphate-Diphosphohydrolase) and Extracellular Nucleotides Regulate Cotton Fiber Elongation in Cultured Ovules. Greg Clark, Jonathan Torres, Scott Finlayson, Xueying Guan, Craig Handley, Jinsuk Lee, Julia E. Kays, Z. Jeffery Chen, and Stanley J. Roux 1073

DEVELOPMENT AND HORMONE ACTION

The REDUCED LEAFLET Genes Encode Key Components of the trans-Acting Small Interfering RNA Pathway and Regulate Compound Leaf and Flower Development in Lotus japonicus. Jun Yan, Xuefei Cai, Jianghong Luo, Shusei Sato, Qunyi Jiang, Jun Yang, Xiangling Cao, Xiaohu Hu, Satoshi Tabata, Peter M. Gresshoff, and Da Luo 797

The Role of Casein Kinase II in Flowering Time Regulation Has Diversified during Evolution. Eri Ogiso, Yuji Takahashi, Takuji Sasaki, Masahiro Yano, and Takeshi Izawa 808

SEUSS and SEUSS-LIKE Transcriptional Adaptors Regulate Floral and Embryonic Development in Arabidopsis. Fang Bao, Sridevi Azhakanandam, and Robert G. Franks 821

Characterization of the Possible Roles for B Class MADS Box Genes in Regulation of Perianth Formation in Orchid. Yu-Yun Chang, Nai-Hsuan Kao, Jen-Ying Li, Wei-Han Hsu, Yu-Ling Liang, Jia-Wei Wu, and Chang-Hsien Yang 837

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

Biochemical and Molecular Characterization of PvPAP3, a Novel Purple Acid Phosphatase Isolated from Common Bean Enhancing Extracellular ATP Utilization. Cuique Liang, Jiang Tian, Hon-Ming Lam, Boon Leong Lim, Xiaolong Yan, and Hong Liao 854

Arabidopsis Deadenylases AtCAF1a and AtCAF1b Play Overlapping and Distinct Roles in Mediating Environmental Stress Responses. Justin W. Walley, Dior R. Kelley, Gergana Nestorova, David L. Hirschberg, and Katayoon Dehesh 866

A Raf-Like MAPKKK Gene DSM1 Mediates Drought Resistance through Reactive Oxygen Species Scavenging in Rice. Jing Ning, Xianghua Li, Leslie M. Hicks, and Lisheng Xiong 876

Enhanced Abscisic Acid-Mediated Responses in nia1nia2noa1-2 Triple Mutant Impaired in NIA/NR- and AtNOA1-Dependent Nitric Oxide Biosynthesis in Arabidopsis. Jorge Lozano-Juste and José León 891

Chitinase-Like Protein CTL1 Plays a Role in Altering Root System Architecture in Response to Multiple Environmental Conditions. Christian Hermanus, Silvana Porco, Nathalie Verbruggen, and Daniel R. Bush 904

Gravity-Induced Modifications to Development in Hypocotyls of Arabidopsis Tubulin Mutants. Shouhei Matsumoto, Saori Kumasaki, Kouichi Saga, Kazuyuki Wakabayashi, Takashi Hashimoto, and Takayuki Hoson 918
GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

[WO] Aneuploidy Causes Tissue-Specific Qualitative Changes in Global Gene Expression Patterns in Maize. Irina Makarevitch and Carolyn Harris

[C][OA] MEF9, an E-Subclass Pentatricopeptide Repeat Protein, Is Required for an RNA Editing Event in the nad7 Transcript in Mitochondria of Arabidopsis. Mizuki Takenaka

PLANTS INTERACTING WITH OTHER ORGANISMS

[C][W][OA] The Pepper 9-Lipoxygenase Gene CaLOX1 Functions in Defense and Cell Death Responses to Microbial Pathogens. In Sun Hwang and Byung Kook Hwang


[W][OA] Novel Bifunctional Nucleases, OmBBD and AtBBD1, Are Involved in Abscisic Acid-Mediated Callose Deposition in Arabidopsis. Min Kyoung You, Hyun Young Shin, Young Jin Kim, Sung Han Ok, Sung Ki Cho, Ji Ung Jeung, Sang Dong Yoo, Jeong Kook Kim, and Joong Sheep Shin


WHOLE PLANT AND ECOPHYSIOLOGY


SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION


A Sugar-Inducible Protein Kinase, VvSK1, Regulates Hexose Transport and Sugar Accumulation in Grapevine Cells. Fatma Lecourieux, David Lecourieux, Céline Vignault, and Serge Delrot

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

[O] Indicates Web-only data.

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