

On the Cover: The cover for this Focus Issue on Cellular Dynamics depicts a collage of images from featured articles. The descriptions of the images from left to right are as follows. Image 1: The Arabidopsis protein INP1 (green) assembles into three distinct domains of the plasma membrane in tetrad-stage microspores. The microspores (magenta) are held together by the callose wall (blue). INP1 localization predicts the sites of aperture formation on the surface of mature pollen grains. Image 2 (Central Image): Microtubule growth trajectories on the light grown hypocotyl cell face color coded for apical directed (yellow), basal-directed down (magenta), left (green) and right (cyan). Image 3: Volume rendering of the microtubules (green) and plasma membrane (magenta) in a field of leaf epidermal pavement cells in the process of lobe formation. Image 4 (second row): Filaments formed by the chloroplast division protein FtsZ1 from *Oryza sativa* expressed in a heterologous yeast system. The dashed line represents the outline of the imaged cell. Image 5: A meristem of an Arabidopsis thaliana root expressing the SHORT-ROOT-GFP which is used to analyze the mechanisms of intercellular transport during development. Background Image: Arabidopsis cotyledon pavement cells expressing GFP-PTS1 and stained with propidium iodine. Images created by Zvi Spiegelman, Sidney L. Shaw, Dan Szymanski, Samuel A. Belteton, Kathy Osteryoung, Allan D. TerBush, Anna Dobritsa, and Elizabeth Frick.

THANK YOU TO REVIEWERS

An acknowledgment of *Plant Physiology* reviewers.

1

FOCUS ISSUE

EDITORIAL

Cellular Dynamics: Cellular Systems in the Time Domain *Dan Szymanski, Diane Bassham, Teun Munnik, and Wataru Sakamoto*

12

UPDATES

^[OPEN]Diffuse Growth of Plant Cell Walls. *Daniel J. Cosgrove*

Structural and functional roles of cellulose, xyloglucan, and pectins in cell wall enlargement are reappraised with insights from mechanics, atomic force microscopy, and other methods.

16

^[OPEN]Interplay between Ions, the Cytoskeleton, and Cell Wall Properties during Tip Growth. *Carlisle S. Bascom Jr., Peter K. Hepler, and Magdalena Bezanilla*

Tip growth is a focused and tightly regulated apical explosion that depends on the interconnected activities of ions, the cytoskeleton, and the cell wall.

28

^[OPEN]Finite Element Modeling of Shape Changes in Plant Cells. *Amir J. Bidhendi and Anja Geitmann*

Mechanical modeling of plant cells using finite element methods serves to simulate the behavior of complex cell shapes with the aim to understand biological functioning

41

^[OPEN]ROP GTPases Structure-function and Signaling Pathways. *Gil Feiguelman, Ying Fu, and Shaul Yalovsky*

Interactions between receptor like kinases and guanyl nucleotide exchange factors together with identification of effector proteins reveal putative ROP GTPases signaling cascades.

57

Continued on next page

Continued from preceding page

[OPEN]Advances in Imaging Plant Cell Dynamics. *George Komis, Dominik Novák, Miroslav Ovečka, Olga Šamajová, and Jozef Šamaj*

Advanced bioimaging uncovers insights into subcellular structures of plants. 80

[OPEN]Update: Plant Cortical Microtubule Arrays. *Andrew Elliott and Sidney L. Shaw*

Cortical microtubules play a critical role in plant morphogenesis by creating array patterns that template the deposition of cellulose microfibrils. 94

[OPEN]The Actin Cytoskeleton: Functional Arrays for Cytoplasmic Organization and Cell Shape Control. *Dan Szymanski and Christopher J. Staiger*

Functionally distinct actin filament arrays cluster organelles and define cellular scale flow patterns for secretion. 106

[OPEN]Update on Myosin Motors: Molecular Mechanisms and Physiological Functions. *Jennifer M. Ryan and Andreas Nebenführ*

Recent progress has revealed aspects of the molecular mechanisms that allow myosin motors to carry out their physiological functions. 119

[OPEN]Stromules: Probing Formation and Function. *Maureen R. Hanson and Kevin M. Hines*

Stromules are plastid stroma-filled tubules that increase the surface area of the envelope and extend the reach of the plastid within the plant cell, affecting biosynthesis, metabolism, and signaling. 128

[OPEN]The Molecular Machinery of Chloroplast Division. *Cheng Chen, Joshua S. MacCready, Daniel C. Ducat, and Katherine W. Osteryoung*

Recent studies advance understanding of the mechanisms, spatial control, and regulation of chloroplast division, but many questions remain. 138

[OPEN]Fission and Fusion of Plant Mitochondria, and Genome Maintenance. *Shin-ichi Arimura*

Dynamic changes maintain a multipartite mitochondrial genome meets the changing needs of plant cells. 152

[OPEN]Peroxisome Function, Biogenesis, and Dynamics in Plants. *Yun-Ting Kao, Kim L. Gonzalez, and Bonnie Bartel*

Recent advances highlight understanding of the diversity of peroxisome contributions to plant biology and the mechanisms through which these essential organelles are generated. 162

[OPEN]Advances in Plant ER Architecture and Dynamics. *Giovanni Stefano and Federica Brandizzi*

Recent advances highlight mechanisms that enable the morphological integrity of the plant ER in relation to the other organelles and the cytoskeleton. 178

Continued on next page

[OPEN]The Plant Trans-Golgi Network. Not Just a Matter of Distinction. *M. Ruiz Rosquete, DJ. Davis, and G. Drakakaki*

The trans-Golgi network in plants is a major sorting station of Golgi derived cargo while it also receives recycled material from endocytosis 187

[OPEN]Membrane Dynamics and Multiple Functions of Oil Bodies in Seeds and Leaves. *Takashi L. Shimada, Makoto Hayashi, and Ikuko Hara-Nishimura*

Oil bodies have multiple functions: oleosin-mediated freezing tolerance of seeds, direct interaction with glyoxysomes for lipid degradation in seedlings, and antifungal compound production in leaves. 199

[OPEN]Inroads into Internalization: Five Years of Endocytic Exploration. *Gregory D. Reynolds, Chao Wang, Jianwei Pan, and Sebastian Y. Bednarek*

Advances over recent years underlines a growing interest in investigating endocytosis in plants. 208

[OPEN]Dynamics of Autophagosome Formation. *Junmarie Soto-Burgos, Xiaohong Zhuang, Liwen Jiang, and Diane C. Bassham*

Environmental stress activates autophagy and leads to autophagosome formation at the endoplasmic reticulum. 219

[OPEN]Dynamic Changes in Plant Nuclear Organization in Response to Environmental and Developmental Signals. *Norman R. Groves, Alecia M. Biel, Anna H. Newman-Griffis, and Iris Meier*

The functional organization of the plant nuclear pore, nuclear envelope, and nucleoplasm marks dynamically changing environmental cues and developmental programs. 230

[OPEN]Emerging Roles of the Nuclear Cap-Binding Complex in Abiotic Stress Responses. *Agata Daszkowska-Golec*

Plant nuclear CBC consisted of two subunits (CBP20 and CBP80) is involved in both conserved processes related to RNA metabolism and simultaneously in extremely dynamic plant stress response. 242

[OPEN]Polysomes, Stress Granules and Processing Bodies: A Dynamic Triumvirate Controlling Cytoplasmic mRNA Fate and Function. *Thanin Chantarachot and Julia Bailey-Serres*

Discoveries illuminate highly regulated dynamics of mRNA translation, sequestration, and degradation within the cytoplasm of plants. 254

BREAKTHROUGH TECHNOLOGIES

[OPEN]Nuclear Transcriptomes at High Resolution Using Retooled INTACT. *Mauricio A. Reynoso, Germain C. Pauluzzi, Kaisa Kajala, Sean Cabanlit, Joel Velasco, Jérémie Bazin, Roger Deal, Neelima R. Sinha, Siobhan M. Brady, and Julia Bailey-Serres*

Improved technology and methodology facilitate affinity purification of nuclei and analysis of nuclear transcriptomes, chromatin, and other nuclear components. 270

RESEARCH REPORT

^[OPEN]Three-Dimensional Analysis of Chloroplast Structures Associated with Virus Infection. *Xuejiao Jin, Zhihao Jiang, Kun Zhang, Pengfei Wang, Xiuling Cao, Ning Yue, Xueting Wang, Xuan Zhang, Yunqin Li, Dawei Li, Byung-Ho Kang, and Yongliang Zhang*

Three-dimensional visualization identifies structural remodeling in chloroplasts during barley stripe mosaic virus infection. 282

RESEARCH ARTICLES

^[OPEN]Conserved Dynamics of Chloroplast Cytoskeletal FtsZ Proteins Across Photosynthetic Lineages. *Allan D. TerBush, Joshua S. MacCready, Cheng Chen, Daniel C. Ducat, and Katherine W. Osteryoung*

Bacterial-like and a eukaryotic-specific FtsZ families have distinct but conserved functions in the division of red- and green-lineage chloroplasts. 295

Microtubule Array Patterns Have a Common Underlying Architecture in Hypocotyl Cells. *Andrew Elliott, and Sidney L. Shaw*

Cortical microtubule arrays in the Arabidopsis hypocotyl share a common underlying architecture that identifies their mode of construction. 307

^[OPEN]Pollen Aperture Factor INP1 Acts Late in Aperture Formation by Excluding Specific Membrane Domains from Exine Deposition. *Anna A. Dobritsa, Andrew B. Kirkpatrick, Sarah H. Reeder, Peng Li, and Heather A. Owen*

Pollen aperture factor INP1 assembles gradually and asynchronously at specific membrane domains and is involved in keeping them adjacent to callose wall. 326

^[OPEN]Kinase MPK17 and the Peroxisome Division Factor PMD1 Influence Salt-induced Peroxisome Proliferation. *Elizabeth M. Frick and Lucia C. Strader*

MPK17 and PMD1 are required with the actin cytoskeleton for peroxisome proliferation in response to salt treatment. 340

^[OPEN]F-Actin Mediated Focusing of Vesicles at the Cell Tip Is Essential for Polarized Growth. *Jeffrey P. Bibeau, James L. Kingsley, Fabienne Furt, Erkan Tüzel, and Luis Vidali*

Quantitative analysis and modeling of vesicle diffusion shows that polarized cell growth rates are sustained by actin-based vesicle clustering at the tip. 352

^[OPEN]Environmental and Genetic Factors Regulating Localization of the Plant Plasma Membrane H⁺-ATPase. *Miyoshi Haruta, Li Xuan Tan, Daniel B. Bushey, Sarah J. Swanson, and Michael R. Sussman*

Cellular dynamics and localization of plasma membrane H⁺-ATPase is determined by cell type, light condition, and a receptor kinase, FERONIA, which regulates cell elongation growth. 364

^[CC-BY]Auxin and ROP GTPase Signaling of Polar Nuclear Migration in Root Epidermal Hair Cells. *Moritaka Nakamura, Andrea R. Claes, Tobias Grebe, Rebecca Hermkes, Corrado Viotti, Yoshihisa Ikeda, and Markus Grebe*

Auxin and ROP signaling affect nuclear migration in root epidermal cells. 378

^[CC-BY] **KinG Is a Plant-Specific Kinesin That Regulates Both Intra- and Intercellular Movement of SHORT-ROOT.** *Ziv Spiegelman, Chin-Mei Lee, and Kimberly L. Gallagher*

KinG is a plant-specific calponin-homology domain kinesin that forms a complex with SHR through binding to SIEL, promotes its intercellular trafficking, and facilitates pausing of SHR-associated endosomes on microtubules.

392

Efficient ER Fusion Requires a Dimerization and a C-Terminal Tail Mediated Membrane Anchoring of RHD3. *Jiaqi Sun and Huanquan Zheng*

Efficient ER membrane fusion requires dimerization of RHD3 in different ER membranes and an interaction between membrane lipids and the C-terminal amphipathic helix of RHD3.

406

^[OPEN] **Division Plane Orientation Defects Revealed by a Synthetic Double Mutant Phenotype.** *Ricardo Mir, Victoria H. Morris, Henrik Buschmann, and Carolyn G. Rasmussen*

The tangled1air9 double mutant had synthetic division plane orientation and root growth and cell file rotation defects that are rescued by full-length TAN1-YFP and only partially by TAN1-YFP deletion constructs.

418

^[OPEN] **Reassessing the Roles of PIN Proteins and Anticlinal Microtubules during Pavement Cell Morphogenesis.** *Samuel A. Belteton, Megan G. Sawchuk, Bryon S. Donohoe, Enrico Scarpella, and Daniel B. Szymanski*

Neither PINs nor stable anticlinal microtubules define the lobing patterns of pavement cells; broader analyses of microtubules and cell wall strain are needed.

432

Predicting Dynamic Metabolic Demands in the Photosynthetic Eukaryote *Chlorella vulgaris*. *Cristal Zuñiga, Jennifer Levering, Maciek R. Antoniewicz, Michael T. Guarnieri, Michael J. Betenbaugh, and Karsten Zengler*

Constraint-based modeling gives insights into dynamic metabolic demands and compartmentalization in a photosynthetic eukaryote.

450

REGULAR ISSUE

ON THE INSIDE

Peter V. Minorsky

463

FOUNDERS' REVIEW

^[OPEN] **Auxin Signaling.** *Ottoline Leyser*

Auxin triggers diverse responses in plants, and this is reflected in quantitative and qualitative diversity in the auxin signaling machinery.

465

LETTER TO THE EDITOR

The Arabidopsis E3 Ubiquitin Ligase SP1 Targets to Chloroplasts, Peroxisomes, and Mitochondria. *Ronghui Pan and Jianping Hu*

480

COMMENTARIES

Retromer and VSR Recycling: A Red Herring? *David G. Robinson*

Recently published data on retromer function in animal cells demands a rethink on the mechanism of recycling of vacuolar sorting receptors in plants.

483

Continued on next page

Stomatal Response to Humidity: Blurring the Boundary between Active and Passive Movement. *Florent Pantin and Michael R. Blatt*

Two recent publications suggest that VPD drives stomatal conductance independent of ABA and that hydropassive and active stomatal movements are interlocked within a single, mechanistic framework. 485

SCIENTIFIC CORRESPONDENCE

[OPEN] ABA Accumulation in Dehydrating Leaves Is Associated with Decline in Cell Volume, Not Turgor Pressure. *Lawren Sack, Grace P. John, and Thomas N. Buckley*

Reanalysis of published experimental data shows that in dehydrating leaves ABA accumulation is linked with reduction of cell volume rather than turgor, providing clues toward signaling mechanisms. 489

BREAKTHROUGH TECHNOLOGIES

[OPEN] An Improved *Brome mosaic virus* Silencing Vector: Greater Insert Stability and More Extensive VIGS. *Xin Shun Ding, Stephen W. Mannas, Bethany A. Bishop, Xiaolan Rao, Mitchell Lecoultrre, Soonil Kwon, and Richard S. Nelson*

A modified virus vector facilitates plant gene fragment retention and improves gene-silencing phenotypes in the host. 496

RESEARCH REPORT

[OPEN] Extracellular ATP Acts on Jasmonate Signaling to Reinforce Plant Defense. *Diwaker Tripathi, Tong Zhang, Abraham J. Koo, Gary Stacey, and Kiwamu Tanaka*

Extracellular ATP signaling, mediated by the P2K1 receptor, changes the stability of JAZ1 protein in JA signaling to boost plant defense response. 511

RESEARCH ARTICLES

BIOCHEMISTRY AND METABOLISM

[OPEN] Coexpression Analysis Identifies Two Oxidoreductases Involved in the Biosynthesis of the Monoterpene Acid Moiety of Natural Pyrethrin Insecticides in *Tanacetum cinerariifolium*. *Haiyang Xu, Gaurav D. Moghe, Krystle Wiegert-Rininger, Anthony L. Schilmiller, Cornelius S. Barry, Robert L. Last, and Eran Pichersky*

A set of dehydrogenases are involved in the synthesis of trans-chrysanthemic acid, the terpene moiety of the natural insecticide pyrethrins. 524

Glutathione Transferase U13 Functions in Pathogen-Triggered Glucosinolate Metabolism.

Mariola Piślewska-Bednarek, Ryohei Thomas Nakano, Kei Hiruma, Marta Pastorczyk, Andrea Sanchez-Vallet, Suthitar Singkaravanit-Ogawa, Danuta Ciesiołka, Yoshitaka Takano, Antonio Molina, Paul Schulze-Lefert, and Paweł Bednarek

Glutathione S-transferase class-tau member 13 is essential for the PENETRATION2 myrosinase-mediated preinvasive resistance and callose deposition in Arabidopsis thaliana. 538

[OPEN] A Mucin-like Protein of Planthopper is Required for Feeding and Induces Immunity Response in Plants. *Xinxin Shangguan, Jing Zhang, Bingfang Liu, Yan Zhao, Huiying Wang, Zhizheng Wang, Jianping Guo, Weiwei Rao, Shengli Jing, Wei Guan, Yinhua Ma, Yan Wu, Liang Hu, Rongzhi Chen, Bo Du, Lili Zhu, Dazhao Yu, and Guangcun He*

*A secreted mucin-like protein in the rice brown planthopper (*Nilaparvata lugens*) enables insect feeding and induces plant immune responses.*

552

[OPEN] Distinct Functions of STARCH SYNTHASE 4 Domains in Starch Granule Formation. *Kuan-Jen Lu, Barbara Pfister, Camilla Jenny, Simona Eicke, and Samuel C. Zeeman*

In Arabidopsis leaves, the catalytic C-terminal region of STARCH SYNTHASE 4 promotes starch granule initiation while its noncatalytic N-terminal region determines starch granules morphology.

566

[OPEN] Gradually Decreasing Starch Branching Enzyme Expression Is Responsible for the Formation of Heterogeneous Starch Granules. *Juan Wang, Pan Hu, Lingshang Lin, Zichun Chen, Qiaoquan Liu, and Cunxu Wei*

Starch-branching enzyme expression is responsible for the formation of four heterogeneous starch granules distributed regionally from inside to outside in high-amylose rice endosperm.

582

[OPEN] A Program for Iron Economy during Deficiency Targets Specific Fe Proteins. *Laura J. Hantzis, Gretchen E. Kroh, Courtney E. Jahn, Michael Cantrell, Graham Peers, Marinus Pilon, and Karl Ravet*

To adjust to iron limitation, Arabidopsis rosettes coordinately down-regulate expression of abundant Fe proteins and key components of the iron-sulfur cluster assembly system in the chloroplasts.

596

[OPEN] Regulation of Sucrose Transporters and Phloem Loading in Response to Environmental Cues. *Qiyu Xu, Siyuan Chen, Ren Yunjuan, Shaolin Chen, and Johannes Liesche*

Sucrose transporter expression in leaves is regulated at the transcriptional and post-transcriptional level to link changes in photosynthesis and sugar status with phloem loading and carbon export.

930

[OPEN] Vessel-Specific Reintroduction of CINNAMOYL COA REDUCTASE 1 (CCR1) in Dwarfed *ccr1* Mutants Restores Vessel and Xylary Fiber Integrity and Increases Biomass. *Barbara De Meester, Lisanne de Vries, Merve Özparpucu, Notburga Gierlinger, Sander Corneillie, Andreas Pallidis, Geert Goeminne, Kris Morreel, Michiel De Bruyne, Riet De Rycke, Ruben Vanholme, and Wout Boerjan*

*Restoring vessel integrity without lowering general ferulic acid levels overcomes dwarfism in *ccr1* mutants and reveals monolignol transport from vessels to xylary fibers.*

611

CELL BIOLOGY

[OPEN] The DEAD-box RNA Helicase RH50 Is a 23S-4.5S rRNA Maturation Factor that Functionally Overlaps with the Plastid Signaling Factor GUN1. *Francesca Paieri, Luca Tadini, Nikolay Manavski, Tatjana Kleine, Roberto Ferrari, Piero Morandini, Paolo Pesaresi, Jörg Meurer, and Dario Leister*

RH50 is required for processing of chloroplast ribosomal RNA and shares several features with the signaling factor GUN1, including intrachloroplast localization, expression profile, and epistatic effects.

634

Turnip Mosaic Virus Counteracts Selective Autophagy of the Viral Silencing Suppressor HCpro. *Anders Hafren, Suayib Üstün, Anton Hochmuth, Steingrim Svenning, Terje Johansen, and Daniel Hofius*

Potyvirus antagonize NBR1-mediated antiviral autophagy that targets RNA granules containing the viral RNA silencing suppressor HCpro for degradation. 649

Prolines in Transit Peptides Are Crucial for Efficient Preprotein Translocation into Chloroplasts. *Dong Wook Lee, Yun-Joo Yoo, Md. Abdur Razzak, and Inhwan Hwang*

Prolines in transit peptides are critical for the preprotein translocation through import channels and prevent inappropriate insertion of TMD-containing preproteins into chloroplast envelopes. 663

^[OPEN]Coordinated Regulation of Hypocotyl Cell Elongation by Light and Ethylene through a Microtubule Destabilizing Protein. *Qianqian Ma, Xiaohong Wang, Jingbo Sun, and Tonglin Mao*

Light and ethylene mediate hypocotyl cell elongation by coordinating the expression of microtubule-destabilizing protein MDP60 in Arabidopsis. 678

ECOPHYSIOLOGY AND SUSTAINABILITY

^[OPEN]Reduction in Root Secondary Growth as a Strategy for Phosphorus Acquisition. *Christopher F. Strock, Laurie Morrow de la Riva, and Jonathan P. Lynch*

Reduced root secondary growth decreases maintenance and construction costs, allowing greater root elongation and soil exploration, thereby improving P acquisition and plant growth under P stress. 691

A Model of Leaf Coordination to Scale-up Leaf Expansion from the Organ to the Canopy. *Pierre Martre and Anaëlle Dambreville*

The coordination of the growth of wheat organs highlights robust functional rules used to model the dynamics of wheat leaf growth at the phytomer and canopy scales in response to abiotic constraints. 704

GENES, DEVELOPMENT, AND EVOLUTION

^[OPEN]GROWTH-REGULATING FACTOR and GRF-INTERACTING FACTOR Specify Meristematic Cells of Gynoecia and Anthers. *Sang-Joo Lee, Byung Ha Lee, Jae-Hak Jung, Soon Ki Park, Jong Tae Song, and Jeong Hoe Kim*

Specification of carpel margin meristems and archesporial cells by the GRF-GIF duo is a prerequisite for the female and male reproductive competence of Arabidopsis. 717

^[OPEN]A Role for the F-Box Protein HAWAIIAN SKIRT in Plant microRNA Function. *Patricia L. M. Lang, Michael D. Christie, Ezgi S. Dogan, Rebecca Schwab, Jörg Hagmann, Anna-Lena van de Weyer, Emanuele Scacchi, and Detlef Weigel*

HAWAIIAN SKIRT is a cofactor for Arabidopsis thaliana microRNA function and acts in an F-box-dependent manner. 730

TsNAC1 Is a Key Transcription Factor in Abiotic Stress Resistance and Growth. *Can Liu, Baomei Wang, Zhaoxia Li, Zhenghua Peng, and Juren Zhang*

*TsNAC1 improves abiotic stress resistance of *Thelungiella halophila* by regulating ion transport and retards vegetative growth by limiting the expansion of cells.* 742

[CC-BY] **SHORTROOT-Mediated Increase in Stomatal Density Has No Impact on Photosynthetic Efficiency.** *Mara L. Schuler, Olga V. Sedelnikova, Berkley J. Walker, Peter Westhoff, and Jane A. Langdale*

Stomatal density can be increased in rice by expanding the expression domain of SHORTROOT, but contrary to theoretical predictions, enhanced stomatal numbers have no impact on photosynthetic capacity. 757

[OPEN] **Transcription Factors VND1-VND3 Contribute to Cotyledon Xylem Vessel Formation.** *Tian Tian Tan, Hitoshi Endo, Ryosuke Sano, Tetsuya Kurata, Masatoshi Yamaguchi, Misato Ohtani, and Taku Demura*

VND1, VND2, and VND3 are required for xylem vessel element formation in the secondary veins of Arabidopsis cotyledons grown under continuous dark conditions. 773

Transcription Factor WRKY75 Interacts with DELLA Proteins to Affect Flowering. *Liping Zhang, Ligang Chen, and Diqu Yu*

WRKY75 functions as a component of the regulatory network in Arabidopsis that modulates the onset and progression of floral initiation through GA signaling. 790

Balance between Cytosolic and Chloroplast Translation Affects Leaf Variegation. *Ruijuan Wang, Jun Zhao, Min Jia, Ni Xu, Shuang Liang, Jingxia Shao, Yafei Qi, Xiayan Liu, Lijun An, and Fei Yu*

Mutations in cytosolic ribosomal protein RPS21 enhance leaf variegation in Arabidopsis by loss of chloroplast VAR2/AtFtsH2 protein, an effect dependent on chloroplast translation. 804

[OPEN] **Transcription factor OsTGA10 is a target of the MADS protein OsMADS8 and is required for tapetum development.** *Zhi-Shan Chen, Xiao-Feng Liu, Dong-Hui Wang, Rui Chen, Xiao-Lan Zhang, Zhi-Hong Xu, and Shu-Nong Bai*

The transcription factor OsTGA10, a target of OsMADS8, regulates tapetum development via direct binding to other tapetum-regulatory factors and to the regulatory regions of genes involved in tapetum development. 819

MEMBRANES, TRANSPORT, AND BIOENERGETICS

A Tonoplast Sugar Transporter Underlies a Sugar Accumulation QTL in Watermelon. *Yi Ren, Shaogui Guo, Jie Zhang, Hongju He, Honghe Sun, Shouwei Tian, Guoyi Gong, Haiying Zhang, Amnon Levi, Yaakov Tadmor, and Yong Xu*

A tonoplast sugar transporter CITST2 is regulated by a sugar-induced WRKY transcription factor SUSIWM1. 836

SIGNALING AND RESPONSE

[OPEN] **Stomatal VPD Response: There Is More to the Story Than ABA.** *Ebe Merilo, Dmitry Yarmolinsky, Pirko Jalakas, Helen Parik, Ingmar Tulva, Bakhtier Rasulov, Kalle Kilk, and Hannes Kollist*

ABA level is important for steady-state stomatal conductance, and OST1 is crucial for humidity-induced stomatal closure. 851

[OPEN] **Arabidopsis Novel Glycine-Rich Plasma Membrane PSS1 Protein Enhances Disease Resistance in Transgenic Soybean Plants.** *Bing Wang, Rishi Sumit, Binod B. Sahu, Micheline N. Ngaki, Subodh K. Srivastava, Yang Yang, Sivakumar Swaminathan, and Madan K. Bhattacharyya*

Continued from preceding page

The Arabidopsis nonhost resistance gene PSS1 encoding an unknown glycine-rich plasma membrane protein has shown to enhance sudden death syndrome resistance in transgenic soybean plants. 865

[OPEN] *Arabidopsis ACTIN-DEPOLYMERIZING FACTOR3 is Required for Controlling Aphid Feeding from the Phloem.* Hossain A. Mondal, Joe Louis, Lani Archer, Monika Patel, Vamsi J. Nalam, Sujon Sarowar, Vishala Sivapalan, Douglas D. Root, and Jyoti Shah

Green peach aphid feeding from the sieve elements is restricted by ACTIN-DEPOLYMERIZING FACTOR3, implicating an actin-dependent process in controlling insect feeding from the phloem. 879

The RIN-MC Fusion of MADS-Box Transcription Factors Has Transcriptional Activity and Modulates Expression of Many Ripening Genes. Shan Li, Huijinlan Xu, Zheng Ju, Dongyan Cao, Hongliang Zhu, Daqi Fu, Donald Grierson, Guozheng Qin, Yunbo Luo, and Benzhong Zhu

Tomato RIN-MC fusion plays a negative role in ripening and encodes a chimeric transcription factor that modulates the expression of many ripening genes, thereby contributing to the rin mutant phenotype. 891

[OPEN] *Ethylene Receptors Signal via a Noncanonical Pathway to Regulate Abscisic Acid Responses.* Arkadipta Bakshi, Sarbottam Piya, Jessica C. Fernandez, Christian Chervin, Tarek Hewezi, and Brad M. Binder

The ETHYLENE RESPONSE1 and ETHYLENE RESPONSE2 ethylene receptors signal via a noncanonical pathway to control sensitivity to the hormone abscisic acid during seed germination. 910

[OPEN] *OsmiR396d miRNA affects gibberellin and brassinosteroid signaling to regulate plant architecture.* Yongyan Tang, Huanhuan Liu, Siyi Guoa, Bo Wang, Zhitao Li, Kang Chong, and Yunyuan Xu

The microRNA396d connects OsBZR1 with OsGRFs to regulate the signal of brassinosteroid and gibberellin for controlling the key agriculture yield traits in rice. 946

CORRECTION

Wu H., Cockshutt A.M., McCarthy A., and Campbell D.A. Distinctive Photosystem II Photoinactivation and Protein Dynamics in Marine Diatoms. 960

[CC-BY] Article free via Creative Commons CC-BY 4.0 license.

[OPEN] Articles can be viewed without a subscription.