FOCUS ISSUE ON UBIQUITIN IN PLANT BIOLOGY

EDITORIALS

Focus on Ubiquitin in Plant Biology. Bonnie Bartel and Vitaly Citovsky

UPDATES

The Expanding Universe of Ubiquitin and Ubiquitin-Like Modifiers. Richard D. Vierstra

Ubiquitination during Plant Immune Signaling. Daniel Marino, Nemo Peeters, and Susana Rivas

The U-Box E3 Ligase SPL11/PUB13 Is a Convergence Point of Defense and Flowering Signaling in Plants. Jinling Liu, Wei Li, Yuese Ning, Gautam Shirsekar, Yuhui Cai, Xuli Wang, Liangying Dai, Zhilong Wang, Wende Liu, and Guo-Liang Wang

The COP9 Signalosome: Its Regulation of Cullin-Based E3 Ubiquitin Ligases and Role in Photomorphogenesis. Cynthia D. Nezames and Xing Wang Deng

Ubiquitin-Mediated Control of Plant Hormone Signaling. Dior R. Kelley and Mark Estelle

Ubiquitin on the Move: The Ubiquitin Modification System Plays Diverse Roles in the Regulation of Endoplasmic Reticulum- and Plasma Membrane-Localized Proteins. Damien D. Guerra and Judy Callis

The Role of the Ubiquitin-Proteasome System in Agrobacterium tumefaciens-Mediated Genetic Transformation of Plants. Shimpei Magori and Vitaly Citovsky

Ubiquitin and Plant Viruses, Let's Play Together! Catherine Alcaide-Loridan and Isabelle Jupin

Gibberellin Signaling: A Theme and Variations on DELLA Repression. Amber L. Hauvermale, Tohru Ariizumi, and Camille M. Steber

RESEARCH ARTICLES


[OW][OA]The Light-Response BTB1 and BTB2 Proteins Assemble Nuclear Ubiquitin Ligases That Modify Phytochrome B and D Signaling in Arabidopsis. Matthew J. Christians, Derek J. Gingerich, Zhihua Hua, Timothy D. Lauer, and Richard D. Vierstra

On the Cover: The cover of this Focus Issue devoted to Ubiquitin in Plant Biology depicts the stylized ubiquitin/proteasome system, which attaches multiple ubiquitin residues to a substrate protein and is then degraded by the 26S proteasome. These events are shown against the background of a confocal scanning laser micrograph of a tobacco (Nicotiana tabacum) leaf that visualizes chloroplast autofluorescence (purple signal) and the nucleocytoplasmic partition of the transiently expressed cyan fluorescent protein fluorescent marker (blue signal). This issue highlights the roles of ubiquitin and ubiquitin-like modifiers in all different aspects of plant development and morphogenesis, hormonal and environmental responses, chromatin remodeling and histone modifications, and plant-pathogen interactions. Cover design by Stanislav V. Kozlovsky (Moscow State University, Russia) and Vitaly Citovsky (State University of New York, Stony Brook).

REGULAR ISSUE
ON THE INSIDE
Peter V. Minorsky 143

UPDATES
Canopy Light and Plant Health. Carlos L. Ballaré, Carlos A. Mazza, Amy T. Austin, and Ronald Pierik 145
Reactive Oxygen Species and Autophagy in Plants and Algae. María Esther Pérez-Pérez, Stéphane D. Lemaire, and José L. Crespo 156

GENOME ANALYSIS

BREAKTHROUGH TECHNOLOGIES

BIOINFORMATICS
Application of the Gini Correlation Coefficient to Infer Regulatory Relationships in Transcriptome Analysis. Chuang Ma and Xiangfeng Wang 192

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES
Synergistic Interactions between Carotene Ring Hydroxylases Drive Lutein Formation in Plant Carotenoid Biosynthesis. Rena F. Quinlan, Maria Shumskaya, Louis M.T. Bradbury, Jesús Beltrán, Chunhui Ma, Edward J. Kennedy, and Eleanor T. Wurtzel 204
A Structural Basis for the Biosynthesis of the Major Chlorogenic Acids Found in Coffee. Laura A. Lallemand, Chloe Zubieta, Soon Goo Lee, Yechun Wang, Samira Acajjaoui, Joanna Timmins, Sean McSweeney, Joseph M. Jez, James G. McCarthy, and Andrew A. McCarthy 249
Toward Stable Genetic Engineering of Human O-Glycosylation in Plants. Zhang Yang, Eric P. Bennett, Bodil Jørgensen, Damian P. Drew, Emma Arigi, Ulla Mandel, Peter Ulsvikov, Steven B. Levery, Henrik Clausen, and Bent L. Petersen 450

Continued on next page
BIOENERGETICS AND PHOTOSYNTHESIS

Chlorophyll b Reductase Plays an Essential Role in Maturation and Storability of Arabidopsis Seeds.
Saori Nakajima, Hisashi Ito, Ryouichi Tanaka, and Ayumi Tanaka 261

Photosynthetic Adaptation to Length of Day Is Dependent on S-Sulfoxyganyne Synthase Activity in the Thylakoid Lumen.
María Ángeles Bermúdez, Jeroni Galánés, Inmaculada Moreno, Philip M. Mullineaux, Cecilia Gotor, and Luis C. Romero 274

Photosystem II Photoactivation, Repair, and Protection in Marine Centric Diatoms.
Hongyan Wu, Suzanne Roy, Meriem Alami, Beverley R. Green, and Douglas A. Campbell 464

CELL BIOLOGY AND SIGNAL TRANSDUCTION

The Mediator Complex Subunit PFT1 Interferes with COP1 and HY5 in the Regulation of Arabidopsis Light Signaling.
Cornelia Klose, Claudia Bülke, Aurora Piaias Fernandez, Eberhard Schäfer, Eva Zwick, and Thomas Kretsch 289

Rice Mitogen-Activated Protein Kinase Interactome Analysis Using the Yeast Two-Hybrid System.
Raksha Singh, Mi-Ok Lee, Jae-Eun Lee, JiHyun Choi, Ji Hun Park, Eun Hye Kim, Ran Hee Yoo, Jung-II Cho, Jong-Seong Jeon, Randeep Rakwal, Ganesh Kumar Agrawal, Jae Sun Moon, and Nam-Soo Jwa 477

DEVELOPMENT AND HORMONE ACTION

Inhibition of Tiller Bud Outgrowth in the tin Mutant of Wheat Is Associated with Precocious Internode Development.
Tesfamichael H. Kebrum, Peter M. Chandler, Steve M. Swain, Rod W. King, Richard A. Richards, and Wolfgang Spielmeyer 308

Cytokinin Activity of cis-Zeatin and Phenotypic Alterations Induced by Overexpression of Putative cis-Zeatin-O-glucosyltransferase in Rice.
Toru Kudo, Nobue Makita, Mikiko Kojima, Hiroki Tokunaga, and Hitoshi Sakakibara 319

Functional Characterization of the GATA Transcription Factors GNC and CGA1 Reveals Their Key Role in Chloroplast Development, Growth, and Division in Arabidopsis.

Ligand-Induced Alterations in the Phosphorylation State of Ethylene Receptors in Tomato Fruit.
Yusuke Kamiyoshihara, Denise M. Tieman, Donald J. Huber, and Harry J. Klee 488

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

The Subcellular Localization of Tubby-Like Proteins and Participation in Stress Signaling and Root Colonization by the Mutualist Piriformospora indica.
Marco Uwe Reitz, Jeff Kweku Bissue, Kathleen Zoeller, Agnès Attard, Ralph Hückelhoven, Katja Becker, Jafargholi Imanti, Ruth Eichmann, and Patrick Schäfer 349

Maria Zoeller, Nadja Stingl, Markus Krischke, Agnes Fekete, Frank Waller, Susanne Berger, and Martin J. Mueller 365

Unique Drought Resistance Functions of the Highly ABA-Induced Clade A Protein Phosphatase 2Cs.
Govinda Badiger Bhaskara, Thao Thi Nguyen, and Paul E. Verslues 379

The Rice Monovalent Cation Transporter OsHKT2;4: Revisited Ionic Selectivity.
Ali Sassi, Delphine Mieulet, Imran Khan, Bertrand Moreau, Isabelle Gaillard, Hervé Sentenac, and Anne-Aliénor Very 498

PLANTS INTERACTING WITH OTHER ORGANISMS

Jinrong Wan, Kitaanu Tanaka, Xue-Cheng Zhang, Geon Hui Son, Laurent Brechenmacher, Tran Hong Nha Nguyen, and Gary Stacey 396

The Lateral Organ Boundaries Domain Transcription Factor LBD20 Functions in Fusarium Wilt Susceptibility and Jasmonate Signaling in Arabidopsis.
Louise E. Thatcher, Jonathan J. Powell, Elizabeth A.B. Aitken, Kenal Kazan, and John M. Manners 407

Continued on next page
Ectopic Expression of Rubisco Subunits in Maize Mesophyll Cells Does Not Overcome Barriers to Cell Type-Specific Accumulation. Katia Wostriff, Aimee Clark, Shirley Sato, Tom Clemente, and David Stern

Characterization of SOC1’s Central Role in Flowering by the Identification of Its Upstream and Downstream Regulators. Richard G.H. Immink, David Poč, Silvia Ferrario, Felix OH, Kerstin Kaufmann, Felipe Leal Valentim, Stefan de Folter, Froukje van der Wal, Aalt D.J. van Dijk, Markus Schmid, and Gerco C. Angenent

Formation of Complex Extrachromosomal T-DNA Structures in Agrobacterium tumefaciens-Infected Plants. Kamy Singer, Yoel M. Shiboleth, Jianming Li, and Tzvi Tzfira

A Mathematical Model for BRASSINOSTEROID INSENSITIVE1-Mediated Signaling in Root Growth and Hypocotyl Elongation. G. Wilma van Esse, Simon van Mourik, Hans Stigler, Colette A. ten Hove, Jaap Molenaar, and Sacco C. de Vries

Availability of Rubisco Small Subunit Up-Regulates the Transcript Levels of Large Subunit for Stoichiometric Assembly of Its Holoenzyme in Rice. Yuji Suzuki and Amane Makino


Roles of Four Arabidopsis U-Box E3 Ubiquitin Ligases in Negative Regulation of Abscisic Acid-Mediated Drought Stress Responses. Dong Hye Seo, Moon Young Ryu, Fabien Jammes, Jae Hwan Hwang, Michelle Turek, Bin Goo Kang, June M. Kwak, and Woo Taek Kim

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

Indicates Web-only data.

Open Access articles can be viewed online without a subscription.