ON THE COVER

Wood is formed by the successive addition of secondary xylem, which consists of cells with a conspicuously thickened secondary wall composed mainly of lignin and cellulose. Mitsuda et al. (pages 270–280) show that two plant-specific transcription factors, NAC SECONDARY WALL THICKENINGS PROMOTING FACTOR1 (NST1) and NST3, are key regulators of the formation of secondary walls in woody tissues of Arabidopsis. Experiments with both loss- and gain-of-function mutants suggest that NST1 and NST3 function redundantly to promote secondary wall thickening in interfascicular fibers and secondary xylem. Putative orthologs of NST1 and NST3 present in the genome of poplar suggest that they might also function as key regulators of the formation of secondary walls in trees and could be used as a tool for the genetic engineering of wood and its derivatives. The cover image shows an autofluorescent image of lignin in a cross section of root hypocotyl of the nst1-1 nst3-1 double mutant. Lignified secondary xylem was never observed, whereas lignification of vascular vessels was not affected, showing up as a fireworks-like display of fluorescent spots.

EDITORIAL

New Features for a New Year
Rich Jorgensen

IN THIS ISSUE

Gibberellins Are Modified by Methylation in Planta
Nancy A. Eckardt

IN BRIEF

A Complete MAPK Signaling Cascade That Functions in Stomatal Development and Patterning in Arabidopsis
Arabidopsis WEE1 Kinase Controls Cell Cycle Arrest in Response to DNA Damage
Nancy A. Eckardt

RESEARCH ARTICLES

SDG714, a Histone H3K9 Methyltransferase, Is Involved in Tos17 DNA Methylation and Transposition in Rice
Yong Ding, Xia Wang, Lei Su, JiXian Zhai, ShouYun Cao, DongFen Zhang, ChunYan Liu, YuPing Bi, Qian Qian, ZhuKuan Cheng, ChengCai Chu, and XiaoFeng Cao

Regulation of Telomerase in Arabidopsis by BT2, an Apparent Target of TELOMERASE ACTIVATOR1
Shuxin Ren, Kranthi K. Mandadi, Amy L. Boedeker, Keerti S. Rathore, and Thomas D. McKnight

Methylation of Gibberellins by Arabidopsis GAMT1 and GAMT2
Marina Varbanova, Shinjiro Yamaguchi, Yue Yang, Katherine McKelvey, Atsushi Hanada, Roy Borochov, Fei Yu, Yusuke Jikumaru, Jeannine Ross, Diego Cortes, Choong Je Ma, Joseph P. Noel, Lew Mander, Vladimir Shulaev, Yuji Kamiya, Steve Roderelm, David Weiss, and Eran Pichersky

The indeterminate gametophyte1 Gene of Maize Encodes a LOB Domain Protein Required for Embryo Sac and Leaf Development
Matthew M.S. Evans

Stomatal Development and Patterning Are Regulated by Environmentally Responsive Mitogen-Activated Protein Kinases in Arabidopsis
Huachun Wang, Njabulo Ngwenyama, Yidong Liu, John C. Walker, and Shuqun Zhang

Repression of Flowering in Arabidopsis Requires Activation of FLOWERING LOCUS C Expression by the Histone Variant H2A.Z
Roger B. Deal, Christopher N. Topp, Elizabeth C. McKinney, and Richard B. Meagher

CRYPTOCHROME2 in Vascular Bundles Regulates Flowering in Arabidopsis
Motomu Endo, Nobuyoshi Mochizuki, Tomomi Suzuki, and Akira Nagatani
S Locus Genes and the Evolution of Self-Fertility in Arabidopsis thaliana
Sue Sherman-Broyles, Nathan Boggs, Agnes Farkas, Pei Liu, Julia Vrebalov, Mikhail E. Nasrallah, and June B. Nasrallah

Characterization of the SP11/SCR High-Affinity Binding Site Involved in Self/Nonself Recognition in Brassica Self-Incompatibility
Hiroko Shimosato, Naohiko Yokota, Hiroshi Shiba, Megumi Iwano, Tetsuyuki Entani, Fang-Sik Che, Masao Watanabe, Akira Isoigai, and Seiji Takayama

ARF7 and ARF19 Regulate Lateral Root Formation via Direct Activation of LBD/ASL Genes in Arabidopsis
Yoko Okushima, Hidehiro Fukuki, Makoto Onoda, Athanasios Theologis, and Masao Tasaka

Interactions among PIN-FORMED and P-Glycoprotein Auxin Transporters in Arabidopsis
Joshua J. Blakeslee, Anindita Bandyopadhyay, Ok Ran Lee, Jozef Mravec, Boosaree Titapiwatanakun, Michael Sauer, Srinivas N. Makam, Yan Cheng, Rodolphe Bouchard, Jili Adamec, Markus Geisler, Akitomo Nagashima, Tatsuya Sakai, Enrique Martinola, Jili Frimi, Wendy Ann Peer, and Angus S. Murphy

Flavonoid Accumulation in Arabidopsis Repressed in Lignin Synthesis Affects Auxin Transport and Plant Growth
Sébastien Bessseau, Laurent Hoffmann, Pierrrette Geoffroy, Catherine Lapierre, Brigitte Pollet, and Michel Legrand

PIP5K9, an Arabidopsis Phosphatidylinositol Monophosphate Kinase, Interacts with a Cytosolic Invertase to Negatively Regulate Sugar-Mediated Root Growth
Ying Lou, Jin-Ying Gou, and Hong-Wei Xue

A Novel Transcriptional Cascade Regulating Expression of Heat Stress Proteins during Seed Development of Arabidopsis
Sachin Kotak, Elizabeth Vierling, Helmut Bäumlein, and Pascal von Koskull-Döring

empty pericarp4 Encodes a Mitochondrion-Targeted Pentatricopeptide Repeat Protein Necessary for Seed Development and Plant Growth in Maize
José F. Gutierrez-Marcos, Mauro Dal Prà, Anna Giulini, Liliana M. Costa, Giuseppe Gavazzi, Sylvain Cordelier, Olivier Sellam, Christophe Tatout, Wyatt Paul, Pascual Perez, Hugh G. Dickinson, and Gabriella Consonni

Arabidopsis WEE1 Kinase Controls Cell Cycle Arrest in Response to Activation of the DNA Integrity Checkpoint
Kristof De Schutter, Jérôme Joubès, Toon Cools, Aurine Verkest, Florence Coreillou, Elena Babychkuk, Els Van Der Schueren, Tom Beeckman, Sergei Kushnir, Dirk Inze, and Lieven De Veylder

The Kinesin ATK3 Functions in Early Spindle Assembly in Arabidopsis
J. Christian Ambrose and Richard Cyr

The Arabidopsis irregular xylem8 Mutant Is Deficient in Glucuronoxylan and Homogalacturonan, Which Are Essential for Secondary Cell Wall Integrity
Staffan Persson, Kenny Hosmer Caffall, Glenn Freshour, Matthew T. Hilley, Stefan Bauer, Patricia Poindexter, Michael G. Hahn, Debra Mohnen, and Chris Somerville

Chlamydomonas reinhardtii Has Multiple Prolyl 4-Hydroxylases, One of Which Is Essential for Proper Cell Wall Assembly
Katriina Keskiaho, Reija Hieto, Raija Sormunen, and Johanna Myllyharju

NAC Transcription Factors, NST1 and NST3, Are Key Regulators of the Formation of Secondary Walls in Woody Tissues of Arabidopsis
Sue Sherman-Broyles, Nathan Boggs, Agnes Farkas, Pei Liu, Julia Vrebalov, Mikhail E. Nasrallah, and June B. Nasrallah

Arabidopsis PLD2 Regulates Vesicle Trafficking and Is Required for Auxin Response
Gang Li and Hong-Wei Xue

Rice SCAMP1 Defines Clathrin-Coated, trans-Golgi–Located Tubular-Vesicular Structures as an Early Endosome in Tobacco BY-2 Cells
Sheung Kwan Lam, Ching Lung Siu, Stefan Hämmer, Seonghoo Jang, Gynheung An, David G. Robinson, and Liwen Jiang

Arabidopsis KAM2/GRV2 Is Required for Proper Endosome Formation and Functions in Vacuolar Sorting and Determination of the Embryo Growth Axis
Kentaro Tamura, Hideyuki Takahashi, Tadashi Kunieda, Kentaro Fuji, Tomoo Shimada, and Ikuko Hara-Nishimura
The PEROXIN11 Protein Family Controls Peroxisome Proliferation in Arabidopsis
Travis Orth, Sigrun Reumann, Xinchun Zhang, Jilian Fan, Dirk Wenzel, Sheng Quan, and Jianping Hu

The Acylationtransferase GPAT5 Is Required for the Synthesis of Suberin in Seed Coat and Root of Arabidopsis
Fred Beisson, Yonghua Li, Gustavo Bonaventure, Mike Pollard, and John B. Ohlrogge

In Vivo Participation of Red Chlorophyll Catabolite Reductase in Chlorophyll Breakdown
Adriana Pružinská, Iwona Anders, Sylvain Aubry, Nicole Schenk, Esther Tapernoux-Lüthi, Thomas Müller, Bernhard Kräutler, and Stefan Hörtensteiner

Online version contains Web-only data.
Open Access articles can be viewed online without a subscription.