ON THE COVER

Cells must sense and regulate their internal NH₄⁺ levels to modulate nitrogen levels and avoid NH₄⁺ toxicity. Bai et al. (pages 1497–1511) identify an Arabidopsis [Ca²⁺][Ca²⁺] associated protein kinase (CAP1), a receptor-like kinase that mediates NH₄⁺ homeostasis. CAP1 also regulates the polar growth of root hairs by maintaining tip-focused cytoplasmic Ca²⁺ gradients. The cap1-1 mutation specifically affects root hair tip elongation and the morphology of root hairs on Murashige and Skoog medium and produces elevated levels of cytoplasmic NH₄⁺. Ammonium depletion from the medium reestablished the Ca²⁺ gradient necessary for normal root hair tip growth in the mutant. The image shows abnormal root hairs in a cap1-1 mutant grown on Murashige and Skoog medium.

IN BRIEF

Nitrogen-Sparing Mechanisms in Chlamydomonas: Reduce, Reuse, Recycle, and Reallocate 1379
Nancy A. Eckardt

Orange Carotenoid Protein Quenches Excess Energy and Singlet Oxygen 1380
Jennifer Mach

Marked for Destruction: MANNOSIDASE4 and 5 Process N-Linked Glycans into ER-Associated Degradation Tags 1381
Nancy Hofmann

LARGE-SCALE BIOLOGY ARTICLES

Efficient Genome-Wide Detection and Cataloging of EMS-Induced Mutations Using Exome Capture and Next-Generation Sequencing 1382

High-Throughput Genotyping of Green Algal Mutants Reveals Random Distribution of Mutagenic Insertion Sites and Endonucleolytic Cleavage of Transforming DNA 1398
Ru Zhang, Weronika Patena, Ute Armbruster, Spencer S. Gang, Sean R. Blum, and Martin C. Jonikas

Nitrogen-Sparing Mechanisms in Chlamydomonas Affect the Transcriptome, the Proteome, and Photosynthetic Metabolism 1410

RESEARCH ARTICLES

Boom-Bust Turnovers of Megabase-Sized Centromeric DNA in Solanum Species: Rapid Evolution of DNA Sequences Associated with Centromeres 1436
Haiqin Zhang, Andrea Kobližková, Kai Wang, Zhiyun Gong, Ludmila Oliveira, Giovana A. Torres, Yufeng Wu, Wenli Zhang, Petr Novák, C. Robin Buell, Jiří Macas, and Jiming Jiang
Homoeologous Chromosome Sorting and Progression of Meiotic Recombination in *Brassica napus*: Ploidy Does Matter! 1448

Laurie Grandont, Nieves Cuñado, Olivier Coriton, Virgine Huteau, Frédérique Eber, Anne Marie Chèvre, Mathilde Grelon, Liudmila Chelysheva, and Eric Jenczewski

STM/BP-Like KNOXI Is Uncoupled from ARP in the Regulation of Compound Leaf Development in *Medicago truncatula* 1464

Chuanen Zhou, Lu Han, Guifen Li, Maofeng Chai, Chuxiang Fu, Xiaofei Cheng, Jiangqi Wen, Yuhong Tang, and Zeng-Yu Wang

Analysis of the Root System Architecture of *Arabidopsis* Provides a Quantitative Readout of Crosstalk between Nutritional Signals 1480

Fabian Kellermeyer, Patrick Armengaud, Triona J. Seditas, John Danku, David E. Salt, and Anna Amtmann

A Receptor-Like Kinase Mediates Ammonium Homeostasis and Is Important for the Polar Growth of Root Hairs in *Arabidopsis* 1497

Ling Bai, Xiaonan Ma, Guozeng Zhang, Shufei Song, Yun Zhou, Lijie Gao, Yuchen Miao, and Chun-Peng Song

The Rice Basic Helix-Loop-Helix Transcription Factor TDR INTERACTING PROTEIN2 Is a Central Switch in Early Anther Development 1512

Zhenzhen Fu, Jing Yu, Xiaowei Cheng, Xu Zong, Jie Xu, Mingjiao Chen, Zongyun Li, Dabing Zhang, and Wanqi Liang

The ARC1 E3 Ligase Promotes Two Different Self-Pollen Avoidance Traits in *Arabidopsis* 1525

Emily Indriolo, Darya Safavian, and Daphne R. Goring

A Receptor-Like Kinase Mediates Ammonium Homeostasis and Is Important for the Polar Growth of Root Hairs in *Arabidopsis* 1538

Ling Bai, Xiaonan Ma, Guozeng Zhang, Shufei Song, Yun Zhou, Lijie Gao, Yuchen Miao, and Chun-Peng Song

The Rice Basic Helix-Loop-Helix Transcription Factor TDR INTERACTING PROTEIN2 Is a Central Switch in Early Anther Development 1553

Zhenzhen Fu, Jing Yu, Xiaowei Cheng, Xu Zong, Jie Xu, Mingjiao Chen, Zongyun Li, Dabing Zhang, and Wanqi Liang

A Receptor-Like Kinase Mediates Ammonium Homeostasis and Is Important for the Polar Growth of Root Hairs in *Arabidopsis* 1556

Ling Bai, Xiaonan Ma, Guozeng Zhang, Shufei Song, Yun Zhou, Lijie Gao, Yuchen Miao, and Chun-Peng Song

The Rice Basic Helix-Loop-Helix Transcription Factor TDR INTERACTING PROTEIN2 Is a Central Switch in Early Anther Development 1565

Zhenzhen Fu, Jing Yu, Xiaowei Cheng, Xu Zong, Jie Xu, Mingjiao Chen, Zongyun Li, Dabing Zhang, and Wanqi Liang

Functional Analysis of the Hydrophilic Loop in Intracellular Trafficking of *Arabidopsis* PIN-FORMED Proteins 1570

Anindya Ganguly, Minho Park, Mahipal Singh Kesawat, and Hyung-Taeg Cho

SPX4 Negatively Regulates Phosphate Signaling and Homeostasis through its Interaction with PHR2 in Rice 1586

Qundan Lv, Yongjia Zhong, Yuguang Wang, Zhiye Wang, Li Zhang, Jing Shi, Zhongchang Wu, Yu Liu, Chuanzao Mao, Keke Yi, and Ping Wu

Light-Harvesting Complex Protein LHCBM9 Is Critical for Photosystem II Activity and Hydrogen Production in *Chlamydomonas reinhardtii* 1598

Sabrina Grewe, Matteo Ballottari, Marcelo Alcocer, Cosimo D’Andrea, Olga Blicherne-Zlassen, Ben Hankamer, Jan H. Mussungug, Roberto Bassi, and Olaf Kruse

ACTIN-RELATED PROTEIN6 Regulates Female Meiosis by Modulating Meiotic Gene Expression in *Arabidopsis* 1612

Yuan Qin, Lihua Zhao, Megan I. Skaggs, Sebastien Andreuza, Tatsuya Tsukamoto, Aneesh Panoli, Kirsten N. Wallace, Steven Smith, Imran Siddiqi, Zhenbiao Yang, Ramin Yadegari, and Ravishankar Panivelu

Actin-Dependent and -Independent Functions of Cortical Microtubules in the Differentiation of *Arabidopsis* Leaf Trichomes 1629

Adrian Sambade, Kim Findlay, Anton R. Schäffner, Clive W. Lloyd, and Henrik Buschmann
Choreography of Transcriptomes and Lipidomes of *Nannochloropsis* Reveals the Mechanisms of Oil Synthesis in Microalgae

Jing Li, Danxiang Han, Dongmei Wang, Kang Ning, Jing Jia, Li Wei, Xiaoyan Jing, Shi Huang, Jie Chen, Yantao Li, Qiang Hu, and Jian Xu

Arabidopsis Cuticular Wax Biosynthesis Is Negatively Regulated by the DEWAX Gene Encoding an AP2/ERF-Type Transcription Factor

Young Sam Go, Hyojin Kim, Hae Jin Kim, and Mi Chung Suh

Methylcrotonyl-CoA Carboxylase Regulates Triacylglycerol Accumulation in the Model Diatom *Phaeodactylum tricornutum*

Feng Ge, Weichao Huang, Zhuo Chen, Chunye Zhang, Qian Xiong, Chris Bowler, Juan Yang, Jin Xu, and Hanhua Hu

Plasma Membranes Are Subcompartmentalized into a Plethora of Coexisting and Diverse Microdomains in *Arabidopsis* and *Nicotiana benthamiana*


Arabidopsis Class I α-Mannosidases MNS4 and MNS5 Are Involved in Endoplasmic Reticulum–Associated Degradation of Misfolded Glycoproteins

Silvia Hüttner, Christiane Veit, Ulrike Vavra, Jennifer Schoberer, Eva Liebminger, Daniel Maresh, Josephine Grass, Friedrich Altmann, Lukas Mach, and Richard Strasser

Clathrin and Membrane Microdomains Cooperatively Regulate RbohD Dynamics and Activity in *Arabidopsis*

Huaqing Hao, Lusheng Fan, Tong Chen, Ruili Li, Xiaojuan Li, Qihua He, Miguel A. Botella, and Jinxing Lin

The Enzyme-Like Domain of *Arabidopsis* Nuclear β-Amylases Is Critical for DNA Sequence Recognition and Transcriptional Activation

Sebastian Soyk, Klařa Šimková, Evelyne Zürcher, Leonie Luginbühl, Luise H. Brand, Cara K. Vaughan, Dierk Wanke, and Samuel C. Zeeman

**HEAT-INDUCED TAS1 TARGET1 Mediates Thermotolerance via HEAT STRESS TRANSCRIPTION FACTOR A1a–Directed Pathways in Arabidopsis**

Shuxia Li, Jinxin Liu, Zhongyuan Liu, Xiaorong Li, Feijie Wu, and Yuke He

The Cyanobacterial Photoactive Orange Carotenoid Protein Is an Excellent Singlet Oxygen Quencher

Arezki Sedoud, Rocio López-Igual, Ateeq ur Rehman, Adjé Wilson, François Perreau, Clémence Boulay, Imre Vass, Anja Krieger-Liszkay, and Diana Kirilovsky

*Arabidopsis* miR156 Regulates Tolerance to Recurring Environmental Stress through SPL Transcription Factors

Anna Stief, Simone Altmann, Karen Hoffmann, Bikram Datt Pant, Wolf-Rüdiger Scheible, and Isabel Bäurle

The H+-ATPase HA1 of *Medicago truncatula* Is Essential for Phosphate Transport and Plant Growth during Arbuscular Mycorrhizal Symbiosis

Franziska Krajinski, Pierre-Emmanuel Courty, Daniela Sieh, Philipp Franken, Haoqiang Zhang, Marcel Bucher, Nina Gerlach, Igor Kryvoruchko, Daniela Zoeller, Michael Udvardi, and Bettina Hause
A H^+-ATPase That Energizes Nutrient Uptake during Mycorrhizal Symbioses in Rice and *Medicago truncatula*

Ertao Wang, Nan Yu, S. Asma Bano, Chengwu Liu, Anthony J. Miller, Donna Cousins, Xiaowei Zhang, Pascal Ratet, Million Tadege, Kirankumar S. Mysore, J. Allan Downie, Jeremy D. Murray, Giles E.D. Oldroyd, and Michael Schultze

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

Online version contains Web-only data.

Articles can be viewed online without a subscription.
This information is current as of June 30, 2017

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>eTOCs</td>
<td>Sign up for eTOCs at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a></td>
</tr>
<tr>
<td>CiteTrack Alerts</td>
<td>Sign up for CiteTrack Alerts at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a></td>
</tr>
<tr>
<td>Subscription Information</td>
<td>Subscription Information for The Plant Cell and Plant Physiology is available at: <a href="http://www.aspb.org/publications/subscriptions.cfm">http://www.aspb.org/publications/subscriptions.cfm</a></td>
</tr>
</tbody>
</table>