

June #2 2019

## Plant Journal

### Maize HSFA2 and HSBP2 antagonistically modulate raffinose biosynthesis and heat tolerance in Arabidopsis

Lei Gu, Tao Jiang, Chunxia Zhang, Xudong Li, Chunmei Wang, Yumin Zhang, Tao Li, Lynnette M.A. Dirk, A. Bruce Downie, Tianyong Zhao

First Published: 10 June 2019

### Structural basis for the modulation of plant cytosolic triosephosphate isomerase activity by mimicry of redox-based modifications

Eduardo Castro-Torres, Pedro Jiménez-Sandoval, Sergio Romero-Romero, Alma Fuentes-Pascacio, Laura M. López-Castillo, Corina Díaz-Quezada, D. Alejandro Fernández-Velasco, Alfredo Torres-Larios, Luis G. Brieba

#### Significance Statement

Reactive oxidative species (ROS) and glutathione regulate plant cytosolic triosephosphate isomerases (cTPI) by targeting two reactive cysteines that function as thiol switches. Here we present the structural basis for cTPI inactivation by ROS and *S*-glutathionylation regulation. Our structures show how *S*-glutathionylation protects AtcTPI from irreversible chemical modifications while re-routing carbon metabolism aimed to decrease oxidative stress.

#### Science

#### Flexible domains in a well-oiled machine

*Science*, this issue p. [eaaw9128](#)

Motors convert one form of energy into another. For biological motors, adenosine triphosphate (ATP) serves as chemical energy and its hydrolysis is coupled to conformational changes that exert mechanical force. ATP synthases reverse this process in a multistep process: first converting an electrochemical gradient to rotational kinetic energy, and then coupling rotation to formation of high-energy phosphodiester bonds. Murphy *et al.* investigated these energy changes in the dimeric mitochondrial F<sub>1</sub>-F<sub>o</sub> ATP synthase from *Polytomella* sp., a unicellular alga. They solved high-resolution cryo-electron microscopy structures of the ATP synthase complex, extracting 13 rotational substates. This collection of structures revealed that the rotation of the F<sub>o</sub> ring and central stalk is coupled with partial rotations of the F<sub>1</sub> head. This flexibility may enable the head to better couple continuous rotation with discrete ATP synthesis events.

*Science*, this issue p. [eaaw9128](#)

**EMBO J.** 10.15252/embj.2018101433 (2019).

#### QC keeps on keeping on

Several protein quality control processes have been identified that monitor and remove misfolded or damaged proteins in the endoplasmic reticulum. Schmidt *et al.* asked whether additional pathways monitor proteins further along the secretory pathway in the Golgi complex and the endosome. They identified a degradation pathway in budding yeast cells associated with endosome and Golgi, which they named EGAD. EGAD extracts membrane proteins from the Golgi and endosomes, allowing them to become substrates for cytosolic proteasomal degradation. An important cellular substrate of this pathway is a protein called Orm2, which is involved in down-regulating sphingolipid biosynthesis. The selective degradation of Orm2 facilitates the homeostatic regulation of sphingolipid biosynthesis.

#### NEWS

**NEW WEED KILLERS** Bayer AG in Leverkusen, Germany, announced it will spend €5 billion over the next decade on research to develop weed-killing alternatives to its controversial, widely used herbicide glyphosate. Countries in Europe have been moving toward banning the product, and Bayer faces multimillion-dollar U.S. jury verdicts from lawsuits alleging that it caused illnesses.

**AGENCIES MOVED** The U.S. Department of Agriculture has picked the Kansas City, Missouri, region to host two research units that many scientists say should be kept in Washington, D.C. “[Agriculture] Secretary [Sonny] Perdue is well on his way to dismantling one of the best agricultural economics research institutions in the world,” says Ron Wasserstein of the American Statistical Association in Alexandria, Virginia, about one of the units, the Economic Research Service. The other is the National Institute of Food and Agriculture.

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Mitochondria organize the cellular proteostatic response and promote cellular senescence.

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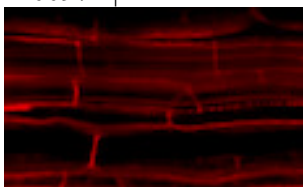
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The EMBO Journal, Vol. 38, No. 10, 15 May 2019

### **Single-cell damage elicits regional, nematode-restricting ethylene responses in roots**

Peter Marhavý, Andrzej Kurenda, Shahid Siddique, Valerie Dénervaud Tendon, Feng Zhou, Julia Holbein, M Shamim Hasan, Florian MW Grundler, Edward E Farmer, Niko Geldner  
e100972 | First Published: 06 May 2019



Tissue damage restricted to a limited root area triggers a non-systemic ethylene response as a defense mechanism against microscopic invaders.

## Extracellular matrix sensing by FERONIA and Leucine-Rich Repeat Extensins controls vacuolar expansion during cellular elongation in *Arabidopsis thaliana*

Kai Dünser, Shibu Gupta, Aline Herger, Mugurel I Feraru, Christoph Ringli, Jürgen Kleine-Vehn  
e100353 | First Published: 08 March 2019



Extracellular Leucine-Rich Repeat Extensin proteins link the plasma membrane receptor-like kinase FERONIA with the cell wall for sensing mechanical constraints affecting vacuolar size and plant cell elongation

## An ancient antisense-driven RNA switch drives plant sex determination

Frédéric Berger

e101685 | First Published: 26 February 2019



Discovery of the central module regulating sexual dimorphism in haploid early land plants opens doors towards understanding evolution of sex chromosomes

## A cis-acting bidirectional transcription switch controls sexual dimorphism in the liverwort

Tetsuya Hisanaga, Keitaro Okahashi, Shohei Yamaoka, Tomoaki Kajiwara, Ryuichi Nishihama, Masaki Shimamura, Katsuyuki T Yamato, John L Bowman, Takayuki Kohchi, Keiji Nakajima

e100240 | First Published: 04 January 2019



Female sexual differentiation in a basal land plant is determined by an antisense RNA-regulated MYB-type transcription factor, whose conservation in vascular plants suggests shared principles for gamete formation

## Mitochondria and pathogen immunity: from killer to firestarter

Joel S Riley, Stephen WG Tait

e102325 | First Published: 17 May 2019

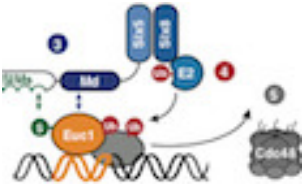


New work reveals an unexpected, non-lethal immune defence role of the mitochondrial apoptotic machinery

## Slx5/Slx8-dependent ubiquitin hotspots on chromatin contribute to stress tolerance

Markus Höpfler, Maximilian J Kern, Tobias Straub, Roman Prytuliak, Bianca H Habermann, Boris Pfander, Stefan Jentsch

e100368 | First Published: 23 April 2019



Yeast SUMO-targeted ubiquitin ligases (STUbLs) and ubiquitin co-localize to seven genomics loci marked by the

### To Fis or not to Fuse? This is the question!

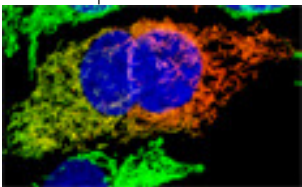
Marc Liesa, Alexander Van der Blik, Orian S Shirihai  
e101839 | First Published: 01 April 2019



Mammalian Fis1 induces mitochondrial fragmentation by inhibiting the mitochondrial fusion m

### Human Fis1 regulates mitochondrial dynamics through inhibition of the fusion machinery

Rong Yu, Shao-Bo Jin, Urban Lendahl, Monica Nistér, Jian Zhao  
e99748 | First Published: 06 March 2019



Human Fis1 promotes Drp1- and Dyn2-independent mitochondrial fragmentation by inhibiting mitofusins and OPA1 GTPase activity, revealing functional evolutionary divergence between yeast and mamm

Bio-protocol June issues

Simple Method to Determine Protein Redox State in *Arabidopsis thaliana*

Authors: Keisuke Yoshida and Toru Hisabori

**[Abstract] Thiol-based redox regulation is a posttranslational protein modification that plays a key role in many biological aspects. To understand its regulatory functions, we need a method to directly assess protein ...**

Article identifier: [bio-protocol.org/e3250](https://bio-protocol.org/e3250)

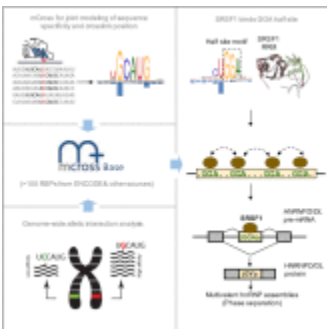
Molecular Cell : Volume 74, Issue 6

[Modeling RNA-Binding Protein Specificity In Vivo by Precisely Registering Protein-RNA Crosslink Sites](#)

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Huijuan Feng, Suying Bao, Mohammad Alinoor Rahman, Sebastien M. Weyn-Vanhentenryck, Aziz Khan, Justin Wong, Ankeeta Shah, Elise D. Flynn, Adrian R. Krainer, Chaolin Zhang

*Graphical abstract*



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