Sept #2
eLife
GENETICS AND GENOMICS, PLANT BIOLOGY
Epigenetic silencing of a multifunctional plant stress regulator
**Mark Zander, Björn C Willige ... Joseph R Ecker**
Interplay between histone demethylation and chromatin remodeling shapes the chromatin environment of the essential stress regulator *ETHYLENE-INSENSITIVE2*.
BIOCHEMISTRY AND CHEMICAL BIOLOGY, CELL BIOLOGY
Mitochondria supply ATP to the ER through a mechanism antagonized by cytosolic $Ca^{2+}$
**Jing Yong, Helmut Bischof ... Randal J Kaufman**

**Physiologia Plantarum**
Special Issue Articles

Regulation of physiological aspects in plants by hydrogen sulfide and nitric oxide under challenging environment
Saikat Paul, Aryadeep Roychoudhury
First Published: 03 September 2019

**Science**
**Mitoribosomal small subunit biogenesis in trypanosomes involves an extensive assembly machinery**
**By Martin Saurer, David J. F. Ramrath, Moritz Niemann, Salvatore Calderaro, Céline Prange, Simone Mattei, Alain Scaiola, Alexander Leitner, Philipp Bieri, Elke K. Horn, Marc Leibundgut, Daniel Boehringer, André Schneider, Nenad Ban**
*Science*13 Sep 2019 : 1144-1149
Mitochondrial ribosome maturation in trypanosomes involves numerous assembly factors and the formation of large assembly intermediates.

Mitochondria teach ribosome assembly
Katrin Karbstein
*Science* 13 Sep 2019:
Vol. 365, Issue 6458, pp. 1077-1078
DOI: 10.1126/science.aay7771

Evolving antibiotic resistance
Resistance to antibiotics is a serious threat to human health. But how do bacteria become resistant to treatment? Accumulating evidence suggests that bacteria evolve resistance by sharing genetic elements that encode genes that confer antibiotic resistance within and between populations. In a Perspective, MacLean and Millan discuss how these genetic elements arise, how they are passed between bacteria, and what can be done to prevent their dispersal so that resistance traits can be prevented from spreading.

*Science*, this issue p. 1082
 Allostery

Active sites that move together
Enzymes often form dimers or higher-order oligomers, even when each active site is isolated and the reactions are simple. But the effect of a neighbor can be profound. Mehrabi *et al.* used a photolabile compound to initiate a reaction in the enzyme fluoroacetate dehalogenase, which they could follow by time-resolved serial synchrotron crystallography. Snapshots of the reaction revealed large allosteric motions between the two active sites of the dimeric enzyme. Each active site traded the ability to bind substrate and catalyze the reaction, such that only one was engaged at a time. This behavior is common in enzymes but is rarely visualized and still poorly understood.

*Science*, this issue p. 1167
I mentioned this one before:

## Hidden treasure in the microbiome

We know that the human microbiome contains a wealth of largely unknown genetic diversity. Whole metagenome shotgun sequencing is needed to make the links between genes and phenotypes. Sberro *et al.* have computationally analyzed thousands of small protein-coding genes in the Human Microbiome Project data. More than 400,000 clusters of open reading frames (ORFs) of less than 150 nucleotides were constructed de novo. Within the approximately 4000 small ORFs likely to be protein-coding, the majority have no homology with known protein domains, and some are evolutionarily conserved, indicating that they have essential functions. Some peptides are transmembrane and secreted, which hints that they are used in signaling between bacteria and host. Others are implicated in bacterial immunity and horizontal gene transfer. Thus, this effort provides a rich resource for understanding the body's relationship with its microbiota.
*Cell* **178**, 1245 (2019).

Nature
28 August 2019
(An enzyme I never heard of!)
**Structure and mechanism of mitochondrial proton-translocating transhydrogenase**
The structure of a mammalian proton-translocating transhydrogenase in various conformations is solved by cryo-electron microscopy, and a mechanism for the coupling process within the enzyme is proposed.

Wen J, Jiang F, Weng Y, Sun M, Shi X, Zhou Y, Yu L, Wu Z.
Identification of heat-tolerance QTLs and high-temperature stress-responsive genes through conventional QTL mapping, QTL-seq and RNA-seq in tomato.
BMC Plant Biol. 2019 Sep 11;19(1):398. PMID: 31510927 [PubMed - in process]

Chen K, Guo T, Li XM, Yang YB, Dong NQ, Shi CL, Ye WW, Shan JX, Lin HX.
NAL8 encodes a prohibitin that contributes to leaf and spikelet development by regulating mitochondria and chloroplasts stability in rice.
BMC Plant Biol. 2019 Sep 11;19(1):395. PMID: 31510917 [PubMed - in process]

Liu Q, Liang C, Zhou L.
Structural and functional analysis of the Hsp70/Hsp40 chaperone system.
Protein Sci. 2019 Sep 11;.PMID: 31509306 [PubMed - as supplied by publisher]

Brouquisse R.
Multifaceted roles of nitric oxide in plants.
J Exp Bot. 2019 Aug 29;70(17):4319-4322. PMID: 31505682 [PubMed - in process]

Corpas FJ.
Hydrogen Sulfide: A New Warrior against Abiotic Stress.
Trends Plant Sci. 2019 Sep 4;. PMID: 31494025 [PubMed - as supplied by publisher]

**The Plant Journal**

## Auxin signaling modulates *LATERAL ROOT PRIMORDIUM1* (*LRP1)* expression during lateral root development in Arabidopsis

Sharmila Singh, Sandeep Yadav, Alka Singh, Mahima, Archita Singh, Vibhav Gautam, Ananda K. Sarkar
First Published: 04 September 2019

The EMBO Journal, Vol. 38, No. 18, 16 September 2019

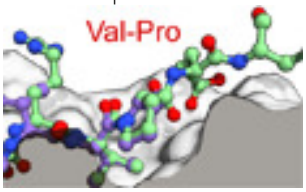
e102962 | First Published: 21 August 2019


A new study reveals a unified mechanism of transcription factor activation by structurally diverse photoreceptors during plant photomorphogenesis.

Plant photoreceptors and their signaling components compete for COP1 binding via VP peptide motifs

Kelvin Lau, Roman Podolec, Richard Chappuis, Roman Ulm, Michael Hothorn

e102140 | First Published: 15 July 2019

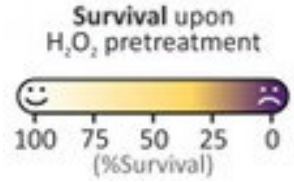



Light activation increases affinity of various photoreceptors for the E3 ligase COP1, resulting in protection of light-regulated transcription factors from COP1

**Hyperoxidation of mitochondrial peroxiredoxin limits H2O2-induced cell death in yeast**

Gaetano Calabrese, Esra Peker, Prince Saforo Amponsah, Michaela Nicole Hoehne, Trine Riemer, Marie Mai, Gerd Patrick Bienert, Marcel Deponte, Bruce Morgan, Jan Riemer

e101552 | First Published: 07 August 2019



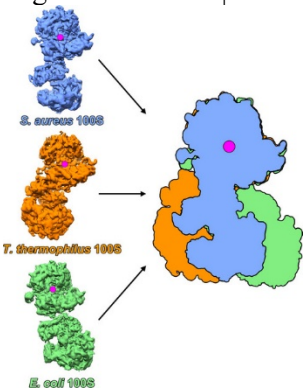

$H_2O_2$-mediated oxidation of the mitochondrial glutathione pool by peroxiredoxin Prx1 is a key determinant of peroxide-induced cell death in yeast.

The FEBS Journal, Vol. 286, No. 18, September 2019

Stress response as implemented by hibernating ribosomes: a structural overview

Donna Matzov, Anat Bashan, Mee-Ngan F. Yap, Ada Yonath

Pages: 3558-3565 | First Published: 23 June 2019



The recent cryogenic electron microscopy structures of ribosomal dimers (called ‘sleeping ribosomes’ or 100S complexes) that are naturally produced to inhibit bacterial protein synthesis under stress, allow for the identification of

species-specific structural elements. As this dimerization process is vital for cell survival, it is an attractive target for the design of novel species-specific antimicrobial substances aimed either at the inhibition or at the stabilization of the complex formation.

eLife – September 18, 2019
Two mechanisms regulate directional cell growth in *Arabidopsis* lateral roots
**Charlotte Kirchhelle, Daniel Garcia-Gonzalez ... Ian Moore**
In lateral roots, cells employ a novel pathway to cell edges to control directional growth, which acts independently of the leading paradigm of oriented deposition of cellulose microfibrils at faces.

How roots direct their growth
Two separate mechanisms control which direction cells in the roots of plants grow.

Sun Z, Brodsky JL.
Protein quality control in the secretory pathway.
J Cell Biol. 2019 Sep 19;. PMID: 31537714 [PubMed - as supplied by publisher]

Ndi M, Masuyer G, Dawitz H, CarlstrÃ¶m A, Michel M, Elofsson A, Rapp M, Stenmark P, Ott M.
Structural basis for the interaction of the chaperone Cbp3 with newly synthesized cytochrome <i>b</i> during mitochondrial respiratory chain assembly.
J Biol Chem. 2019 Sep 19;. PMID: 31537648 [PubMed - as supplied by publisher]

Bandyopadhyay A, Bose I, Chattopadhyay K.
Osmolytes ameliorate the effects of stress in the absence of the heat shock protein Hsp104 in Saccharomyces cerevisiae.
PLoS One. 2019;14(9):e0222723. PMID: 31536559 [PubMed - in process]

Phadte AS, Mahalingam S, Santhoshkumar P, Sharma KK.
Functional rescue of cataract-causing Î±A-G98R-crystallin by targeted compensatory suppressor mutations in human Î±A-crystallin.
Biochemistry. 2019 Sep 16;. PMID: 31523965 [PubMed - as supplied by publisher]

Kolbert Z, Barroso JB, Brouquisse R, Corpas FJ, Gupta KJ, Lindermayr C, Loake GJ, Palma JM, PetÅ™ivalskÃ½ M, Wendehenne D, Hancock JT.
A forty year journey: The generation and roles of NO in plants.
Nitric Oxide. 2019 Sep 18;. PMID: 31541734 [PubMed - as supplied by publisher]

Matamoros MA, Cutrona MC, Wienkoop S, Begara-Morales JC, Sandal N, Orera I, Barroso JB, Stougaard J, Becana M.
Altered plant and nodule development and protein S-nitrosylation in Lotus japonicus mutants deficient in S-nitrosoglutathione reductases.
Plant Cell Physiol. 2019 Sep 16;. PMID: 31529085 [PubMed - as supplied by publisher]

Oleinik N, Kim J, Roth BM, Selvam SP, Gooz M, Johnson RH, Lemasters JJ, Ogretmen B.
Mitochondrial protein import is regulated by p17/PERMIT to mediate lipid metabolism and cellular stress.
Sci Adv. 2019 Sep;5(9):eaax1978. PMID: 31535025 [PubMed - in process]

Fernando V, Zheng X, Walia Y, Sharma V, Letson J, Furuta S.
S-Nitrosylation: An Emerging Paradigm of Redox Signaling.
Antioxidants (Basel). 2019 Sep 17;8(9). PMID: 31533268 [PubMed]

Wang J, Johnson AG, Lapointe CP, Choi J, Prabhakar A, Chen DH, Petrov AN, Puglisi JD.
eIF5B gates the transition from translation initiation to elongation.
Nature. 2019 Sep 18;. PMID: 31534220 [PubMed - as supplied by publisher]

**Journal of Agronomy and Crop Science**

Impact of heat stress on pod-based yield components in field pea (*Pisum sativum* L.)
Yunfei Jiang, Donna L. Lindsay, Arthur R. Davis, Zhifa Wang, Dustin E. MacLean, T. D. Warkentin, R. A. Bueckert

**Plant Cell & Environment**

Age-dependent loss of seed viability is associated with increased lipid oxidation and hydrolysis
Janine Wiebach, Manuela Nagel, Andreas Börner, Thomas Altmann, David Riewe

Version of Record online: 10 September 2019

Seeds can stay alive for hundreds of years without light or reduced carbon sources; they are considered to be the longest living mortal life form. This work shows that lipid oxidation and degradation are connected to losses in germination of cereal seeds dry aged for up to 40 years.

**ELIFE**
How roots direct their growth
Two separate mechanisms control which direction cells in the roots of plants grow.

Proximity labeling of protein complexes and cell type-specific organellar proteomes in Arabidopsis enabled by TurboID
**Andrea Mair, Shou-ling Xu ... Dominique C Bergmann**

**Plant Journal**

Single organelle function and organization as estimated from Arabidopsis mitochondrial proteomics
Philippe Fuchs, Nils Rugen, Chris Carrie, Marlene Elsässer, Iris Finkemeier, Jonas Giese, Tatjana M. Hildebrandt, Kristina Kühn, Veronica G. Maurino, Cristina Ruberti, Mareike Schallenberg-Rüdinger, Janina Steinbeck, Hans-Peter Braun, Holger Eubel, Etienne H. Meyer, Stefanie J. Müller-Schüssele, Markus Schwarzländer

First Published: 14 September 2019

Technical Advance

Plant Regulomics: A Data-driven Interface for Retrieving Upstream Regulators from Plant Multi-omics Data
Xiaojuan Ran, Fei Zhao, Yuejun Wang, Jian Liu, Yili Zhuang, Luhuan Ye, Meifang Qi, Jingfei Cheng, Yijing Zhang

First Published: 08 September 2019

Original Articles

Both male and female gametogenesis require a fully functional protein *S*-acyl transferase 21 in *Arabidopsis thaliana*
Yaxiao Li, Hong-Ju Li, Chris Morgan, Kirsten Bomblies, Weicai Yang, Baoxiu Qi

Version of Record online: 12 September 2019

**Significance Statement**

This study highlights the importance of protein *S*-acylation in the early meiotic stages that lead to the development of male and female sporophytic reproductive structures and associated gametophytes in Arabidopsis.

Multiple steps of leaf thickening during sun-leaf formation in Arabidopsis
Rina Hoshino, Yuki Yoshida, Hirokazu Tsukaya

Version of Record online: 09 September 2019
**Significance Statement**

Thick sun leaves or thin shade leaves develop in response to light intensity, but the mechanism involved in leaf-thickness growth is unclear. Based on high-resolution sectional images of leaf primordia, we identified two distinct developmental stages. During the early stage, intense light triggers changes in cell shape via blue-light receptors. During the later stage, sucrose enhances the isotropic enlargement of cells. Taken together, these results provide insight into sun-leaf formation.

Gemperline DC, Marshall RS, Lee KH, Zhao Q, Hu W, McLoughlin F, Scalf M, Smith LM, Vierstra RD.
Proteomic analysis of affinity-purified 26S proteasomes identifies a suite of assembly chaperones in <i>Arabidopsis</i>.
J Biol Chem. 2019 Sep 27;. [Epub ahead of print]
PMID: 31562246 [PubMed - as supplied by publisher]

Lohani N, Singh MB, Bhalla PL.
High Temperature Susceptibility of Sexual Reproduction in Crop Plants.
J Exp Bot. 2019 Sep 27;. [Epub ahead of print]
PMID: 31560053 [PubMed - as supplied by publisher]

Masser AE, Kang W, Roy J, Kaimal JM, Quintana-Cordero J, FriedlÃ¤nder MR, AndrÃ©asson C.
Cytoplasmic protein misfolding titrates Hsp70 to activate nuclear Hsf1.
Elife. 2019 Sep 25;8. [Epub ahead of print]
PMID: 31552827 [PubMed - as supplied by publisher]

D'Andrea L, Rodriguez-Concepcion M.
Manipulation of Plastidial Protein Quality Control Components as a New Strategy to Improve Carotenoid Contents in Tomato Fruit.
Front Plant Sci. 2019;10:1071.
PMID: 31543891 [PubMed]

BIOCHEMISTRY AND CHEMICAL BIOLOGY, CELL BIOLOGY
Mitochondria supply ATP to the ER through a mechanism antagonized by cytosolic $Ca^{2+}$
**Jing Yong, Helmut Bischof ... Randal J Kaufman**
ATP enters the endoplasmic reticulum (ER) lumen through an SLC35B1/AXER-dependent*CaATiER* mechanism, and ATP usage in the ER renders 'anti-*Warburg*' effect by increasing ATP regeneration from OxPhos while decreasing glycolysis.