On the Cover: The composite image shows the submergence response found in flood-tolerant Rumex spp. and a ribbon model of the receiver domain from the ETHYLENE RESPONSE1 (ETR1) ethylene receptor of Arabidopsis (Arabidopsis thaliana). Rumex spp. escape from submerged conditions by fast elongation of petioles. This cell elongation process is initiated by the accumulation of ethylene inside the submerged plant tissues, related to the slow diffusion of gases in water. Subsequently, other plant hormones, along with regulators of photomorphogenesis, mediate this growth response, leading to the stimulation of target processes such as cell wall loosening. After the leaf tips emerge into the atmosphere, oxygen can diffuse into the plant to ensure survival. In the ribbon model of the ETR1 receiver domain, amino acids that are important for various traits described by Bakshi et al. (pp. 219–232) are shown in space-filling structures. Mutation of three amino acid residues (gray carbons) results in a receptor that cannot stimulate nutational bending in response to ethylene. Mutation of two residues in the γ loop (white carbons) results in a receptor that inhibits germination on salt more effectively than wild-type ETR1, whereas mutation of two residues just prior to the γ loop (black carbons) results in a receptor that cannot inhibit germination on salt. The model of the ETR1 receiver domain was generated by Molecular Operating Environment (version 2012.10) based on the receiver domain crystal structure (Protein Data Bank 1DCF). Cover image credits: Ole Pedersen, Freshwater Biological Laboratory, University of Copenhagen (Rumex spp. submergence response); and Brad M. Binder, Department of Biochemistry, Cellular, and Molecular Biology, University of Tennessee, Knoxville (ETR1 receiver domain). Cover layout by Diane McCauley.
Producing the Ethylene Signal: Regulation and Diversification of Ethylene Biosynthetic Enzymes. Matthew A. Booker and Alison DeLong

Posttranslational modifications control the stability of a key family of biosynthetic enzymes, and phylogenetic analysis indicates recent specialization of this enzyme family in seed plants.

Ethylene and the Regulation of Physiological and Morphological Responses to Nutrient Deficiencies. María José García, Francisco Javier Romera, Carlos Lucena, Esteban Alcántara, and Rafael Pérez-Vicente

Physiological and morphological responses to increase the mobilization and uptake of nutrients from the soil are subject to regulation by ethylene.

Ethylene and Hormonal Cross Talk in Vegetative Growth and Development. Bram Van de Poel, Dajo Smet, and Dominique Van Der Straeten

Recent insights into the role of ethylene in regulating plant growth and development highlight interactions with other hormones.

Role of Ethylene and Its Cross Talk with Other Signaling Molecules in Plant Responses to Heavy Metal Stress. Nguyễn Phuong Thao, M. Isabal R. Khan, Nguyễn Binh Anh Thu, Xuan Lan Thi Hoang, Mohd Asgher, Nafees A. Khan, and Lam-Son Phan Tran

Ethylene regulates plant responses to heavy metal stress through the interaction with other signaling molecules.

Mechanistic Insights in Ethylene Perception and Signal Transduction. Chuanli Ju and Caren Chang

New insights into the ethylene signaling pathway, including dynamic regulatory mechanisms, provide a more comprehensive view of ethylene perception and signal transduction.

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[OPEN] Tobacco Translationally Controlled Tumor Protein Interacts with Ethylene Receptor Tobacco Histidine Kinase1 and Enhances Plant Growth through Promotion of Cell Proliferation. Jian-Jun Tao, Yang-Rong Cao, Hao-Wei Chen, Wei Wei, Qing-Tian Li, Biao Ma, Wan-Ke Zhang, Shou-Yi Chen, and Jin-Song Zhang

Translationally-controlled tumor protein binds with a class of ethylene receptors at the endoplasmic reticulum and affects protein degradation.


A mutation that impairs ethylene response in pea reveals an interaction of light and ethylene signaling in the control of leaf expansion during deetiolation.

[OPEN] Roles of Ethylene Production and Ethylene Receptor Expression in Regulating Apple Fruitlet Abscission. Giulia Eccher, Maura Begheldo, Andrea Boschet, Benedetto Ruperti, and Alessandro Botton

The balance between the ethylene produced by the fruit and cell-specific expression of ethylene receptor genes in the seed affects the determinism of apple fruitlet abscission.
Strigolactone Regulates Leaf Senescence in Concert with Ethylene in Arabidopsis. Hiroaki Ueda and Makoto Kasaba

Prolonged dark treatment induces ethylene synthesis and consequent induction of strigolactone synthesis in the leaf to promote leaf senescence.

MAOHUZI6/ETHYLENE INSENSITIVE3-LIKE1 and ETHYLENE INSENSITIVE3-LIKE2 Regulate Ethylene Response of Roots and Coleoptiles and Negatively Affect Salt Tolerance in Rice. Chao Yang, Biao Ma, Si-Jie He, Qing Xiong, Kai-Xuan Duan, Cui-Cui Yin, Hui Chen, Xiang Lu, Shou-Yi Chen, and Jin-Song Zhang

Two transcriptional regulators of ethylene signaling play differential roles in ethylene and salt stress responses, distinct from their orthologs in Arabidopsis.

The ETHYLENE RESPONSE FACTORS ERF6 and ERF11 Antagonistically Regulate Mannitol-Induced Growth Inhibition in Arabidopsis. Marieke Dubois, Lisa Van den Broeck, Hannes Claey, Kaatje Van Vlierberghe, Minami Matsui, and Dirk Inzé

A negative feedback loop involving two Ethylene Response Factors fine-tunes growth inhibition and stress tolerance activation under mannitol-induced stress.


Long-chain fatty acids enhance the expression of an ethylene biosynthesis gene, production of ethylene, and promote ethylene-induced aerenchyma formation.


Ethylene and cell proliferation confine the amplitude of Arabidopsis hyponastic leaf movement.

Disruption of Ethylene Responses by Turnip mosaic virus Mediates Suppression of Plant Defense against the Green Peach Aphid Vector. Clare L. Casteel, Manori De Alwis, Aurélie Bak, Haili Dong, Steven A. Whitham, and Georg Jander

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Identification of Regions in the Receiver Domain of the ETHYLENE RESPONSE1 Ethylene Receptor of Arabidopsis Important for Functional Divergence. Arkadipta Bakshi, Rebecca L. Wilson, Randy F. Lacey, Heejung Kim, Sai Keerthana Wuppalapati, and Brad M. Binder

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Half-of-the-Sites Reactivity of the Castor Δ9-18:0-Acyl Carrier Protein Desaturase.  Qin Liu, Jin Chai, Martin Moche, Jodie Guy, Ylva Lindqvist, and John Shanklin

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A Critical Role of Lyst-Interacting Protein5, a Positive Regulator of Multivesicular Body Biogenesis, in Plant Responses to Heat and Salt Stresses.  Fei Wang, Yan Yang, Zhe Wang, Jie Zhou, Baofang Fan, and Zhixiang Chen

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Elevation of Pollen Mitochondrial DNA Copy Number by WHIRLY2: Altered Respiration and Pollen Tube Growth in Arabidopsis. Qiang Cai, Liang Guo, Zhao-Rui Shen, Dan-Yang Wang, Quan Zhang, and Sodmergen

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Evolution of an alpine genome involved an unusually high number of pericentric inversions, plausibly facilitating the evolution of heavy metal-related traits.

Evolution of an alpine genome involved an unusually high number of pericentric inversions, plausibly facilitating the evolution of heavy metal-related traits.

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The Arabidopsis Mediator Complex Subunit16 Is a Key Component of Basal Resistance against the Necrotrophic Fungal Pathogen Sclerotinia sclerotiorum. Chenggang Wang, Jin Yao, Xuezhu Du, Yanping Zhang, Yijun Sun, Jeffrey A. Rollins, and Zhonglin Mou

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A Novel Gene, OZONE-RESPONSIVE APOPLASTIC PROTEIN1, Enhances Cell Death in Ozone Stress in Rice. Yoshiaki Ueda, Shahid Siddique, and Michael Frei

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Development of the Poplar-Laccaria bicolor Ectomycorrhiza Modifies Root Auxin Metabolism, Signaling, and Response. Alice Vayssières, Ales Penčík, Judith Felten, Annegret Kohler, Karin Ljung, Francis Martin, and Valérie Legué

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