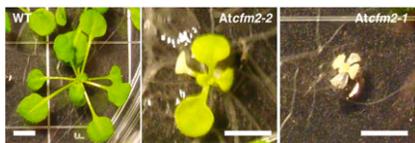


IN BRIEF

## Chloroplast Intron Splicing Mechanisms



Mutations in *At CFM2* condition-defective seed and stunted albino phenotypes due to impaired splicing of group I and group II introns in chloroplasts.

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Land plant chloroplast genomes contain ~20 group II introns and a single group I intron. These introns are derivatives of self-splicing ribozymes that have become dependent upon proteins for their splicing. The chloroplast RNA splicing and ribosome maturation (CRM) domain was initially recognized in three proteins that promote the splicing of chloroplast group II introns and in a bacterial protein that associates with assembling 50S ribosomal subunits. **Asakura and Barkan (pages 3864–3875)** investigated the functions of another member of this family, CFM2 (CRM Family Member 2). T-DNA insertions in *Arabidopsis cfm2* conditioned defective seed and chlorophyll-deficient phenotypes (strong and weak alleles,

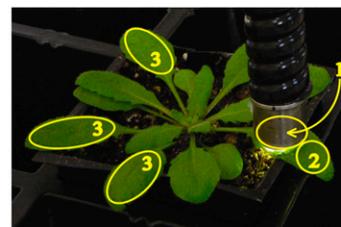
respectively), with impaired splicing of specific group I and group II introns in chloroplasts. Coimmunoprecipitation assays showed that maize CFM2 is found in complexes that include these intron RNAs as well as previously described CRM splicing factors. The results show that different CRM proteins play nonredundant roles in the splicing of the same group II introns and that CRM proteins enhance the functions of three classes of catalytic RNA: group I introns, group II introns, and 23S rRNA. The authors suggest that CRM domains may be well suited to interact with catalytic RNAs in a manner that facilitates their evolutionary decay into protein-dependent enzymes.

## Systemic Acquired Acclimation to High Light

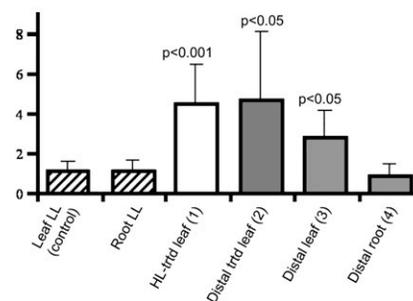
Different parts of the canopy are exposed to potentially damaging full sunlight as the sun tracks from east to west. **Rossel et al. (pages 4091–4110)** investigate a novel photoprotective signaling system in *Arabidopsis* by which exposed leaves could signal to and thereby preacclimate shaded leaves, which is known as systemic acquired acclimation (SAA). They show that a systemic signal is rapidly transmitted from high-lighted exposed to distal shaded leaves, resulting in very similar changes in global gene expression. It is further shown that SAA is associated with an acclimatory response that enhances tolerance to oxidative damage, and the zinc finger transcription factor ZAT10 plays a role in this response. High light exposure rapidly induced ZAT10 expression in exposed and distal photo-

synthetic tissues but not roots (see figure). ZAT10 overexpression results in enhanced tolerance to photoinhibitory light and exogenous H<sub>2</sub>O<sub>2</sub> and increased expression of antioxidant genes. Results from a number of signaling and hormone-deficient mutants indicated that SAA is distinct from pathogen-related systemic acquired resistance. This work shows that SAA involves a novel signal or combination of signals that can preacclimate photosynthetic tissues to high light.

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ZAT10 mRNA abundance:



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## Systemic Acquired Acclimation to High Light

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