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Key words Photosynthesis, plant stress responses, post-harvest, science communication, traditional crafts



Summary

Background

- Though plants do not show locomotion, they are sensitive to environmental changes and pathogen infections and adapt well to the environment.
- Chloroplasts, the site of photosynthesis, play an important role in the environmental response of plants, but their molecular mechanism is unknown.
- Research on the environmental response of plants leads to the improvement of the productivity and the preservation characteristics of crops.

Purposes

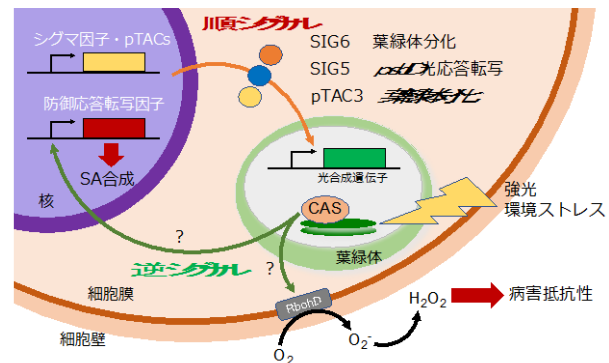
- To develop new agricultural technology, We will elucidate molecular mechanisms of plant environmental responses, focusing on the role of chloroplasts.

Achievements

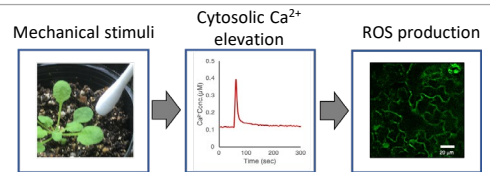
- We have identified key factors that control chloroplast development and chloroplast factors that control plant environmental responses.
- To reduce post-harvest stress of vegetables and fruits, we studied molecular mechanisms of mechanical stress response in plants.
- We have techniques to transform the chloroplast genome.

Papers

- Eukaryotic-type plastid nucleoid protein pTAC3 is essential for transcription by the bacterial-type plastid RNA polymerase. PNAS 109, 7541–7546 (2012)
- Chloroplast-mediated activation of plant immune signalling in Arabidopsis Nature Commun. 3:926 (2012)
- Blue light-induced transcription of plastid-encoded psbD gene is mediated by a nuclear-encoded transcription initiation factor, AtSig5 PNAS 101, 3304–3309 (2004)



Signaling between Chloroplasts and the Nucleus



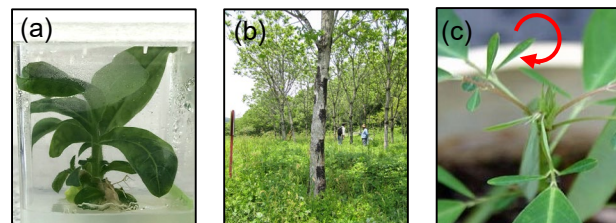
Early plant responses to brief touching



Control Touch Control Touch

Repeatedly touching the leaves causes an inhibition in plant growth (WT)

A mutant insensitive to mechanical stimuli



Plants we use: *Arabidopsis thaliana*, (a) Tobacco for chloroplast transformation, (b) *Toxicodendron vernicifluum* for lacquer ware, (c) moving plant (*Desmodium motorium*)



Appeal points

My current research interests focus on the role of chloroplasts in plant stress signaling. Understanding the molecular mechanisms underlying the plant stress responses would contribute to develop novel agricultural technologies.