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Summary

Backgrounds

- Photosynthesis is an essential chemical reaction for plant growth. Light-induced damage is concentrated in the photosystem II (PSII) reaction center protein D1. Thus, photosynthetic organisms have developed an effective mechanism called the PSII repair cycle, which implements rapid and selective degradation of photo-damaged D1.
- In the PSII repair cycle, FtsH, an ATP-dependent metalloprotease in thylakoid membranes, performs the selective degradation of the damaged D1 protein.

Purpose

- Our research focuses on the protein quality control by proteases in the thylakoid membrane under various stress conditions.

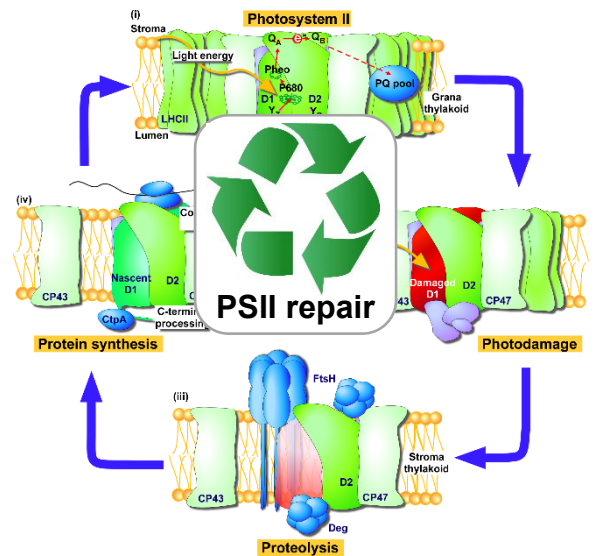
Major achievements

- We revealed an essential factor that is critical for maintaining photosynthesis and acts on leaf variegation. Our attempt using the RNAi gene silencing strategy has successfully generated leaf-variegated plants.
- We have clarified the difference of photo-induced damage on the photosynthetic apparatus caused by blue and red LEDs.

Prospects of collaboration

[Collaboration with agriculture and food industries]

- Measurement of photo-induced damage under various light conditions and develop cultivation technology for enhancing plant yield.
- Research of effects of light quality and photoperiod of LED light on photo-induced damage, generation of reactive oxygen species, and plant growth



Schematic drawing of PSII repair cycle in the thylakoid membrane.



Disruption of responsible gene for the protein quality control in thylakoid membranes causes leaf variegation.



Selling point

We focus on chloroplasts to understand stress tolerance mechanisms under various light conditions.