

# Breeding using environmental response mechanisms in plants

Agricultural Science and Technology

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## Summary

### Background

- Plants have "eyes" to know changes in the surrounding environment.
- Plants have mechanisms to utilize the functions of various genes in order to adapt to the surrounding environment. However, there are many things left unclear about how it works.
- By understanding the mechanism and gene functions for plants to adapt to the environment, we can make plants resistant to environmental stress.

### Objective

- It reveals the function of unknown isoforms caused by changes in transcriptional start sites in response to environmental stimuli.
- We aim to use this knowledge to develop novel breeding techniques.

### Results

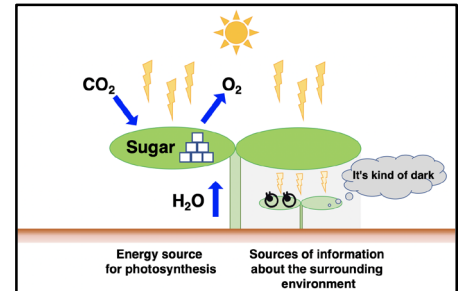
- Studies in model plants have shown that light stimulation changes the position of the transcriptional start site, resulting in cytoplasmic localized isoforms that were previously unknown in many genes.
- We have shown that cytoplasmic localized isoforms produced by changes in transcription initiation sites work to reduce light stress in plants.

## Prospects for Collaboration

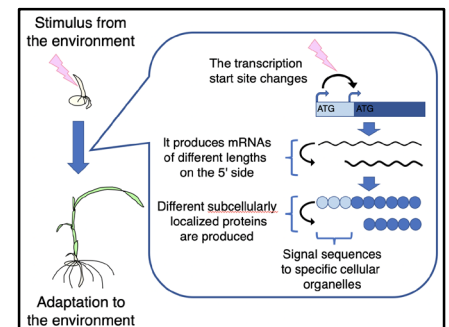
### 【 Cooperation with Agriculture and Food Industry 】

I would like to make stress-resistant varieties by using the mechanism for adapting to the plant environment.

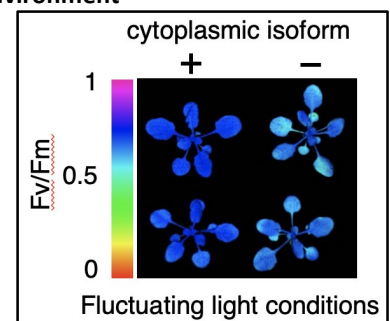
【 Cooperation with Industry 】 I would like to expand the possibilities as a material for plants.



Plants capture light with their "eyes" and sense changes in their surroundings



Isoforms generated by changes in transcription start site in response to the environment work to adapt plants to their environment



The presence of cytoplasmic isoforms reduces photoinhibition



Control of transcription start sites in response to environmental stimuli is thought to be a universal mechanism not only in response to plant light, but also in eukaryotes, and we will make extensive use of our knowledge.