Open position for the LSM call of applications

Department/Institute: LMU Faculty of Biology, Plant Molecular Biology

Subject areas/Research fields: botany/plant sciences, microbiology, genetics, cell biology, physiology

Keywords: acclimation, photosynthesis, cyclic electron flow, suppressor screen

Name of supervisor: Prof. Dario Leister

Project title:

Acclimation to fluctuating light: cyclic electron flow

Project description:

Under natural conditions, light intensities fluctuate. Therefore, proper regulation of photosynthesis is crucial for effective plant performance under fluctuating light (FL). Cyclic electron flow (CEF) involves two thylakoid membrane proteins, PGR5 and PGRL1, both of which are critical for plant development under FL. Several lines of evidence suggest that PGR5 and PGRL1 form a complex in the thylakoid membrane. However, the precise mechanism of their action, the regulation of their respective activities, and whether this process has the potential to enhance acclimation to FL remain elusive. In preliminary work, we have shown that PGR5 and PGRL1 can reconstitute CEF in the cyanobacterium Synechocystis sp. PCC 6803, making it possible to study PGR5-dependent CEF in a prokaryote using superior genetic tools in relatively short time spans. We also found that the pgrl2 mutation suppresses the pgrl1 mutation, but not the pgr5 mutation - in other words: PGR5 can function without PGRL1. This result significantly revised our view of PGR5-dependent CEF, with PGR5 being the central component regulated by PGRL1 and PGRL2.

In this project, we will characterise suppressor mutations of prg5 and pgrl1 at the genetic, physiological and protein levels and set up novel suppressor screens. In addition to the model plant Arabidopsis thaliana, we will use our cyanobacterial test system with reconstructed PGR5-dependent CEF for rapid molecular and mechanistic studies.

References:

Rühle T, Dann M, Reiter B, Schünemann D, Naranjo B, Penzler JF, Kleine T, Leister D. (2021) PGRL2 triggers degradation of PGR5 in the absence of PGRL1. Nat Commun. 2021 Jun 24;12(1):3941. doi: 10.1038/s41467-021-24107-7.

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www.plantmolecularbiology.bio.lmu.de

Apply: Please send your application through the online portal of the Graduate School Life Science Munich (LSM).