



## Open position for the LSM call of applications

**Department/Institute:** LMU Faculty of Biology, Plant Metabolism

**Subject areas/Research fields:** Botany and Plant Science, Cell Biology, Molecular Biology, Physiology, Systems Biology

**Keywords:** cold acclimation, CP12, photosynthesis, proteomics, redox regulation

**Name of supervisor:** Prof. Dr. Peter Geigenberger

**Project title:** Role of NTRC in acclimation of plants to low temperatures

### Project description:

Low temperature is an important factor for plant performance and distribution. In the cold, light energy absorption exceeds its metabolic utilization in the Calvin-Benson cycle (CBC) leading to photoinhibition. A decrease to sub-freezing temperatures leads to ice-formation and dehydration resulting in severe cellular damage. Acclimation of plants to low temperatures has been found to increase the freezing tolerance of cold-hardy plants, which is accompanied by a stimulation of photosynthesis and accumulation of soluble sugars.

In our preliminary work, we identified the chloroplast redox-regulator NADPH-dependent thioredoxin reductase C (NTRC) as a crucial mediator in cold acclimation. We discovered a previously unknown interaction between NTRC and the CBC Protein 12 (CP12) leading to redox-activation of the CBC by triggering the dissociation of an autoinhibitory PRK/CP12/GAPDH protein complex in the cold. It will be the aim of the project to analyze the underlying mechanisms and signaling components, using reverse genetics, metabolomics and redox proteomics in *Arabidopsis thaliana*.

### References:

Teh JT, Leitz V, Holzer VJC, Neusius D, Marino G, Meitzel T, García Cerdán JG, Dent RM, Niyogi KK, Geigenberger P/Nickelsen J (2023) NTRC regulates CP12 to activate Calvin-Benson cycle during cold acclimation. Proc Natl Acad Sci USA 120, e2306338120; <https://doi.org/10.1073/pnas.2306338120>

### For further information, please contact:

Prof. Dr. Peter Geigenberger: [geigenberger@bio.lmu.de](mailto:geigenberger@bio.lmu.de)

### Research group website:

<https://www.en.botanik.bio.lmu.de/research/geigenberger/index.html>

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