

Webinar « Photosynthesis and Metabolism »

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Crosstalk between photosynthetic electron management pathways and carbon metabolism under fluctuating nutrient conditions in *Chlamydomonas*

Photosynthetic organisms constantly need to adjust their energy production to meet the metabolic demand varying largely in their natural environment. Any imbalance between the energy production and the utilization could potentially lead to over-reduction and ROS generation. In the past 10 years, electron management pathways (such as PGRL1/PGR5 mediated cyclic electron flow (CEF) and O₂ photoreduction by the Flavodiiron -FLV- protein) have been extensively studied to understand the regulation of photosynthetic energy production. However, most of those studies focused on understanding the function of PGRL1 and FLV under different light regimes such as high light or fluctuating light but their role during nitrogen (N) deficiency have been barely investigated. I will present our latest results on the interplay between carbon metabolism and electron management pathways in the model microalga *Chlamydomonas reinhardtii* by using mutants impaired in PGRL1 and FLV grown under N replete and deprived conditions. By measuring the O₂ exchange rate, photosystem II quantum yield and reduced carbon accumulation, we have showed that the O₂ photoreduction and TAG biosynthesis compensate for the deficiency of PGRL1 during N limitation while the lack of FLV results in high accumulation of starch under N replete condition.

