Elucidating the role of PGR5 and NDH in modulating cyclic electron flow under high temperature stress in *Arabidopsis thaliana*

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High temperature is a serious threat to sustainable crop production as it damages the photosynthetic machinery of plants. A cyclic electron transport (CET) around photosystem I (PSI) minimizes PSI photodamage under various abiotic stress conditions. In *Arabidopsis,* CET pathways mediated by Proton Gradient Regulation 5 (*pgr5*) and type I NAD(P)H dehydrogenase (NDH) have recently been shown to be important for combating thermal stress by protecting PSI. However, the underlying molecular mechanisms remain poorly characterized due to technical constraints in measuring CET in C3 plants. Here, we evaluate the thermal stress responses of *Arabidopsis thaliana (Col-0)*, *pgr5,* and *ndh* mutants under lab growth conditions (22°C day/night) and high temperature stress (24 hours 35°C day/night). We will measure chlorophyll fluorescence of PSI and PSII, together with histochemical staining of reactive oxygen species (ROS) in control and heat-treated samples. We will also perform biochemical assays of stress markers and blue native gel analysis to study how cyt b_6f, NDH, and PSI supercomplexes are altered by heat stress. Overall, our studies aim to delineate the role of CET pathways under heat stress and to understand how PSI-NDH-cyt b_6f supercomplex assemblages contribute to photoprotection of PSI.