Localization of Deg Proteases in *Chlamydomonas reinhardtii*

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Photosystem II (PSII) is frequently subjected to damage by reactive oxygen species. In the PSII repair cycle, the D1 subunit is selectively removed and degraded using the FtsH protease system. In plants, Deg proteases facilitate this process by clipping D1 loops that extend outside the thylakoid membrane. In algae, D1 fragments accumulate in FtsH mutants of *Chlamydomonas reinhardtii*. However, it is unknown if Deg proteases also play a role in algal PSII repair. The *Chlamydomonas* genome encodes 14 predicted Deg proteases and redundancy among this group poses a major challenge towards elucidating the exact roles and functions. We reasoned that any Deg proteases that localize to the chloroplast may play a role in Photosystem II (PSII) repair. We fused a yellow fluorescent protein variant to the C-termini of Deg open reading frames and imaged the resulting strains using confocal microscopy. We have localized Deg1A, Deg2, and Deg5. Interestingly, the localization patterns change as a function of light/dark phase of the light cycle. After completing our localization study, we will use CRISPR-Cas9 method to knock out chloroplast-localized Deg proteases to study their role (if any) on the PSII repair cycle.