

Reevaluation of RubA in *Synechococcus* PCC 7002 Confirms Its Essential Role in Photosystem II

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The maturation of photosynthetic reaction centers requires multiple assembly factors. RubA in *Synechocystis* sp. PCC 6803 and its homolog RBD1 in *Chlamydomonas reinhardtii* and *Arabidopsis thaliana* are required for Photosystem II (PSII) assembly, likely by stabilizing the non-heme iron (Calderon et al. 2013; García-Cerdán et al. 2019). In contrast, Bryant and coworkers reported that RubA was essential for Photosystem I (PSI) assembly in the cyanobacterium *Synechococcus* (*Picosynechococcus*) sp. PCC 7002 (Shen et al. 2002). To clarify the role of RubA specifically in PCC 7002, we performed whole-genome sequencing of the original $\Delta rubA$ mutant generated in the Bryant laboratory. This revealed the expected *rubA* insertional inactivation along with an unrecognized deletion of *psaC*. We then reconstructed a clean $\Delta rubA$ mutation in a wild-type PCC 7002 background and analyzed photosystem function. The new $\Delta rubA$ strain retained functional PSI but had low levels of PSII, consistent with the role of RubA/RBD1 in other photosynthetic organisms. Our results resolve a long-standing discrepancy regarding RubA function and illustrate the utility of modern whole-genome sequencing in reassessing historical mutants.