

Metal homeostasis in *Chlamydomonas* chloroplasts

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The function of ascorbate peroxidase-related (APX-R) proteins, found in all green photosynthetic eukaryotes, remains unknown. This research focuses on *Chlamydomonas* ascorbate peroxidase 2 (APX2) protein, which belongs to the APX-R protein family. We found that this enzyme does not rely on ascorbate as electron donor for peroxidase activity and resides in the chloroplasts, featuring a TAT-motif signal for translocation to the lumen. *apx2* mutants displayed a low plastocyanin abundance which resulted in a faster P700 oxidation of photosystem I. *In vitro* experiments showed that recombinant APX2 binds copper in addition to heme. We also demonstrated that APX2 interacts with the Cu-binding site of plastocyanin using ¹H-NMR experiments and AlphaFold2 structural prediction. In conclusion, we propose a dual role for APX2: participating in the transfer of copper to plastocyanin and regulating the intracellular copper distribution.