PSBS PROTEIN INTERACTIONS DURING NON-PHOTOCHEMICAL QUENCHING

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The non- photochemical quenching of excitation energy (NPQ) describes a photoprotective mechanism in the antenna of PSII which dissipates excess excitation energy as heat at the level of ^{1}Chl* and by that prevents the formation of singlet oxygen in PSII. Four different components contribute to NPQ, called qT, qE, qZ and qI. qT represents the mechanism of 'state transitions' and seems to contribute to NPQ in higher plants only at low, non-saturating light conditions. Under saturating light conditions, the qE mechanism represents the dominating NPQ component active in the short-term (up to 60 min). The qE component of NPQ, also termed pH-dependent quenching, is based on a complex mechanism, which is strictly dependent on the ΔpH across the thylakoid membrane, the PsbS protein and the xanthophyll zeaxanthin (Zx). According to the current understanding of qE, a low pH in the thylakoid lumen induces (i) PsbS-dependent conformational changes in the antenna of PSII and (ii) the formation of Zx, resulting finally in the quenching of excitation energy in PSII antenna proteins. The central role of PsbS in these processes is related to the function of PsbS as sensor of the lumen pH. However the molecular basis of this central function and particularly the underlying interactions of PsbS with PSII antenna proteins that lead to energy quenching are largely unclear. In this work we present an in vivo approach using chemical crosslinking to identify protein interactions involving the PsbS protein during NPQ induction and relaxation in *Arabidopsis thaliana* revealing its direct role on the formation of quenching sites in the antenna complexes of photosystem II.