Cytoplasmic Protein Phosphatase 2A regulatory subunit B modulates chloroplastic processes in *Arabidopsis thaliana*

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PP2A is a heterotrimeric serine/threonine phosphatase composed of a catalytic subunit C, a scaffold subunit A, and a regulatory subunit B, which determines the target specificity of the PP2A holoenzyme. The genome of *Arabidopsis thaliana* contains five genes encoding PP2A-C subunits, three A subunits and 17 largely uncharacterized B subunits, which combine to form variable PP2A isoforms with wide range of physiological target processes. We have explored the roles of distinct PP2A-B subunits in signaling events that connect chloroplastic processes with regulation of growth and development in Arabidopsis leaves. Knock-down mutant deficient in a specific cytosolic PP2A-B subunit shows age-dependent yellowing patches in the peripheral parts of mature leaves. Electron microscopy revealed pronounced chloroplast degradation and cell death in the spongy mesophyll tissue of the *pp2a-b* mutant. Promoter::GUS analysis indicates differential activity of *PP2A-B* promoter during growth: highest activities are visualized first in cotyledons and later in the distal areas of ageing leaves of 5 weeks old plants. Accordingly, yeast two-hybrid screening for candidate interacting partners for PP2A-B identified components related to brassinosteroid biosynthesis as well as defense and senescence associated pathways. Preliminarily, analysis of soluble leaf extracts and thylakoid protein complexes by 2D native gel electrophoresis suggests adjustments in chloroplast carbon metabolism rather than in photosynthetic light reactions in *pp2a-b* plants. This proteomic approach also revealed a prominent phosphoprotein up-regulated in the *pp2a-b* mutant, and identified as an adenosyl homocysteine hydrolase related to DNA methylation and silencing of nuclear genes. Analysis of a putative regulatory role for this enzyme in the control of pentose phosphate pathway, glycolysis and/or gluconeogenesis is currently underway. Taken together, our data indicate that this specific PP2A-B isoform has a central role in the signaling events that coordinate the metabolism and integrity of chloroplasts during different stages of growth.