

SL802 Vesicle Trafficking in Chloroplast Biogenesis

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Dynamamin is a high molecular weight GTP-binding protein with an intrinsic GTPase activity. Recently many genes belonging to the dynamamin family have been isolated from a variety of eukaryotic systems ranging from yeast to human. To understand the intracellular trafficking in plants we isolated and characterized dynamamin-like proteins in Arabidopsis. In Arabidopsis there are at least 5 isoforms of dynamamin-like proteins. Interestingly two of them, ADL1 and ADL2, were localized at the chloroplasts. Especially ADL1 was found at the thylakoid membranes. Western blot analysis also indicated that ADL2 is also present in the membrane fraction. The biochemical properties of ADL2 were very similar to those of ADL1. When deletion constructs of ADL1 isoform was introduced into Arabidopsis the transgenic plants showed the yellow leaf phenotype, suggesting that the ADL1 is involved in the biogenesis of chloroplast. EM studies revealed that the transgenic plants have defects in the thylakoid membrane biogenesis. These results strongly suggested that vesicle trafficking plays a important role in the biogenesis of chloroplasts. To investigate the role of ADL isoforms we started screening of T-DNA insertion mutants from the T-DNA insertion library by PCR screening method. Also, we investigated the involvement of vesicle trafficking by treating etiolated maize leaf with inhibitors of PI3-kinase. The results showed that the treatment inhibited chloroplast development, thus further supporting the involvement of vesicle trafficking in the chloroplast development.