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Characterization of a chloroplast Acetyltransferase in Arabidopsis thaliana

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Chloroplast Acetyltransferases in Arabidopsis thaliana are a part of the General control non-repressible 5-related N-Acetyltransferase superfamily (GNAT), which is characterized by a high structural conservancy. Among the acetylated chloroplast proteins, those involved in photosynthesis make up a large proportion, indicating that the GNATs may be important regulators of photosynthesis (Hartl et al. 2017). All chloroplast GNATs show N-terminal as well as lysine acetylation activity in different intensities. When expressed heterologous, 2 of the 8 acetyltransferases in the chloroplast show more relaxed acetylation activities compared to the remaining six, pointing to a putative redundancy in the plant on the one hand but give also hints on the dependency of these proteins on complex partners on the other hand (Bienvenut et al. 2020). Previous research already highlighted the tendency of GNAT proteins to form complexes critical for their function in diverse organelles (Liszczak et al. 2013). Our research fucuses on one of the chloroplasts acetyltransferases with relaxed activity when expressed heterologous. It exists in 7 different splice forms and our goal is to shed light on the specific functions of these splice forms by investigating altered localisation or acetylation activities. Furthermore, we want to examine the physiological role of the acetyltransferase and its splice forms with a knockout mutant line and its respective complementations. Regarding the relaxed acetylation activity in heterologous expression studies, another focus is on the identification of putative interaction partners of the enzyme in planta and on the question whether the acetyltransferases activity in influenced by Co-Expression partners in vivo.

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