

NTMC2T5 protein family: newly identified ER-chloroplast contact site proteins involved in abiotic stress.

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Plants are sessile organisms and therefore they have perfected a complex molecular signalling network to detect and respond to the different environmental stresses such as high temperatures, salinity, or drought. In plants, fatty acid synthesis takes place at chloroplasts, and they are assembled into glycerolipids and sphingolipids at the endoplasmic reticulum (ER). Then, the newly synthesized lipids in the ER are delivered to chloroplast via a non-vesicular pathway, likely through lipid transport proteins (LTP). These LTP would be localized in ER-chloroplast membrane contact sites (MCS). Synaptotagmin-like mitochondrial-lipid-binding (SMP) domain proteins are evolutionarily conserved LTP in eukaryotes that localize at MCS. They are involved in tethering of these MCS through interaction with other proteins/membrane lipids and in transferring of glycerolipids between these two membranes. We have studied the occurrence of SMP proteins in *A. thaliana* and *S. lycopersicum* by searching remote orthologs of human E-Syt1 (SMP protein). By using transient expression in *N. benthamiana* leaves and confocal microscopy, we have identified the NTMC2T5 family with two homologs in *A. thaliana* and only one in *S. lycopersicum* that are anchored to the chloroplast outer membrane and are interacting with the ER (at ER-chloroplast MCS). Our preliminary data have unequivocally demonstrated that NTMC2T5 proteins are anchored to the chloroplast, and they bind in trans the ER. Additionally, it is predicted that these proteins contain a SMP domain which is a lipid-transfer domain, indicating that these proteins could be responsible for some of the lipid transferring events at ER-chloroplast MCS that are still unknown. Our preliminary phenotypic analyses have shown that these proteins are involved in salt tolerance. Finally, we have observed that clustering of chloroplasts around the nucleus occurred when we overexpressed these proteins in *Nicotiana benthamiana* leaves.