

P003 *AtPARN* : An Essential poly(A)ribonuclease in *Arabidopsis*
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Deadenylation is often the first and rate-limiting step of mRNA turnover in a variety of organisms from yeast to higher eukaryotes. There is no protein known to work as a deadenylase in higher plants so far. In this study, we have investigated the *Arabidopsis* homolog of Poly(A)ribonuclease (PARN) which is a deadenylase identified in mammals but absent from in yeast. Consistent with the fact that AtPARN conserved three Exo domains of RNaseD family, the recombinant AtPARN had a poly(A) degradation activity *in vitro*. Transient expression assays following the introduction of AtPARN-GFP fusions into plant cells indicated that AtPARN is localized in both the nucleus and cytoplasm. To address the importance of this enzyme *in vivo*, we obtained four independent insertion mutants of AtPARN. Three alleles which have T-DNA insertions at the different positions between ATG and stop codon caused a lethal phenotype as evidenced by a lack of viable homozygous mutants and aborted seeds in the siliques of heterozygotes. These observations indicate that AtPARN is an essential poly(A)ribonuclease that is required first during early development presumably to facilitate the deadenylation events in the nucleus and/or cytoplasm. The importance of AtPARN in *Arabidopsis* suggests that it may be essential in other multicellular eukaryotes as well. Funded by NSF, DOE, and JSPS.