

P001 Choice of start codon in a single transcript determines DNA ligase 1 isoform production and intracellular targeting in *Arabidopsis*.

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DNA ligase 1 is the only essential ligase activity in plants and is implicated in critical processes of DNA replication, repair and recombination and in transgene insertion during *Agrobacterium*-mediated plant transformations. Mitochondrial and nuclear forms of DNA ligase 1 in *Arabidopsis* are translated from a single mRNA species through control of translation initiation from either the first (M1) or second (M2) in-frame AUG codons respectively. Translation of *AtLIG1* mRNA *in vitro* occurs from either M1 or M2 but initiation from a third (M3) in-frame AUG codon occurs on transcripts in which M1 and M2 are mutagenised to stop codons. Wt *AtLIG1*-GFP constructs can be targeted *in planta* to both nucleus and mitochondria. *AtLIG1*-GFP translation from M1 specifically targets the fusion protein only to mitochondria *in planta* whilst translation from M2 or M3 targets the fusion protein only to the nucleus. Interestingly, the *AtLIG1*-GFP fusion protein in which translation initiates from M1 contains both an N-terminal mitochondrial targeting sequence and an NLS yet this protein is targeted only to mitochondria. This result raises intriguing questions on translational control mechanisms that regulate how the protein products of a single transcript are targeted to more than one cellular compartment.