ARABIDOPSIS TRYPTOPHAN-RICH SENSORY PROTEIN: DIFFERENT SUB-CELLULAR LOCALIZATION AND ALTERNATIVE TRANSLATION START CODONS?

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As a result of multiple endosymbioses, plant cells contain three different genomes. One of the consequences of this partitioning of genetic information is that processes which take place inside organelles require input from two different compartments. The molecular events that regulate this integration are still poorly understood, but the recent identification of Mg-protoporphyrin IX as a key signaling molecule has provided news insights into one of these signaling mechanisms. In *Rhodobacter sphaeroides* the outer membrane tryptophan-rich sensory protein (TspO) has been shown to be involved in controlling the transcription of genes involved in photopigment biosynthesis and in the efflux of critical tetrapyrrole intermediates. TspO shows a high homology to the mammalian peripheral benzodiazepine receptor (PBR). PBR activation involves numerous biological functions including cell proliferation and apoptosis. PBR is located at mitochondrial outer membrane but in situations of cell proliferation it is re-located to the nuclear membrane. The analysis of the *Arabidopsis* genome indicates the presence of a unique TspO/PBR gene with high similarity to bacterial and mammal counterparts. It shows an amino-terminus extension with three in frame start codons. The last one is perfectly aligned with the unique AUG from bacterial and mammals. Assuming that the N-terminal extension could contain targeting information for the control of AtTspO localization, we develop a series of eGFP fusions. Those constructs have been transformed in *Arabidopsis* and BY2 cells and analyzed by confocal microscopy. Transgenic lines harboring the full-length protein accumulate eGFP in vesicles and chloroplasts whereas a fusion using the third AUG seems to be located exclusively at mitochondria. These data suggest that TspO/PBR protein can appear in multiples localizations, depending on translation or post-translation controls.
Keywords: tryptophan-rich sensory protein; dual targeting; *Arabidopsis.*