

**T21: Thermodynamic stability of mRNAs in plants using Mfold: enhanced stability of the *Tortula ruralis* ADLH7B6 transcript as compared to angiosperm- and animal-derived ALDH7 orthologues.**

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The desiccation-tolerant moss *Tortula ruralis* is an important experimental system for the study of gene control in response to severe water deficit-stress. Numerous studies over the past 30 years have clearly demonstrated that mRNA transcripts for several genes are stably maintained in desiccated gametophytes (see 1, 2 & 3 for review), and we have hypothesized that this represents a key component of vegetative desiccation-tolerance in mosses. To pursue this idea, we analyzed the RNA secondary structures of the “stress aldehyde” ALDH7 protein family using the recently developed RNA folding program, *Mfold* (4). The ALDH7 protein family consists of two sub-families—ALDH7A is comprised of animal sequences exclusively and ALDH7B is comprised of plant sequences exclusively. The *Mfold* predicted minimum free energy of the ALDH7 family, excluding *ALDH7B6*, is  $\Delta G = -517$  (+/- 50). The *T. ruralis* sequence (*ALDH7B6*) is predicted to have a minimum free energy of  $\Delta G = -743$  that is significantly different from the mean ( $P < 0.001$ ). We will present representative folded mRNA structures and discuss the implications of the data upon mRNA stability & vegetative desiccation-tolerance.

Oliver M.J. and J.D.Bewley. 1997. Desiccation-tolerance of plant tissues: a mechanistic overview. *Horticultural Reviews* 18: 171 - 214.

Oliver M.J., J.Velten and A.J.Wood. 2000. Bryophytes as Experimental Models for the Study of Environmental Stress Tolerance: Desiccation-tolerance in Mosses. *Plant Ecology* 151: 73 - 84

Wood A.J. and M.J.Oliver. 2003. The Molecular Biology and Genomics of the Desiccation Tolerant Moss *Tortula ruralis*. A.J.Wood, M.J.Oliver, D.J.Cove (eds.), Kluwer Academic Press (in press)

Zuker M. 2003 Mfold web server for nucleic acid folding and hybridization prediction. *Nucleic Acids Research* 31: 1 - 10