14 Characterization of a Low Molecular Weight Heat-Shock Protein cDNA Clone from *Nicotiana tabacum*

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We characterized a cDNA clone for a low molecular weight heat-shock protein (LMW HSP) from tobacco named TLHS-1. Nucleotide sequence determination of TLHS-1 identified an open reading frame for 159 amino acids. To the upstream of the open reading frame, a sequence of 124 nucleotides was determined. To the 3′ downstream of the open reading frame, 212 nucleotides were identified which carried poly(A)-tail. Comparison of the open reading frame and hydropathy plot of TLHS-1 with the previously reported class I LMW HSPs showed high identity which classified TLHS-1 as a class I LMW HSP cDNA clone. We proposed that there are six consensus regions in class I LMW HSPs. RNA blot hybridization for TLHS-1 showed a typical expression pattern of heat-shock-inducible gene from three common tobacco cultivars. The open reading frame of TLHS-1 was overexpressed in *Escherichia coli*. TLHS-1 protein confers thermal protection of other proteins *in vitro* and *in vivo*. Thermal induced aggregation of citrate synthase was reduced by purified TLHS-1 protein, and thermal death rate at 50 ℃ was reduced in *E. coli* expressing TLHS-1. From these data, we can expect that TLHS-1 acts as a molecular chaperone.

Keywords: LMW heat-shock protein, Sequence comparison, Citrate synthase, Molecular chaperone