



Comprehensive identification and expression analysis of *Hsp90s* gene family in *Solanum lycopersicum*

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ABSTRACT. Heat shock protein 90 (*Hsp90*) is a protein produced by plants in response to adverse environmental stresses. In this study, we identified and analyzed *Hsp90* gene family members using a bioinformatic method based on genomic data from tomato (*Solanum lycopersicum* L.). The results illustrated that tomato contains at least 7 *Hsp90* genes distributed on 6 chromosomes; protein lengths ranged from 267-794 amino acids. Intron numbers ranged from 2-19 in the genes. The phylogenetic tree revealed that *Hsp90* genes in tomato (*Solanum lycopersicum* L.), rice (*Oryza sativa* L.), and *Arabidopsis* (*Arabidopsis thaliana* L.) could be divided into 5 groups, which included 3 pairs of orthologous genes and 4 pairs of paralogous genes. Expression analysis of RNA-sequence data showed that the *Hsp90-1* gene was specifically expressed in mature fruits, while *Hsp90-5* and *Hsp90-6* showed

opposite expression patterns in various tissues of cultivated and wild tomatoes. The expression levels of the *Hsp90-1*, *Hsp90-2*, and *Hsp90-3* genes in various tissues of cultivated tomatoes were high, while both the expression levels of genes *Hsp90-3* and *Hsp90-4* were low. Additionally, quantitative real-time polymerase chain reaction showed that these genes were involved in the responses to yellow leaf curl virus in tomato plant leaves. Our results provide a foundation for identifying the function of the *Hsp90* gene in tomato.

Key words: Expression analysis; Gene duplication; Heat shock protein; Tomato