Modulation of host gene expression during the initial steps of tomato infection by a potyvirus

Poliane Alfenas-Zerbini[1]*, Francisco Murilo Zerbini[1]*, Riani Moreira Neto[1], Ivan G. Maia[2] e Júlio C.M. Cascardo[3].

[1]Dep. de Fitopatologia/BIOAGRO, UF Viçosa, Viçosa, MG, 36570-000. [2]Dep. de Genética, UNESP, Botucatu, SP; [3]Dep. de Biologia e Genética Molecular, UESC, Ilhéus, BA. *E-mail: palfenas@ufv.br; zerbini@ufv.br

Plant defense responses against pathogens cause up- and downward shifts in gene expression. To identify differentially expressed genes in a plant-virus interaction, a subtractive library was constructed from tomato plants inoculated with *Pepper yellow mosaic virus* (PepYMV). Several genes were up- or down-regulated, including transcriptional regulators (e.g., SCARECROW and WRKY transcription factors), signaling proteins (e.g., CAX-interacting and SNF1 kinases), proteins involved in stress responses (e.g., Hsp90, DNA-J, TCTP) and ubiquitins. Differential expression of 42 genes was validated by macroarray analysis. Four genes (CRC9, CXIP4, SNF1 and TCTP) were validated by qRT-PCR. The genes encoding SNF1 and TCTP were selected for additional analyses. The kinetics of differential expression was analyzed by qRT-PCR. Expression of both TCTP and SNF1 was induced at 48 hpi, and remained high until 96 hpi. To verify whether the induction of TCTP and SNF1 is part of a general response to biotic stresses, tomatoes were inoculated with *Pseudomonas syringae* pv. *tomato*, *Alternaria solani*, *Meloidogyne incognita*, TMV, CMV and ToYSV, besides PepYMV. Leaves were collected at 0 and 72 hpi and expression levels of TCTP and SNF1 were analyzed by qRT-PCR. TCTP was induced only upon infection by PepYMV, while SNF1 was induced upon infection by PepYMV and ToYSV. Functional analysis of the role of TCTP, SNF1 and Sub? (alpha subunit of the 26S proteasome) is being investigated by virus-induced gene silencing (VIGS). Preliminary results suggest that silencing of all three genes renders the plants resistant to infection.

Keywords: PepYMV, TCTP, SNF1