Defense mechanism of citrus limon seedlings against fungal pathogens: signal transduction and pal gene

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Citrus limon seedlings respond to fungat attack inducing the phenylpropanoid pathway producing phytoalexins. The de nero synthesis of one of the main enzymes, phenylalanine ammonia-lyase (PAL), is accomplished after 24 hours inoculation with Alternaria alternata, or after 3 - 4 hours in response to elicitors. The transduction of these signals requires Ca2+ active calcium ion channels. We present evidence of other components of the signal transduction pathway, as well as characteristics of the PAL gene. The participation of calmodulin, PK and phosphoinositides was analyzed using specific antagonists or inhibitors, before eliciting lemon seedlings. Trifluoperazine and W-7 (CaM antagonists), staurosporine (PKC inhibitor), 2,5-dihydroxyeinnamate methyl ester and lavendustin A (PTK inhibitors) and caffeine (IP3 receptor antagonist) prevented the induction of PAL. The corresponding ICs0 values are similar to those observed in animal systems. A PAL gene was isolated using PCR primers based on