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ROLE OF VvMYB14, A NOVEL R2R3 MYB FACTOR, IN BIOTIC AND ABIOTIC STRESS RESPONSE AND IN THE REGULATION OF STILBENE BIOSYNTHESIS IN GRAPEVINE

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Stilbene synthases, R2R3 MYB, downy mildew, abiotic stresses

Stilbene synthases (STSs) are a class of enzymes belonging to the general CHS type III polyketide synthase family involved in the last step of the biosynthesis of stilbenes. These enzymes, and their main products resveratrol or pynosylvin are detectable in only a limited number of unrelated plant species, including grape, and accumulate in response to biotic and abiotic stresses. Despite numerous studies that have been performed on the accumulation, metabolism and biological properties of resveratrol, little is known about the transcriptional regulation of this pathway. Based on microarray data obtained from grape cell cultures treated with jasmonic acid we identified a candidate R2R3 MYB transcription factor that shows an expression pattern similar to that observed for STSs and which could be involved in the regulation of stilbene biosynthesis in grape. This R2R3 MYB factor was designated *VvMYB14*, based on homology with the *AtMYB14* R2R3 MYB factor. Neither gene has previously been functionally characterized in either plant species. Analysis of *VvMYB14* expression in grape leaf discs treated with biotic (downy mildew infection) and abiotic stresses (wounding and UV-C exposure) known to be involved in the transcriptional activation of *STS* genes, showed a close correlation between the pattern and timing of expression of selected *STS* genes and *VvMYB14*.

Using a Dual Luciferase Reporter Assay System in transiently transformed grapevine cells, VvMYB14 was demonstrated to increase stilbene synthase promoter activity. Confirmation of the role of *VvMYB14* in the transactivation of VvSTS genes *in planta* is currently being examined using a transgenic grapevine hairy root system for testing the effect of both silencing and overexpression of *VvMYB14* on the response of VvSTS expression. Preliminary results indicate that roots in which VvMYB14 has been silenced, show significantly reduced levels of *VvSTS* transcription following the application of an abiotic stress. Further experiments are now underway to clarify the role of VvMYB14 in the regulation of both the stilbene synthase pathway and genes belonging to the general phenylpropanoid pathway in grapevine