

Geminivirus Rep Protein Interferes with the Plant DNA Methylation Machinery and Suppresses Transcriptional Gene Silencing

Edgar Rodríguez-Negrete¹, Alvaro Piedra-Aguilera¹, Rosa Lozano-Durán², Lucía Cruzado¹, Eduardo R. Bejarano¹, Araceli G. Castillo¹

1 Area de Genética. Instituto de Hortofruticultura Subtropical y Mediterránea “La Mayora”(IHSM-UMA-CSIC). Campus de Teatinos. 29071. Málaga

2 Shanghai Center for Plant Stress Biology, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai 200032, China

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Viruses are masters at circumventing host defenses and manipulating the cellular environment for their own benefit. The replication of the largest known family of single-stranded DNA viruses, *Geminiviridae*, is impaired by DNA methylation but the fact that plants might use methylation as a defense against geminiviruses and the impact that viral genome methylation may have during the infection, remain controversial.

We have found that geminiviruses reduce the expression of the plant maintenance DNA methyltransferases, MET1 and CMT3, in both, locally and systemically infected tissues. Furthermore, we demonstrated that the virus-mediated repression of these two maintenance DNA methyltransferases is widely spread among different geminivirus species and we have identified Rep as the geminiviral protein responsible for the repression of MET1 and CMT3. The presence of Rep, suppresses transcriptional gene silencing (TGS) of an *Arabidopsis* transgene and of host loci whose expression is strongly controlled by MET1. Bisulfite sequencing analyses showed that the expression of Rep caused a substantial reduction in the levels of DNA methylation at certain loci at CG sites. The biological relevance of these findings and the role of Rep as a TGS suppressor will be discussed.

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