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Integration of *Cauliflower mosaic virus* into the genome of *Arabidopsis thaliana* through homologous recombination

Previous studies have shown that Cauliflower mosaic virus (CaMV) is able to recombine with and acquire a viral transgene from plant genomes. The formation of recombinant viruses occurs as a consequence of CaMV replication, involving two twemplate switches during reverse transcription of the CaMV RNA to DNA. However, CaMV also can be found in the nucleus of cells in the form of a minichromosome. One question that has not been resolved is whether this form of CaMV was capable of homologous recombination into the plant genome. The present experiments were designed to investigate the capacity of CaMV to become integrated into a target sequence present in Arabidopsis thaliana. The target sequence in A. thaliana consisted of the CaMV 35S promoter, the complete gene VI sequence of CaMV strain D4, and the rbcS terminator. The virus was CaMV strain W260. Consequently, infections could be inititated through inoculation of the plants. During infection, a recombination event within the 35S promoter would juxtapose a unique Arabidopsis sequence adjacent to the transgene with CaMV sequences unique to the CaMV viral DNA. CaMV W260 was inoculated into the transgenic plants and total DNA was isolated from infected plants approximately 25 days after inoculation. We subsequently used PCR to show that a recombinant between CaMV W260 and the transgene could be detected in transgenic plants. Our evidence suggests that CaMV is also capable of integration into the genome of Arabidopsis thaliana through a mechanism involving homologous recombination between the viral DNA and the 35S promoter present in the transgene.

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