Universität Basel

Research Project

Suppression of RNA silencing by plant pararetroviruses: protein versus RNA-based?

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Project title Suppression of RNA silencing by plant pararetroviruses: protein versus RNA-based?
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Plants defend themselves against viruses by generating virus-derived small interfering (si)RNAs and thereby silencing the viral genome. Viruses counteract this defense by producing suppressor proteins. We have evidence that not only proteins but also viral RNAs could be used as suppressors: the extreme accumulation of siRNAs from a 600 bp leader region of *Cauliflower mosaic praretrovirus* (CaMV) suggests that this region acts as a decoy to divert the silencing machinery from the viral coding regions. This highly-structured leader of the pregenomic 35S RNA is a hindrance for scanning ribosomes, which have to bypass it by a shunt mechanism to initiate polycistronic translation. Early literature described a CaMV "8S RNA", which covers just the leader region. We shall investigate whether 8S RNA of CaMV and related pararatroviruses such as *Rice tungro bacilliform virus* (RTBV) serves as a precursor of virus-derived siRNAs, whether it is produced by run-off transcription from the gapped viral DNA as a short-stop RNA and/or whether Met-tRNA, which primes viral reverse transcription, is also involved in creating the siRNA precursor. We shall test whether transient or stable over-expression of the CaMV and the RTBV leader region in a single-stranded or a double-stranded RNA form is able to suppress silencing. These studies should reveal whether a short-stop RNA-based suppression is a universal mechanism employed by plant pararetroviruses and, perhaps, also animal retroviruses. Additionally we shall identify protein-based suppressor(s) in RTBV and associated *Rice tungro spherical virus*, an RNA picorna-like virus, and study whether synergistic suppression of silencing by two or more viral suppressors, whether RNA- or protein-based, might contribute to severity of the rice tungro disease caused by a combination of the two viruses. This will help design new strategies to control the rice tungro disease and, in general, diseases caused by plant pararetroviruses.

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