

## **SUPPRESSION OF RNA SILENCING IN PLANTS**

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RNA silencing is a remarkable type of gene regulation based on sequence-specific targeting and degradation of RNA. The term refers to related pathways found in organisms as diverse as fungi (quelling), plants (post-transcriptional gene silencing, PTGS), protozoans, and a variety of animals including *C. elegans*, *Drosophila*, and mice (RNA interference, RNAi). In these organisms, the process is characterized by conserved genes and biochemical features. One key conserved feature is that the induction of RNA silencing involves dsRNA. In plants, RNA silencing may have evolved as a defense against viruses, many of which replicate via dsRNA intermediates. Consistent with this idea, a number of plant viruses encode suppressors of silencing. Here we report studies using one such suppressor of silencing, the helper component proteinase (HC-Pro) of potyviruses, as a tool to understand the mechanism of gene silencing. We show that HC-Pro suppresses silencing induced by three different classes of transgene, in each case eliminating the accumulation the short interfering RNAs (siRNAs) that mediate sequence-specific RNA degradation. In contrast, the accumulation of two other classes of small RNAs is enhanced in plants expressing HC-Pro. We have identified several cellular proteins that interact with HC-Pro in the yeast two-hybrid system. Studies of the role of these proteins in RNA silencing are providing clues about the mechanism and regulation of the silencing pathway. The emerging view is that RNA silencing is part of a sophisticated network of interconnected pathways for cellular defense, RNA-surveillance, and development, and may become a powerful tool to experimentally manipulate gene expression.