

R gene regulation mediated by miRNA/phasiRNA during plant defense response against *P. syringae*

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In plants, two main types of noncoding small RNA molecules have been found: microRNAs (miRNAs) and small interfering RNAs (siRNAs), differing these in their biogenesis and mode of action, but sharing similar sizes (20-24 nt). In plants, their mature forms are products of the activity of DCL proteins and can act as negative regulators of gene expression. In recent years, the role of miRNAs in regulation of gene expression in plant responses against bacterial pathogens is becoming clearer. Comparisons carried out in our lab between expression profiles of different *Arabidopsis thaliana* mutants affected in gene silencing, and plants challenged with *Pseudomonas syringae* pathovar tomato DC3000, led us to identify a set of uncharacterized R genes, belonging to the TIR-NBS-LRR gene family, as differentially expressed in these conditions. By bioinformatics tools, we found a miRNA* of 22 nt putatively responsible for down-regulating expression of these R genes. We have also found that the corresponding pri-miRNA is down-regulated after PAMP-perception. We demonstrate that plants with altered levels of this miRNA* (knockdown lines or overexpression lines) exhibit altered PTI-associated phenotypes, suggesting a role for this miRNA* in this defence response against bacteria. We have characterized the expression pattern of both pri-miRNA and its best target R genes. Finally, we identify phasiRNAs that arise from the transcript of this R gen in a miRNA*-RDR6-DCL4-dependent manner.