MASTER'S THESIS

Arabidopsis miR163 and its target are involved in defense against Pseudomonas syringae

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Date of Award:
2016

ABSTRACT

Small RNAs are important regulators for a variety of biological processes, including leaf development, flowering-time, embryogenesis and defense responses. Most ancient miRNAs are conserved among different plant species and well characterized, while young *MIRNA* genes are considered to be non-conserved, highly species-specific and less well-studied. miR163 is a non-conserved miRNA and its locus has evolved recently by inverted duplication events of its target gene. Previously, we have shown that miR163 acts as a negative regulator of defense response. However, it remains unclear how miR163 and its targets are being regulated in response to pathogen attacks. Here, we further elucidated the molecular controls and the involvement of miR163 and its targets in plant defense response. Elevated level of miR163 was observed by *Pst* treatment in *Arabidopsis thaliana*, and this upregulation was found to be important in controlling the accumulation of its targets (*PXMT1* and *FAMT*), to which they were also inducible by *Pst* treatment. Transcript and protein level analyses in transgenic plants overexpressing miR163-resistant form of *PXMT1* or *FAMT* provided evidence for miR163 in fine-tuning its targets, suggesting that the stress-inducible miR163 and its targets act in concert in affecting defense genes expression. Epigenetically, histone deacetylation was found to involve in the repression of miR163 targets before and after *Pst* infection. Our findings revealed additional mechanistic insights to the controls and the evolutionary significance of young miRNA in mediating plant defense pathways against biotic stresses.

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