Deciphering the interaction between plants and the bacterial pathogen Ralstonia solanacearum

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Most bacterial plant pathogens employ a type-III secretion system to inject type-III effector (T3E) proteins directly inside plant cells. The complex infection process of *Ralstonia solanacearum* is supported by a large number of T3Es, although the function of most of them is still unknown. In order to understand the plant infection by *R. solanacearum*, we are performing screens aimed at identifying T3Es that target diverse plant functions, including immunity, responses to other environmental cues, and development. Following this strategy, we have found that *R. solanacearum* employs different T3Es to manipulate the immune responses to bacterial elicitors and hormone signalling. One of these T3E, RipAY, is a strong suppressor of immune responses. Transient expression of RipAY in *Nicotiana benthamiana* leaves severely compromises the plant response to bacterial elicitors and to exogenous treatment with salicylic acid. Biochemical analysis shows that RipAY associates with several different cytosolic thioredoxins in plant cells. Additionally, RipAY has a domain with predicted gamma-glutamyl cyclotransferase activity, usually involved in the degradation of glutathione, a major determinant of cellular redox state. Consistent with this, we found that RipAY degrades glutathione in plant cells, and this biochemical activity is required for the suppression of immunity. Our results suggest that *R. solanacearum* employs RipAY to

manipulate the redox regulation of host cells, displaying a novel virulence strategy that has a severe impact on immune responses.