

RIN4 Is A Multifunctional Protein That Differentially Regulates Basal And R-gene Mediated Defenses. da Cunha, L. & Mackey, D. Department of Horticulture and Crop Science, The Ohio State University Columbus, Ohio 43210.

Upon sensing the attack of a pathogen, plants use innate immune systems to organize a sophisticated array of defenses. In this context, at least two types of resistance can be distinguished, a less intense form of defense known as basal defense and the hypersensitive response (HR), a type of cell death around the site of infection. In *Arabidopsis*, the RIN4 protein is a key regulator of both types of resistance against the bacterial pathogen *Pseudomonas syringae*. Despite the recent advances in this field, little is known about the molecular mechanisms by which RIN4 regulates these two types of resistance. Therefore, it is imperative to identify specific domains of RIN4 and RIN4-associated proteins that regulate each defense signaling pathway. We have used structure/function analysis to learn about functional domains within RIN4. A variety of RIN4 derivatives with N-terminal, internal, and C-terminal deletions were constructed and expressed in *Arabidopsis*. Multiple mutations were identified that disrupt the ability of RIN4 to properly regulate either basal defense or the HR, while not affecting regulation of the other type of defense. Thus, these data indicate that RIN4 employs distinct domains and/or functions to differentially regulate basal defense and the HR. To further elucidate how RIN4 carries out these distinct functions, we are carrying out yeast two-hybrid screening and immunoaffinity purification to identify new RIN4-associated proteins that are candidates for participating in the regulation of each type of plant defense. Because RIN4 homologs exist in crop plants, work in the model system will translate to agriculture.