

**ANALYSIS OF A PEA DEFENSE GENE PROMOTER VIA
AGROINFILTRATION AND ITS FUSION WITH AN ELICITOR-
CODING GENE TO DEVELOP NON-HOST RESISTANCE**

Jane J. Choi and Lee A. Hadwiger, Department of Plant Pathology
Washington State University, Pullman, WA 99164-6430

Plant non-host disease resistance is characterized in part by the induction of multiple defense genes, which act as deterrents against diverse and potentially harmful organisms. The pea DRR206 gene is induced following inoculation with pathogens, treatment with abiotic agents, and to a moderate extent by wounding. In this study, a deletion series of DRR206 promoter segments were fused with the GUS reporter gene and transiently transferred to tobacco, potato, and pea. Analyses of GUS activity in leaf tissues from these different plants revealed that two upstream regions of the DRR206 promoter were particularly important for activation in the three plant species. Several database search tools revealed the presence of putative *cis* regulatory elements within the DRR206 promoter, including a wound/pathogen inducible box (W/P-box) and a WRKY box (W-box). Gel shift assays with nuclear extracts from treated and untreated tissue with the W/P-box revealed both similar and unique protein-DNA complexes from pea, potato, and tobacco. Stable transformations of tobacco were performed with gene constructs of the DRR206 promoter fused with a DNase elicitor gene from *Fusarium solani* f. sp. *phaseoli*, FspDNase. Pathogenicity tests indicated that the FspDNase elicitor conferred resistance against *Pseudomonas syringae* pv *tabaci* and *Alternaria alternata* in tobacco and in potato showed resistance against *Phytophthora infestans*. These studies demonstrate that the elicitor-coding gene, FspDNase, is capable of inciting pathogen resistance in a heterologous plant system when fused with defined regions of the pea DRR206 promoter.