Microbial and genetic determinants of *Listeria monocytogenes* colonization of *A. thaliana* roots

Haley Clapper

Listeria monocytogenes (LM) is a human pathogen and agent of listeriosis, a foodborne illness that can cause severe complications and death in immunocompromised individuals. LM-related illnesses have one of the highest mortality rates of foodborne illnesses, with 30% of patients dying due to infection. LM occurs ubiquitously in the environment, where it can attach to crops that humans consume. LM contamination of food products poses a major threat to human health, and to the food industry, costing between $2.3 and $22 billion per year.

Current research on LM largely investigates the clinical aspects of LM infection, with very little understanding of LM in an environmental context. Thus, little is known about LM in the environment and how it interacts with the flora and other soil microbes. To investigate the factors that influence LM plant root colonization, we utilized a hydroponic assay in which *Arabidopsis thaliana* seedlings were suspended in media and inoculated with LM. We first tested several media and found that LM readily colonizes and persists on *A. thaliana* roots in minimal-nutrient media. We then investigated the effects of LM pre-assay growth temperature on colonization and found that it was significantly enhanced at 30˚C and 37˚C, however, this enhancement is not due to the virulence gene regulator PrfA. Finally, we investigated the impact of coculturing LM with other soil microbes and found that *Pseudomonas fluorescens* increased LM colonization, while other bacteria predominantly decreased LM colonization. These data demonstrate LM readily colonizes *A. thaliana* in this hydroponic assay, and that genetic and microbial factors may influence LM colonization of plant roots.