

Student: Maggie Vaughn
Mentor: Dr. Fangming Xiao
University of Idaho
Plant, Soil and Entomological Sciences
vaug4067@vandals.uidaho.edu

Manipulation of *PRR* genes in tomato and potato

Plants use two types of receptor-associated immune systems to defend themselves against potential pathogens: pattern recognition receptor (PRR) -mediated resistance and disease resistance (R) gene-mediated resistance. The PRR-mediated resistance relies on the plant cell membrane-located PRR to perceive the pathogen-associated molecular patterns (PAMPs) of pathogens or the endogenous damage-associated molecular patterns (DAMPs) produced in response to pathogen attacks, whereas the R-mediated resistance is dependent on the recognition of pathogen effectors (called avirulence effectors) by R proteins.

One of the Arabidopsis PRR genes, *PEPR1*, recognizes Arabidopsis endogenous PEP1 peptide that is produced in response to pathogen attacks. However, tomato and potato do not possess the *PEPR1* gene. We have generated transgenic potato and tomato plants heterogeneously over-expressing the Arabidopsis *PEPR1* gene and the preliminary *Phytophthora* assay indicated these transgenic plants exhibit partial resistance to *P. infestans*. Recently, a second pep1-recognizing *PEPR* gene (termed *PEPR2*) has been identified in Arabidopsis, which promoted us to introduce the second *PEPR2* into transgenic tomato and potato that already has *PEPR1*. Thus, our goal is to heterogeneously over-express both *PEPR1* and *PEPR2* in tomato and potato plants for possible enhanced resistance to *P. infestans*.

In addition, I have been working with characterization of four *PRR* genes from tomato. These *PRRs* (termed 7130, 1820, 6100 and 6320) were originally found in Fry lab at Cornell to be induced by *P. infestans* infection. These four *PRRs* have been successfully cloned into a binary vector and Western blotting is currently undergoing to verify the expression of these *PRRs* in plant cells.

