

**Project Summary**  
**Rocky Mountains Cooperative Ecosystem Studies Unit**

Project Title: Mutating Amino Acid Networks of Insect Chemoreceptors for Controlled Tuning

Discipline: Interdisciplinary  
Type of Project: Research  
Funding Agency: US Army Core of Engineers  
Other Partners/Cooperators: Montana State University  
Effective Dates: 2/23/2011 - 2/23/2012  
Funding Amount: \$54,955

Investigators and Agency Representative:

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Project Abstract:

The aims of this proposed project is to identify, predict, modify and validate amino acids from insect odorant receptors that control receptor specificity. The ultimate goal is to understand the details of receptor selectivity such that receptors may be used as highly specific sensors for pollution prevention. The research project is proposed to the U.S. Army Corps of Engineers Engineering Research and Development Center (ERDC) at the Construction Engineering Research Laboratory (CERL) in Champaign, Illinois. The Recipients specific stated objectives are: (1) Analyze insect olfactory receptors using ClustalW2, construct phylogenetic trees using PAUP software, identify specific amino acids that are subjected to positive selection pressure using PAML; (2) Based on Objective 1, mutate specific amino acids of honeybee and moth pheromone receptors predicted to control specificity of their response to their ligands and (3). Functionally characterize the mutated receptors expressed in *Xenopus* oocytes using the OpusXpress6000A robotics system for two-electrode voltage clamp electrophysiology.

Outcomes with Completion Dates: February 23, 2012

Keywords: amino acids, insects, pollution prevention, U.S. Army Corps of Engineers Engineering Research and Development Center (ERDC), Montana State University