Road Salt Alternative Using AFPs

James Vacca, Yunwoo Choi, Vivien Marmerstein, Dr. Becky Meyer (MIT)
Western Reserve Academy, Hudson, Ohio

Objective

This project seeks to address the environmental and infrastructural challenges posed by road salts through the creation of antifreeze proteins (AFPs).

Our design involves the transformation of *Escherichia coli* with two separate plasmids, each carrying a gene sequence for AFPs derived from mealworms and winter ryegrass. These AFPs operate by attaching to the surface of forming ice crystals, effectively preventing ice formation at sub-zero temperatures.

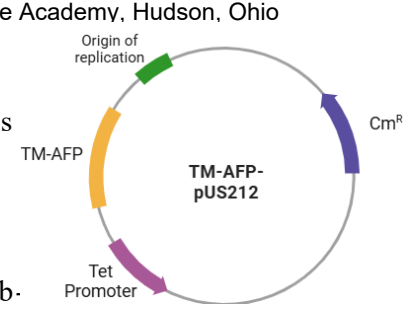

Figure 1. LP-AFP-pBAD18 plasmid

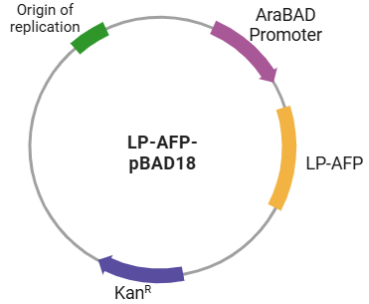

Figure 2. TM-AFP-pUS212 plasmid

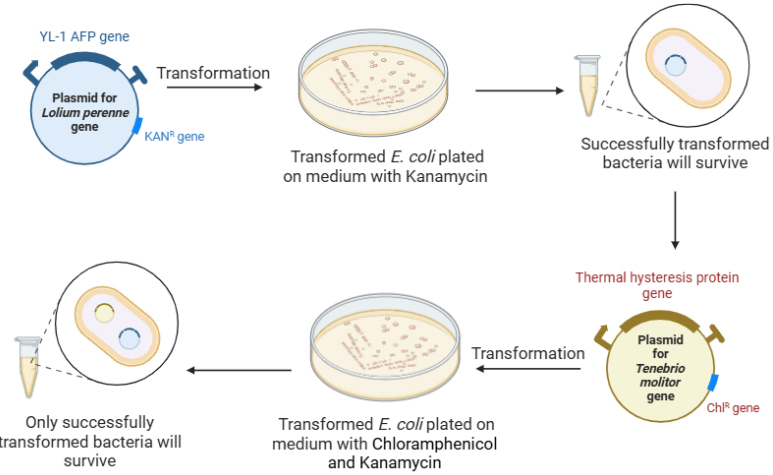

Figure 3. Transformation of plasmids

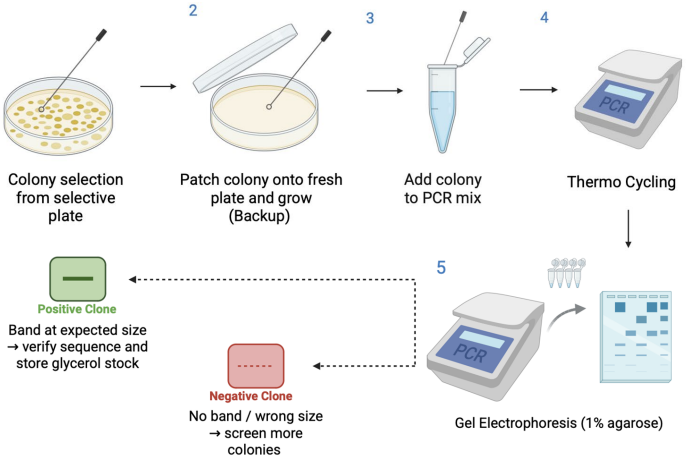

Figure 4. PCR procedure

BioMADE · UCB · GINKGO BIOWORKS · CAROLINA · K2 SCIENTIFIC · VitalTog · NEW ENGLAND BioLabs Inc. · Ragon Institute MASS GENERAL | MIT | HARVARD