Transplanting a Bacterial Immune System: Determining the Function of a Novel CRISPR System

Riannon Smith  
Utah State University

Melena Garrett  
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/roch
Part of the Biology Commons, and the Chemistry Commons

Recommended Citation
https://digitalcommons.usu.edu/roch/98

This Poster is brought to you for free and open access by the Browse Undergraduate Research Events at DigitalCommons@USU. It has been accepted for inclusion in Research on Capitol Hill by an authorized administrator of DigitalCommons@USU. For more information, please contact dylan.burns@usu.edu.
Transplanting a Bacterial Immune System: Determining the Function of a Novel CRISPR System

I. Introduction

CRISPR (Clusters of Regularly Interspaced Short Palindromic Repeats) loci and cas (CRISPR-associated) genes provide adaptive immunity (see panel below) in bacteria and have recently been repurposed for genome editing.

Systems are structurally and functionally diverse.
- 2 classes, 6 types, 33 subtypes
- Very few have been studied experimentally
- None of the Type IV systems have been characterized

II. Methods

Nothing is known about Type IV CRISPR system function. To discover the structure and function of the system, we created a circular piece of DNA (vector) that contains all of the Type IV CRISPR system genes.

Transfer vectors were made with a single gene and various affinity tags.

Restriction enzymes were used to cut the vectors. The genes were then inserted one at a time into the destination vector.

The vector was co-transformed with a second vector containing a CRISPR into *E. coli* cells.

III. Results

- We successfully transplanted the genes of a Type IV immune system into *E. coli* cells.
- Our system is expressing proteins.
- Trials are underway to identify conditions that express an entire Type IV system complex.

IV. Conclusions

Study conducted with funding from the USU Undergraduate Research and Creative Opportunity Grant with lab assistance from the USU Department of Chemistry and Biochemistry.