ZapE and *Pseudomonas aeruginosa* and CAUTI Development

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CPSP359G
College Park Scholars Academic Showcase, May 3, 2024

Introduction

Pseudomonas aeruginosa is a key pathogen that is responsible for catheter-associated urinary tract infection, also known as CAUTI. Despite this, the bacteria does not pose a major threat to humans but can dangerous if in contact with an exposed wound. To get inside a human, the bacteria is settled on the lumen of a catheter. When the catheter is inserted inside a human, the bacteria can creep from the catheter and start to cause infections within the human body's system like the endocrine system.

Some of my colleagues that I had the opportunity of working with. Our lab was located on the third floor of the Microbiology Building. On the extreme left, is the leader of the Bacterial Pathogenesis stream Dr. Hall. Next to her was my TA Sam Chung. He was the one that oversaw my experiments in the lab the majority of the time.

Site Information:

Name of Site FIRE Bacterial Pathogenesis Lab

Address

Program Teacher: Dr. Cherisse Hall TA: Sam Chung and Trish

We want to study how *Pseudomonas aeruginosa* affects the body's systems if not properly taken care of.

The goal of this site was to modify *Pseudomonas aeruginosa* to see if there would be any change to the formation of its biofilm.

Issues Confronting Site:

One of the issues that I had confronting the site was the commute to the location. I went to UMD and came back 3 days a week by bus. Sometimes the bus would get delayed or there would be some technical issue that occurred.

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Activities:

I did a series of experiments including Gradient PCR, DNPl digest, DNA Gel Purification, PNK and DNA Ligase, Bacterial Transformation, Plasmid Purification, and Sequencing the DNA.

Impact:

The reason we look at *Pseudomonas aeruginosa* is because it's a very common hospital acquired infection (HAI). HAIs can cause numerous infections and have increased the mortality rate of people at hospitals. Besides killing people, it cause a financial burden as people are required to spend more money to treat the infection. By looking into this, it can help medical professionals to produce a way to prevent CAUTI form such an easily acquired infection.

In my hand, these are two centrifuge tubes that contain *E. Coli DH5a* isolates. This is since I worked with two sgRNAs sequences and the hope was that at least one of them would be successfully inserted into the plasmid.

One thing to note, is that since the lab works with *E. Coli and Pseudomonas aeruginosa*, we need to wear protective equipment such as lab coats, gloves, and goggles.

Discussion:

Overall, mine and my team's experiment turned out to be mostly successful. This is because for the most part, we were able to confirm that out plasmid had the sgRNA sequence inside after undergoing DNA sequencing.

Future Work:

After completing these experiments, our plan is to transform the *Pseudomonas aeruginosa* using the modified plasmid, silence the gene that we worked with using CRISPR dCas 9, and then observing the biofilm formation and making note of its pathogenic capabilities.

Acknowledgments:

I would like to acknowledge and thank Dr. Holtz and Dr. Merck for the opportunities I have gotten within the Scholars program and SGC. I would also like to thank Dr. Cherisse Hall, Sam Chung, and Trish Erin for their help and guidance this summer. I want to thank Katie and Jess for being amazing team members to work on this project with and lastly, I would like to thank the UMD FIRE Program for the opportunity to conduct this research.