Once Upon *E. Miricola*

GRP#07
Section#1

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ABSTRACT

Elizabethkinea miricola is a bacterium that was found on the Mir Space Station. It is oppotunistic, and is resistant to several antibiotics, (Green et al, 2008). This resistance is founded on the presense of multiple genes. Doctor Canaan's team along with a group of undergrad students (Group 7) investigated genes suspected of providing resistance. For Group 7, Bla_1819 did code for resistance. This was secured through replication of genes, insertion into vecotrs, and then using tiles to color test for presence of betalactamase resistance.

INTRODUCTION

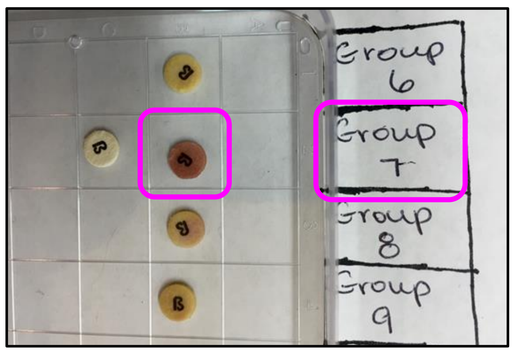
Testing on the *Elizabethkinea miricola* for specific genes that produce betalactamase resistance started out after the disocvery of the bacteria capitalizing on immune weakness and the genus' ability to be found in an abundance of habitats, (Kirby, 2004), where human exposure can cause death or illness, (Hayek et al, 2013). Most specifically, *E. miricola* was found on the Mir Space Station. *E. meningoseptica*, the first species discovered, has multiple betalactamase genes which assists in resistance to over 20 antibiotics. In *E. miricola*, group seven is testing the bla_1819 betalactame predicted gene as it is thought that if *E. meningoseptica* has multiple forms of resistance that *E. miricola* might as well. This gene has been isolated by mapping the DNA as it is thought to have high likeliness in the production of betalactames, and through cloning and other methods, the results were discerned.

MATERIALS AND METHODS

Dr. Canaan, Dr. Matts, Shanell Shoop, and Nathanial Torres performed the initial steps by extracting DNA from E.miricola. Our group was assigned to specific gene to test for antibiotic resistance. We created forward primer, ATGATGAAAAGATTAAAAGG, by using the first 20 bases on the gene we were given and a reverse primer, TTAATTTGAAGCCTTTTG, by taking the last 18 bases and reverse the order of them before coding. We then PCR amplified the extracted DNA with the forward and reverse primers we created in order to test the DNA sequences for the gene we are looking for. We then ran an agarose gel electrophoresis and ran it for 1-2 hours. After running the electrophoresis, we heat shock transformed *E.coli* with the gene sequence we were given. We did this by selecting for our PCR fragment by adding a Kanamycin resistance gene to the vector. The samples were then spread plated the bacteria onto a TSA plate and incubated overnight at 37C. Colonies were then counted and recorded. Dr. Canaan team then took the clones and screen them for beta-lactamase activity.

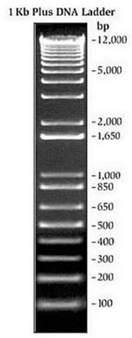
RESULTS

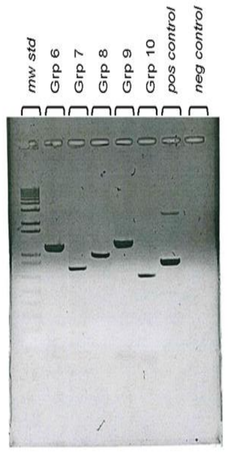
Results of the tests on bla_1819 suggested that the gene is extremely active in the production of betalactamase resistance. As shown by the color of group 7's tile against the tile of the control, the red displays positive results. These results strongly supported the hypothesis that bla_1819 would be a batalactame producing gene. Strengths of the experimental design were that it was easy to see if the gene was cloned and in the vector. Strengths also were that betalactame tiles were very capable of showing positive or negative contrast.




Negative


Positive





DISCUSSION

It is important to find anti-biotic resistant genes due to the rising number of bacterium that are becoming resistant to modern antibiotics. By isolating their genes, researchers can find new ways to attack opportunistic bacterium and create new antibiotics to help affected patients. Without the complete identification of all elements of present bacterium, the possibility of casualties in our existence is ever present. The further that individuals explain and diagnose the portions of each ailment, the more that the human species is prepared. By locating coding for resistance in the bla_1819 gene, similar squences found in other Genuses might be recognized.

By dissecting the genomic features of dreadful diseases, finding ferocious phenotypes, and resolving ravenous wrongs, people can iscover the answers to medical mysteries, especially the mysteries that threaten people's well-being. These are successful advancements to be made. This experiment simulated a degree of what one of those advancements is like. Correctly identifying the Deoxyribonucleic acid segments that inhibit the anti-biotic from taking an effect on the *Elizabethkinea miricola* bacteria allows further steps to be made to render this bacteria, and other bacteria's, natural defenses void. Preparing the future generation's security by providing them with the necessary skills and fortifications is above all the most important trait to pass on.

REFERENCES

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