CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

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Project Number

J1601

Project Title

Strains of Photorhabdus Isolated in the Santa Monica Mountains Are Most Similar to Each Other and Strains from Wisconsin

Abstract

Objectives/Goals

The overall goal of these experiments were to determine if Photorhabdus sp are present in the Santa Monica Mountains and compare them with other known strains.

Methods/Materials

E. coli MG1655 was used as a negative control and Photorhabdus luminescens HM was used for comparison of DNA sequences. After isolating three novel strains of Photorhabdus from the Santa Monica Mountains, the first test was to sequence their 16S rRNA as a #fingerprint# for identification. In order to do so, genomic DNA was isolated from each bacterium grown in liquid culture. Results of the genomic isolation showed a variety of concentrations of DNA, with all of them being sufficient to proceed to the next step. PCR was used to amplify the 16S rRNA DNA for each of the strains, which was verified by gel electrophoresis. DNA sequencing reactions were assembled and then sent out for commercial sequencing. The completed DNA sequences were downloaded from the sequencing service web site and compared using the program BLAST (Basic Local Alignment Search Tool) for similarity. In order to assess possible physiological differences, the pigment profile of pigments produced by the strains on two media, LB agar and tryptic soy agar were compared.

Results

The DNA sequencing results showed that each of the three Photorhabdus strains that were isolated are most similar to each other and highly similar to know strains of Photorhabdus temperata from Wisconsin, and different from Photorhabdus luminescens strain HM. The pigment profile results showed E. coli was without a pigment while the three new strains produced the same light yellow color and the Photorhabdus HM had a dark orange pigment.

Conclusions/Discussion

With only a few base pairs difference, the bacteria isolated can be concluded to be a new substrain of Photorhabdus temperata. The pigment profiles were also consistent with the three new strains being the same strain and being different from Photorhabdus luminescens. Overall, this project is the first to report the presence of Photorhabdus temperata in the Santa Monica Mountains.

Summary Statement

Isolation of novel strains of Photorhabdus and their relationship to other strains.

Help Received

I preformed all technical aspects of the project besides the DNA sequencing, in which I used a commercial sequencing service. Method demonstration and lab access and equipment were provided by Prof. David Bermudes in the Department of Biology at California State University Northridge.