



CALIFORNIA STATE SCIENCE FAIR

2015 PROJECT SUMMARY

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| Name(s) Rebecca P. Chen | Project Number S1504 |
| Project Title Determining Genetic Causes of Streptococcus pyogenes' Susceptibility to Retinoic Acid | |
| Objectives/Goals This project's goal was to find the genes that contribute to Streptococcus Pyogenes' susceptibility to retinoic acid, the active form of Vitamin A. | Abstract A genetic screen was used to find the retinoic acid resistant AP M1T1 GAS 5448 mutants created using a Transposon Tn917 library. This was done through screening the transposon library, alternating it in 5 μ g/mL erythromycin antibiotic in Todd-Hewitt Broth (THB) and increasing concentrations of retinoic acid in 80% Roswell Park Memorial Institute media and 20% THB. After a manageable number of mutants were found, their genes disrupted by the transposon insertions were discovered using single-primer polymerase chain reactions, GeneWiz sequencing services, and ncbi.gov's nucleotide BLAST tool. |
| Results To date, three genes have been identified that contribute to susceptibility to retinoic acid; CitG gene, Csn1 gene and UvrC from the mutants A9 Sequence L-2, B6 Sequence L-2 and B10 Sequence L-2, and D10 Sequence L-2 respectively. | |
| Conclusions/Discussion The CitG gene either codes for part of the GntR family of transcriptional regulators, or a catalyst of functions dealing with energy as ATP. The Csn1 gene codes for proteins associated with prokaryotic acquired immunity. The UvrC gene codes for 1 of 3 subunits of an endonuclease that participates in the nucleotide excision repair process. These genes and how they contribute to the bacterium's susceptibility can be carefully studied further in the future to create novel non-antibiotic treatments of Streptococcus infections, thus reducing society's dependence on antibiotics and slowing the proliferation of antibiotic-resistant bacteria. | |
| Summary Statement A genetic screen is used to discover the genes that cause Streptococcus Pyogenes' susceptibility to retinoic acid. | |
| Help Received Used lab equipment at University of California, San Diego under the supervision of Dr. Ericka Anderson; Dr. Jason Cole and Samira Dahesh created the transposon library for me to use. | |