



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

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Project Title
A Study of Contact Lens Solution Preservatives as a Potential Treatment for MRSA and Pseudomonas Infections

Abstract

Objectives/Goals
The objective was to continue testing five select contact lens solutions against *P. aeruginosa*, and to see how low the lens solution preservatives Chlorhexidine Gluconate and Polyaminopropyl Biguanide could be diluted while still remaining effective antimicrobial agents against MRSA and Pseudomonas.

Methods/Materials
Part 1: *P. aeruginosa* was diluted to an optical density of 0.40 in phosphate buffered saline using a spectrophotometer, and this suspension was then diluted to 1:20. The solutions were serially diluted with CA-MHB, and 10 µl of the prepared bacterial solution was added. The plates were incubated, then resazurin was added. The experiment was repeated three times.
Part 2: The bacteria were prepared with the same methods as in Part 1. CHD and PAPB were serially diluted, then 10 µl of the bacterial solution was added to the wells. The plates were incubated. The MRSA and Pseudomonas trials were run separately.

Results
Part 1: Menicare was most effective in discouraging growth of *P. aeruginosa* than any of the other tested solutions, and the average percentage in which bacteria began to grow was 9.375%. Boston Advance and Simplus averaged 11.25%. Lobob and Opti-Free 18.75%, and the saline control 45%.
Part 2: Against MRSA, CHD and the combination averaged 0.000125% and PAPB averaged 0.0001875%. Against Pseudomonas, CHD and PAPB averaged 0.001% and the combination averaged 0.0005%.

Conclusions/Discussion
Part 1: None of the solutions performed as well against Pseudomonas as they had against MRSA. This data suggests that it is more difficult for the preservatives to kill Gram-Negative bacteria than Gram-Positive.
Part 2: The preservatives did not eliminate bacteria at percentages as low as hypothesized, possibly due to being isolated from the rest of the contact lens solution's ingredients. The next step would be to discover whether these concentrations are safe for human internal use.

Summary Statement
My project looks into the antiseptic ingredients in contact lens solutions as a potential treatment for MRSA and Pseudomonas infections, and is working toward finding a way to effectively do so.

Help Received
Used lab equipment at UCSD under the supervision of Dr. Victor Nizet and Mr. Leo Lin; Mrs. Elaine Gillum helped edit research paper; Parents bought contact lens solutions; Mother helped glue board together