How "Clean" Are Your Contacts?

Antimicrobial Effectiveness in Different Contact Solutions

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Introduction

- Many corneal eye infections are caused by harmful gram negative, such as *Pseudomonas aeruginosa*, that are found on contact lenses (**Sankaridurg, 2000**).
- Biofilms of *Pseudomonas aeruginosa*, *Serratia marcescens*, *Staphylococcus epidermidis*, *Streptococcus pyogenes* develop biofilms that can take over 10 hours to desinigrate in solutions **(Wilson, et al. 1991)**

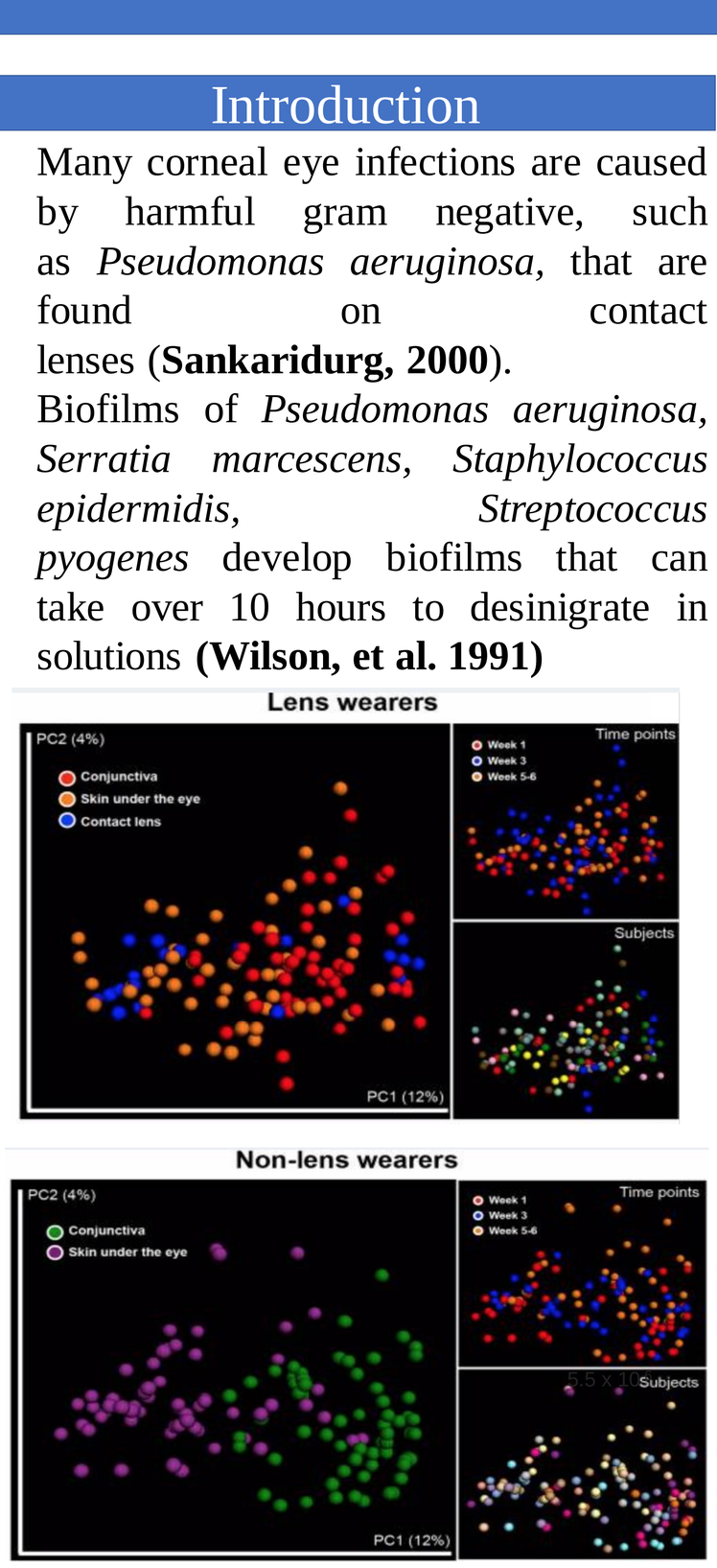
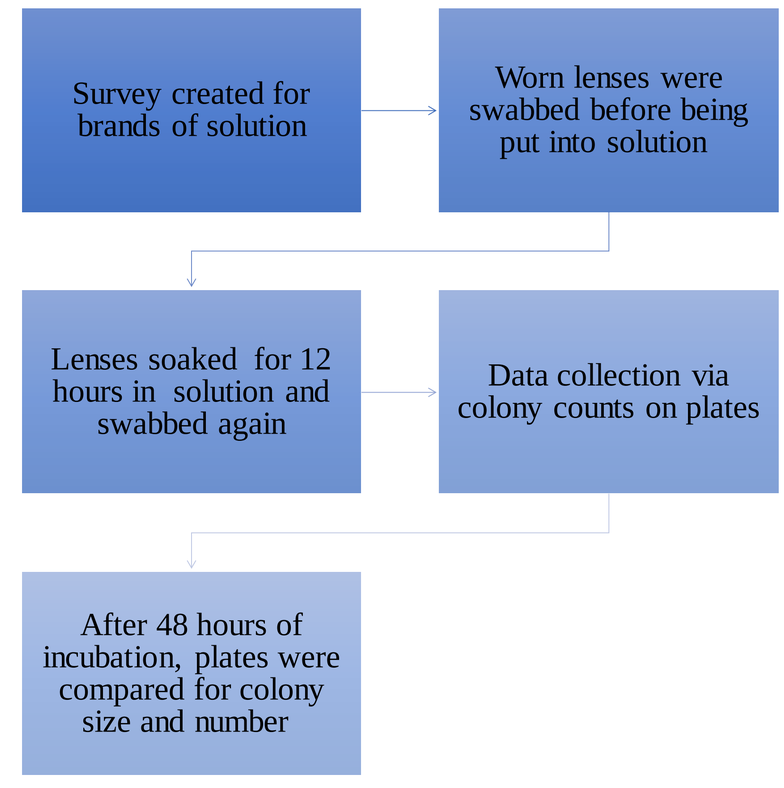


Figure 1. Diversity of conjunctiva, skin, and contact lens wearers vs non-wearers. Eye microbiota is different in those who wear contacts and resembles more closely to the microbiota of the skin**.**

***Hypothesis*:** Most brands of contact solutions claim to be 99.9% effective at removing microbes from the lenses and our goal was to see how well three contact solutions were at doing this.

Methods



Methods

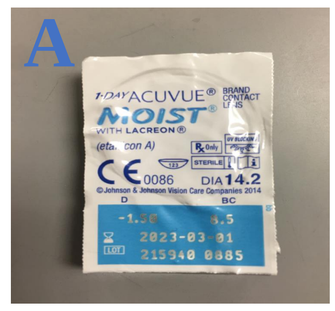


Figure 2. Panels A, B, C, and D represent the control and three solutions used in the experiment. The three solutions were chosen based upon the public's survey response.

Results

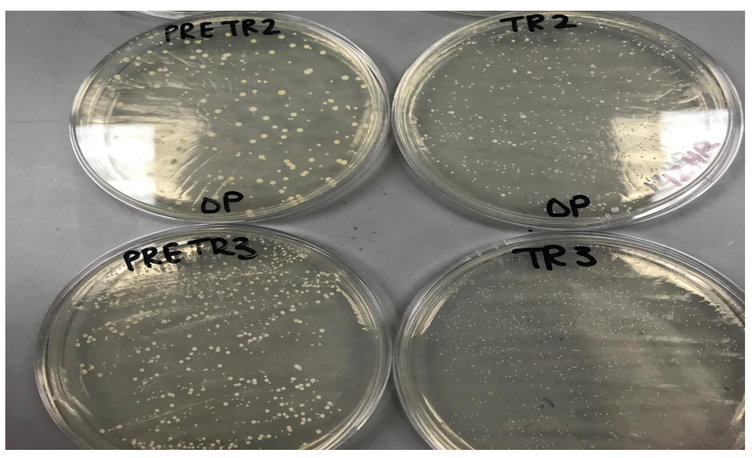


Figure 3. Solution B trials. Nutrient agar plates from solution B (Opti-Free) with all two out of three trials; before solution and after solution (48-72hr incubation period)

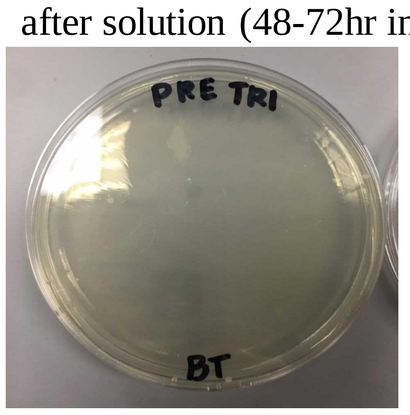


Figure 4. Solution D trials. The contacts acquired more bacteria after being in the solution (right) than before being soaked (left).

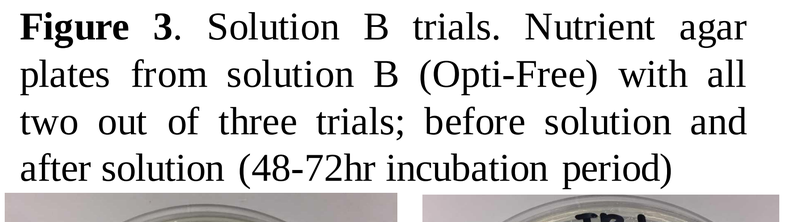


Figure 5. Results from the control solution (5A) along with 2 trials of the Generic Brand solution (5B). The top image, control, was expected to have zero growth and the bottom, GB, grew after sitting in solution for 12 hrs.

Results

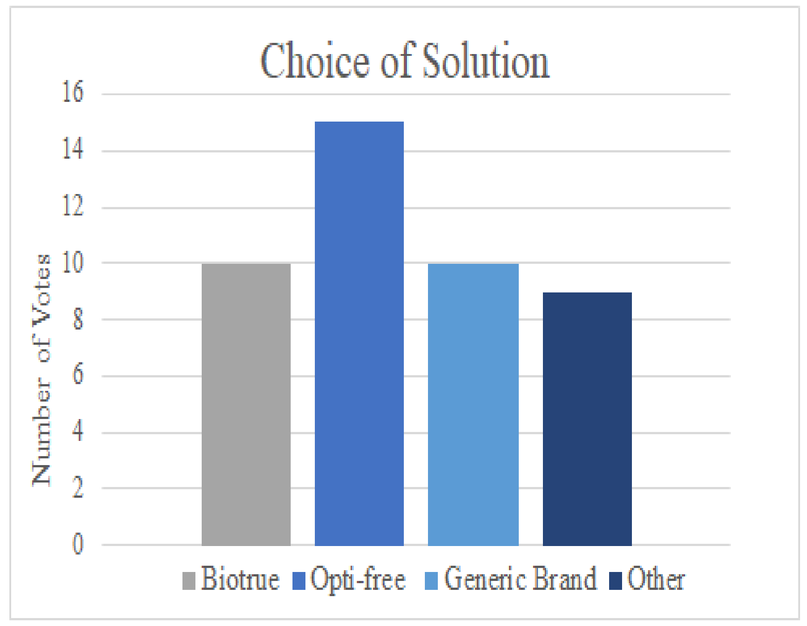


Figure 6. 44 participants partook in a survey and voted for the brand of solution they used.

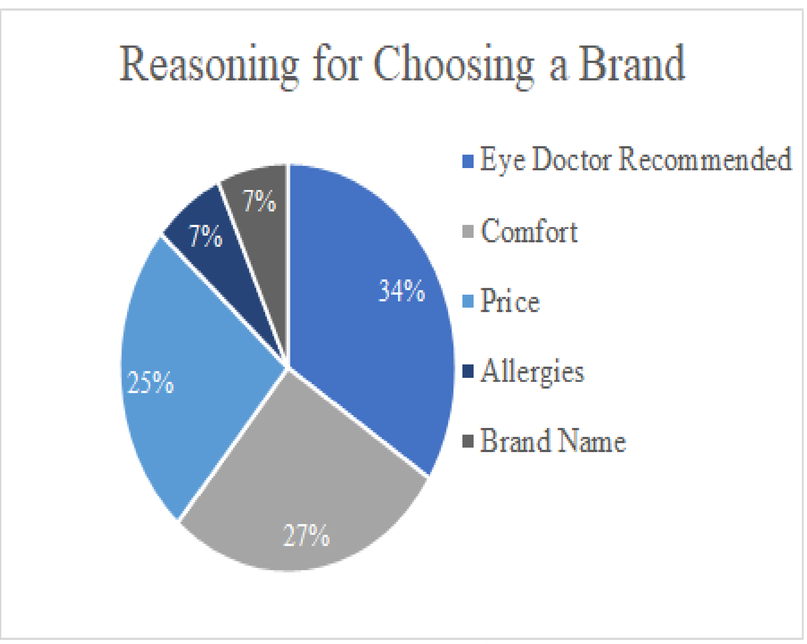


Figure 7. The participants of the survey chose a reason why they used their brand of solution from the above Figure 6.

Discussion

- Solutions are typically chosen by doctor recommendation, price, or comfort (**Figure 6**).
- Claiming to kill 99.99% of bacteria may only apply to 2-3 pathogens (**Nyco, 2018**).
- Uncontrolled temperatures can affect the outcome of how well a solution is able to kill bacteria from the lens (**Preidt R, 2008**).

Future Directions

- More trials with each solution to check the longevity of the solutions
- More test subjects
- Test the bacteria by gene sequencing (16S rRNA) to see what types of bacteria were present in the eye before and after solution

References & Acknowledgments

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2. Preidt R 2008. High Temps Degrade Contact Lens Solution: Study. ABC News. https://abcnews.go.com/Health/Healthday/story?id=6225896&page=1
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