

Introduction

- The project goal is to test the effectiveness of a coating on silicone tubing of peritoneal catheter extensions to reduce biofilm formation.
- Peritoneal dialysis (PD) is a treatment option that filters blood using the peritoneum [1].
- Dialysate enters the body through a peritoneal catheter-extension. Excess fluid and chemical waste diffuse across the peritoneum and into the PD fluid which is then removed from the body [2].
- Peritonitis is the inflammation of the peritoneum usually from bacterial or fungal infection. Minimizing infections is important for PD patients to improve quality of life [3].

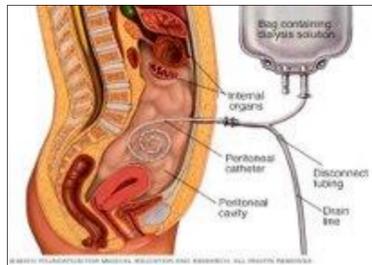


Figure 1. Diagram of peritoneal dialysis setup.

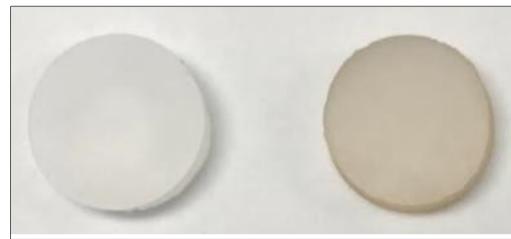


Figure 2. Images of bare non-coated (left) silicone coupon, and the metallic coated silicone coupon (right).

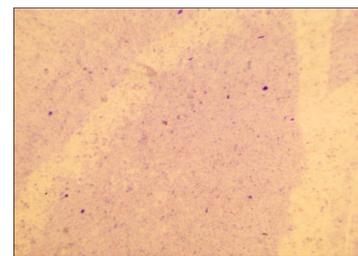
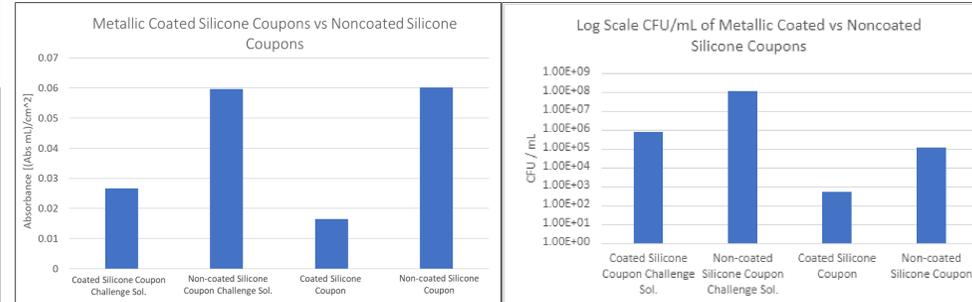


Figure 3. (Left) Metallic coated coupon after crystal violet staining at obj. 10x.



Figure 4. (Right) Metallic coated coupon after crystal violet staining.

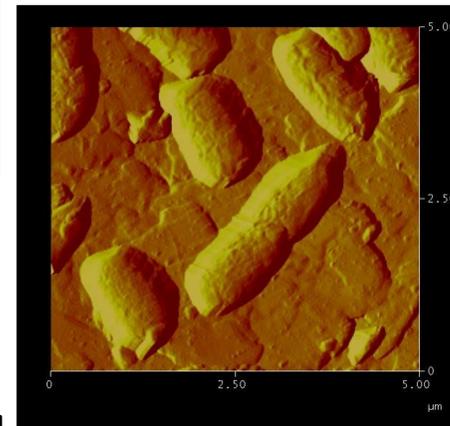


Figure 5. Atomic force microscopy image of non-coated silicone coupon.

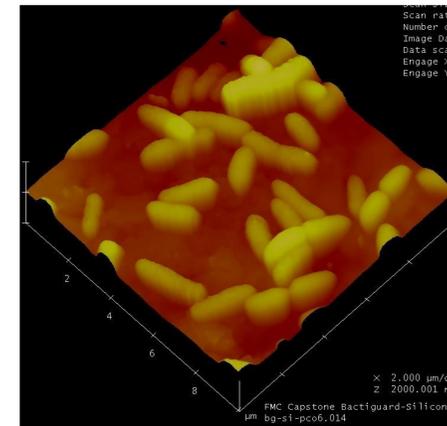


Figure 6. Atomic force microscopy 3D image of metallic coated silicone coupon.

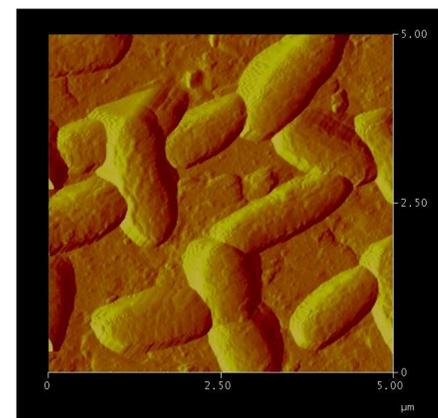


Figure 7. Atomic force microscopy image of metallic coated coupon.

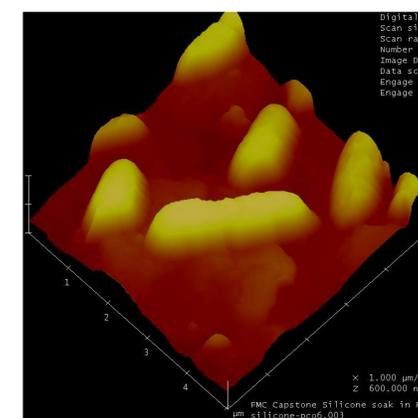


Figure 8. Atomic force microscopy image 3D of non-coated silicone coupon.

Results and Discussion

- Crystal violet staining has shown a 55.42% reduction between the metallic coated and non-coated silicone coupons. The challenge solution has shown a 72.63% reduction in bacterial growth.
- Colony forming units per mL data has shown a 2-log reduction between the metallic coated and non-coated silicone coupons. The challenge solution has also shown a 2 log reduction between the metallic coated and non-coated silicone coupons.
- Visual confirmation of crystal violet staining the biofilm attached to the coupons has been shown in Figures 3 & 4.
- As shown in the AFM images healthy bacteria can be seen growing on both the metallic coated and non-coated silicone coupons. These images are shown in Figures 5-7.

Future Work

- Perform more replicates of the experiment.
- Use of *S. aureus* and *P. Aeruginosa* in place of PcO6.
- Analyze the results with atomic force microscopy and scanning electron microscopy.
- Analyze results using live dead staining techniques.
- Replicate results to ensure reliability.

Acknowledgements

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References

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Method

