

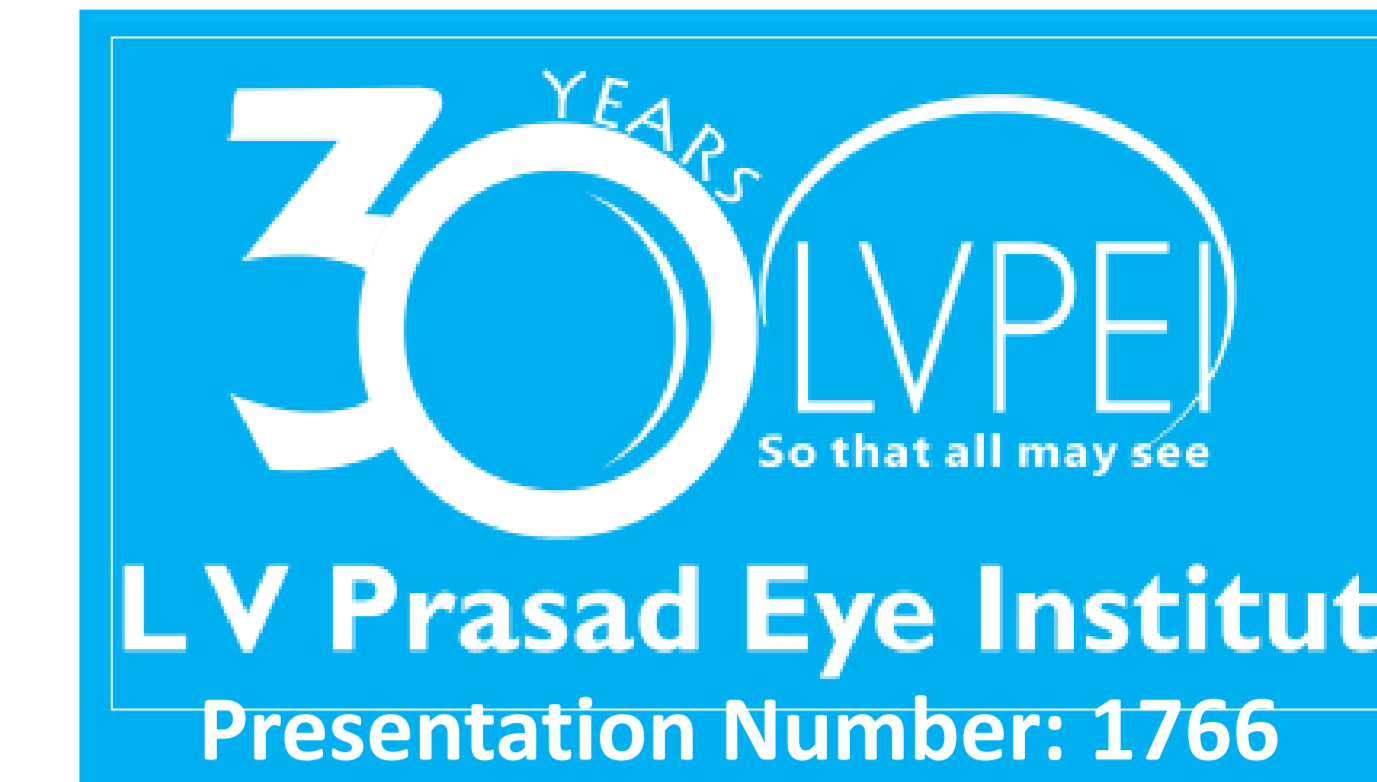


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THE TIME-COURSE OF RETENTION OF ANTI-ADHESION ACTIVITY OF MEL4 PEPTIDE-COATED CONTACT LENSES

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INTRODUCTION

- The antimicrobial Mel4 peptide is a small protein, which can prevent microbes from adhering to contact lens surface.¹
- Mel4-coated contact lenses have been tested ex-vivo and shown to be safe to wear in humans on a daily wear schedule for a week.¹
- A recently completed 3 month clinical trial with Mel4-coated contact lenses worn on a 14 day extended wear modality has shown no unforeseen events, or evidence of cytotoxicity.
- However, after 14 days of wear, Mel4-coated contact lenses lost antimicrobial activity against *P. aeruginosa* and *S. aureus*.
- The unworn Mel4-coated contact lenses had excellent antimicrobial activity against *P. aeruginosa* and *S. aureus* compared to uncoated control lenses.
- Mel4-coated antimicrobial contact lenses retain inhibitory activity following 1 day of human wear. However, the retention of activity following prolonged wear remains unknown.
- This study examined how long the antimicrobial activity of Mel4-coated contact lenses was retained during wear.

AIM

- To determine the time course for retention of inhibitory activity of Mel4-coated antimicrobial contact lenses during human wear.

METHODS

- Mel4 peptide was covalently coated onto commercially available Etafilcon A contact lenses using EDC (1-ethyl-3-[3 dimethylaminopropyl] carbodiimide hydrochloride) and NHS (N-Hydroxysuccinimide) coupling.²
- A prospective, randomised, single masked, contralateral extended contact lens wear trial with 12 human subjects was conducted.
- Subjects wore Mel4-coated lenses and uncoated lenses. Lenses were collected after 8 hours, 1 night, 3 nights, 6 nights, and 9 nights of lens wear.
- Ex-vivo retention of activity was investigated using *S. aureus* L2260/15 and *P. aeruginosa* ATCC 27853 immediately after lens collection.
- Antimicrobial activity of Mel4-coated lenses was evaluated after allowing 1.0×10^6 cfu/ml of bacterial cells to adhere to the lenses for 18 hours at 37°C. Uncoated Etafilcon A lenses were used as controls.
- After adhesion, the numbers of viable bacteria on the lenses were determined by agar plate counts.
- Antimicrobial activity of Mel4-coated lenses against the *P. aeruginosa* and *S. aureus* strains were evaluated by viable plate count.
- The retention of activity was analysed using the Wilcoxon signed rank to compare between Mel4-coated and control lenses.

REFERENCES

1. Dutta et al. Contact Lens and Anterior Eye 2017;40:175-83
2. Dutta et al. Invest Ophthalmol Vis Sci 2013;54:175-82

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RESULTS

- Ten subjects successfully completed the study. The male and female ratio was 1:9, with an average age of 21.3 ± 3.2 years.
- One participant dropped out of lens wear during the study due to severe dryness and discomfort with both contact lenses. Another participant dropped due to epidemic viral conjunctivitis.
- Worn Mel4-coated contact lenses were active against *P. aeruginosa* and *S. aureus* for up to 3 days.

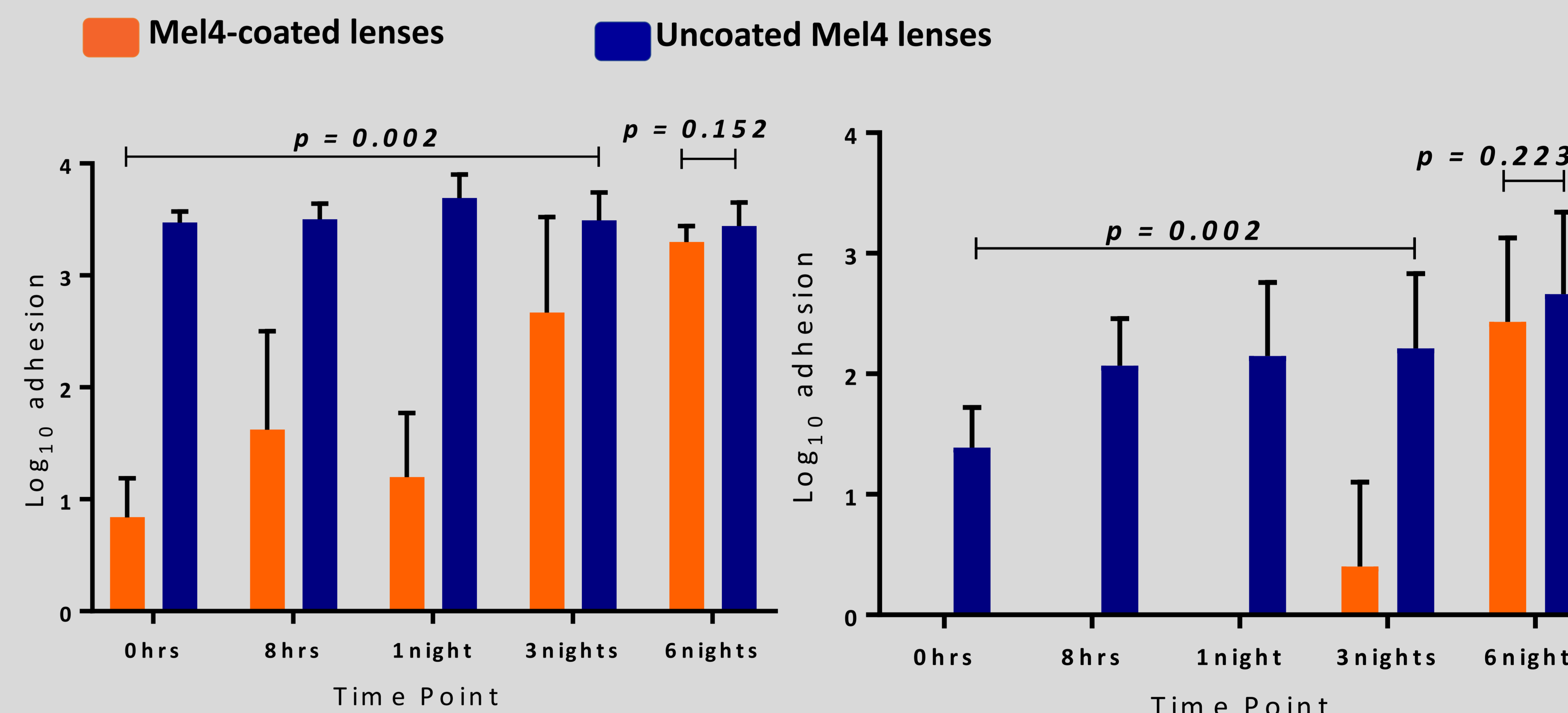


Figure 1: *P. aeruginosa* adhesion to contact lenses

Figure 2: *S. aureus* adhesion to contact lenses

CONCLUSION

- Mel4-coated contact lenses retain antimicrobial activity against *S. aureus* and *P. aeruginosa* for at least three nights of wear but lose the activity at six nights of wear.
- This loss of activity may be due to the fouling of the lens surface by tear film components or degradation of the Mel4 peptide. These possibilities are being examined in follow-up studies.

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