

Platelet Lysate Protects Ocular Surface and Decreases Inflammation in Dry Eye

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Conflict of Interest - Disclosure

- No conflict of interest to declare

Introduction

- **Exposure Keratopathy:** Inadequate eyelid closure or blinking reflex
→ Prolonged exposure of the ocular surface and drying of the cornea
- **Human Platelet Lysate (HPL):** Centrifugation and subsequent isolation of the platelet fraction from the platelet-rich plasma (PRP) or platelet concentrate (PC)
→ Release of rich growth factors after freeze/thaw cycle(s):¹
 - ✓ Epidermal growth factor (EGF)
 - ✓ Transforming growth factor - β 1 (TGF- β 1)
 - ✓ Platelet-derived growth factor-AB (PDGF-AB)
 - ✓ PDGF-BB
 - ✓ Hyaluronic acid

Purpose: To evaluate the effects of HPL on exposure keratopathy in the rabbit model.

Methods



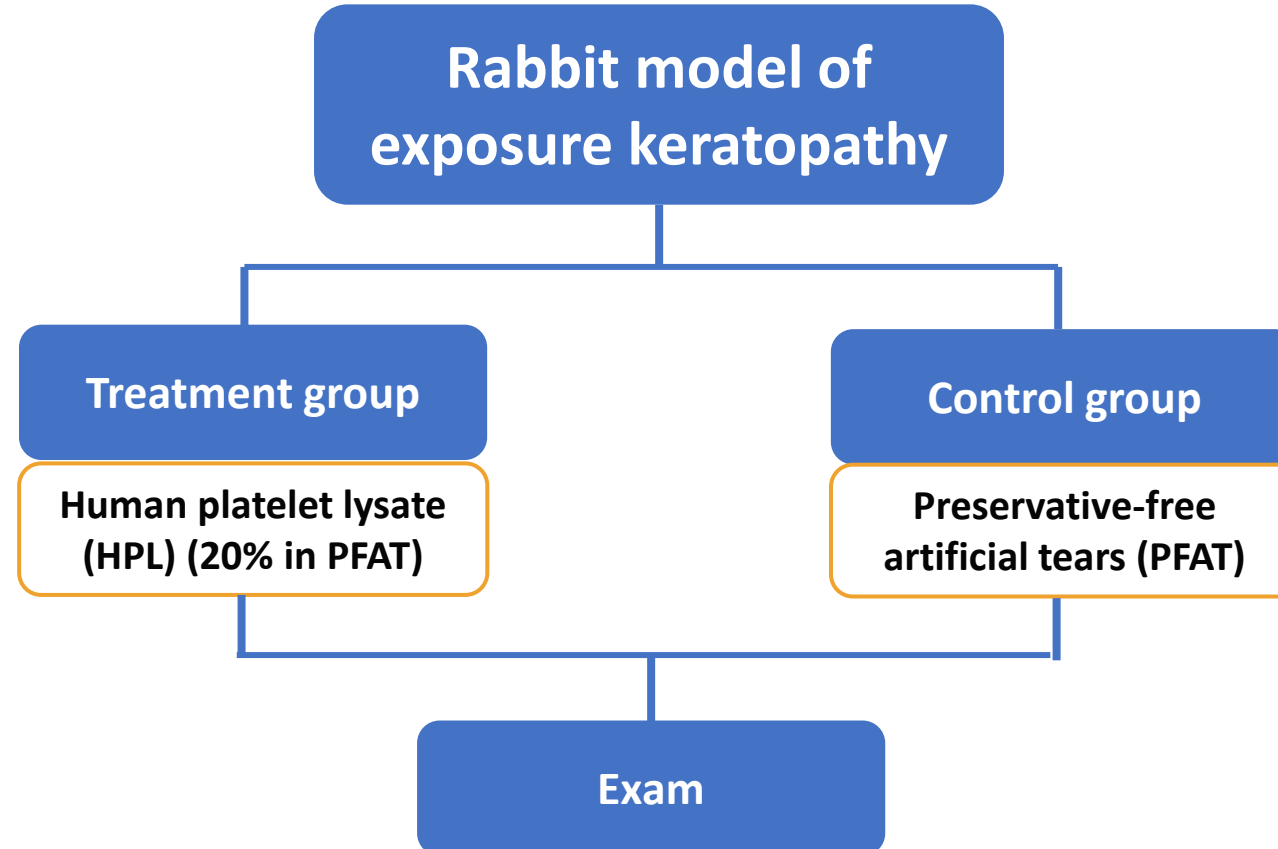
Human plate lysate

Commercially available HPLs, UltraGRO (Helios, Atlanta, Georgia, USA)

Rabbit model of exposure keratopathy

- New Zealand albino rabbits (female, 3.0–3.5 kg; age: 6 months)
- Specula applied to the right eyes continuously without any lubricants,
 - Exposure of the cornea to perilimbal conjunctiva for 4 hours (in 50~60% humidity, 25~28°C)
 - Specula removed and applied topical medication every 15 minutes for 4 hours

Methods



1. Fluorescein staining: Epithelial healing
2. Ultrasound pachymetry: Monitor central corneal thickness change
3. In vivo confocal microscopy: Observe cellular morphology and inflammatory infiltrate at different layers
4. Immunohistochemistry: Identify the inflammatory cells

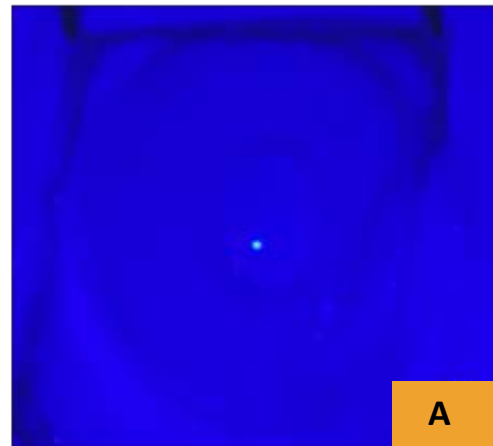
Result : Fluorescein Staining

Pre-exposure 0 hr

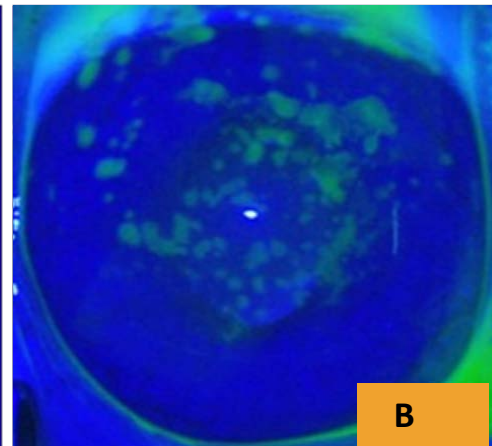
Post-exposure for 4 hrs

Post-treatment for 4 hrs
(Treat/15 min)

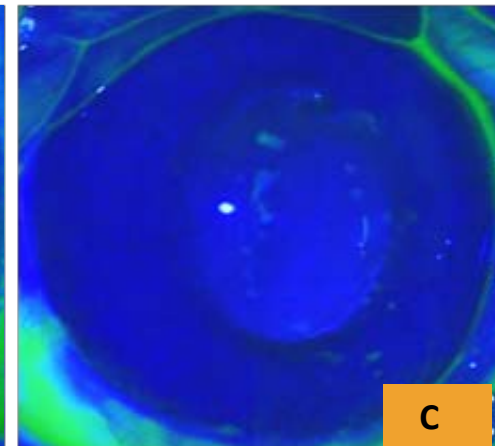
PFAT



A

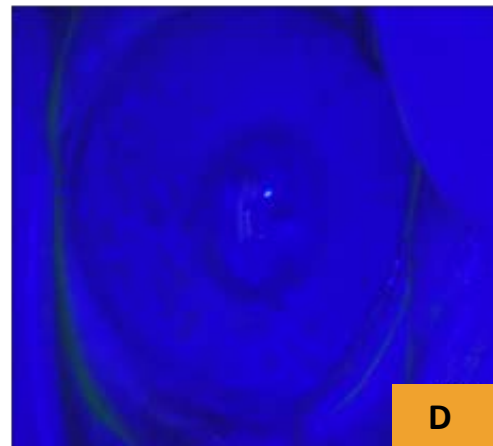


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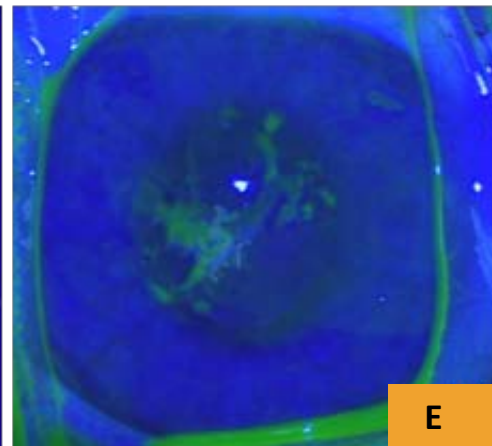


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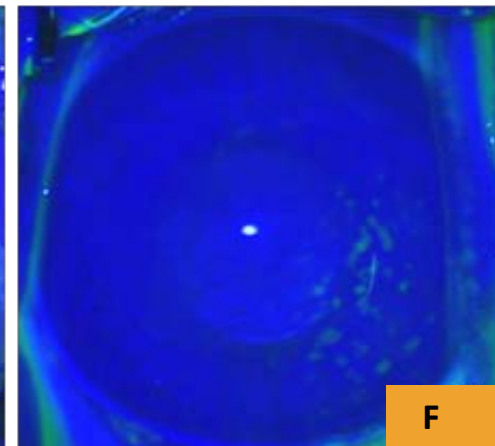
HPL



D

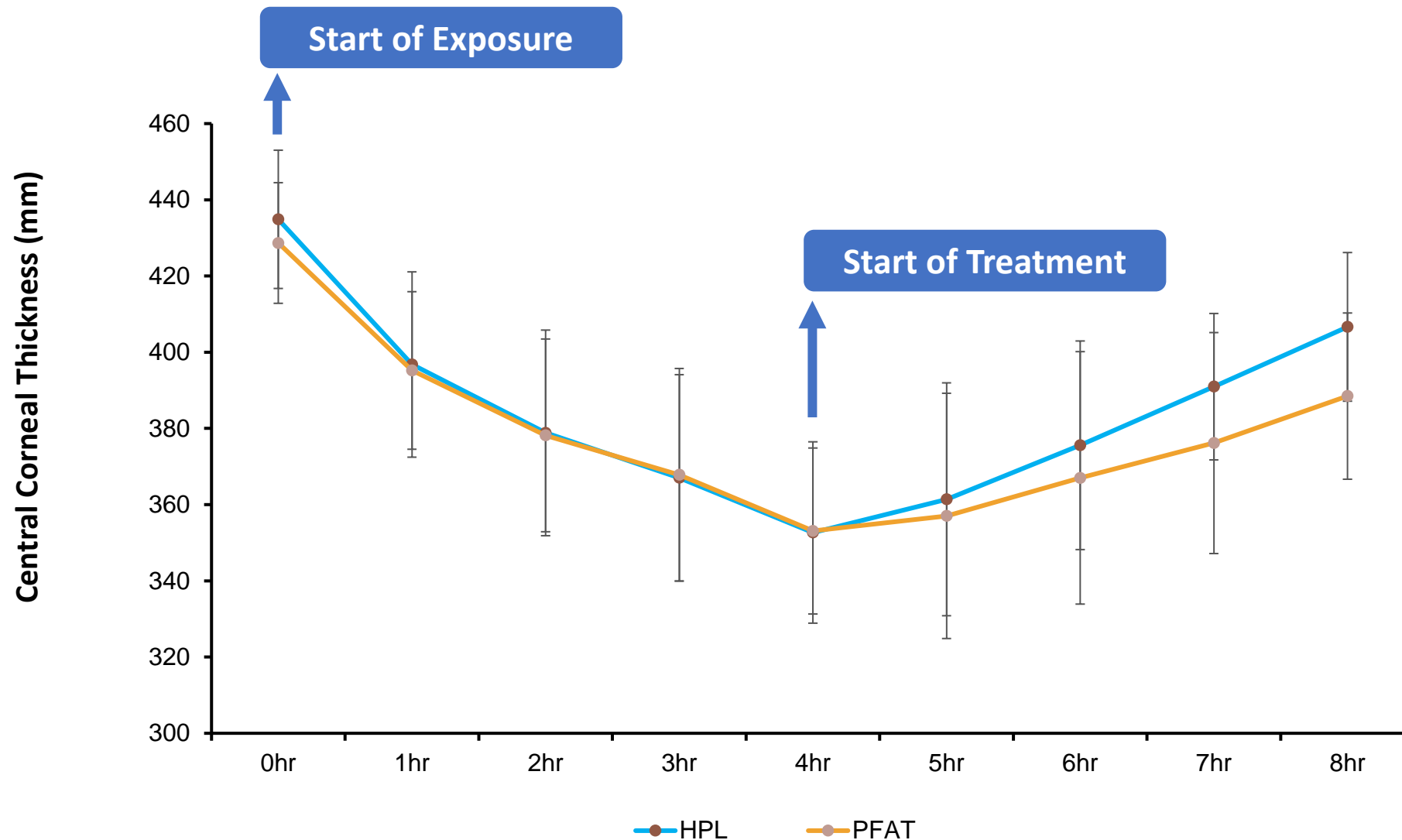


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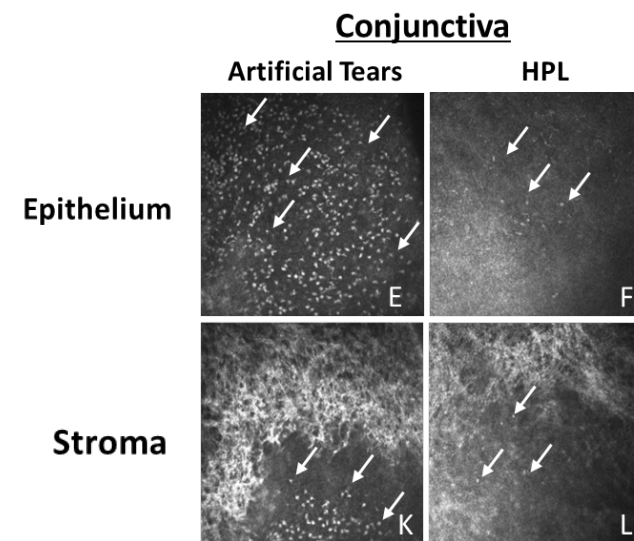
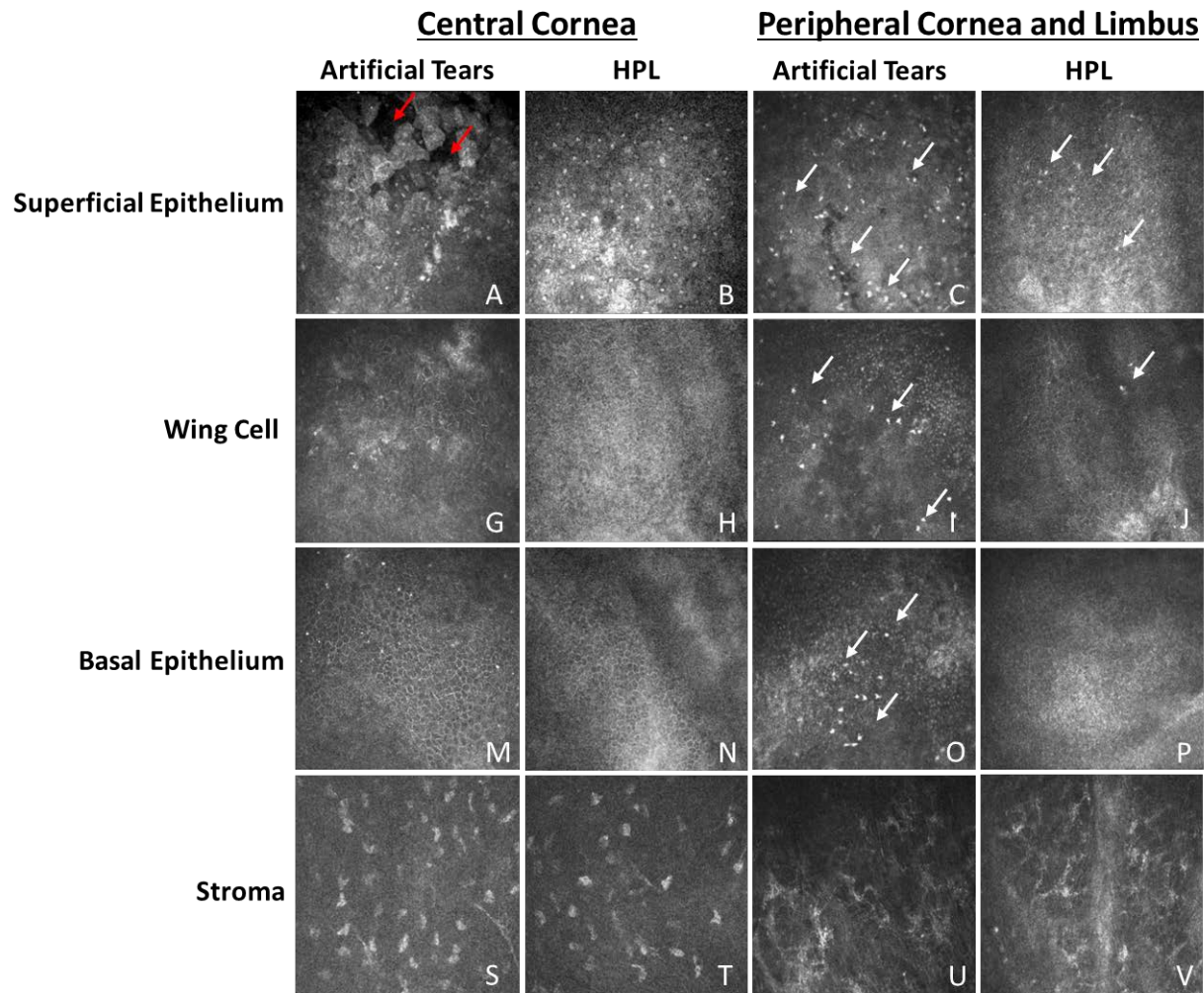
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Result : Ultrasound Pachymetry



Result : In vivo Confocal Microscopy

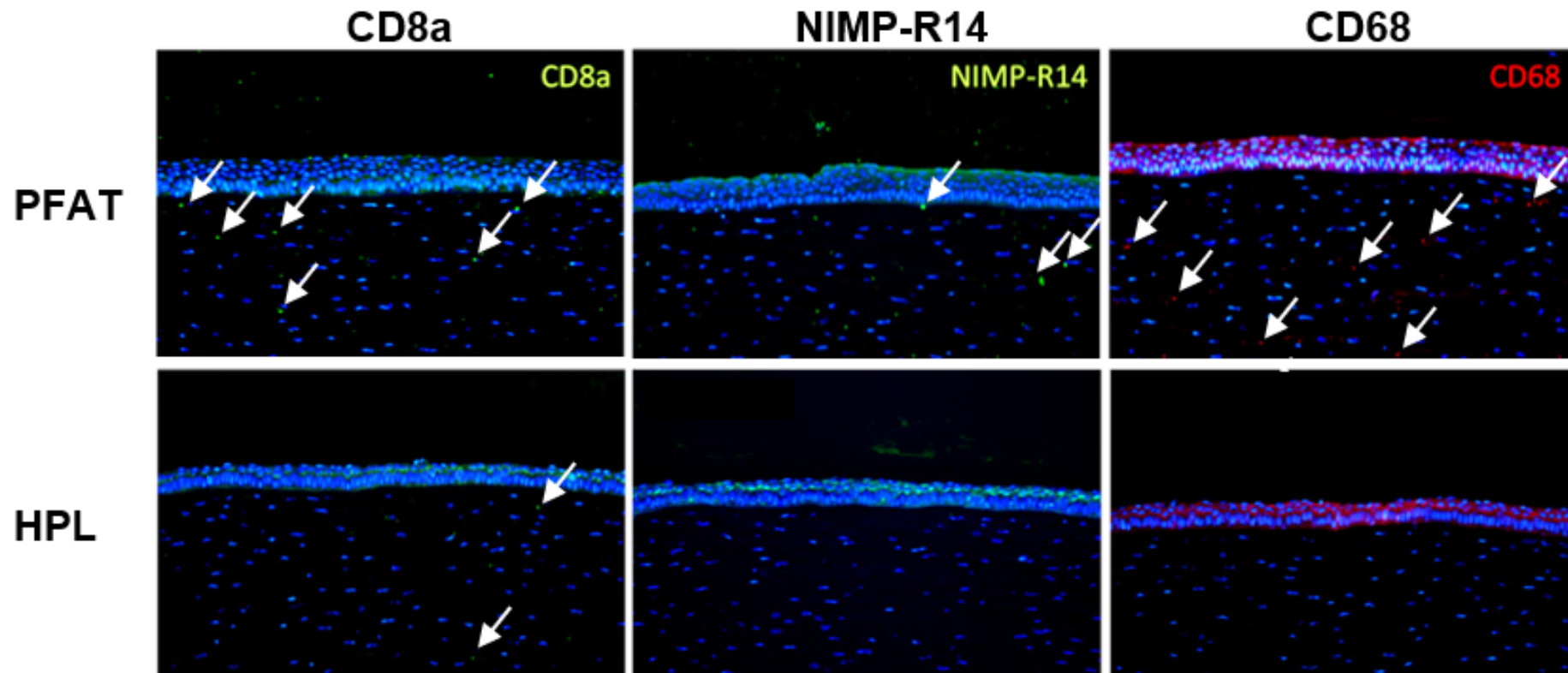
Post-treatment for 4 hrs



Red arrow: Cellular disappearance
White arrow: Inflammatory cells

Result: Immunohistochemical (IHC) staining - Cornea

Post-treatment for 4 hrs



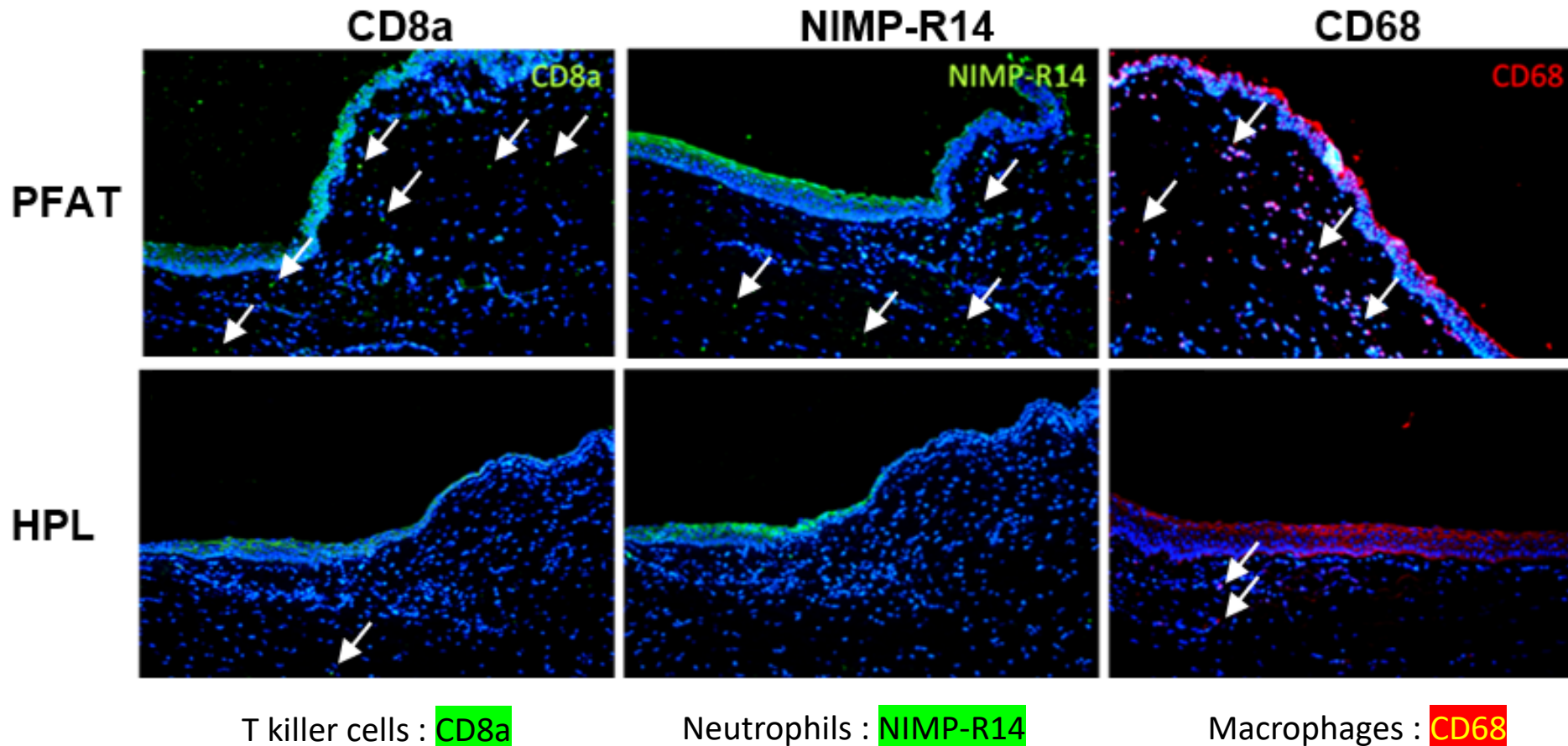
T killer cells : **CD8a**

Neutrophils : **NIMP-R14**

Macrophages : **CD68**

Result: Immunohistochemical (IHC) staining - Limbus

Post-treatment for 4 hrs



Conclusion

In treating short-term exposure keratopathy in a rabbit model, HPL showed:

- **Decrease superficial cellular loss**
- **Significant inhibitory effect on inflammatory responses**

Thus, HPL may provide a valuable alternative in the management of dry eye disease especially in short-term exposure keratopathy

References

1. Huang CJ, Sun YC, Christopher K, et al. Comparison of corneal epitheliotrophic capacities among human platelet lysates and other blood derivatives. PLoS One. 2017;12(2):e0171008.

THANK YOU

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