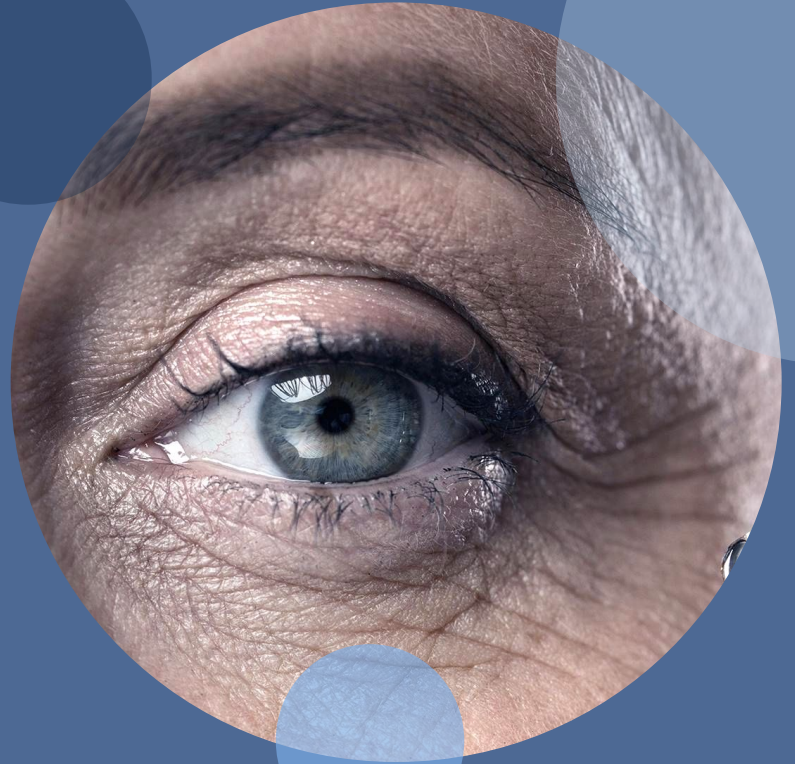


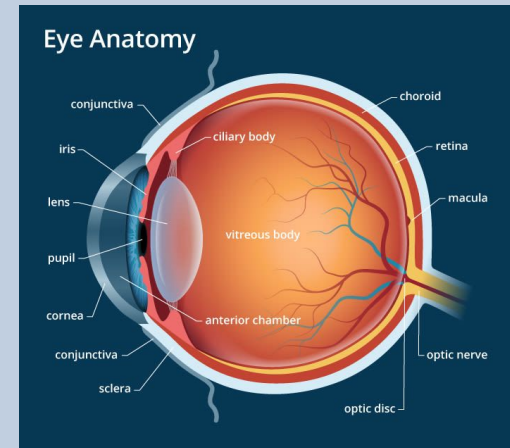
Immunotherapy Project: Keratitis

Brianna Cervantes



What is keratitis?

- Keratitis = inflammation
 - Due to contact lens use
- Caused by *Pseudomonas aeruginosa*
 - Digest cornea
 - Contributes to inflammation when infect host
- Antibiotic Resistant
- Pyocyanin
 - Neutrophil = apoptosis



Current Therapies (Antibiotic Treatment)

01

Tobramycin

Weaker



02

Besivance

Stronger



03

Moxifloxacin

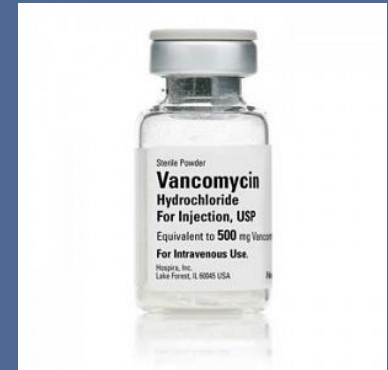
Stronger



04

Vancomycin

Has to be made in the pharmacy
Can't be found in an eye drop alone without need
Cannon



Current Therapies (Steroid Treatment)

01

Lotemax

Strong



02

Alrex

Low



03

Durezol

Canon



04

Tobradex

Mix of antibiotic and steroid
Sporadic use

Used if swelling is really bad and
need to get infection under
control



Immune Protection/Response



APCs



Tear Fluid



Corneal
Epithelium



Immunotherapy Approach (Glutop)

- Glutathione (GSH)
 - Reduce biofilm
 - Prevent secretion of toxin
- Eye Drop
 - Combo with antibiotic
 - OR
 - Work with antibiotic
- Similar Approach
 - Stem Cell Eye Drops



Possible Side Effects/Would it be effective?

- Too high of a concentration can cause ROS to attack corneal cells
- Allergies



- It is unknown whether this technique would be a better approach from traditional treatments
- Traditional approach could be cheaper

A close-up photograph of a woman lying back, receiving eye drops from a healthcare professional. The professional's hands are visible, one holding a small white bottle and the other holding a white tissue. The woman has a neutral expression and is looking upwards. The background is softly blurred, suggesting a clinical or medical setting. There are three semi-transparent circular overlays: a light blue one in the top left, a dark blue one in the middle left, and a dark blue one in the bottom right.

QUESTIONS?

References

- Curran, Colleen S, et al. "Mechanisms and Targeted Therapies for Pseudomonas Aeruginosa Lung Infection." *American Journal of Respiratory and Critical Care Medicine*, American Thoracic Society, 15 Mar. 2018, www.ncbi.nlm.nih.gov/pmc/articles/PMC5855068/.
- O'Malley, Yunxia Q., et al. "Pseudomonas Aeruginosapyocyanin Directly Oxidizes Glutathione and Decreases Its Levels in Airway Epithelial Cells." *American Journal of Physiology-Lung Cellular and Molecular Physiology*, vol. 287, no. 1, 11 Mar. 2004, doi:10.1152/ajplung.00025.2004.
- Das, T, Simone, M., Ibugo, A.I., Witting, P.K., Manefield, M., Manos, J., 2017. Glutathione Enhances Antibiotic Efficiency and Effectiveness of DNase I in Disrupting Pseudomonas aeruginosa Biofilms While Also Inhibiting Pyocyanin Activity, Thus Facilitating Restoration of Cell Enzymatic Activity, Confluence and Viability. *Frontiers in Microbiology* 8. doi:10.3389/fmicb.2017.02429
- Klare, William, et al. "Glutathione-Disrupted Biofilms of Clinical Pseudomonas Aeruginosa Strains Exhibit an Enhanced Antibiotic Effect and a Novel Biofilm Transcriptome." *Antimicrobial Agents and Chemotherapy*, vol. 60, no. 8, 2016, pp. 4539–4551., doi:10.1128/aac.02919-15.
- Van Laar, Tricia A., et al. "Pseudomonas AeruginosagshAMutant Is Defective in Biofilm Formation, Swarming, and Pyocyanin Production." *MSphere*, vol. 3, no. 2, 2018, doi:10.1128/msphere.00155-18.
- Zeppieri, Marco, et al. "Adipose Derived Stem Cells for Corneal Wound Healing after Laser Induced Corneal Lesions in Mice." *Journal of Clinical Medicine*, vol. 6, no. 12, 2017, p. 115., doi:10.3390/jcm6120115.
- Hilliam, Yasmin, et al. "Pseudomonas Aeruginosa and Microbial Keratitis." *Journal of Medical Microbiology*, vol. 69, no. 1, 2020, pp. 3–13., doi:10.1099/jmm.0.001110.
- Taube, M-A, et al. "Pattern Recognition Receptors in Microbial Keratitis." *Eye*, vol. 29, no. 11, 2015, pp. 1399–1415., doi:10.1038/eye.2015.118.
- Deschênes, Jean. *Bacterial Keratitis Treatment & Management: Medical Care, Surgical Care, Consultations*, Medscape, 8 May 2020, emedicine.medscape.com/article/1194028-treatment#:~:text=The%20traditional%20therapy%20for%20bacterial,still%20the%20recommended%20initial%20therapy.
- Geddes-McAlister, Jennifer, et al. "Tasked with a Challenging Objective: Why Do Neutrophils Fail to Battle Pseudomonas Aeruginosa Biofilms." *Pathogens*, vol. 8, no. 4, 8 Dec. 2019, p. 283.

