

Clinical Translation of a Novel Anti-Microbial Therapy for Eye Infections

Principal Investigators

PolyU : Qian Zhao

UW : Benjamin Thompson

Co-I : Chuen Thomas Lam

Aims

To complete preclinical testing and promote the translation of an innovative therapy designed to treat eye infections, addressing the urgent challenge of microbial resistance to existing antibiotic options.

Background

Antimicrobial-resistant pathogen, such as Methicillin-resistant *Staphylococcus aureus* (MRSA), poses a serious global health threat, especially in ocular and skin infections. Antibiotic efficacy varies due to resistance and microbiome disruption, increasing infection risks and treatment side effects. Previously, the project team discovered a combination therapy of a protein and a FDA-approved drug, enhancing antimicrobial effects over 500-fold. This therapy demonstrated excellent efficacy in animal models of ocular and skin infections.

Work to be Done

Comprehensive preclinical testing is essential to define the therapeutic index and guide future clinical trials, advancing this antimicrobial combination therapy toward regulatory approval and clinical use. Key tasks include:

- **Efficacy & Safety Testing** : Assessing treatment effects through bacterial load, ocular injury scores, immune response markers, and toxicity studies.
- **ADME Testing** : Evaluating drug absorption, distribution, metabolism, and excretion by analysing plasma and tissue concentrations.
- **Pharmacokinetics (PK) Studies** : Determining PK parameters after topical administration in mice.
- **Next-Generation Drug Development** : Building on prior CEVR research, the team aims to optimize the therapy through rational drug design, and drug repurposing, by leveraging the unique molecular mechanisms it discovered.

Benefits

Effective eye disease therapies reduce vision loss and ease healthcare burdens, especially for aging populations. The potent anti-infection treatment alleviates suffering, lowers resistance, costs, and hospital admissions. Long-term, policy-driven stewardship strengthens global health strategies and sustains effective treatments.

Impact

By repurposing FDA-approved treatments, the novel therapy accelerates drug development, reduces costs, and will potentially generate a sustainable R&D pipeline. The long-term impact includes better public health, lower healthcare costs, and improved treatment options for drug-resistant infections.

