FINAL REPORT

DATE: 3 June 2024

GRANT: CFWA Golf PhD Top Up Scholarship 2020

RECIPIENT: Joshua Iszatt

PROJECT TITLE: Investigating an alternative therapeutic agent for the treatment of bacterial infections in kids with cystic fibrosis

The rise of bacteria resistant to multiple antibiotics is a significant public health challenge. One of the most dangerous species is Staphylococcus aureus, particularly its resistant form known as Methicillin-Resistant S. aureus (MRSA). This pathogen commonly causes recalcitrant respiratory infections in young patients with cystic fibrosis (CF). Infections with MRSA lead to inflammation, airway damage, and lung function decline over time. Currently, prolonged courses of various antibiotics are used to treat lung infections in CF patients.

Bacteriophages, or phages, are viruses that infect and kill bacteria, offering a potential new treatment against MRSA in addition to antibiotics. However, finding effective phages against S. aureus and ensuring their safety for use against lung infections has been challenging. This project aimed to discover environmental phages that can combat S. aureus and to assess their safety using animal airway models.

In this study, two novel phages, named Koomba kaat 1 and Biyabeda mokiny 1, were discovered and found to be effective against a broad range of MRSA bacterial isolates. The safety of these phages was evaluated using animal models where numerous airway-specific endpoints, such as inflammatory cytokines and total cell counts, were measured. The results indicated that neither Koomba kaat 1 nor Biyabeda mokiny 1 caused any damaging outcomes. This research, conducted in the final year of this PhD project, enhances our understanding of using phages to treat chronic MRSA lung infections and has indicated that purified phage suspensions may be applied directly to the lungs with no adverse effects.