ACT HEALTH VACATION STUDY PROGRAM

PROJECT SUMMARY

Project Title	Killer peptides – a silver bullet for antimicrobial resistant bacteria
Supervisor	Prof. Si Ming Man, Dr. Daniel Enosi Tuipulotu, A/Prof Dipti Dipti Talaulikar
Address	Division of Immunity, Inflammation and Infection The John Curtain School of Medical Research The Australian National University 131 Garran Rd, Acton ACT 2601
Telephone	+61 2 612 56793
Email	siming.man@anu.edu.au / daniel.enosi@anu.edu.au

Lead discipline (please select one)	
☐ **Nursing and Midwifery**	☐ **Health Economics**
☐ **Allied Health**	☐ **Biostatistics**
☐ **Medicine**	☐ **Value-based Healthcare**
X Pre-clinical	☐ **Epidemiology**
☐ **Health Policy**	☐ **Other**

Outline of the project 250 words max

According to the World Health Organisation, infectious diseases kill 17 million people each year, posing a significant economic burden to the global economy. Although antibiotics have been instrumental in the treatment of infections, many are rapidly becoming ineffective due to widespread resistance. As a result, infections with multi-drug resistant bacteria, viruses and fungi result in severe disease, which are often difficult to treat. **This increase in multidrug resistance is alarming and there is an urgent need to identify new therapies to combat and kill these pathogens.**

Our lab has engineered a series of novel antimicrobial peptides that can kill several clinically important bacteria with considerable potency. Notable examples are *Neisseria meningitidis* and *Moraxella catarrhalis.* We hypothesise that these antimicrobial peptides rupture the bacterial membrane causing it to explode. Moreover, these antimicrobial peptides may have broad spectrum activity.

This project aims to assess the antimicrobial efficacy of engineered antimicrobial peptides against a library of clinical isolates, including antimicrobial-resistant strains.

Specifically, you will examine the antimicrobial effect of 10 engineered peptides against 10 species of clinically important bacteria obtained from the Canberra Hospital. Antimicrobial sensitivity will be assessed using colony forming unit assays and growth curve analysis. Promising antimicrobial peptide candidates will be tested over a range of concentrations to determine the minimum inhibitor concentration (MIC).

Proposed research methods

You will gain hands-on research experience in a world-leading research institution and learn advanced microbiology techniques including the development of antimicrobial assays to discover novel therapeutics for the treatment of infectious agents.

Expected outcomes:

This proposal will provide fundamental knowledge in antimicrobial drug discovery and preclinical development. Students will acquire knowledge of the current status of antimicrobial stewardship in addition to knowledge of new and upcoming therapies that will ultimately aid management of infectious diseases in a clinical setting.

Preferred study discipline being undertaken by the student

Medical Sciences, Biological sciences, or Medicine

Benefits to the student and to the department

This project will provide following benefits to the student:

i) opportunity to contribute to world-class and timely research;
ii) enhance critical thinking, knowledge, and research skills;
iii) learn experimental techniques relevant to the study of infectious disease and antimicrobials;
iv) improve scientific writing and communication skills;

The project will provide following benefits to the department:

(i) attract students with an interest in medical research
(ii) showcase research excellence of the Division
(iii) promote future collaboration
(iv) demonstrate leadership in research and education.

Alignment with Government Research Priorities 100w max

The knowledge gained from the proposed project will:

(i) enhance our scientific understanding the exact mechanism in which antimicrobial peptides kill bacteria.
(ii) determine the spectrum of disease-causing bacteria that are susceptible to variations of engineered antimicrobial peptides.
(iii) expand the repertoire novel therapeutic options that are currently in development to counter the global crisis of antibiotic resistance.

This proposal aligns with the Australian Government's National Science and Research Priorities in the area of health.

Department within ACT Health Directorate / Canberra Health Services where the student will be based

The project will be jointly supervised in the labs of Professor Si Ming Man from The John Curtin School of Medical Research and A/Prof. Dipti Talaulikar from the Canberra Hospital.

Please submit form to preclinical.research@act.gov.au