

# Lipidated Polymyxins

Novel analogue of polymyxin B as a new last-line therapy against antibiotic-resistant strains of Gram-negative bacteria.



## Problem

The growing issue of antibiotic-resistant bacteria is one of the greatest threats to humanity. Bacteria have been consistently mutating in response to the overuse or misuse of antibiotics. Globally, around 1.27 million people died in 2019 as a result of antibiotic-resistant infections and this figure is expected to grow to 10 million by 2050.

Polymyxins are a class of well-established antibiotics which were withdrawn from clinical use due to their nephrotoxicity and neurotoxicity following intravenous administration. Over the last ten years, many industry and academic players have been working to develop a safer, effective novel polymyxin. Despite these research and development efforts, very few polymyxins have translated into the clinical setting, highlighting the urgency of a new analogue.

## Technology

Of the numerous different compounds of the polymyxin family (A-F, K, M, P, S, T) that are used clinically, polymyxin B and E (colistin) have the lowest toxicity profile and most favourable pharmacological properties. Even so, patients experience significant adverse side effects. New analogues are therefore needed to circumvent these while retaining potent antibiotic activity.

Our technology has created an entirely novel class of S-lipidated polymyxins based on polymyxin B that retain the lipid portion, which disrupts the outer protective membrane in Gram negative bacteria that leads to bacterial cell death. Our S-lipidated polymyxins are highly potent antibiotics but non-toxic to kidney cells at high concentrations, a major complication when deploying natural polymyxins.

## Major advantages

- Provides a potent novel polymyxin analogue that can be utilised as a last line of therapy against antibiotic-resistant strains.
- Greater efficacy with significantly reduced nephrotoxicity compared to current standard of care.

## Applications

Targets the most critical pathogens identified by WHO:

- *Acinetobacter baumannii*
- Carbapenem-resistant *Pseudomonas aeruginosa*
- Carbapenem-resistant Enterobacteriaceae (*E. coli*, *K. pneumoniae* carbapenem-resistant)

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## UniServices by the numbers

Total external research funding:

**\$261.3M**

(35% increase over 2020)

**45**

companies started in the past five years

**\$1.25BN**

Total market capitalisation of companies formed

**\$73.5M**

Net asset value of the University of Auckland Inventors' Fund

**17,335** Covid-19 vaccinators trained by the Immunisation Advisory Centre in 2021

**1,700**

New Zealand teachers reskilled and upskilled through Tui Tuia | Learning Circle professional learning and development in 2021

**3,000**

clinical staff at 22 DHBs trained through teamwork-based acute care simulations designed by NetworkZ in the past five years

**14,391** times that child and youth mental health workers attended Whāraurau e-modules, trainings and workshops in 2021

## UniServices

UniServices is a not-for-profit company of the University of Auckland that champions research and ideas with the power to change the world. From seeking out and bringing together partners in academic institutions, industry and government to build new knowledge and solutions through research; to whakatupu (nurturing) and commercialising the ideas and intellectual property that arise from the University of Auckland's great minds, we act as the kaihono (those who join and link people to people, and people to projects) firmly entrenched in the ecosystem that bridges the world of academia with business, government and our communities.

## University of Auckland

Waipapa Taumata Rau | The University of Auckland is New Zealand's largest and leading university. The name Waipapa Taumata Rau, gifted to the University by Ngāti Whātua Ōrākei, refers to the 'place of many peaks' – places to strive for, ascend to and succeed. We also rank in the top 10 globally for sustainable development impact. The University supports economic growth locally and nationally through innovation and entrepreneurship, creating quality jobs and high-value businesses, and producing graduates that contribute to our economy and society for the benefit of all.

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