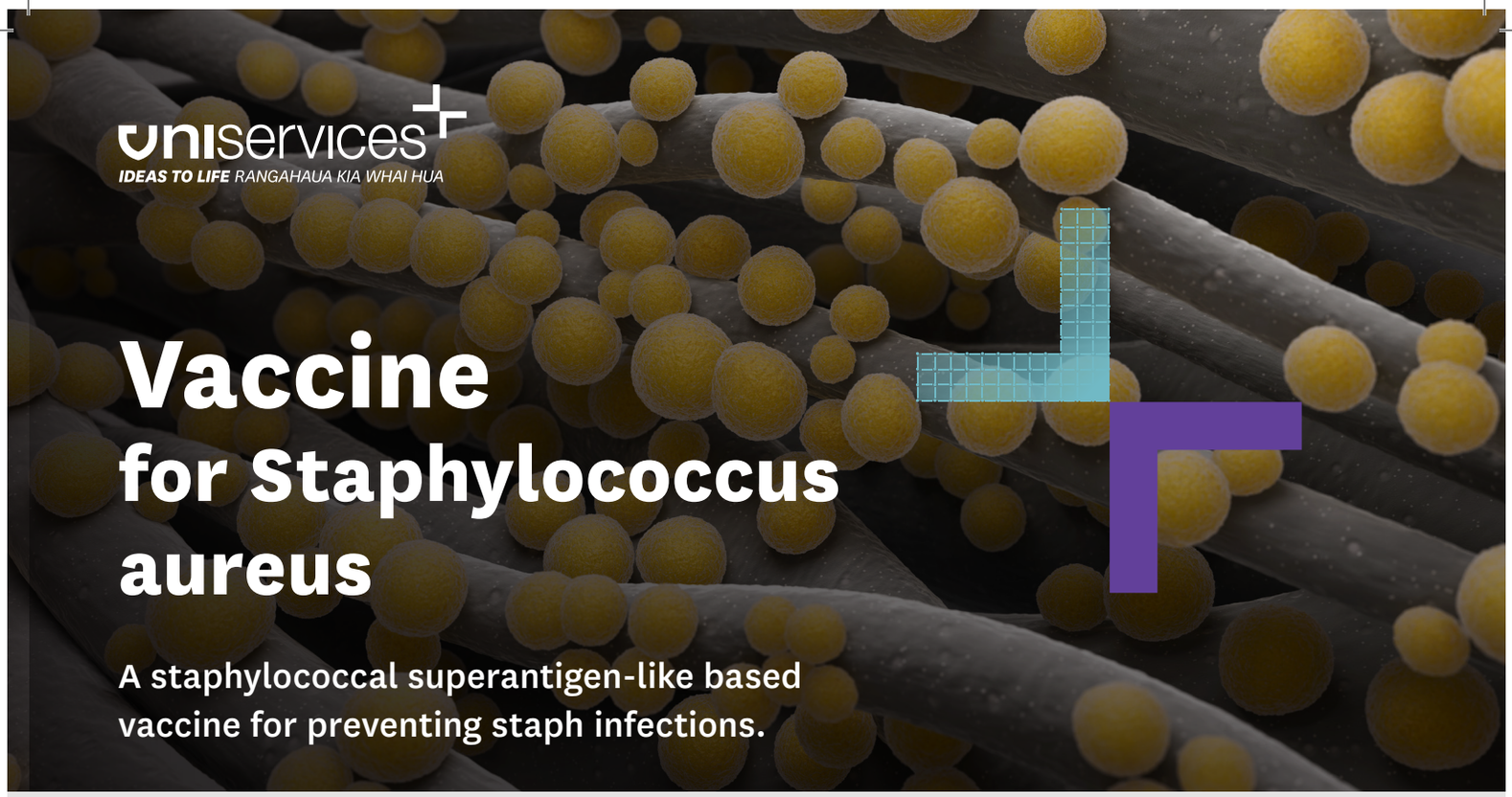

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IDEAS TO LIFE RANGAHAUA KIA WHAI HUA

Vaccine for Staphylococcus aureus

A staphylococcal superantigen-like based vaccine for preventing staph infections.

Background

Staphylococcus aureus is a commensal gram-positive bacterium which can cause a wide range of human diseases, including cellulitis, necrotizing fasciitis, pneumonia, infective endocarditis, bacteremia, and toxic shock syndrome. The ease with which S. aureus acquires antibiotic resistance means that treatment failure is increasingly common. The need for new clinical management approaches has significantly increased the investment and interest in alternate methods of treating and preventing S. aureus infections, including prophylactic vaccination.

Development of an effective vaccine for S. aureus has been a continuing effort over the past two decades, as yet with no success. The main strategy behind most vaccines for S. aureus that have failed in the clinic has been to elicit a humoral antibody response to clear the bacteria via opsonophagocytosis. It has become apparent that this approach **does not work.**

Technology

Our approach is to target staphylococcal superantigen-like (SSLs) proteins using a fusion protein comprising three key SSLs. SSLs are universally conserved virulence factors which are secreted by S. aureus. Our vaccine generates neutralising antibodies which act on these secreted virulence factors, preventing S. aureus from evading the immune system and establishing infection.

Major advantages

- Targets secreted immune evasion factors – aims to neutralize staphylococcal virulence rather than providing sterilizing immunity.
- Focuses on virulence factors that are immune inhibiting (help the pathogen escape the immune system) rather than immune stimulating – this is an aspect of virulence which hasn't been previously targeted.
- SSL proteins are carried by all isolates, which enables coverage of all disease-causing strains.
- Unlike many S. aureus secreted virulence factors, activity of SSL proteins is not limited to their human versions of the target molecules, suggesting applicability for both human and veterinary vaccines.
- The team are recognised leaders in staphylococcal immunology, in particular the structure and function of the staphylococcal superantigen-like (SSL) virulence factors.

Applications

- Human vaccine for S. aureus: targeted use to high-risk individuals, e.g., those undergoing surgery, dialysis, procedures requiring lengthy use of an in-dwelling catheter.
- Human vaccine for S. aureus: targeted use in recurrent skin and soft tissue infections.
- Human vaccine for S. aureus: targeted use to military.
- Veterinary vaccine for S. aureus: prevention of mastitis in dairy cows.
- Veterinary vaccine for S. aureus: prevention of dermatitis in companion animals (esp. dogs).

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

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Contact

Kimberlee Jordan
Snr Commercialisation Manager
+64 9 923 9520
kimberlee.jordan@auckland.ac.nz

Evelyn Body
Director of Commercialisation- BioTech
+64 21 405 267 or +64 9 923 2643
e.body@auckland.ac.nz

UniServices

Level 10, 49 Symonds Street,
Private Bag 92019,
Victoria Street West,
Auckland 1142, New Zealand
+64 9 373 7522 **uniservices.co.nz**

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NEW ZEALAND