

Novel bioactive nano-constructs for treatment of chronic wound infections



THE UNIVERSITY OF
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Therapy - Infectious Disease



> Pre-Clinical

Problem

The rampant misuse and overuse of antibiotics have accelerated the rise of antimicrobial resistance globally, with resistant pathogens posing significant threats to health systems. These resistant bacteria, often found in hospitals, can resist antibiotics and evade immune defences.

Infections such as diabetic foot ulcers and complications with orthopaedic implants highlight the inadequacy of current treatments which fail to simultaneously inhibit bacterial growth, prevent biofilm formation, modulate immune responses, and facilitate tissue repair.

Current strategies, which often target only one aspect like bacterial growth or biofilm disruption, lack comprehensive action against infections and do not support infected tissue functionality recovery. An integrated approach that combines antimicrobial activity with immune activation and tissue repair is critically needed to combat these resistant infections effectively.

Solution

Our team have developed a novel phage-extracellular vesicle (EV) conjugate designed to promote tissue repair in individuals with bacterial infections, which is particularly beneficial for those with compromised healing. The conjugate is designed to be cleaved under specific conditions, enabling targeted therapeutic action.

It is intended to treat a range of bacterial pathogens and can be modified to include additional therapeutic agents. This innovation also covers methods for its synthesis and pharmaceutical compositions comprising it.

The conjugate's therapeutic applications include enhancing tissue repair, reducing inflammation, treating infections, minimising damaged tissue, expediting healing, and initiating tissue repair mechanisms, making it suitable for various tissues and particularly useful for chronic wounds or those associated with diabetes.

Commercial Opportunity

Our novel phage-EV conjugate represents a significant advancement in treating bacterial infections and promoting tissue repair, especially in patients with impaired healing.

Its targeted delivery system, adaptable for various pathogens and therapeutic agents and potential capacity to accelerate healing and reduce inflammation, would be potentially beneficial for chronic and diabetes-related wounds.

The innovation includes synthesis methods and pharmaceutical compositions.

Intellectual Property Status

PCT/AU2024/050568.

Inventors

Wojciech Chrzanowski, Hien Thi Duong

Potential Commercial Applications

These novel phage-EV conjugates have potential to be developed as therapies for chronic wound infections as well as in food science, agriculture and veterinary applications.

Contact Commercialisation Office

Name: Julius Juarez

Position: Commercialisation Manager

Email: julius.juarez@sydney.edu.au | Phone: +61 403 181 295
sydney.edu.au/innovation-and-enterprise