A novel therapy for the treatment of bacterial biofilms

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Technology description

Market Need

Chronic infections such as those exhibited in chronic wounds, chronic and relapsing respiratory infections, chronic osteomyelitis (orthopaedic implant-associated infections) and chronic rhinosinusitis affect millions of people worldwide and play an important role in morbidity and mortality, particularly among the elderly. The repetitive use of antibiotics significantly contributes to the development of antibiotic resistance, a global concern of immense proportions. Particularly chronic infections caused by biofilms, where bacteria grow in slime-enclosed, sessile aggregates, are a major concern due to their inherent resistance to conventional antimicrobial agents. As such, there is a need for a more effective therapy to eradicate bacterial biofilm-associated infections.

The Technology

Researchers at the University of Adelaide’ s Department of Otolaryngology have identified an effective way of treating disease-relevant microbial biofilms. This is facilitated by the use of a chelating agent (Deferiprone) in concert with a haem mimetic, Gallium Protoporhyrin IX (GaPP). Both bioactives interfere with the bacterial iron metabolism, which is vital for bacterial growth, survival and pathogenesis. We have shown potent synergistic antibacterial effects of Def-GaPP against pathogens that are associated with devastating chronic infections, namely S. aureus, S. epidermidis and P. aeruginosa. The combination of Def-GaPP demonstrated significant activity against pathogens in planktonic, biofilm and small colony variant form. Moreover, Def-GaPP exceeded the effect of standard antibiotics and had the capacity to restore and potentiate the activity of antibiotics against Multidrug Resistant (MDR) strains. We showed that Def-GaPP has an excellent safety and efficacy profile in vitro and in our sheep model of sinusitis. In addition, Def aids in the healing of the infected wound and has anti-adhesive properties making the Def-GaPP combination particularly well suited as a dressing after surgery. Our extensive proof-of-principle studies position us to commence a Phase 1 clinical trial in early 2018.

This technology will have broad applicability in the field of surgical wound care, including in relation to chronic rhinosinusitis and orthopaedic implants, but also as an antimicrobial for antibiotic resistant pathogens and treatment of biofilm associated infections (chronic rhinosinusitis, chronic wounds etc).

Institution

The University of Adelaide

Inventors

Sarah Vreugde
324
Peter-John Wormald
324