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Poster abstract submission

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Poster title

Pre-Clinical Development of a Peptide Dendrimer–Chitosan Conjugate for P. aeruginosa Wound Infections

Poster abstract

Background: The management of Pseudomonas aeruginosa-infected wounds remains a critical clinical challenge due to the high incidence of antimicrobial resistance, highlighting the need for alternative therapeutic strategies.
Aim: This study evaluated the antimicrobial and wound healing potential of antimicrobial dressings based on third-generation antimicrobial peptide dendrimers (AMPDs), G3KL, coupled to chitosan derivatives against P. aeruginosa infections both in vitro and in vivo.
Methods: The AMPD-chitosan conjugates were synthesised, characterised and incorporated into hydrogel-based wound dressings. Their antimicrobial activity was assessed in vitro against the ESKAPE panel and in vivo in a P. aeruginosa-infected mouse model. Biocompatibility and wound-healing were assessed in a non-infected wound model.
Results: Our studies demonstrated that covalent coupling of AMPDs to chitosan derivatives enhanced stability, preserved antibacterial efficacy, and reduced hemolysis and cytotoxicity. Notably, third-generation AMPD-chitosan conjugates showed high bactericidal activity in vitro against ESKAPE pathogens.
Their incorporation into wound dressings promoted wound healing, reduced expression of pro-inflammatory cytokines (TNF-α, IL-6), and increased production of anti-inflammatory IL-10.
In vivo, the dressings provided robust protection in P. aeruginosa-infected mice while showing excellent biocompatibility in a non-infected mouse model.
Impact: Therefore, these results demonstrate that AMPD-chitosan conjugates are a promising therapeutic platform for treating persistent P. aeruginosa wound infections, combining broad-spectrum activity, wound healing promotion, and safety in pre-clinical models.

Research topic

Small molecule therapeutics

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