Breaking the barrier – a novel approach to controlling infection in hard-to-heal wounds

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Aims

This study aimed to evaluate anti-biofilm and wound healing effects of NX-AS-911 in an *ex vivo* wound model infected with 'gold standard' *Pseudomonas aeruginosa* and *Staphylococcus aureus* in the presence (and absence) of standard of care (SOC) antibiotics.

Methods

The anti-biofilm effects of NX-AS-911 on *S aureus* and *P aeruginosa* in the presence (and absence) of SOC antibiotics were reviewed by inoculating artificial wounds 24- to 48-hours prior to a 3-day, daily treatment regime with NX-AS-911 in the presence and absence of SOC antibiotics. Sampling was performed day-2 and day-4 post initiating treatment. Analysis on the effect on total bioburden was performed through colony-forming units (CFU) determinations, followed by a review of the effects on pathogen and host gene expression through quantitative RT-PCR. Immuno-histochemical staining and microscopy were performed to evaluate the extent of epithelialisation/wound healing and presence of biofilm aggregates and inflammatory markers. Time points were day-4 and day-7 post initiating treatment.

Results

Treatment with NX-AS-911 increased the *ex vivo* efficacy of SOC antibiotics against *S aureus* and *P aeruginosa* biofilms. Expression of key pathogen virulence genes was reduced in the presence of NX-AS-911. Combination treatment also showed evidence of wound healing due to the reduction in pathogen virulence factor expression and bioburden and NX-AS-911 had an immuno-modulatory effect.

Conclusion

NX-AS-911 has anti-virulence activity against both *S aureus* and *P aeruginosa*. NX-AS-911 also enhanced the antibiotic activity of SOC antibiotics against clinically relevant strains of *S aureus* and *P aeruginosa*, supporting our efforts to progress this drug to clinical evaluation as an adjunctive therapy to conventional antibiotics in the treatment of chronic wound infections and cystic fibrosis. ■

Conflict of interest statement

There is no conflict of interest.

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