

## Antibacterial Hydrogels for Wound Care

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**Abstract :** Aim: Control of bacterial bioburden in wounds is an important step for minimizing the risk of wound infection. An antimicrobial hydrogel wound dressing is developed out of soft polymeric hydrogels that contain antimicrobial peptides (AMPs). Such wound dressings can bind and kill all types of bacteria, even the resistance types at the wound site. Methods: AMPs are permanently bonded onto a soft nanostructured polymer via covalent attachment and physical entanglement. This improves stability, rapid antibacterial activity, and, most importantly, prevents the leaching of AMPs. Major Findings: Antimicrobial analysis of antimicrobial hydrogels using in-vitro wound models confirmed >99% killing efficiency against multiple bacterial strains, including MRSA, MDR, E. Coli. Furthermore, the hydrogel retained its antibacterial activity for up to 4 days when exposed to human serum. Tests confirmed no release of AMPs, and it was proven non-toxic to mammalian cells. An in-vivo study on human intact skin showed a significant reduction of bacteria for part of the subject's skin treated with antibacterial hydrogels. A similar result was detected through a qualitative study in veterinary trials on different types of surgery wounds in cats, dogs, and horses. Conclusions: Antimicrobial hydrogels wound dressings developed by permanent attachment of AMPs can effectively and rapidly kill bacteria in contact. Such antibacterial hydrogel wound dressings are non-toxic and do not release any substances into the wound.

**Keywords :** antibacterial wound dressing, antimicrobial peptides, post-surgical wounds, infection

**Conference Title :** ICWC 2023 : International Conference on Wound Care

**Conference Location :** Toronto, Canada

**Conference Dates :** September 18-19, 2023