

# Self-Healing Antibacterial Polysaccharide Hydrogel Adhesives for Diabetic Wounds

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## Abstract

Traditional sutures for wound closure pose challenges like lengthy procedures and scar formation, especially in diabetic patients. This study presents a novel injectable hydrogel, PGHAA (borated peach gum polysaccharide and oxime hyaluronic acid), designed to enhance diabetic wound healing. Incorporating arginine for angiogenesis and using natural polysaccharides, PGHAA exhibits superior adhesion, biocompatibility, and immunoregulation. In vivo tests on diabetic rats demonstrate that PGHAA accelerates wound closure, reduces inflammation, and enhances collagen deposition and angiogenesis. Molecular dynamics simulations reveal self-healing mechanisms, while transcriptome analysis shows the activation of IL-17 pathways, promoting skin regeneration. PGHAA hydrogels significantly advance chronic wound treatment.

## Keywords

Injectable Hydrogel, Diabetic Wound Healing, Angiogenesis, Biocompatibility, Self-Healing