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# Application of LL-37-loaded hydrogel for deep tissue injury healing in mouse models

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## Abstract

Background: Deep tissue injury is a unique type of pressure injury, the consequences of which, result in the impairment of angiogenesis. There is a present and unmet need for clinically effective therapeutic options. The human antimicrobial peptide, LL-37, has been shown to enhance wound healing in chronic wounds. However, its low stability within the wound environment limits its overall efficacy. Methods: An injectable, biocompatible and thermosensitive chitosan hydrogel embedded with LL-37 (LL-37/CS hydrogel) was developed and the efficacy of these hydrogels on deep tissue injury in mouse models was investigated. Results: The cytotoxicity assay demonstrated that the LL-37/CS hydrogel did not affect Mouse embryonic fibroblast cells (NIH3T3) viability. Moreover, it displayed antimicrobial activity on Staphylococcus Aureus and it also effectively inhibited the expression of TNF-α in vitro inflammatory models induced by LPS. Consistently, levels of mRNA and protein expression of key angiogenesis growth factors were up-regulated ($p < 0.05$) in the LL-37 hydrogel-treated wounds, compared with untreated wounds in vivo. Moreover, levels of the mRNA expression of inflammation factors were significantly increased ($p < 0.05$).

Conclusion: The injection of LL-37 peptide within hydrogels improved the efficiency of LL-37 delivery and optimized the performance of LL-37 in the enhancement of deep tissue injury wound healing. The results shown here provide a theoretical basis for further investigations into the clinical application of LL-37/CS hydrogel dressings.

Keywords: LL-37; hydrogel; deep tissue injury; wound healing

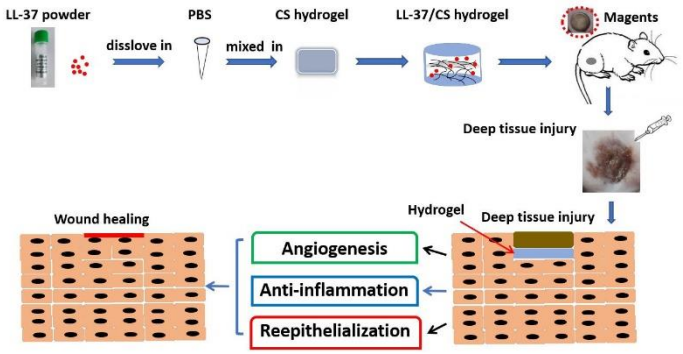


Fig. Schematic representation of mechanisms. It shows the mechanisms of action of LL37/CS hydrogel in deep tissue pressure injury healing processes.

## Biography:

Ju Zhang, PhD, School of Nursing, Qingdao University. Dr.Zhang received her PhD degree from Peking Union Medical College. After postdoctoral work, her research focuses on basic research and clinical transformation of pressure injury. In addition, her research involves the molecular mechanism of the progression of pressure injury as well as the development of biofunctional dressings that can be applied to wound healing.

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