

WOUND HEALING AND CRITICAL CARE

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A novel sprayable thermosensitive hydrogel coupled with zinc modified metformin promotes the healing of skin wound

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A novel sprayable adhesive is established (ZnMet-PF127) by the combination of a thermosensitive hydrogel (Pluronic F127, PF127) and a coordination complex of zinc and metformin (ZnMet). Here we demonstrate that ZnMet-PF127 potently promotes the healing of traumatic skin defect and burn skin injury by promoting cell proliferation, angiogenesis, collagen formation. Furthermore, we find that ZnMet could inhibit reactive oxygen species (ROS) production through activation of autophagy, thereby protecting cell from oxidative stress induced damage and promoting healing of skin wound. ZnMet complex exerts better effects on promoting skin wound healing than ZnCl₂ or metformin alone.

ZnMet complex also displays excellent antibacterial activity against *Staphylococcus aureus* or *Escherichia coli*, which could reduce the incidence of skin wound infections. Collectively, we demonstrate that sprayable PF127 could be used as a new drug delivery system for treatment of skin injury. The advantages of this sprayable system are obvious: (1) It is convenient to use; (2) The hydrogel can cover irregular skin defect sites evenly in a liquid state. In combination with this system, we establish a novel sprayable adhesive (ZnMet-PF127) and demonstrate that it is a potential clinical treatment for traumatic skin defect and burn skin injury

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