



WOUND HEALING

## PHOTO-CROSSLINKED POLYMERIC MATRIX WITH ANTIMICROBIAL FUNCTIONS FOR EXCISIONAL WOUND HEALING IN MICE

Yu-ping Hsiao<sup>(1)</sup> - Ming-hsian Chang<sup>(2)</sup> - Chia-yen Hsu<sup>(2)</sup> - Ping-shan Lai<sup>(2)</sup>

Chung Shan Medical University Hospital, Dermatologist, Taichung, Taiwan<sup>(1)</sup> - National  
Chung Hsing University, Department Of Chemistry, Taichung, Taiwan<sup>(2)</sup>

**Abstract:** Wound infection extends the duration of wound healing and also causes systemic infections such as sepsis, and, in severe cases, may lead to death. Early prevention of wound infection and its appropriate treatment are important. A photoreactive modified gelatin (GE-BTHE) was synthesized by gelatin and a conjugate formed from the 3,3',4,4'-benzophenone tetracarboxylic dianhydride (BTDA) and the 2-hydroxyethyl methacrylate (HEMA). Herein, we investigated the photocurable polymer solution (GE-BTHE mixture) containing GE-BTHE, poly(ethylene glycol) diacrylate (PEGDA), chitosan, and methylene blue (MB), with antimicrobial functions and photodynamic antimicrobial chemotherapy for wound dressing. This photocurable polymer solution was found to have fast film-forming property attributed to the photochemical reaction between GE-BTHE and PEGDA, as well as the antibacterial activity in vitro attributed to the ingredients of chitosan and MB. Our in vivo results also demonstrated that untreated wounds after 3 days had the same scab level as the GE-BTHE mixture-treated wounds after 20 s of irradiation, which indicates that the irradiated GE-BTHE mixture can be quickly transferred into artificial scabs to protect wounds from an infection that can serve as a convenient excisional wound dressing with antibacterial efficacy. Therefore, it has the potential to treat nonhealing wounds, deep burns, diabetic ulcers and a variety of mucosal wounds.

**Keywords:** photo-crosslinked film; antibacterial effects; wound dressing

