عنوان مقاله:

Synthesis and Preparation of Biodegradable Hybrid Hydrogel Incorporated with Curcumin Nanomicelles for Full Thickness Wound Healing

محل انتشار:

سومین کنگره بین المللی و پنجمین کنگره ملی زخم و ترمیم بافت (سال: 1397)

تعداد صفحات اصل مقاله: 1

نویسندگان:

Mona Alibolandi - *PHD, Assistant Professor of Medical Biotechnology, Mashhad University of Medical Sciences, Mashhad, Iran*

Mohammad Ramezani - *PHD, Assistant Professor of Medical Biotechnology, Mashhad University of Medical Sciences, Mashhad, Iran*

خلاصه مقاله:

There is a clinical need for a novel, more efficient therapy for full thickness wound healing. In the current study, curcumin encapsulated PEG-PLA [poly(lactide)-block-poly(ethylene glycol)] nanomicelles were incorporated into dextran hydrogel for a full thickness dermal wound healing application. To assess the application of the hydrogel as a therapeutic wound dressing, its morphology, swelling pattern, kinetics of degradation, and capacity to control curcumin release were evaluated. It was found that the prepared hybrid hydrogel had acceptable biocompatibility, incorporation capacity of curcumin nanomicelles, and mechanical properties. An in vitro release experiment also demonstrated the sustained release of curcumin from dextran hydrogel, which was first controlled by the diffusion of curcumin from hydrogel and continued through hydrogel matrix erosion at the terminal phase. An in vivo wound healing experiment was carried out using dressing hydrogels on full thickness wounds in BALB/c mice. An histological study demonstrated that the application of curcumin nanomicelles incorporated hydrogel could significantly augment the re-epithelialization of epidermis and collagen deposition in the wound area. Expression of CD31 and vimentin in wound tissue was investigated using immunohistochemistry tests on the eighth day post wounding. The results obtained demonstrated that curcumin nanomicelles incorporated hydrogel could significantly accelerate angiogenesis, fibroblast accumulation, and the process of wound healing. Together, the data indicate that the prepared hybrid curcumin PEG–PLA nanomicelles incorporated dextran hydrogel is a promising candidate for full thickness wound treatment that increases re-epithelialization, collagen deposition, angiogenesis, and tissue granulation.

کلمات کلیدی:

Dextran, Hydrogel, Curcumin, Wound Healing, Micelle, Hybrid Hydrogel