عنوان مقاله:

3D printed scaffold based on GelMA hydrogel for skin tissue engineering

محل انتشار:

اولین کنگره بین المللی مهندسی بافت و پزشکی بازساختی ایران (سال: 1397)

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خلاصه مقاله:

Key roles of the healthy human skin are to prevent bacterial infection and excessive loss of water. Such essential roles are compromised in patients with severe full-thickness wound. The conventional skin tissue engineering approaches have developed several skin substitute products such as Integra® and Matriderm®. Although these products have already been applied in clinic as the substitutes of autologous split-thickness skin grafts, the fixed shape and dimensions of these skin equivalents could not satisfy the personalized skin treatment. Moreover, these commercial skin products must be changed multiple times during healing process which also greatly increases the cost and the complexity of wound care and management. 3D bio printing has been applied to skin tissue engineering as well. The capability of patterning soft biopolymer materials to three-dimensional structures as the scaffolds is critical for emerging tissue engineering technology. Currently, natural hydrogels used to support epidermal regeneration are mainly gelatin-based, which mimic the natural dermal extracellular matrix but often suffer from insufficient and uncontrollable mechanical and degradation properties. GelMA, which forms covalently cross-linked hydrogels under UV light exposure with the presence of a photo initiator, has recently gained increasing attention, especially in the field of biomedical applications. GelMA with tunable mechanical, degradation and biological properties is used to engineer the epidermis for skin tissue engineering applications. The strong and tunable properties of GelMA hydrogels have suggested that the keratinocyte laden hydrogels can be used as epidermal .substitutes, wound dressings or substrates to construct various in vitro skin models

کلمات کلیدی:

GelMA hydrogel, 3D bioprinting, Skin substitute, Chronic wounds, Tissue engineering