

An Evaluation of Wound Healing Efficiency of Chitin-PAA-GTMAC hydrogel By Quantitative Detection of Proliferating Cell Nuclear Antigen in Developing Epidermal Cells

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Abstract

Background: The Chitin-PAA-GTMAC hydrogel was the biomaterial application of chitin which was one of the most abundant organic materials in nature. It could be easily prepared from crustacean shells and developed as a new biological dressing material by adding the carboxylic group and quaternary ammonium to chitin structure in order to improve the absorption and antibacterial ability to promote the wound healing.

Objectives: To evaluate wound healing efficiency of Chitin-PAA-GTMAC at the ratio of 1:4 and 1:10 as compared with commercial product (Intrasite® gel) in Wistar rats by indirect immunoperoxidase staining technique to localize the PCNA positive cells whose numbers indicate the progress and efficiency of the healing process of the wound.

Methods: The wound healing efficiency was studied in the full-thickness excision wounds of 24 Wistar rats. Three full-thickness wounds were performed on the dorsal body wall of each animal. Each wound was covered with different wound dressing, including Chitin-PAA-GTMAC at the ratio of 1:4 and 1:10 along with the Intrasite® gel. The group of four animals was sacrificed at day 3, 7, 9, 12, 15 and 18 post operation respectively. The wound tissues were dissected and processed to localize PCNA positive cells by indirect immunoperoxidase staining technique.

Results: The results demonstrated that the application of the Chitin-PAA-GTMAC hydrogel in both ratios displayed more significantly average percentages of PCNA positive cells than those of Intrasite® gel.

Conclusions: The Chitin-PAA-GTMAC hydrogel might offer benefits in promoting wound healing and could be used for the treatment of full-thickness open wounds.

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