結合透明質酸於活性碳纖維對傷口癒合之應用探討
Application of hyaluronic acid with active carbon fiber in wound healing therapy

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Wound healing is a dynamic process in the response to injury is aimed at re-constructing wound tissue. The wound healing process has four phases, including homeostasis, inflammation, proliferation, and remodeling. Furthermore, the fibroblasts contributed to restoring some of the function in the proliferative phase by increasing the number of fibroblasts in the extra cellular matrix and may increase collagen secretion and protein concentration and may help normalize wound healing. To accelerate the wound healing, an ideal wound dressing should protect the wound from bacterial invasion, maintain a moist wound healing environment, and promote fibroblast to migrate into the wound situation. Therefore, the novel wound dressing was needed to prepare for wound healing purpose. There is a new activated carbon fiber material for prepared dimensional cell scaffold not only is biocompatible but also bioactive in order to promote adequate fibroblast cell growth interactions depending on the implant application. And, when the wound dressing removed from the reconstruct damaged tissue, the wound dressing must be easy to apply and remove to improve patient comfort. To achieve the above objective, the novel wound dressing is needed to have multifunctional, which reduce the wound inflammation, the promotion tissue organization regeneration, and being easily removable and comfortable to wear. In our study, multifunctional wound dressing composed of biomaterials of hyaluronic acid could combine with the active carbon fiber, then another biomaterials (gelatin/ poly-γ-glutamic acid) encapsulated gentamicin might adhere to the other side active carbon fiber were prepared for studies. First, to avoid the microbes-invading the wound site, the antibiotic (gentamicin) showed the significantly antibacterial ability i*n vitro* antibacterial study. Second, the cell proliferation and migration evaluation of the confocal laser microscopy revealed that the cultured cells showed a continuous lined cytoskeletal distributing in the multifunction wound dressing, thus the developed wound dressing in the study was cytocompatible. Finally, *in vivo* experiment result on the prepared multifunction wound dressing demonstrate the potential of such biologically functionalized dressing to accelerate wound closure.

Keywords: hyaluronic acid; poly-γ-glutamic acid; active carbon fiber; multifunction wound dressing