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KGM HYDROGELS INHIBIT THE CONTRACTION OF TISSUE ENGINEERED SKIN AND STIMULATE THE PROLIFERATION OF FIBROBLASTS IN THE DERMAL AREA

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SUMMARY

Wound closure skin contraction occurs simultaneously as part of the repairing process to restore barrier function and protection after an injury. The process of repair without the use of optimized regenerative template from collagen type I, is often accompanied by the formation of scar and skin contraction that cause disfigurement and impaired movements. The work by Yannas et al. elucidated antagonistic relation between wound closure by contraction and regeneration that scar formation is a process secondary to wound contraction which can be prevented simply by early intervention of contraction blocking. A previous study in MacNeil group showed that the contraction of tissue engineered skin based on human dermis appeared to be related to the differentiation status of the keratinocytes. Although Yannas' work on the cancellation of contraction leading to scar less wound healing was conducted in a well-defined animal model, it was interesting to see the effects of plant heteropolysaccharide, konjac glucomannan (KGM), which is known for its selective effects on the inhibition of keratinocyte proliferation and migration not fibroblasts *in vitro* on the formation and contraction of 3D tissue engineered (TE) skin model. This study was also aimed to examine the relation between physiochemistry of KGM in soluble and insoluble form; namely interpenetrating network and graft co-network hydrogel on cell viability and phenotype as well as skin contraction and appearance. The biological activities of soluble and insoluble KGM suggest two mechanisms of action in self-reorganization and reepithelization of 3D TE skin model: *1)* the stimulation of fibroblast proliferation in the dermal area encourages keratinocyte migration for re-epithelization and *2)* the inhibition of keratinocyte proliferation helped to reduce skin contraction that would be beneficial to wound healing.