

Local Activities of the Membranes Associated with Glycosaminoglycan-Chitosan Complexes in Bone Cells

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Abstract : Chitosan is a cationic polysaccharide derived from the partial deacetylation of chitin. Hyaluronic acid (HA), chondroitin sulfate (CS) and heparin (HP) are anionic glycosaminoglycans (GCGs) which can regulate osteogenic activity. In this study, chitosan membranes were prepared by glutaraldehyde crosslinking reaction and then complexed with three different types of GCGs. 7F2 osteoblasts-like cells and macrophages Raw264.7 were used as models to study the influence of chitosan membranes on osteometabolism. Although chitosan membranes are highly hydrophilic, the membranes associated with GCG-chitosan complexes showed about 60-70% cell attachment. Furthermore, the membranes associated with HP-chitosan complexes could increase ALP activity in comparison with chitosan films only. Three types of the membranes associated with GCG-chitosan complexes could significantly inhibit LPS induced-nitric oxide expression. In addition, chitosan membranes associated with HP and HA can down-regulate tartrate-resistant acid phosphatase (TRAP) activity but not CS-chitosan complexes. Based on these results, we conclude that chitosan membranes associated with HP can increase ALP activity in osteoblasts and chitosan membranes associated with HP and HA reduce TRAP activity in osteoclasts.

Keywords : osteoblast, osteoclast, chitosan, glycosaminoglycan

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