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Calcium-hyaluronic acid hybrid film for the promotion of skin regeneration

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Skin is a soft tissue composing the outermost layer of human body and plays crucial roles including resistance to infection and maintenance of human body. Therefore, it is of interest to develop artificial skin for the recovery and substitute of damaged skin tissue. Surface property of biomaterials represents the biological function of biomaterials which will determine the material biocompatibility. In this study, we investigated on functional film development of surface modification of artificial skin substrates. For this purpose, a hybrid films composed of hyaluronic acid (HA) and calcium ion-containing compound were prepared. HA is a glycosaminoglycan and hydrophilic due to the presence of hydroxyl groups. It plays a role in cell proliferation. HA can stimulate the fibroblastic activities which result in the synthesis of collagen and elastin. Hence, HA can be a molecule that can be utilized for the promotion of skin regeneration. Calcium ion participates in a number of biological reactions at both molecular and cellular levels. We hypothesized that the combined effect of HA and calcium ion can further stimulate the fibroblasts for the skin regeneration. The hybrid films were prepared at different concentrations of HA and the cell morphology, adhesion, proliferation, and level of collagen synthesis were examined by using NIH 3T3 fibroblast cell line. The adhesion and proliferation of NIH 3T3 cell appeared to be dependent HA concentration and were greater at low HA concentration. Adherent cells tended to agglomerate as HA concentration increases. Collagen synthesis was stimulated on the hybrid films compared to the control.

Biography

Woo-Kul Lee completed his PhD at the Oregon State University in USA and served as a Postdoc and Research Assistant Professor in College of Dentistry, Seoul National University in Korea. His major research area is developing biomaterials relevant to soft and hard tissues. He is currently a Professor in the Department of Chemical Engineering and a Department Head in the Department of Creative Convergent Manufacturing Engineering. He has been serving as a Member of the Editorial Board of the *Applied Chemistry for Engineering*, Director for academic affairs, and Director for general affairs for the Korean Society of Industrial and Engineering Chemistry.

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