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3D spheroid formation applicable to a wide variety of cell types onto chitosan based hydrogel culture system

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Tissue engineering and regenerative medicine is a field that has evolved for over the two decades, and is gaining more interest. Methods for culturing cells are needed to grow replacement tissue for regenerative medicine. Two-dimensional (2D) culture has been a standard method for *in vitro* cell culture. However, *in vivo* system is three-dimensional (3D) and cells behave more natively when cultured in 3D environment. Thus, one of the points is to develop better 3D cell culture method *in vitro* that would mimic *in vivo* system. To achieve this goal, we synthesized a hexanoic glycol chitosan (HGC) and investigated a versatile and cost effective *in vitro* 3D applicable multi cellular culture system. First, carboxylic anhydride was conjugated onto glycol chitosan by an imide bond forming reaction. Then, HGC was coated on cell culture plate and then they were lyophilized before using cell culture medium. This 3D matrix culture system could provide a biologically active environment for cells to proliferate, differentiate and secrete cell specific extracellular matrix. In the present work, A549 cells, Epithelial cell (EPC), Cardiomyocyte, Mesenchymal stem cell (MSC) and Adipose stem cell (ADSC) were cultivated on the cell culture plate coated HGC and investigated the 3D spheroid formation, respectively. Results demonstrated that all cell lines were cultured as spheroids in the plate coated HGC. We have confirmed that the HGC plate can be applied to a wide variety of cell lines which can be potentially used for a variety of uses. Further study is processed to find more effective biodegradable HGC for cultivating cells in a 3D environment.

Biography

Bosun Kwon has completed his MS and PhD from University of Southern California, USA. He was the Research Advisor and Consultant of Wooridul Spine Hospital, Seoul, Korea. He is the Research Director of Wooridul Huebrain Research Institute and Winnova Integrative Bioresearch Institute, Seoul, Korea. He has various patents and publication related to studies for tissue engineering and has been serving as an Editorial Board Member of The Korea Society of Industrial and Engineering Chemistry.

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