

Mimicking of Various ECM Tangible Cues for the Manipulation of Hepatocellular Behaviours

Authors : S. A. Abdellatef, A. Taniguchi, Namiki, Tsukuba, Ibaraki

Abstract : The alterations in the physicochemical characteristics of bio-materials are renowned for their impact in cellular behaviors. Surface chemistry and substratum topography are separately considered as mutable characteristics with deep impact on the overall cell behaviors. In our recent work, we examined the manipulation of the physical cues on hepatic cellular behaviors. We have proven that the geometrical or dimensional characteristics of nano features are essential for the optimum hepatocellular functions. While here, the collective impact of both physical and chemical cues on hepatocellular behaviors was investigated. On which RGD peptide was immobilized on a TiO₂ nano pattern that imitates the hierarchically extend collagen nano fibrillar structures. The hepatocytes morphological and functional changes induced by simultaneously combining the diversified cues were investigated. TiO₂ substrates that integrate nano topography with the adhesive peptide motif (RGD) had showed an increase in the hepatocellular functionality to the maximum extent. While a significant enhancement in expression of these liver specific markers on RGD coated surfaces were observed compared to uncoated substrates regardless of topography. Consequently in depth understanding of the relationship between various kind of cues and hepatocytes behaviors would be a paving step in the application of tissue engineering and bio reactor technology.

Keywords : biomaterial, tiO₂, hepG2, RGD

Conference Title : ICNMN 2015 : International Conference on Nanostructured Materials and Nanotechnology

Conference Location : Miami, United States

Conference Dates : March 09-10, 2015