

Effect of Heterogeneous Multi-Layered Gelatin Scaffolds on the Diffusion Characteristics and Cellular Activities of Preosteoblasts

이동현*, 안근선¹, 김유나¹, 이상원¹, 정윤정¹

중앙대학교; ¹중앙대학교 융합공학부

(dhlee@cau.ac.kr*)

Tissue engineering is a rapidly growing field of study that involves a multi-disciplinary effort. Key components of tissue engineering are thought to be cells, scaffold, and signaling molecules. Recently, researchers have been focusing of rendering multiple functionalities to the scaffold materials, mainly by controlling the mechanical properties of scaffold materials, and also by incorporating assortments of signaling molecules to the scaffold matrix. However, not only the mechanical properties and the signaling effects, but also the diffusion property of the scaffold is being considered to be important in order for the tissue engineering system to be a successful one. Diffusion characteristics of the scaffold is important in maintaining adequate supply of oxygen and nutrients to the cells, removal of waste products, and also the expression of the signaling molecules to the cells as well. In order to achieve such characteristics, we have synthesized heterogeneous multi-layered scaffolds with gradient heterogeneous pore size by through multi-stacking procedure. We have studied the effect of such heterogeneous structure of scaffolds on diffusion characteristics and cellular activities by examining the factors including swelling kinetics, cell adhesion efficiency, and proliferation and differentiation behavior of the encapsulated cells.