

Biodegradable and Bioactive Scaffold for Bone Tissue Engineering

Authors : A. M. Malagon Escandon, J. A. Arenas Alatorre, C. P. Chaires Rosas, N. A. Vazquez Torres, B. Hernandez Tellez, G. Pinon Zarate, M. Herrera Enriquez, A. E. Castell Rodriguez

Abstract : The current approach to the treatment of bone defects involves the use of scaffolds that provide a biological and mechanically stable niche to favor tissue repair. Despite the significant progress in the field of bone tissue engineering, several main problems associated are attributed to giving a low biodegradation degree, does not promote osseointegration and regeneration, if the bone is not healing as well as expected or fails to heal, will not be given a proper ossification or new bone formation. The actual approaches of bone tissue regeneration are directed to the use of decellularized native extracellular matrices, which are able of retain their own architecture, mechanic properties, biodegradability and promote new bone formation because they are capable of conserving proteins and other factors that are founded in physiological concentrations. Therefore, we propose an extracellular matrix-based bioscaffolds derived from bovine cancellous bone, which is processed by decellularization, demineralization, and hydrolysis of the collagen protein, these protocols have been successfully carried out in other organs and tissues; the effectiveness of its biosafety has also been previously evaluated in vivo and Food and Drug Administration (FDA) approved. In the specific case of bone, a more complex treatment is needed in comparison with other organs and tissues because is necessary demineralization and collagen denaturalization. The present work was made in order to obtain a temporal scaffold that succeed in degradation in an inversely proportional way to the synthesis of extracellular matrix and the maturation of the bone by the cells of the host.

Keywords : bioactive, biodegradable, bone, extracellular matrix-based bioscaffolds, stem cells, tissue engineering

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