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SYNTHESIS OF GELATIN-CHITOSAN FREEZE-DRIED SCAFFOLDS AND EVALUATION FOR *IN VITRO* CELL GROWTH AND IN VIVO TISSUE INTEGRATION

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Burn lesions are frequently occurring injuries that exhibit poor healing ability. Scaffolds play a critical role in the reconstruction of damaged living tissue and those produced using biopolymers, such as gelatin and chitosan, are biocompatible and have adequate functional properties. Mesenchymal stem cells (MSC) and fibroblasts are an excellent tool for studying the behavior of this kind of biomaterials and their ability to guide the growth and tissues repair. The aim of this study was the synthesis of freeze-dried scaffolds based on gelatin and chitosan added with aloe vera and snail mucus. The microstructure and *in vitro* cellular interaction with scaffolds were determined through SEM. Cell viability of cell seeded scaffolds was determined through the MTT assay. Wound healing *in vivo* studies were made by contact with incandescent metallic bar on dorsal female mice, then the scaffolds were subcutaneously implanted. For production of porous scaffolds, gelatin (G), chitosan (CH), aloe vera (A) and snail mucus (S) suspensions was prepared. The scaffold forming suspensions (SFS) were frozen at -80 ºC, prior to freeze-drying at -58 ºC for 18 h. The resulting sponge-like material was cross-linked and freeze-dried again. Gelatin-based scaffolds showed what appeared to be a highly porous sponge displaying interconnected porosity and homogeneous pore diameters, as well as pore wall thickness. Important microstructural changes were observed in the scaffolds as a function of additives. Scanning electron micrographs revealed that the cells appeared to attach and spread well in all scaffolds, forming multiple protrusions and cellular aggregates that gradually increased in size. MTT assay showed that fibroblasts proliferated more rapidly on the scaffolds containing aloe vera and the mixture of aloe vera and snail mucus. The scaffold was observed to be biocompatible on subcutaneous implantation in mice model which was supported by scaffold integration with tissue and presence of blood vessels in histological studies.

Biography

Daniel Lopez-Angulo has completed his PhD from University of Santiago de Chile. He has experience in the study of physical properties of biopolymer's network, focusing on quantification and measurement of structural relaxation phenomenon in glassy state materials. Currently, he is a Postdoctoral Researcher at University of Sao Paulo Brazil, where he is developing a project, related to synthesis of porous scaffolds based gelatin and chitosan for enhance cell proliferation and tissue regeneration for biomedical applications. He has published more than 10 papers in reputed journals.

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