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A novel porous multilayer scaffold for cartilage tissue engineering

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Biomaterials for cartilage tissue engineering has been widely used in recent years because techniques for treating cartilage affections, together with palliative treatments, have not been effective so far. For that reason, this research is aimed to obtain and characterize a new porous multilayer scaffolds based on natural polymers for their potential use in a possible cartilage regeneration and restoration. The surface morphology of chitosan/collagen materials (with hydroxyapatite in the calcified layer) was characterized by Scanning Electron Microscopy (SEM) showing an adequate porosity able to allow the nutrients exchange and cell mobility through the matrix. *In vitro* studies of cell viability and proliferation were carried out with human C-28 chondrocyte cell line, by MTS and Live/Dead assays. The specimens allowed cell viability and proliferation in a period of 14 days, showing that scaffolds were non cytotoxic. The bioactive behavior of the calcified layer was also evaluated by immersing materials in a Simulated Biological Fluid (SBF) solution for a period of 28 days. The specimens were analyzed by SEM at 3, 7, 14 and 28 days of immersion in solution. Some apatite nuclei were observed on the surface after 3 days, a higher population of nuclei at 14 days and an apatite layer covering almost the entire surface at 28 days. This fact guarantees the osseointegration of scaffolds with subchondral bone. The results obtained are encoring, proposing this porous multilayer scaffolds as a promising candidates for cartilage tissue engineering.

Biography

Yaima Campos Mora has finished her Bachelor's Degree from the Chemistry Faculty of Havana University, Cuba (2005). The researcher has completed her Master's Degree in Science and Technology of Materials, "Obtaining and characterization of acrylic composites loaded with hydroxyapatite for their possible use in bone restoration" in the Institute of Materials Science and Technology, Cuba (2010). In this moment, she is doing her PhD in the Translational Nanobiomaterials and Imaging group of Radiology Department, in Leiden University Medical Center (LUMC), Netherlands. She has participated in 23 international scientific congresses and has published more than 10 scientific articles.

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