



Research Project Proposal

Academic year 2020-2021

Máster en Investigación Biomédica

Project Nº 37

Title: *Optimization of rhBMP-2 treatments by composite fabrication and controlled release from mimetic periosteum scaffold*

Department/ Laboratory *Cell Therapy and Regenerative Medicine Department, Experimental Orthopaedics Laboratory, CIMA.*

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Summary

The regenerative capacity of bone tissue can be compromised in an important percentage of fractures, resulting in fracture nonunion, a major cause of chronic pain and disability. Autografts are the most important therapeutic option, but its availability is limited. Using tissue engineering strategies, we are developing mimetic autografts by combining biomaterials as scaffolds (poly caprolactone, PCL) functionalized with progenitor cells and morphogens. In this project we will fabricate a mimetic periosteum by melt electrowriting and determine its therapeutic potential for the delivery of rhBMP-2 after functionalization with different strategies including, Fibronectin/Poly ethyl acrylate modification (PEA/FN), covalent modification with microparticles of Poly Lactic Glycolic Acid (PLGA) and deposition of nanoparticles of Hydroxyapatite (nHA). Each strategy will be evaluated in its capacity for rhBMP-2 deliver and retention *in vitro* as well as its therapeutic potential *in vivo* using a bone critical size defect of the femur in rats. Efficacy of treatment will be evaluated by micro computed tomography, histology and immunohistochemistry.

yes	X
no	

Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?