



**MÁSTER EN INVESTIGACIÓN BIOMÉDICA**

**Research Project Proposal**

Academic year 2022-2023

**Project Nº 39**

**Title:** *Mimetic autografts functionalization with nanoparticles for a customized treatment of pseudoarthrosis*

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

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**Summary**

The complications associated to the regenerative capacity of the bone can result in a fracture nonunion. These difficulties occur in the 10% of the fractures worldwide. Autografts are the most important therapeutic option. However, its availability is limited. Using tissue engineering strategies, we are developing mimetic autografts by combining biomaterials as scaffolds (poly caprolactone, PCL) and they can be functionalized with progenitor cells, morphogens, chemo-attractant or other components as antibiotics, key to treat open fractures. In this project, we will fabricate a mimetic periosteum by melt electrowriting functionalized with nanoparticles that will content personalized combinations of antibiotics and rhBMP-2 to personalize the mimetic graft to the patient. We will use different strategies to bind and load the nanoparticles with the idea of improving the therapeutic potential in vivo. Efficacy of treatment will be evaluated by micro computed tomography, histology and immunohistochemistry using a bone critical size defect of the femur in rats.

yes	x
no	

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