



## Research Project Proposal

Academic year 2020-2021

### *Máster en Investigación Biomédica*

<b>Project Nº 34</b>	
<b>Title:</b> <i>Biofabrication of a human Achilles tendon</i>	
<b>Department/ Laboratory</b> <i>Musculoskeletal Regeneration Unit, Laboratory 1.02, Regenerative Medicine Program, Cima Universidad de Navarra</i>	
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<b>Summary</b>  <p>Tendons are naturally designed to bear loads, resulting in supremely enduring tissues. Given their crucial role, tendon injuries are one of the most common causes of pain and disability. Most tendon injuries lead to atrophic muscles where tissue is often replaced by a fibrous scar and abundant adipose infiltration. In turn, this results in a severely diminished functional capacity. Current surgical interventions aim at bringing together the ends of the ripped tendon but usually fail due to re-tearing and diminished mechanical capacity.</p> <p>Tissue engineering aims at generating tissues in the lab, either for therapy (replacement) or modelling. The present project will blend to characterize Achilles tendon rupture at a mechanical and histological level by using an animal model developed by our team. This study will use human tenocytes obtained from patient's samples with engineered scaffolds to fabricate artificial tendons. These scaffolds have been developed by our team with the use of a unique additive manufacturing technology called melt electrowriting (MEW). In the course of this project, the candidate will perform the following activities towards the generation of an advanced engineered human tendon:</p> <ul style="list-style-type: none"> <li>• Characterization of Achilles tendon rupture in a animal model</li> <li>• Isolation and characterization of human tenocytes</li> <li>• Fabrication of MEW scaffolds</li> <li>• Evaluation of biocompatibility tenocytes-MEW substrates</li> <li>• Mechanical stimulation of generated samples in a bioreactor</li> <li>• In vitro and in vivo analysis of the final constructs</li> </ul> <p>The candidate will receive training in cellular biology, MEW and biomaterials, as well as basic molecular biology, imaging techniques and basic animal handling.</p>	
yes	X
no	
<b>Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?</b>	