



**Research Project Proposal**  
Academic year 2021-2022  
**Máster en Investigación Biomédica**

<b>Project Nº 29</b>	
<b>Title:</b> Role of interleukin-1 $\beta$ in the infiltration and polarization of macrophages in adipose tissue	
<b>Department/Laboratory</b> Functional Metabolomics Laboratory, Department of Endocrinology & Nutrition. Clínica Universidad de Navarra.	
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<b>Summary</b>	
<p><b>Background:</b> The obesity-associated low-grade chronic inflammation results from the interaction between adipocytes and cells from the immune system, mainly macrophages. Obesity induces a phenotypic switch from an anti-inflammatory M2-polarized state to a pro-inflammatory M1 state mediated through different cytokines.</p> <p><b>Hypothesis:</b> This project addresses the hypothesis that the adipose tissue excess and the glycemic state underlay the changes in the gene expression of the proinflammatory cytokine interleukin-1<math>\beta</math>. In this way, interleukin-1<math>\beta</math> may play a role in the macrophage polarization, aggravating the inflammatory state of obese patients. In addition, the blockade of interleukin-1<math>\beta</math> using siRNA may contribute to improve the inflammation of adipose tissue associated to obesity.</p> <p><b>Objectives and Methods:</b> The involvement of interleukin-1<math>\beta</math> in M1 polarization will be determined in human adipocytes and macrophages cell cultures as well as the potential use of blockade of interleukin-1<math>\beta</math> in the improvement of the obesity-associated inflammatory state. In addition, the effect of conditioned medium secreted by adipocytes, with normal expression of interleukin-1<math>\beta</math> or silenced, on gene expression profile of macrophages will be studied. Moreover, the relationship with other inflammatory markers as well as extracellular matrix components will be also studied.</p> <p>The following <b>techniques</b> will be used:</p> <p><i>Sample processing:</i></p> <ul style="list-style-type: none"> <li>- Serum, plasma and buffy coat extraction</li> <li>- Cellular isolation from adipose tissue</li> <li>- RNA isolation from adipose tissue and peripheral blood mononuclear cells</li> <li>- Protein extraction from adipose tissue</li> </ul> <p><i>Biology molecular techniques:</i></p> <ul style="list-style-type: none"> <li>- Nucleic acid and protein quantification and quality assessment</li> <li>- Analysis of gene expression by Real-time PCR</li> <li>- Analysis of protein expression by Western-blot</li> </ul> <p><i>Analytic techniques:</i></p> <ul style="list-style-type: none"> <li>- ELISAs</li> <li>- Large-scale cytokine analyses <i>Multiplex</i> (Luminex™ 200)</li> <li>- Immunohistochemical analysis of proteins</li> </ul> <p><i>Human macrophage and adipocyte cell cultures</i></p>	
<b>yes</b>	<input type="checkbox"/>
<b>no</b>	<input checked="" type="checkbox"/>
Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?	