



**Research Project Proposal**  
Academic year 2019-2020

**Project Nº 45**

**Title: Adipose tissue, macrophages and immunomodulation. Role of interleukin-1 $\beta$  in infiltration and polarization of macrophages in adipose tissue**

**Department/ Laboratory** Functional Metabolomics Laboratory, Department of Endocrinology & Nutrition. Clínica Universidad de Navarra.

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**Summary Background:** 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.

**Hypothesis:** This project addresses the hypothesis that the adipose tissue excess and the glycemic state underlay the changes in the gene expression of interleukin-1 $\beta$ . In this way, interleukin-1 $\beta$  may play a role in the macrophage polarization, aggravating the inflammatory state of obese patients. In addition, the blockade using siRNA of interleukin-1 $\beta$  may contribute to improve the inflammation of adipose tissue associated to obesity.

**Objectives and Methods:** The involvement of interleukin-1 $\beta$  in M1 polarization will be determined in human adipocytes and macrophages cell cultures as well as the potential use of blockade of interleukin-1 $\beta$  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 $\beta$  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.

The following **techniques** will be used:

*Sample processing:*

- Serum, plasma and buffy coat extraction
- Cellular isolation from adipose tissue
- RNA isolation from adipose tissue and peripheral blood mononuclear cells
- Protein extraction from adipose tissue

*Biology molecular techniques:*

- Nucleic acid and protein quantification and quality assessment
- Analysis of gene expression by Real-time PCR
- Analysis of protein expression by Western-blot

*Analytic techniques:*

- ELISAs
- Large-scale cytokine analyses *Multiplex* (Luminex™ 200)
- Immunohistochemical analysis of proteins

*Human macrophage and adipocyte cell cultures*

<b>yes</b>		<b>Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?</b>
<b>no</b>		



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