**Research Project Proposal**
Academic year 2020-2021

***Máster en Investigación Biomédica***

**Project Nº 13**

**Title: Role of interleukin-1β in the 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 the proinflammatory cytokine interleukin-1β. In this way, interleukin-1β may play a role in the macrophage polarization, aggravating the inflammatory state of obese patients. In addition, the blockade of interleukin-1β using siRNA may contribute to improve the inflammation of adipose tissue associated to obesity.
**Objectives and Methods:** The involvement of interleukin-1β in M1 polarization will be determined in human adipocytes and macrophages cell cultures as well as the potential use of blockade of interleukin-1β in the improvement of the obesity-associated inflammatory state. In addition, the effect of conditioned medium secreted by adipocytes, with normal expression of interleukin-1β 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)
- Immunohystochemical analysis of proteins

*Human macrophage and adipocyte cell cultures*

| | |
|---|---|
| **yes** | |
| **no** | **X** |

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