Universidad de Navarra

Máster en Investigación Biomédica
Facultad de Ciencias

Research Project Proposal
Academic year 2017-2018

Project Nº 28

Title: Role of the interleukin-1 axis in the osteopontin-mediated development of insulin resistance in the context of obesity.

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Summary

Background: Obesity has become in a real pandemic threatening many of the health gains achieved in the last decades. In this sense, obesity is associated with the development of insulin resistance and type 2 diabetes. Our group has previously shown that during the expansion of adipose tissue that takes place in obesity the expression of osteopontin (OPN) is dramatically increased and that this protein is involved in the development of insulin resistance. On the other hand, interleukin-1β (IL-1β) has been involved in the development of insulin resistance and inflammation, while IL-1 receptor antagonist (IL-1RN) seems to exert a protective effect.

Hypothesis: This project addresses the hypothesis that OPN could play a major role in the development of obesity-associated insulin resistance through alterations in the IL-1 axis.

Objectives and Methods: Our aim is to analyse the role of OPN in the development of insulin resistance in humans and mouse models of diet-induced obesity, studying how the IL-1 axis is involved in this process. We will study changes related to energy homeostasis, carbohydrate and lipid homeostasis and variables related to inflammation, and oxidative stress, systemically and at the tissue level. *In vitro* studies in adipocytes, hepatocytes and myotubes will be perform in order to gain insight in the effects of the IL-1 axis in the development of OPN-mediated insulin resistance and inflammation.

The following **techniques** will be used:
Animal handling
- Control of food intake, energy expenditure and weight changes.

Gene expression analysis.
- RNA extraction from tissue.
- Nucleic acid quantitation and quality assessment.

- Real Time RT-PCR.

Protein expression analysis.

- Protein extraction from tissue.
- Protein amount quantitation (*Bradford*).
- Western blot.

Cell cultures of adipocytes, hepatocytes and myotubes.
In vitro inhibition of gene expression by siRNAs.
Immunohystochemical analysis of proteins in histological preparations.
Processing of serum and plasma from mice.
ELISA.

References

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