Universidad de Navarra
Facultad de Ciencias

**MÁSTER EN INVESTIGACIÓN BIOMÉDICA**
**Research Project Proposal**
Academic year 2022-2023

**Project Nº 28**

**Title:** *Evaluation of the therapeutic potential of protein-based nanoparticles*

**Department/ Laboratory** *Laboratory where the project will be carried out indicating Department, Area, Faculty, CUN, CIMA etc.*
Departamento de Tecnología y Química Farmacéuticas / Centro de Investigación en Nutrición; Universidad de Navarra

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**Summary** Project:

Proteins represent a group of biopolymers with interesting properties to be employed as raw materials for the preparation of nanoparticles for a variety of applications, particularly for drug delivery purposes. In this context, zein (the major storage protein of corn) offers a number of advantages including its prize, biodegradability and origin from renewable resources ("green" product), as well as its GRAS ("generally recognized as safe") status awarded by the US-FDA.
On the other hand, we have recently demonstrated that zein nanoparticles, orally administered, are capable of decreasing fat accumulation and promote lifespan in *C. elegans* [1]. Moreover, in rats, bare zein nanoparticles induce a hypoglycemic effect through the release of GLP-1 by intestinal L-cells. Moreover, in a rat model of obesity, zein nanoparticles significantly ameliorated the signs associated with a metabolic syndrome.

The aim of this Master thesis project would be the preparation and evaluation of protein-based nanoparticles. After physico-chemical characterization, the capability of the selected nanoparticles to diffuse in mucus as well as their effect on *C. elegans* (regarding the effect on fat accumulation, formation of reactive oxygen species and longevity) will be studied, as a previous step to the selection of the best formulations for their evaluation in a rodent model.

(1) Martínez-López AL, et al. Acta Pharm Sin B. 2021 Apr;11(4):989-1002.

NOTA:
We offer the possibility of pursuing in a Ph.D. project thesis.

**Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?** For the master project, handling with animals is not necessary. The project only plans the use of *C. elegans*. However, if the interested person would like to pursuit in a thesis project, the use and manipulation of laboratory animals would be necessary.