Universidad de Navarra

Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2025-2026

Project Nº 22

Title: *Advanced functional magnetic resonance imaging techniques to investigate the cognitive processes involved in the control and inhibition of food intake in lean and overweight individuals*

Department/ Laboratory
Biomedical Imaging Laboratory at the Radiology Department of Clínica Universidad de Navarra

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Summary

The brain plays a fundamental role in regulating food intake and energy homeostasis by integrating multiple signals from adipose tissue and the gastrointestinal tract, which influence eating behavior. Magnetic resonance imaging (MRI) enables the investigation of brain structure and activity within networks associated with appetite regulation processes. Recent studies suggest that obesity induces alterations in both brain structure and connectivity, potentially affecting the motivation to eat and, consequently, causing weight gain.

This project aims to evaluate an optimized functional MRI (fMRI) protocol using advanced techniques to study brain networks linked to appetite and body weight regulation. The imaging protocol includes high-resolution anatomical brain imaging, assessment of neuronal activity during rest and in response to auditory stimuli consisting of words referring to high- and low-energy-density foods.

The study will focus on data collected from lean healthy volunteers and a subgroup of 30 participants with overweight or obesity recruited for the PORTIONS-V randomized trial. The project will compare baseline fMRI data from lean healthy individuals and those with overweight or obesity. The analysis will aim to identify neural differences between these groups, providing insights into how brain networks contribute to appetite regulation and the impact of body weight on these processes.

Students will gain knowledge of functional MRI and its application in neuroscience, participate in fMRI acquisition studies, analyze the obtained data using SPM tools (including preprocessing and statistical analysis) and interpret the results.

yes	
no	X

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