Proposal of Master Research Project (MRP) for the Academic Year 2026-27

Group name: Plasticity of brain networks
IP name: Encarni Marcos
Group web: https://in.umh-csic.es/en/grupos/mecanismos-neuronales-de-la-conducta/#info-general

Title of the MRP:

Cost-benefit integration in effort-based decision-making

Summary of the MRP:

This project will investigate how effort costs influence value-based decision-making in head-fixed mice using a controlled behavioral paradigm. Animals will be trained to choose between options that vary in reward magnitude and associated action costs, allowing the systematic study of cost-benefit trade-offs. Behavioral data will be used to quantify choice patterns and sensitivity to effort and reward across conditions. Computational analyses will be applied to model decision variables and characterize how cost-benefit information is integrated during choice. This approach aims to provide insight into the computational mechanisms underlying effort-based decision making within a well-established behavioral framework.

Methods and technology involved in the MRP:

The project will employ a head-fixed mouse behavioral paradigm to study effort-based decision-making under controlled laboratory conditions. Mice will be trained to perform a choice task in which they select between options that differ in reward magnitude and required action cost. Behavioral performance will be systematically recorded across sessions, focusing on choice patterns, reaction times, and learning dynamics. Experimental conditions will be designed to parametrically manipulate the cost-benefit structure of the task in order to assess decision strategies under different incentive regimes. Data analysis will include behavioral quantification of sensitivity to effort and reward, as well as computational modeling to infer underlying decision parameters. This methodological framework will allow for a rigorous characterization of cost-benefit integration in decision-making using a well-controlled and established behavioral setup.

Contact: Encarni Marcos; emarcos@umh.es