

Group Name: Traslational Neuropsychopharmacology

IP Name: María Salud García Gutiérrez

Group Web: <https://in.umh-csic.es/es/author/maria-gguterrezumh-es/>

Title of the MRP:

Molecular biomarkers associated with stress-related disorders: insights from human brain studies

Summary of the MRP:

Stress-related disorders represent a major public health challenge and are associated with significant alterations in emotional regulation and cognitive function. Increasing evidence suggests that dysregulation of neurobiological processes such as stress signaling, neuroplasticity, and neuroinflammation contributes to vulnerability to these conditions. However, the identification of reliable molecular biomarkers remains a key unmet need.

This project aims to investigate molecular alterations associated with stress-related disorders using human brain samples. Building on previous work from our research group, the study will focus on analyzing candidate genes involved in stress response, synaptic plasticity, and neuroimmune pathways.

Importantly, the project will include the analysis of samples from individuals with severe stress-related phenotypes, including suicide, allowing the exploration of molecular signatures associated with extreme stress vulnerability.

The student will perform targeted gene expression analyses in selected brain regions, such as the prefrontal cortex, amygdala, and hippocampus, using quantitative PCR. Results will be analyzed to identify group differences and, when available, integrated with relevant demographic and clinical variables.

This work aims to contribute to a better understanding of the molecular mechanisms underlying stress-related disorders and may support the identification of biologically relevant biomarkers with potential translational value.

Methods and technology involved in the MRP:

To address the proposed aims, the student will implement advanced molecular and analytical approaches, including:

- Analysis of postmortem human brain samples from cases and matched controls
- Region-specific tissue processing and dissection (e.g., prefrontal cortex)
- RNA extraction and rigorous quality assessment (integrity, purity, concentration)
- Gene expression profiling using targeted approaches/bulk transcriptomics
- Statistical modeling and correlation of molecular findings with available clinical variables

Contact: María Salud García Gutiérrez maria.gguterrez@umh.es