

Project PNRR-MCNT2-2023-12378074 “A multiomic approach for diagnosis and follow-up of eosinophilic esophagitis: from bench to bedside”

This research project aims to identify non-invasive biomarkers to optimize the diagnosis and clinical monitoring of patients suffering from eosinophilic esophagitis (EoE). Leveraging the potential of omics technologies, the study will adopt an integrated approach to analyze clinical, biochemical, immunohistochemical, microbiome, and metabolomic data.

Within this scope, the ICB Institute will conduct research activities focused on biomarker identification via NMR metabolomic profiling across diverse biological matrices (saliva, serum, and gastric fluids) from both healthy controls and EoE patients, before and after therapeutic treatment. In parallel, the Institute will analyze the expression and modulation of antibacterial IgA, IgM, and IgG.

The main objective of the project is to **innovate the diagnostic approach and clinical monitoring of Eosinophilic Esophagitis (EoE)**, thereby reducing the need for invasive procedures for the patient.

The primary goal is broken down into the following **specific objectives**:

- **Identification of Non-Invasive Biomarkers:** To discover, define, and characterize new biological markers in easily samplable matrices (such as saliva, serum, and gastric fluids) to facilitate both the initial diagnosis and the subsequent follow-up of the pathology.
- **Integration of Multi-Omic Data:** To develop an integrated analysis model capable of combining and cross-analyzing diverse types of measurements, including clinical, biochemical, immunohistochemical, microbiome, and metabolomic data.
- **Advanced Metabolomic Profiling (ICB Expertise):** To characterize the metabolomic profile of patients using Nuclear Magnetic Resonance (NMR) spectroscopy, comparing biological samples from healthy subjects (controls) with those from patients affected by EoE.
- **Evaluation of Therapeutic Efficacy:** To monitor molecular and biochemical variations before and after patients' therapeutic treatment, in order to identify early indicators of treatment response.
- **Study of the Immune Response and Microbiome:** To analyze the expression and modulation of antibacterial immunoglobulins (IgA, IgM, and IgG) to better understand the role of the immune system and microbiome interactions in the pathogenesis of EoE.