

Position for the 1 position of a PhD student
in the Doctoral School of Exact and Natural Sciences
Biomedical Sciences (EN) (MCB/JCET/Solaris)
offer no 2022-218

**“Systems Biology to Embrace Complexity in Heart Failure with Preserved Ejection Fraction –
Novel Concepts in Altered Cardiac Energy Metabolism and Potential New Therapeutic Targets”**

Supervisor: dr hab. Mariola Olkowicz

The Doctoral School of Exact and Natural Sciences MCB/JCET/Solaris invites applications for the position of a PhD student that will start on October 2022.

For more information, please visit: [Biomedical Sciences \(EN\) \(MCB/JCET/Solaris\)](#)

Project description:

Heart failure with preserved ejection fraction (HFpEF) is a complex clinical syndrome with heterogeneous pathophysiology and presentation [1]. The limited availability of representative animal models that may recapitulate the clinical features of human HFpEF along with the corresponding complexity of the biological networks occurring in a large number of tissues and cell type under these challenging conditions constitute the major obstacles in conducting mechanistic studies elucidating the pathophysiology of this syndrome. In that context, systems biology – the study of complex interactions in biological systems and the emergent properties that arise from such interactions supported by rapid technological advances which enable highthroughput and systematic profiling of cellular genome, transcriptome, proteome, metabolome, to name a few – represents a powerful approach in HFpEF pathophysiology investigations [2].

The main goal of the research will be to identify the most relevant and integrative biological mechanisms of metabolic dysfunction in HFpEF that can be therapeutically targeted and potentially clinically transferred for the benefit of patients. In addition, this study aims to explore metabolic mechanisms of improved patient outcome in regard to new therapies including SGLT2 inhibitors or other metabolism-affecting drugs. On methodological level, this project will be based on interdisciplinary, state-of-the-art methodologies that will include, among others, modern Omics technologies (NGS transcriptomics, proteomics, metabolomics, lipidomics), modern tools in preserving the intact metabolome/lipidome (solid-phase microextraction), unique strategies to integrate multi-omics datasets (based on machine learning and artificial intelligence) as well as a wide scope of other studies, at functional, biochemical and molecular levels that all will be carried out in the unique model for hyperlipidaemia and atherosclerosis that possesses human-like lipoprotein metabolism (E3L.CETP mice).

[1]. Mishra S, *et al.* Cellular and molecular pathobiology of heart failure with preserved ejection fraction. *Nat Rev Cardiol.* 2021 Jun; 18(6):400-423.

[2]. Gibb AA, *et al.* Molecular Signature of HFpEF: Systems Biology in a Cardiac-Centric Large Animal Model. *JACC Basic Transl Sci.* 2021 Aug 23; 6(8):650-672.

To make the application process fast and easy, [please follow the rules.](#)

Please send your application documents to the Online Application System (OAS) at:

[>> Online Application System <<](#)

End of registration: 11.07.2022