UNIVERSITY OF MEDICINE AND PHARMACY
„CAROL DAVILA" BUCHAREST
DOCTORAL SCHOOL
DOMAINE MEDICINE

Advancing Precision Medicine in Cardiovascular Diseases: Original Contributions on the Role of Molecular and Cellular Factors in Clinical Research

HABILITATION THESIS ABSTRACT

CANDIDATE:
Micheu Miruna-Mihaela
Scientific Researcher grade III
Clinical Emergency Hospital of Bucharest

2025

The habilitation thesis entitled *"Advancing Precision Medicine in Cardiovascular Diseases: Original Contributions on the Role of Molecular and Cellular Factors in Clinical Research"* synthesizes my efforts focused on the development, promotion, and application of the concept of precision medicine in cardiovascular pathology.

The thesis was elaborated in accordance with the recommendations of the National Council for the Certification of University Titles, Diplomas, and Certificates (CNATDCU) and reflects my scientific, academic, and professional activities, with an emphasis on the postdoctoral period (2013–2025), carried out within the Emergency Clinical Hospital of Bucharest.

Scientific Achievements

My postdoctoral research represents a natural continuation of my clinical practice as a cardiologist in one of Bucharest's leading emergency hospitals, as well as of my doctoral research, completed in 2012 with the thesis entitled *"New Therapeutic Modalities in Acute Myocardial Infarction: Autologous Stem Cell Transplantation"* under the supervision of Prof. Dr. Maria Dorobanțu.

My research has followed three main directions, each detailed throughout the thesis.

The first research direction addresses ischemic heart disease, with a focus on acute coronary syndromes. The studies concentrated on identifying molecular, cellular, and imaging biomarkers to optimize diagnosis, risk stratification, and personalized treatment strategies for patients with this condition.

The second research direction highlights the role of genetic variability in inherited cardiomyopathies, with a particular focus on hypertrophic cardiomyopathy. My studies explored rare genetic variants and polymorphisms associated with clinical phenotypes, aiming to better understand the underlying molecular mechanisms and to individualize the management of index patients and their families.

The third research direction centers on the impact of environmental factors on cardiovascular pathology. I investigated the influence of air pollution, temperature fluctuations, and changes in atmospheric pressure on the incidence and severity of cardiovascular events, highlighting the complex interplay between environmental factors and individual vulnerability. These studies offer new perspectives for the development of prevention strategies and adaptation measures in the context of climate change, with direct implications for cardiovascular health.

The results of my research have been supported by participation in twelve competitively awarded research projects, three of which I coordinated as project director, one as the responsible coordinator on behalf of a partner institution, and eight as a team member involved in research/management activities. My publication record includes 31 articles as first author and 11 as co-author in ISI-indexed journals (mainly in Q1/Q2 quartile journals), 10 articles indexed in BDI databases, and over 70 scientific abstracts indexed in international databases. Additionally, I contributed to three collective volumes published by the Romanian Academy Publishing House and Springer.

Currently, my scientometric indices are: Hirsch index of 12 (Web of Science Core Collection) with 374 citations, and h-index 12 (Scopus) with 410 citations.

Academic Achievements

My academic trajectory has been centered on cardiology and cellular and molecular biology, with a special interest in innovative therapies. My doctoral thesis focused on the use of stem cells for myocardial regeneration after infarction, analyzing the potential clinical implications of this therapy.

To strengthen my molecular biology knowledge, I pursued a Master's degree in Applied Genetics and Biotechnology at the University of Bucharest, graduating in 2018. My dissertation involved the molecular and phenotypic characterization of a MYBPC3 gene variant associated with hypertrophic cardiomyopathy, using in silico methods and genotype-phenotype correlations.

My involvement in institutional development projects included active participation—as assistant director—in the CREDO project (*Creation of a Center of Excellence in Clinical and Translational Research*), contributing to the modernization of the research infrastructure within the Cardiology Clinic of the Emergency Clinical Hospital of Bucharest. I coordinated the development of the Regenerative Cardiology Laboratory and the Medical Genetics Laboratory, supporting the conduct of innovative fundamental and applied research.
Within these laboratories, I have been involved in the supervision of three doctoral theses, whose results were validated through publications in ISI-indexed journals, predominantly in Q1/Q2 quartiles, where I often served as the first author.

Professional Achievements

My professional career has evolved through the continuous integration of clinical activity with scientific research. I graduated from the Faculty of Medicine at “Carol Davila”

University of Medicine and Pharmacy in 1999, then completed residencies in Internal Medicine and later in Cardiology.

In parallel, I pursued a research career, being promoted to the positions of Scientific Researcher and subsequently Scientific Researcher Grade III (2012). Throughout my professional journey, I have consistently sought to deepen and expand my expertise in clinical medicine and biomedical research through ongoing interdisciplinary training. In clinical practice, I attended specialization programs in cardiac echocardiography, medical genetics, and bioinformatics, acquiring advanced competencies necessary for an integrated and personalized approach to cardiovascular diseases. In research, I enhanced my skills by participating in advanced courses in flow cytometry, cell biology, and molecular biology, fields essential for elucidating pathophysiological mechanisms and developing innovative therapeutic strategies.

I also developed project management competencies by completing an accredited specialization course, which has enabled me to efficiently coordinate complex research projects and ensure their successful implementation within an effective organizational framework.

Future Career Development Plans

I aim to consolidate and expand the research directions I have already explored, focusing on two main areas: studies in cardiogenetics and cardioinformatics, and resilience and adaptation of cardiovascular patients to climate change.

Academically, obtaining the habilitation will allow me to supervise doctoral theses, providing mentorship to young researchers and contributing to the development of a dynamic academic community focused on excellence and innovation.

Additionally, I intend to continue actively contributing to the modernization of research infrastructure and promoting a transdisciplinary approach in future projects. Strengthening national and international collaborations, as well as disseminating research findings in prestigious journals, remains a constant goal of my development strategy.

Regarding my professional career, I am currently undergoing the promotion process to achieve the rank of Scientific Researcher Grade II, a natural step recognizing my contributions to clinical research. I will continue to combine clinical expertise with scientific inquiry to advance medical knowledge and improve the quality of care for patients with cardiovascular diseases.