

# ABSTRACT

## **Title:** Clinical and Experimental Studies in Thyroid, Metabolic, and Vascular Surgical Pathology

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The habilitation thesis entitled "Clinical and Experimental Studies in Thyroid, Metabolic, and Vascular Surgical Pathology" represents a synthesis of my postdoctoral activity and reflects the outcomes achieved in my professional, academic, and scientific endeavors.

My interest in research began in the early years of my residency, but an essential contribution to my scientific development was made during the three years of clinical training in Marseille, France, in centers recognized at both European and international levels. Indeed, my doctoral thesis was based on the activity carried out during that period.

The postdoctoral research has been structured along two major thematic axes: (1) endocrine surgical pathology, with particular emphasis on thyroid diseases - nodular pathology, thyroid carcinomas, and diffuse thyroid disorders; (2) the complex interplay between obesity, metabolic syndrome, oxidative stress, chronic inflammation, and hormonal imbalances, within the context of vascular and tumor-related pathology. This second research direction encompasses several specific subfields: (a) metabolic risk factors involved in colorectal cancer; (b) metabolic surgery and its impact on associated comorbidities; (c) the role of perivascular ectopic adipose tissue in the pathogenesis of atherosclerosis; (d) experimental studies on animal surgical models for heart failure and atherosclerosis; (e) surgical vascular pathology - including critical limb ischemia and aneurysmal disease - as a natural continuation of my doctoral research.

The first part of the thesis summarizes my personal achievements and scientific contributions throughout my career, focusing on the two main research directions mentioned above. The second part is dedicated to outlining the future development plan for my teaching, academic, and professional career.

In the first section of the scientific contribution, I presented clinical research grounded in my personal experience in thyroid surgery, highlighting the benefits of the robotic axillary approach using the da Vinci surgical system. The results are notable, as we were the first group to implement this technique in Romania. A significant research direction involved the analysis of microRNA profiles in two histological subtypes of papillary thyroid carcinoma. We identified significant differences between the two variants, with potential implications for non-invasive early diagnosis, prognosis, and targeted therapy in differentiated thyroid carcinomas.

Furthermore, I described a study protocol exploring the use of virtual reality in postoperative pain management, demonstrating that this modern method is relatively easy to implement and effective in enhancing immediate postoperative quality of life and comfort, with great benefits in terms of pain relief.

In a rat model of surgical heart failure, I investigated the effects of Lycium barbarum polysaccharides (LBP), demonstrating their antioxidant and anti-inflammatory properties, as well as their beneficial role in myocardial remodeling and the progression of heart failure. The results highlight the translational potential of LBP and support the expansion of evaluation into clinical studies involving human subjects. In parallel, I conducted an analysis of

glucocorticoids (GCs) in perivascular ectopic adipose tissue, emphasizing the role of glucocorticoid receptors and local GC synthesis in the pathogenesis of atherosclerosis.

In clinical studies, I evaluated obese patients undergoing laparoscopic sleeve gastrectomy, reporting short- and medium-term postoperative outcomes, the impact on comorbidities, and early and ultra-early changes in circulating total bile acid levels. These alterations appear to correlate with improvements in insulin resistance, supporting the hypothesis of a connection between bile acids and glucose metabolism. Additionally, in a review article, I synthesized the literature on the implications of metabolic risk factors in colorectal cancer development, highlighting the complex interrelationships between metabolism, inflammation, and carcinogenesis.

From a professional standpoint, I am senior consultant in both general and vascular surgery. Since 2011, I have held the position of lecturer in the Department of Surgery V, and beginning with 2024, at the Faculty of Nursing and Health Sciences at the "Iuliu Hațieganu" University of Medicine and Pharmacy in Cluj-Napoca. I coordinated as project director a national research grant awarded by competition and also an internal grant awarded by UMF "Iuliu Hațieganu" Cluj-Napoca. Additionally, I have participated as a member in seven national grants and one international grant.

The results of my research activity are reflected in 30 articles published in journals indexed in the Web of Science, including 17 as main author, along with 7 other articles in journals indexed in other international databases. My scientific recognition is evidenced by 499 ISI citations in Web of Science-indexed journals and a Hirsch index (h-index) of 12 on Web of Science. According to Google Scholar, my profile includes 921 citations, an h-index of 15, and an i10-index of 22.

In terms of future development for my teaching, academic, and professional career, my main objectives include: continuing research in thyroid cancer genetics - a highly relevant and promising field with significant benefits in early diagnosis, clinical course stratification and personalized therapy based on histological subtype; integrating and applying artificial intelligence methods in the study of endocrine tumor pathology; and investigating the relationships between hormonal dysfunctions and ovarian and breast surgical pathology. Another major objective is the systematic enhancement and application of modern teaching methods, along with ongoing professional development, especially regarding the use of minimally invasive techniques and procedures in endocrine surgery.