

**"VICTOR BABEȘ" UNIVERSITY OF  
MEDICINE AND PHARMACY TIMIȘOARA  
DOCTORAL SCHOOL  
MEDICINE**



**ANATOMO-CLINICAL ASPECTS AND MULTIDISCIPLINARY  
CORRELATIONS REGARDING NORMAL AND  
PATHOLOGICAL STRUCTURES, AND THEIR IDENTIFYING  
AND PRESERVING METHODS**

**ABSTRACT**

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**Timișoara**

**2024**

This habilitation thesis focuses on the most significant scientific, academic, and professional accomplishments. It is organized into four primary sections. These sections describe my scientific achievements, my professional achievements, my academic achievements, as well as other extracurricular activities and the last one presents future perspectives for myself and the Department of Anatomy and Embryology.

I began my educational journey at General School No. 25 in Timișoara (1978-1986), where I developed a strong foundation in the basic sciences. This interest further expanded during my time at the Lyceum of Philology-History in Timișoara (1986-1990), where I specialized in Physics and Chemistry. My pursuit of medical knowledge led me to "Victor Babeș" University of Medicine and Pharmacy in Timișoara, where I graduated from the Faculty of General Medicine in 1997. My academic journey was complemented by hands-on experience as a trainee doctor at the Municipal Clinical Hospital in Timișoara (1998-1999). In November 1999, I began my doctoral studies in the Department of Anatomy and Embryology at "Victor Babeș" University, and by January 2002, I had earned the position of assistant professor. My thesis, titled "Study of the Subdiaphragmatic Autonomic Ganglia - Morpho functional Aspects," explores the fields of neurodevelopment and neuroanatomy, focusing on the sympathetic ganglia's morpho functional complexity. The research encompasses a detailed analysis of the celiac plexus, the enteric nervous system, and autonomic ganglia histology, with biological materials sourced through collaborations with obstetrics, gynecology clinics, and other university centers. My contribution includes studying the developmental anatomy of the celiac ganglion using fetal specimens and a newborn, illustrating its morphological evolution from migration to neuronal differentiation. Additionally, I provided original dissection data on the celiac plexus's morphology and topography in adults and fetal/newborn specimens. Microscopic analyses of fetal samples revealed the structure and development of intramural autonomic plexuses and ganglia in pericoeliac viscera, while a structural study in animals highlighted the need for distinguishing interstitial Cajal cells involved in local neural coordination. I was awarded a Doctorate in Medical Sciences in November 2004, solidifying my dedication to medical research. Since March 2005, I have been a specialist in Pathological Anatomy. For the moment, I hold the position of Associate Professor at the University of Medicine and Pharmacy Victor Babes Timisoara. I have published numerous articles in various national and international journals, including 25 articles in Web of Science/ISI indexed journals, a Hirsch index of 8 and 171 citations (from Web of Science Core Collection database).

As an anatomist, I have been honored to share my knowledge at various scientific gatherings, including national and international congresses and conferences. My dedication extends to active memberships in numerous professional societies such as the Romanian Society of Anatomy (1999-2016), the Romanian Society of Morphology (founding member since 2004), the Romanian Society of Musculo-Skeletal Imaging (founding member since 2007), and the Romanian Algology Association (since 2008). Internationally, I am a member of ASORIS (since 2009) and the German Society of Anatomy (2004-2017). Additionally, I have reviewed 96

articles and 10 book chapters across various esteemed journals, including 21 articles in Web of Science/ISI indexed journals, contributing significantly to the advancement of medical science and ensuring the highest standards of scholarly research.

During my time at UMFTVB, I have actively participated in various committees, gaining extensive experience in academic administration and evaluation processes. I served on committees for evaluating application files of EU and non-EU candidates (2018-2019), and for subject extraction for the entrance exam (2013-2018). My involvement included participating in committees for assistant professor and senior lecturer positions in Anatomy and Embryology (2011-2017) and serving on the committee for observing teaching position competitions (2016-2017). Additionally, I represented employees in implementing fiscal amendments (2017), served on the admission committee for EU students (2016), and have been an active member of the Faculty of Medicine's Quality Assurance and Educational Evaluation Committee (since 2016). Organizing the Anatomy Olympiad (2014) and serving on degree examination committees (2012) further enriched my understanding of academic standards, admissions procedures, and quality assurance within the university framework.

One of my main interests is plastination, a long-term, environmentally friendly preservation technique that impregnates silicone into dissected anatomical components, creating durable and non-toxic teaching materials. At the Department of Anatomy and Embryology at Timisoara's Victor Babes University of Medicine and Pharmacy, we have developed plastinated models such as livers, upper limbs, cerebral hemispheres, and complete brains, allowing students to study structures like tendons, nerves, arteries, gyri, and sulci in their true dimensions. This technique eliminates the drawbacks of formaldehyde exposure, offering odorless and ageless specimens. Our plastinated specimens, displayed in our department museum, serve as excellent study modules and can be used to create a comprehensive library of normal, variable, and diseased anatomy. Utilizing agents like Biodur S3, S6, and S10, plastination enhances the anatomy laboratory environment and requires a recognized plastination facility, specialized tools, and expertise in intricate plastination methods.

My secondary academic focus has been on macroscopic anatomy, the study of structures and organs, which has significantly enhanced my understanding of human morphology. Key areas of interest include the morphological variability of the superficial veins of the lower limb, pathology and morphology of bones, the lumbosacral plexus, morphological and morpho pathological study of teeth, the reproductive system, the respiratory system, joints, fetal anomalies of the cephalic region, and the azygos venous system. I have published numerous articles indexed in ISI and international databases, contributing extensively to the field of macroscopic anatomy.

My third main academic interest is the correlation between microscopic and macroscopic anatomy, and the study of the microscopic structure of tissues and cells in multicellular organisms. Histology began with the invention of the microscope, which allowed scientists to see beyond the resolution limit and observe the cellular

architecture of tissues. This advancement was revolutionary in biological sciences, similar to the Copernican revolution in astronomy, and spurred numerous studies into cell and tissue morphology, leading to the understanding that structure determines function and that alterations in structure can indicate dysfunction. Modern techniques in morphological investigation have furthered our knowledge of shape-function relationships at nearly the molecular level, allowing for reliable data collection from living cells and tissues over extended periods, known as dynamic and precision microscopy.

Significant contributions to histology include the development of tissue fixation and staining techniques, starting with synthetic pigments from the dye industry and advancing with methods pioneered by scholars like Marcello Malpighi. These methods have provided the foundation for modern histology by enabling the detailed examination of tissue samples. The advent of correlative microscopy, combining multiple sensors and modern computing power, allows for the simultaneous analysis of samples at micrometric to nanometric resolutions, uncovering new correlations between morphology and function. The process of histological examination involves several steps, including dissection, fixation, dicing, and coloring, with fixation and coloring being crucial for preserving and visualizing tissue structures. Despite the widespread use of formalin for fixation, alternatives like glycerine offer benefits such as ease of handling and reduced health risks, making them valuable in anatomical research and education.

The last point of interest has been clinical application of anatomy. Human anatomy and physiology form the essential foundations underpinning medical technological advancements. A profound comprehension of the intricate workings of the human body is crucial for innovating new medical devices and therapies in today's rapidly evolving healthcare landscape. Anatomy, being fundamental to medicine, serves as a prerequisite across all medical disciplines, from preclinical education to clinical practice. Despite its foundational importance, the teaching of anatomy is sometimes undervalued, with students occasionally perceiving it as a burdensome study involving cadaver dissection and memorization of inert structures. However, recent advancements in teaching methodologies, such as the use of advanced organizers, have shown promise in enhancing the relevance and engagement of anatomy courses, thereby fostering deeper understanding and motivation among students.

Anatomy not only provides a comprehensive understanding of bodily structures and their functions but also plays a pivotal role in medical specialization and clinical practice. Integrating anatomical knowledge into clinical sciences enhances diagnostic accuracy, therapeutic approaches, and surgical interventions, ultimately improving patient care outcomes. By bridging the gap between anatomy and clinical application, I have endeavored to contribute to the development of more effective diagnostic and treatment strategies. This integration aims to enhance our understanding of diseases and medical conditions, thereby refining approaches to patient care through a comprehensive understanding of clinical and applied anatomy.

Discussing perspectives, the future of anatomy research will be transformed by advanced technologies and interdisciplinary collaboration. My research will leverage High-Resolution Imaging (MRI, CT scans, 3D imaging) for detailed anatomical studies and diagnostic precision. Digital tools like the Anatomage Table and 3D model printing will enable virtual dissections and immersive learning. Focus areas include histology and morphopathology, and the integration of molecular and cellular anatomy to deepen our understanding. Collaborations with biochemists, geneticists, and bioengineers will foster innovative treatments and diagnostics. Genetic and anatomical data integration will enhance personalized medicine and regenerative therapies, with a focus on ethical considerations by reducing reliance on cadaveric specimens.

My educational strategy emphasizes inspiring students in anatomy through modern technologies like the Anatomage Table and 3D model printing for interactive learning. I will organize workshops, practical sessions, and student-led research groups to connect theory with clinical practice. Collaborative learning environments and mentorship programs will further engage students. I aim to share my discoveries through publications in top journals and participation in conferences. Professional collaboration with clinicians and medical professionals will enhance clinical training and research, improving our understanding and treatment of human anatomy. These efforts aim to create a comprehensive approach to anatomical education and practice, benefiting students and the medical community.