

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



**INTEGRATIVE APPROACHES IN MEDICAL
RESEARCH: ANTIOXIDANT MECHANISMS,
CANCER INSIGHTS, AND BIOMEDICAL
APPLICATIONS**

ABSTRACT

Associate Professor PhD CHEVEREȘAN ADELINA

**Timișoara
2024**

The present thesis, entitled „**Integrative Approaches in Medical Research: Antioxidant Mechanisms, Cancer Insights, and Biomedical Applications**” synthesizes the scientific research activity I have carried out since completing my doctoral thesis and my academic and professional career.

Modern health research increasingly adopts integrative approaches, combining insights from various scientific fields to address complex diseases like cancer and conditions associated with oxidative stress. Integrative research recognizes that health issues are rarely isolated and often involve a combination of biological, environmental, and lifestyle factors. By adopting a holistic view, researchers can develop more effective preventive strategies and treatments that address diseases' root causes and multifaceted nature.

Thus, the first part of the thesis was subdivided into four distinct directions targeting the areas of interest.

The first chapter exposes antioxidant mechanisms and their role in cellular protection. Antioxidants play a critical role in maintaining cellular health by neutralizing reactive oxygen species and free radicals - unstable molecules that can cause cellular damage if left unchecked. The antioxidant balance is crucial in preventing various oxidative stress-related diseases, including aging-related conditions, cardiovascular disease, neurodegenerative diseases, and certain cancers.

Next, the thesis focuses on melanoma, the most aggressive form of skin cancer, has seen significant advancements in treatment approaches over recent years. Researchers and clinicians have shifted focus toward a more comprehensive understanding of melanoma biology, taking into account the tumor microenvironment, genetic mutations, and patient-specific factors. Key areas of study include the assessment of melanoma tumor cells, the impact of UV radiation in melanoma development, and the emerging role of hormonal receptors in disease progression and therapy.

The third chapter contains aspects of biomedical research that increasingly focuses on natural extracts and nanoparticles for their potential to treat and prevent disease, combining bioactivity with innovative delivery systems. By integrating the natural bioactive compounds from plant sources with advanced nanotechnology, researchers

aim to enhance therapeutic efficacy while ensuring safety in clinical applications. This combined approach is paving the way for treatments that could target diseases more specifically and reduce side effects, thereby improving patient outcomes in fields ranging from oncology to regenerative medicine. Natural extracts and nanoparticles represent an innovative frontier in biomedical research, offering new hope for safer and more effective treatments. As research progresses, the evaluation of safety and biological activity remains central to realizing the potential of these therapies. Through continued innovation and rigorous testing, natural extracts and nanoparticle-based systems are poised to make a significant impact on modern medicine, supporting a move toward treatments that are both potent and patient-centered.

The final chapter presents the importance of oral health and the impact of dietary choices and oral use of both natural and synthetic compounds. Recent research highlights the potential of specific foods, nutrients, and bioactive compounds to promote oral health and prevent common dental diseases such as cavities, periodontal disease, and oral cancers. In addition to synthetic compounds commonly found in oral care products, researchers are exploring the use of natural compounds for their bioactive properties. This approach aims to support oral health not only through traditional dental treatments but also by leveraging preventive and therapeutic benefits from dietary components and compounds.

The second part of this thesis is focused on academic achievements. I have developed a comprehensive career in both academia and clinical practice, beginning with a Bachelor's degree in Dentistry in 1998, followed by a degree in Pharmacy in 2002, and a Doctorate in Medicine in 2009, focusing on adolescent health behaviors. Since 1999, I have been involved in higher education, and I currently serve as an Associate Professor of the Department of Pharmacology at the University of Medicine and Pharmacy "Victor Babeș" in Timișoara.

In my role, I design a curriculum that equips medical and dental students with essential pharmacological knowledge, emphasizing its application in clinical decision-making. I actively mentor students on research projects related to pharmacology, fostering critical thinking and innovation.

My research contributions include 30 full-text articles and 39 books, and I have presented my work at 82 national and international conferences, my research interests focus on the pharmacodynamics of dental drugs. I hold an H-index of 6, reflecting my impact in the field. I aim to continue advancing pharmacological knowledge and improving patient care practices in both general and dental medicine.

In parallel with the academic function, I also continued the medical activity, discussed in the third part. With over two decades in dental medicine, I have developed a comprehensive clinical practice that emphasizes advanced technical expertise and patient-centered care. My journey began in 1998 as a General Dentistry Intern at the Clinical County Hospital in Timișoara, where I gained valuable experience in various aspects of dental care.

Since 2002, I have managed my practice, Adedent, providing a wide range of dental services to patients of all ages in a comfortable environment. Furthermore, in 2002, I became a Specialist in General Dentistry, and later in 2008, I obtained the title of Primary Dental Physician. In my practice, the focus is on preventive care, and educating patients on oral hygiene to empower them in maintaining their dental health. I also offer restorative dental procedures, including aesthetic restorations and cosmetic treatments, ensuring both functionality and aesthetics.

In 2008, I achieved an advanced certification in implantology from the University of Medicine and Pharmacy “Victor Babeș,” enabling me to provide dental implant placement and restorative dental procedures. This specialization allows me to offer long-term solutions for tooth replacement, focusing on comfort and natural appearance.

I prioritize professional growth through continuous education by attending national and international conferences, which helps me stay updated on the latest techniques and technologies in dentistry. This commitment to lifelong learning enhances my ability to make evidence-based decisions that improve patient outcomes.

Central to my practice is a patient-centered approach. I believe effective dental care involves building trust, listening to patients, and creating a welcoming environment.

The last part of the thesis addresses academic and scientific perspectives. I am dedicated to advancing interdisciplinary research and education in pharmacology and dental medicine. My future research will focus on the pharmacology of dental

therapeutics, particularly enhancing post-surgical outcomes and developing guidelines for safe, effective medication use in implantology.

On the academic front, I plan to integrate technology into the curriculum through digital simulations and case-based learning, preparing students for complex clinical scenarios. My commitment to collaborative research includes establishing a consortium that unites professionals across pharmacology and dental fields, fostering an innovative community focused on improving healthcare practices. These goals reflect my dedication to a holistic, evidence-based approach that benefits both patient care and future healthcare professionals.

The scientific results obtained after completing the doctoral thesis consisted of:

- ❖ 30 ISI-indexed full-text articles;
- ❖ 5 ISI indexed proceedings full-text articles;
- ❖ 7 ISI-indexed abstracts;
- ❖ 5 full-text articles published in volumes with ISSN;
- ❖ 16 BDI-indexed full-text articles;
- ❖ 19 full-text articles published in non-indexed journals
- ❖ 39 published books in national publishing houses
- ❖ 82 - communications at international/national conference/workshop.