

**UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE
“CAROL DAVILA” BUCUREȘTI**



TEZĂ DE ABILITARE

**CERCETĂRI APLICATIVE ÎN DOMENIUL
MECANISMELOR MOLECULARE DE
ACȚIUNE A MEDICAMENTELOR**

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Abstract

The habilitation thesis entitled "Applied Research in the Field of Medicines Molecular Mechanisms of Action " is structured into three sections. The first one describes the personal, professional and academic achievements, the second section is presented in the form of a detailed presentation of the main scientific achievements after the doctoral dissertation, and the third section presents the main future plans regarding the evolution and developpment of the professional, scientific and academic profile.

In the chapter entitled "Professional and Academic Achievements" I presented the entire academic and professional career during my 15 years of activity at the Faculty of Pharmacy of the "Carol Davila" University of Medicine and Pharmacy - Bucharest, and in 2007 I defended the PhD thesis in the field of Pharmaceutical Sciences. Also during this period I passed the exams for obtaining the academic titles and various degrees specific to the profession of pharmacist: resident, specialist, mayor. Professional training has been one of my main concerns with a multidisciplinary educational path adapted to the nature of the subjects taught.

Throughout this period I was concerned with motivating and supporting pharmacy students to deepen the scope of the drug action mechanisms, in all biological and molecular aspects. In this regard, I helped, first of all, to improve the didactic material. Thus, as a co-author, I participated in the development of 4 Laboratory Books required for pharmaceutical practical applications in the field of drug biochemistry. I have also been involved in the development of the didactic material - support for the Biochemistry and Pharmaceutical Microbiology courses.

The aspect of professional pharmaceutical activity completes, necessarily and elegantly, the academic and scientific activity. To that end, I informed, prepared and supported numerous training courses and continuous training for pharmacists across the country, regardless of the geographic area. I also participated, as a member of the Scientific Council, in organizing numerous events within the Romanian pharmaceutical community.

Another aspect I would like to highlight relates to a special field of activity, which I have voluntarily assumed, through the involvement in the activity of Managing Editor at *Farmacia* journal, the only publication in the Romanian pharmaceutical scientific field indexed and quoted on the basis of ISI Thomson Reuters data (IF / 2016 = 1.348).

In the second chapter of the thesis, entitled "Scientific Achievements", I have detailed the results obtained and published in the form of articles quoted ISI or indexed by BDIs, as well as in books / chapters of books published nationally or internationally.

The main research directions developed in the scientific field are in line with the Development Plan of the faculty, the university and respectively the Research and Development-innovation strategies elaborated at national and international levels and can be grouped as follows:

- ✓ Molecular mechanisms involved in variability of central nervous system (CNS) response in different physiopathological contexts;
- ✓ Predictive biochemical parameters for metabolic diseases etiopathogenesis. Oxidative stress, ubiquitous factor of homeostasis imbalances;
- ✓ Study of the effects of xenobiotics on cellular and sub-cellular components, through physico-chemical bioanalyses;
- ✓ Applied research in pharmaceutical microbiology.

Within the first research approach I have conducted both *in vitro*, cell cultures and *in vivo* studies on laboratory animals. The experiments focused on the main neurotransmissions (monoaminergic, melatonin-ergic, serotonergic, opioid-ergic) and their correlation with the mechanisms of action of active drugs in the central nervous system. The research carried out within this research direction has been materialized through the publication of 9 ISI articles (including 7 as the main author), 1 book published in an international publishing house and 2 chapters published in international publishing houses (first author).

Within the research directorate "Predictive biochemical parameters for the metabolic diseases etiopathogens. Oxidative Stress, Ubiquitous Factor of Homeostasis Imbalances ", I conducted both experimental, laboratory and clinical studies, following the main predictive biomarkers of metabolic diseases, including the mechanisms underlying oxidative stress. The research carried out within this research field has been materialized through the publication of 13 ISI articles (of which 7 as the main author) and 1 chapter of a book published in international publishing houses (co-author).

The third research direction addressed refers to the "Study of the effects of xenobiotics on cellular and sub-cellular components through physico-chemical bioanalyses". In this context, I investigated *in vitro* the interaction of new Ruthenium complexes with double stranded DNA from calf thymus, human albumin and human serum transferrin, and the effect of bioindoles on membrane fluidity and transmembrane potential. The research carried out was

materialized by publishing 3 ISI articles (all as principal author), 1 BDI article and 1 ISI indexed proceeding.

The fourth direction of research is represented by "Applied Research in Pharmaceutical Microbiology". The scientific investigations consisted in analyzing the antimicrobial effect of some plant extracts, as well as the clinical monitoring of the multi-drug resistance to antibiotics. I also conducted a comprehensive bibliographic study on the pathophysiological implications of human microbiota. The research carried out within this research department has been materialized through the publication of 6 ISI articles (all as the main author), 1 book published in the national publishing house and 2 chapters published in international publishing houses (1 as the first author, the second as a co-author).

Further, in the description of the main scientific achievements, I also mentioned other interdisciplinary researches, carried out in related fields. Thus, I have developed, together with colleagues from different university centres, studies on the evaluation of new predictive biomarkers associated with various pathophysiological conditions, as well as researches on the influence of xenobiotics on the body. The studies carried out within this field has been materialized through the publication of 9 ISI articles (of which 5 as main author).

The last chapter of the thesis presents the main future plans for the evolution and development of the professional, scientific and academic profile.

The academics must have the ability to tirelessly combine teaching and scientific research, giving equal weight to them. The results achieved both in didactic and research activity are innovative and ensure the observance of the fundamental principles of quality assurance in the national and European space of research and higher education.

On the principle of continuity, I wish to build my professional profile in the coming years. In this respect, I intend to improve (in fact periodically update) the experimental methodology in the practical work with the students as a result of the acquisition of modern equipment, based on the ongoing and future research contracts of the discipline. I propose to develop and introduce new experimental works within the Pharmaceutical Microbiology Laboratory. These new protocols will be modern, aligned with laboratory homologous curricula in the countries of the European Union. I also propose, for the very near future, the introduction of the optional course of *Pharmaceutical Applications of Genetics*.

As far as the development of scientific research activity is concerned, I have proposed that it should be oriented mainly on the same research directions in which I have achieved significant results, but I will also consider the development of related directions. The objectives

of the research activities are to increase its competitiveness, to develop partnerships in the priority areas for the design of new technologies, innovative products and implementation mechanisms to solve complex problems associated with the research areas, and to disseminate the results of the studies accordingly.

In conclusion, the main objective of my career was, is and will be that of professional self-refurbishment so that it can carry out educational and research activities at a high quality level, respecting both its own principles, and the qualitative and ethical ones adopted by the Charter and the Strategic Plan of UMF "Carol Davila" Bucharest.