

**UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE
„CAROL DAVILA” BUCUREȘTI
ȘCOALA DOCTORALĂ
DOMENIUL FARMACIE**

**INTEGRATED RESEARCH REGARDING THE DEVELOPMENT
OF INNOVATIVE PHARMACOLOGICAL BIOACTIVE AGENTS
USING NEW PHARMACEUTICAL SYSTEMS
FOR BETTER NUTRITION AND HEALTH PROMOTION**

CANDIDAT:

Conf. Univ. Dr. Pop Anca Lucia

Universitatea de Medicină și Farmacie “Carol Davila”, București

2022

ABSTRACT

The habilitation thesis entitled "Integrated Research Regarding The Development Of Innovative Pharmacological Bioactive Agents Using New Pharmaceutical Systems for Better Nutrition and Health Promotion" was elaborated following the recommendations of the National Council for Attestation of University Degrees, Diplomas and Certificates and the CSUD regulations of the "Carol Davila" University of Medicine and Pharmacy in Bucharest regarding the obtaining of the habilitation certificate; it consists of a brief display of the evolution of my career from a professional, academic and scientific point of view.

The habilitation thesis is structured into four sections;

- The first chapter describes the professional achievements;
- The second chapter highlights the academic achievements;
- In the third chapter, the leading scientific achievements after the Ph.D. research and thesis are detailed presented;
- the last chapter presents the plans regarding the evolution and development of the professional, scientific and academic profiles.

In the chapter entitled "Professional Achievements," I presented the entire academic and professional career during my 17 years of activity within the Clinical Laboratory and Food Safety department of the Faculty of Pharmacy, "Carol Davila" University of Medicine and Pharmacy Bucharest. I went through all the stages of academic education, starting from the professor assistant status, obtained through a contest. During this period, numerous exams were passed for obtaining the academic titles and degrees specific to the medical doctor and pharmacist profession: resident, specialist. In 2009, I defended my Ph.D. thesis in the field of Pharmaceutical Sciences. Professional training has been the core of my formation with a multidisciplinary educational path adapted to the nature of the subjects taught. Thus, I obtained a master's degree in the field of Pharmacology from the Faculty of Medicine, "Iuliu Hațieganu" University of Medicine and Pharmacy, but also the "Family Medicine" medical specialization and later, the "Diabetes, Nutrition and Metabolic Diseases" medical training, also numerous sub-specializations in the field performed in the country or abroad. Meanwhile, the Scientific Communication specialty was essential in my professional development.

In the chapter entitled "Academic Achievements", regarding the didactic activity, I have been involved in teaching the fourth-year students of the Faculty of Pharmacy, residents of Clinical Pharmacy and Pharmaceutical Laboratory specialties, and master students of the "Nutrition and Food Safety" Master program. The didactic activity was not only focused on teaching but also on motivating and supporting pharmacy, pharmacy residents, and master students in different scientific activities and sustaining the presentation of their results within scientific events, scientific papers, and their bachelor thesis. I also participated as co-author to the improvement of the didactic materials and published two books in the field specific to the teaching subjects.

In the third chapter, entitled "Scientific Achievements," I have detailed the main research directions sustained by the most important publications, as follows:

Innovative therapeutic systems using new technologies. This direction comprises studies regarding the preformulation and formulation of pharmacologically active agents of synthetic and natural origin, in the form of final products, with particular delivery systems (slow release, nanocapsules). We have shown that the optimal pharmacokinetic must be assured for a valuable pharmacodynamic active substance to head the pharmacological targets optimally and exert the therapeutic role. The dynamic in time and through the passage by the body's internal (end external) barriers are particular for each substance from the millions of molecules.

Nonetheless, the food and food supplements category, less pharmacologically regulated, must be formulated respecting the pharmaceutical art and rigors to maximize the benefits nature gives us at the maximum potential and with minimal waste. So, lipid nanoencapsulation of natural active molecules (curcumin, diosgenin, hesperidin) and derivatives (oleoylethanolamides, oleamides) - by having an increased biodisponibility due to the rapid passage of the cellular barriers - showed enhanced therapeutic potential in the treatment of obesity and age-related states (menopause). This research direction is sustained by eight ISI-quoted scientific papers, three patents, and more than five research projects. One research is currently running under a scientific research grant.

Advanced studies regarding innovative bioactive agents. New biomolecules of natural origin. One of the best pharmacist skills is to handle natural origin active therapies in the form of herbs and potions. The modern pharmacist follows the "state of art" in the preclinical and clinical pharmacological evaluation and pharmaceutical characterization of the active ingredients in herbs and other natural sources – minerals, from the sea, or of animal origin. Screening, identification,

and formulation of such bioactive molecules were comprised in this research direction. We have tested preclinically and identified gastroprotective molecules of modified olive oil fatty acids, shark liver oils and other marine origin natural compounds; nephroprotection of extracts of *Sambucus nigra* L. We have shown a significant reduction of total triglycerides, cholesterol, and LDL-c, and an increase of HDL-c, a hypolipidemic action of alil-cisteinsulfoxid (alliin in garlic standardised extract *Alii sativi bulbos*) and *Hippophae fructus*, *Squalus achantios* in hyperlipemia animal model in the laboratory; we have developed over ten food and food supplements formulas. Results were published in three ISI papers and three BDI papers; sustained by three patents. Also, some experiments were financed by over five scientific research projects.

Studies on nutrition and metabolic health promotion

During the last five years, since the development of the Nutrition educational program in our University, I have placed more emphasis in my research activity on clinical and pharmacological aspects regarding human nutrition, metabolic diseases and especially metabolic syndrome, diabetes mellitus, pathologies with a high prevalence in European society and globally, according to the call of the World Health Organization to health specialists. We have developed epidemiological studies in the inter-university and interdisciplinary, integrated team, together with the reputed Universities of Medicine and Pharmacy "Iuliu Hațieganu", Cluj Napoca and the Faculty of Psychology, "Babes Boyai" University of Cluj Napoca regarding nutrition and lifestyle epidemiological studies but also with our sister faculty, the Faculty of Medicine, namely with the "Alexandru Obregia" Psychiatry Institute' and "N. Paulescu" Diabetes and Metabolism Disease Research Institute and their outstanding research teams.

We have analyzed the eating and drinking profiles of medical students, IT workers, and in certain diabetes mellitus patients; as the prevalence of eating disorders (anorexia, bulimia) starts at early childhood ages, we prepared the terrain for evaluation of the diagnostic tools and patient profile in the area of eating disorders, together with top researchers from Romania and USA. This research direction is open and will be developed. Current results were published in sixteen scientific papers, of which seven ISI papers, of which four Q1 and one Q2.

The fourth chapter presents "Plans regarding the development of the academic, scientific and professional activities." The academic activities combine teaching and scientific research to ensure high-quality education. The permanent improvement of the didactic activities is focused

on updating the theoretical and practical activities in the specific fields for the teaching subjects and encouraging the new generation to improve their skills by participating in scientific research.

The previously described scientific directions with significant results will be considered in the future, but I will also consider the development of related directions. The main objectives are to develop partnerships in the priority areas - with the academic, professional, and entrepreneurial environment - for the design of innovative products and the development of new technologies within the research directions, to attract funding through future projects, to disseminate the results of the studies by publishing high impact scientific papers and filing patents applications.

The academic and scientific activities correlate with the professional direction, focusing on active involvement in the socio-professional activities specific to the healthcare community. I acknowledge the duty to capitalize on resources to enhance and train the young researchers in my research area, feed and encourage creativity, and maintain the rigorous working style for the scientific and academic prestige of my professional area and of the University of Medicine and Pharmacy "Carol Davila".