1. THESIS SUMMARY

This habilitation thesis is focused on the information about the scientific, professional and academic activity during the period between 2004-2014, after I obtained the doctoral degree in medical sciences, the pharmacy field.

This activity has been related to the field of toxicology – pharmacology, especially to the development of *in vitro* and *in vivo* models for testing both classic and new pharmaceutical formulations. All publications resulting from research have proven the originality and relevance being accepted by important impact factor journals as it is shown in the list of scientific papers.

The personal research can be divided in several main research themes such as: participation in the activity of formulation for the potential therapeutic structures based especially on pentacyclic triterpenes and not only; development and application of *in vitro* tests (MTT assay, cell cycle, Annexin V, etc.) on normal or pathological cells; development of *in vivo* models of skin cancer, breast cancer, inflammation and in the future of epidermolysis bullosa on experimental animals; testing of the therapeutic / toxic potential of these selected formulations on animal model and on the embryonated egg; the implementation of some modern non-invasive or physical techniques for skin (diagnosis and therapeutic monitoring), or for different formulations.

This habilitation thesis begins with informations that started the basic research such as therapy with natural compounds especially with lupanic structure (e.g. pentacyclic triterpenes) and skin pathology. The interest in analyzing skin organ has begun since the first researches have been made.

During recent years the initiator part of many studies relates to the formulation of optimal products for skin and parenteral using, based on modern techniques such as cyclodextrin inclusion complexes, nanoformulation. This chapter presents data on physico-chemical properties of the active compounds and formulations.

The activity of *in vitro* testing on normal and pathological (cancer) cell lines of different types: mesenchymal stem cells, skin cancer cells, melanoma, breast cancer, cervical cancer, liver etc. has used the physicochemical tested formulations.

The active formulations have gone through *in vivo* screening, frequently,conducted in two directions. Being active compounds (antitumor potential) we studied their antiangiogenic

character on embryonated egg model (chorioallantoic membrane) and their toxicity by embryonic vessel development.

In vivo studies on experimental animals represented the most important interest for me because Ipersonally participated in the "building" and to the development of all types of testing models giving these experimental models also to other researchers. These aspects have contributed to the collaboration with the abroad researchers (Hungary, Germany, USA), part of scientific publications being made in collaboration with them. *In vivo* studies contributed to the pharmaco-toxicological researches for the selected formulations and are related to the classical research (histpathological analysis) but also, to more complex immunohistochemical evaluation, non-invasive assessment, implementation of new assessment methods (SERS) and other original and sometimes spectacular aspects for the research in this field. I also helped through different studies conducted at the end of some PhD thesis in collaboration with doctoral students that have similar topics to those of my research team. I also conducted other studies related to the environmental pollutants such as heavy metals, mycotoxins, herbicides etc.

The thesis is ended by the chapter focused on the future prospects related to the scientific and teaching career and also to the academic development, the related bibliography and all my personal data (CV).

I have coordinated two national projects (type AT and PN II) on these mentioned research areas, I was responsible on an Innovation project, I was a member of four national projects (CEEX, CNCSIS, PN II), I was also manager of international projects (Romania-China bilateral, Romania-Hungary, group responsible for a type TAMOP Hungary project) and member (bilateral RO-HU and SEERA NET)..

The original elements consisted in individualizing models by doses and types of materials and animals that were used and the study of new structures with therapeutic benefits. I wish to complete these complex researches by the accreditation of an experimental pharmaco-toxicological research center that will be able to collaborate later with the pharmaceutical industry.

In other research projects that I participated in, I contributed to the environmental toxicology studies and to other researches related to the heavy metals and mycotoxins pollutants. Moreover, in acollaboration European project with a research group of the Department of Dermatology, University of Szeged, I contributed to the study of UV radiation and blue light

therapy impact for neonatal icterus applied on mouse skin model experience/from newborn to adult. Destructive potential of UV radiation research continues today during the bilateral project 665/2013 that is coordinated by me.

I have and still published books and book chapters in the field of Pharmacy (Dermatopharmacy and Toxicology), in recognized editures and chapters in internationally recognized publishers (e.g. INTECH). I have published 50 articles in ISI journals and more then 50 publications in national and international recognized journals. I have attended to a series of important congresses and conferences in farmaco-toxicological and natural compounds research (EUROTOX; AMAPSEC, PHARMSCIFAIR, DKMT National Congress of Pharmacy, TIMMEDICA, Pharmacy today between promotion and resaerch coorganization, etc).

The research will continue with the analyze on the embryonated egg (tumor cell culture and therapeutic application forms), new animal models (epidermolysis bullosa, skin cancer under UVB intense impact, etc), the analysis of new formulations (bioconjugates incorporated in the cyclodextrin and in a polymeric layer coated) and others. I will try to run a master program in a related field and to develop scientific students research programmes.

All my work will be available and open to those interested in and I will also contribute to the implementation of the romanian research on international level.