

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



**CURRENT INTERDISCIPLINARY APPROACH IN
BIOLOGICAL SYSTEMS: FROM MOLECULAR
LEVEL TO LIVING CELLS**

ABSTRACT

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ABSTRACT

The habilitation thesis entitled "The current interdisciplinary approach to biological systems: from the molecular level to living cells" was developed in accordance with current legislation.

My name is Popescu Roxana, I was born on October 16, 1974. In 1993 I graduated from the National Banat Cology in Timișoara and I was admitted to the Faculty of Medicine within the Victor Babeș University of Medicine and Pharmacy in Timișoara, in the same year.

I graduated from the Faculty of Medicine in 1999 and started my doctoral studies in 2000. My thesis "The study of the liver in chronic alcoholic and viral hepatitis. Clinical, histological, immunohistochemical and morphometric study" was presented in 2008, under the scientific coordination of Prof. Dr. Florin Bogdan and was confirmed by the Order of the Minister of Education no. 10 din 29.05.2009. In 2011, I graduated from the Faculty of Animal Husbandry and Biotechnology, specializing in biotechnology, from the University of Agricultural Sciences and Veterinary Medicine of Banat Timisoara.

This paper, the habilitation thesis, is divided according to academic standards into four parts: (i) the first part is dedicated to scientific achievements, (ii) the second part is dedicated to academic achievements, (iii) the third part is dedicated to professional activity and the last part (iv) is dedicated to academic and scientific perspectives.

After completing my doctorate, I started working in various research projects, participating as a director or member in 13 research projects. To date, I have published 50 articles in ISI-listed journals, of which 15 as lead author, numerous articles in BDI indexed journals, and I have participated in various national and international scientific events in the field. I have a hirsch index of 10, a number of 439 total citations, of which 397 without self-citations.

My collaboration with several research teams was carried out within some research projects, the results being disseminated in the academic environment. I collaborated with researchers from several universities (University of Agricultural Sciences and Veterinary Medicine of Banat "King Mihai I of Romania" in Timisoara, West University

of Timisoara, University of Szeged), as well as with teams from the University of Medicine and Timisoara Pharmacy. I am part of the ANAPATMOL Research Center and I am an associate researcher at 2 other research centers - Molecular Research Center in Nephrology and Vascular Pathology and Research Center for Pharmacotoxicological Assessments (FARMTOX).

Although the activities in the post-doctoral period targeted a wider spectrum, due to the various interdisciplinary collaborations, the main research topics addressed are:

Study of the effects of xenobiotics on biological systems. Xenobiotics are chemicals foreign to life, such as chemically synthesized compounds (including drugs, pesticides, food supplements) that are not natural and therefore not produced by living organisms and ecosystems. Endobiotics (natural chemicals) become xenobiotic when present in the environment at very high concentrations. Xenobiotics are produced mainly by human activities, but some organisms can form them as part of their defense system (for example: mycotoxins or bacterial toxins). They are ubiquitous, the exposure of contemporary man to xenobiotics is inevitable and sometimes voluntary, due to possible beneficial effects on human health (drugs, antioxidants, etc.). The research activity focused on how their bioaccumulation and biomagnification is translated at the level of the food chain. The objective of these studies was to make a general assessment of the risks generated by exposure to xenobiotics and their bioaccumulation, in order to accurately and correctly assess the risks and their effects in the waterfall at the level of the food chain.

Activity of biological or synthetic compounds on prokaryotic and eukaryotic cells. Both synthetic and natural compounds are of real interest in terms of discovering new therapeutic approaches for various pathologies. Obtaining, characterizing and testing them are important preliminary preclinical steps. Throughout my scientific career I have conducted a series of specialized studies on both synthetic and natural compounds. I obtained, characterized and tested in vitro (on 2D and 3D cells) and in vivo certain plant extracts and I focused my attention on certain synthetic compounds of interest and perspective such as ionic liquids.

Molecular markers involved in the management of diabetic nephropathy. The approach of pathologies in recent years depends largely on elucidating the mechanisms of action and finding specific markers relevant to diagnosis and therapeutic protocol.

In the academic didactic part, the activity materialized by participating in the writing of five textbooks of cellular and molecular biology, as well as five guides of practical works for students from the Faculties of General Medicine, Pharmacy and AMG, in Romanian, English and French.

I coordinated various medical-pharmaceutical subjects within the student circles and I participated in the coordination of the bachelor theses at the students of the faculties of General Medicine, Pharmacy, Romanian and French departments, Nutrition.

During the student science sessions, I participated in organizing and guiding the workshops. I also participated as a lecturer in postgraduate courses organized by UMFT.

I also want to develop a strong link between research and teaching, especially by promoting and developing the research center in cellular and molecular biology.

This activity will involve students and will result in the dissemination of studies in ISI indexed journals, in book chapters and books from national and international publications. These results will be the basis for preparation and participation with projects in various competitions. The actions carried out will implicitly increase the international visibility of our discipline, department and university.

Regarding the professional activity, I am employed as a primary care physician at the County Emergency Clinical Hospital "Pius Brînzeu" Timisoara, Str. Iosif Bulbuca Nr. 10, Timisoara 300736, Romania, Clinical Laboratory of Medical Analyzes (www.hosptm.ro). The medical activity started as an intern (2000), resident doctor (2001-2006), specialist (2006) and mayor (2013). I started as a specialist in the Laboratory of the Medlife Clinic Timisoara. Starting with 2011, I joined the team of the Medical Analysis Laboratory, the County Emergency Clinical Hospital "Pius Brinzeu" Timisoara. Since 2017 I am the coordinator of the Department of Toxicology and Molecular Biology, where I validated methods of qualitative and quantitative analysis of viral genetic material and I carried out activities of analysis and detection of heavy metals by mass spectroscopy technique. From this position, I collaborated with colleagues from other institutions or medical specialties, which materialized through the submission of research projects or various scientific publications. My professional training as a professor in the discipline of cellular and molecular biology, as well as as a senior consultant in laboratory medicine allowed me interdisciplinary collaborations with colleagues from other medical specialties (dermatology,

nephrology, pharmacology, metabolic diseases, surgery), including transportation activity guidance for doctoral students.

In the period 2019-2021, my team implemented a cross-border project RORS 498 NEO-PAT-MAN, of which I am the scientific coordinator. The aim of this project was to provide high-performance and state-of-the-art equipment and technologies, which would allow the development of modern and precise methods of medical analysis for: efficient diagnosis of infections; biomarkers involved in the management of neoplastic and metabolic diseases; identification of new biomolecules involved in drug resistance, as well as identification of new compounds with a role in preventing resistance to therapy or with an adjuvant therapeutic role.

In 2020, within the Department of Toxicology and Molecular Biology, we established and developed the RT-PCR laboratory for the diagnosis of SARS-CoV2, reaching a test capacity of 1000 samples / day. I am the coordinator of the National Program for Priority Communicable Diseases, funded by the Ministry of Health. Also, the equipment purchased through the cross-border project RORS 498 (Next Generation Sequencing) allowed the laboratory for the diagnosis of SARS-CoV2 to be included in the National Program of the Ministry of Health for sequencing new variants of SARS-CoV 2.