

CLINICAL RESEARCH IN CARDIOLOGY
- FROM BENCH TO BEDSIDE

Habilitation thesis

Dr. Theodora BENEDEK



For those who stood beside me and gave me their strength

For those who encouraged me when I failed and celebrated me when I won

For those who trusted me and waited for me

For those I loved

For Imre

For Andrea, Anna and Katalin

For my parents



Summary

My involvement in clinical research started already in 1994, as an undergraduated student in the University of Medicine and Pharmacy Tirgu Mures, when I started to work in the group led by **Prof. Benedek Imre**, my mentor, who formed me as a researcher and professionalist, from whom I learned a significant part of my knowledge and who had the most significant contribution to my further career development.

After I graduated the University of Medicine and Pharmacy Tirgu Mures in 1997 with the mark 9.76, and I passed the license examination with the mark 9.84, I started immediately my PhD studies in 1998, with a research dedicated to Dilated Cardiomyopathy. In 2002 I finalized my PhD thesis, entitled *"Particular Aspects regarding compensatory mechanisms, complications and therapeutic possibilities in heart failure caused by Dilated Cardiomyopathy"*.

I became a member of the academic community in 2001 and since then I dedicated a great part of my energy and my time in research. I was involved in the Laboratory of Cardiovascular Research of the Clinic of Cardiology, created by Prof. Benedek, in which we diversified our research activity in three main directions: cardiovascular imaging, research dedicated to acute coronary syndromes and stem cells in cardiology. In 2005, following a 3 months extensive training in the University of Vienna, **I opened a new collaboration between our university and University of Vienna**, which resulted in participation in several basic and clinical research works, finalized by 7 common publications in high impact journals and led to our involvement in the multinational MYSTAR project regarding stem cell therapy following acute myocardial infarction.

In 2006, immediately after the national CEEEX programme of research of excellence was opened to the large public, our research laboratory succeeded to win **4 CEEEX research grants**, at that time the largest number of research grants won by the same collective in one competition. All these CEEEX grants summing 1.5 million EURO have been finalized with great success in 2008, one of them (focusing on stem cell transplantation post acute myocardial infarction) being distinguished with 2 **awards** from the Romanian Ministry of Education and Research and the Romanian Academy of Medical Sciences.

Soon after this, in 2007-2008 we succeeded to win other 3 PNCD II projects and 2 IMPACT projects. The project STAR (*Computerized three-*

dimensional ultraSonographic Technologies and intracardiac mapping in diagnosis and interventional treatment of ARrhythmias based on nanotechnologies), with me as **project director** and including a consortium of 4 public universities under my leadership was selected for financing in the competition 2008 of the PNCD II programme - Partnerships (ctr. no. 42-131/2008) and was successfully finalized in 2011, the results being disseminated in 7 congresses and publications . *This project opened new perspectives for me as an advanced researcher and was the first one to demonstrate my role as a leader of a research group.*

Another important chapter of my research career started in 2008 when, based on my previous results achievements, **I was selected by the European Commission to become an expert evaluator and rapporteur of the European Commission - Directorate Health for research projects in the FP7 framework programme.** Since then I have participated in more than 20 evaluation sessions in Brussels or remote for different calls, when I had the chance to interact with a very large number of international experts and to evaluate a significant (more than 200) research projects proposed by very famous research groups and universities from Europe and USA.

As a result of my professional behaviour and results in Brussels, in 2010 I was selected by the European Commission to become a **monitor and rapporteur of undergoing research contracts**, which gave me the extraordinary chance to closely monitor the development of several excellent European projects and to visit onsite famous research groups from Europe.

The most recent chapter of my professional achievements in research is represented by initiation of several clinical studies with resulted in publications in high impact journals, achieving an **impact factor of 41.52 in extenso, out of which 26.77 as principal author.**

Especially, our study dedicated to imaging unstable plaques using a multimodality approach (Angio CT, OCT and IVUS) resulted so far in 5 publications and communications in international congresses. Also, integration of our previous basic research in the stem cells field into the new perspectives opened by noninvasive Angio CT resulted in the publication of the first description of the role of stem cells in reducing atherosclerosis progression (*Journal of Atherosclerosis and Thrombosis*, 2013).

One of my main achievements in developing new perspectives for imaging-based research came recently, when our team won an FP7 project dedicated to Angio CT assessment of coronary circulation.

The DISCHARGE project (*Diagnostic Imaging Strategies for Coronary Angiography in Patients with Stable Angina: Comparative Effectiveness Research of Existing Technologies - a Pragmatic Randomised*

Controlled Trial), was selected to be financed by the European Commission and will start in January 2014. My role in this project is **partner coordinator** and in the same time **member in the steering committee as coordinator of all the clinical centers from Eastern Europe**, which proves once again **the European dimension of my research activity**.

My **further career development plan** includes creation of two high-level platforms for 3D cardiovascular multimodal and fusion imaging, as a continuation of my previous professional and scientific achievements focused on cardiac imaging.

In the same time, I aim to strengthen the international cooperations within our paneuropean network and my position as an expert of the European Commission for research in the forthcoming Horizon 2020 frame programme.