

Research translation from bench to bedside:

Our main research at Cardiac Electrophysiology Research and Training Center (CERT) is in the field of cardiac electrophysiology and cardiovascular diseases. Since our work is in the medical science, the target for research translation is aiming on improving individual's health and quality of life. Studies ranging from cellular level, small (mice and rats) and large (pigs) animal models (pre-clinical research) to clinical studies have been done to achieve this goal. Here we have selected three major research as examples.

1. Sudden cardiac death caused by a fatal arrhythmia known as ventricular fibrillation (VF) is the major cause of death in most nations around the world including Thailand. Currently, the only effective clinical treatment is to deliver a strong electric shock directly to the heart. Our group has been working on finding ways to improve the efficacy of this treatment as well as to prevent the initiation of VF. Electrophysiological and pharmacological interventions are used to achieve this goal. Food supplement as well as natural products and herbal medicine are being tested for their beneficial as well as adverse effects. Examples for this research are the use of "fish oil" and "krachai-dam". Both of them are well known among Thai. Translation from this research to their use in community is obvious in raising the awareness of their health benefits (fish oil) and undesired effects (krachai-dam), particularly to those who often use them. Academically, this research initiates more studies regarding cardiac electrophysiological effects of fish oil and krachai-dam worldwide.
2. In thalassemia, it is known that one of the most common and fatal complication is its cardiac involvement. This is known as iron overload cardiomyopathy. Currently, it is believed to be due to large amount of iron deposited in the heart. So far, there is no definite parameter to be used for the early prediction of cardiac involvement in thalassemia patients. We have been working together with Professor Suthat Fucharoen at Mahidol University to determine how iron gets into cardiac cells and to find parameters for early prediction of cardiac involvement. Cultured cardiac cells, thalassemic mice and thalassemic patients have been included in this investigation. The translation from cell to bedside in this work is that if we understand the mechanisms of how iron gets into cardiac cells, iron deposition in the heart could be prevented, and if the marker for early detection of cardiomyopathy be found so that patients could be closely monitored with possibly intensive chelating therapy to prevent the progress of the disease.
3. Acute myocardial infarction (AMI) and heart failure (HF) are two major medical burdens in most countries. Understanding their pathophysiological processes is the key for the treatment and prevention strategies. Our group has been working on novel cardiac biomarkers that can be used to give early diagnosis and reliable prognostic prediction. This is a very competitive field since most laboratories around the world are working on the same issue. This competition may sound not so good for labs from the third world. However, the fast knowledge progression and all benefits will fall into the hand of AMI and HF patients.