Funding: Slovak Society of Cardiology Research Grants

Funding Consumables, Equipment Accessories and Repairs, Travel, and Literature for Young Cardiovascular Researchers in Slovakia

Recipients of Slovak Society of Cardiology research grants describe the funding and their research to Jennifer Taylor, BSc, MSc, MPhil.

The Slovak Society of Cardiology provides research grants each year. Applicants must be under 35 years of age and a member of a Slovak Society of Cardiology project being conducted in Slovakia. Grants of €7000 are available for up to 3 years. Projects must address cardiovascular disease and be approved by the head of department where the research will be conducted.

Applications for grants should include the applicant’s curriculum vitae and details of articles and presentations at Slovak Society of Cardiology events and abroad. It should also provide an overview of the subject to be studied and details of the proposed project, together with an estimated cost of the project and breakdown of how Slovak Society of Cardiology funds would be allocated. The funds are intended primarily for consumables, equipment accessories and repairs, travel, and literature. Up to 10% of the funds can be used to pay the researcher. Project results will be published in the Slovak Society of Cardiology journal Kardiológia and presented at the Slovak Society of Cardiology congress.

Katarína Cenkerová, MD, cardiology trainee, 4th Department of Internal Medicine, St. Cyril and Methodius Hospital, University Hospital Bratislava, Slovakia

Dr Cenkerová has received funding from 2012 through to 2015 for the project titled “Heart Failure with Preserved Ejection Fraction. Clinical Characteristics and Comparison with Systolic Heart Failure.” The project focuses on demographic characteristics, diagnostic approaches, treatment, and prognosis, and will include patients hospitalised in Dr Cenkerová’s department for acute heart failure. Basic examinations include blood samples, echocardiography, electrocardiography, medical history, and physical examination. According to echocardiographic parameters, the patients will be divided into those with systolic heart failure and those with heart failure with preserved ejection fraction. Patients will be followed up for 3 years. The basic
examinations will be performed every 6 months. Dr Cenkerová says, “In this way, we can characterise Slovak patients who have heart failure with preserved ejection fraction and analyse the mortality data, the need for rehospitalisations, the prevalence of comorbidities, and treatment. From these results, we are going to see how we can improve our management of patients with heart failure. We will be able to focus on prevention, better treatment (mainly of comorbidities that are currently undertreated), and prolonging life expectancy for our patients.”

The Slovak Society of Cardiology grant is being used to fund the purchase of diagnostic devices and analyse the specific parameters from blood samples. It will also fund the costs of articles and congress participation.

Dr Cenkerová is conducting the project with her colleague, Veronika Pokorná, MD, PhD. Part of the research is performed with help from the head of the Department of Noninvasive Cardiology, Juraj Dúbrava, MD, PhD.

Before this research, Dr Cenkerová investigated patients with atrial fibrillation and the influence of hypertension on the success of direct current cardioversion. She has also published the first data related to demographic characteristics of patients with heart failure with preserved ejection fraction in Slovakia.

Matej Samoš, MD, PhD student and internal medicine/cardiology resident, Department Internal Medicine I, Jessenius School of Medicine, Comenius University and Teaching Hospital, Martin, Slovakia

Dr Samoš has a research grant from the Slovak Society of Cardiology from 2012 through to 2015. His research is primarily focused on treatment optimisation and effective monitoring of acute coronary syndrome, and the relationship between diabetes mellitus and the risk of development of acute coronary syndrome and prognosis. His current project aims to determine whether modified thromboelastography/thromboelastometry is an effective and clinically applicable method for monitoring the effectiveness of combined antiaggregant treatment in patients who have acute ST-elevation myocardial infarction and then to assess whether the combined antiaggregant treatment supplied in standard recommended doses is sufficiently effective. His next aim is to clarify the relation between diabetes mellitus and its duration and the effectiveness of combined antiaggregant treatment.

“Combined antiaggregant treatment is the keystone for the treatment of acute coronary syndrome,” says Dr Samoš. “But resistance to antiaggregant treatment leads to ineffective treatment and the consequent risk of thrombotic complications. It therefore seems appropriate to monitor the effectiveness of combined antiaggregant treatment by lab methods.”

Modified thromboelastography/thromboelastometry enables the complex evaluation of haemostasis. Studies have shown the possibility of using thromboelastometry to evaluate thrombocyte function/dysfunction, but data are lacking on its effectiveness in monitoring combined antiaggregant treatment in patients with acute ST-elevation myocardial infarction. Dr Samoš says, “Application of this method, even as a part of bedside examination, may improve lab monitoring of the effectiveness of antiaggregant treatment and thereby enable better individualisation and effectiveness.”

The research is being conducted at the University Hospital in Martin in cooperation between the Department of Internal Medicine I (head, Professor Marian Mokan, MD) and the Department of Haematology and Transfusion Medicine (head, Professor Peter Kubisz, MD).

Previously, Dr Samoš has investigated inflammatory indicators as predictive markers of coronary heart disease severity, coronary heart disease candidate gene polymorphisms and their relation to coronary heart disease risk factors, inflammatory markers, and diabetes mellitus.

Marcela Danková, MD, PhD, university lecturer, Faculty of Medicine, Comenius University, Bratislava, and resident, IV Department of Internal Medicine, St. Cyril and Methodius Hospital, Bratislava, Slovakia

Dr Danková in the lab. Photograph courtesy of Dr Danková.
Dr Danková has received a Slovak Society of Cardiology grant from 2012 through to 2015 to conduct a project titled “Measurement of Urinary Neutrophil Gelatinase-Associated Lipocalin in Early Diagnosis of Renal Injury in Acute Cardiorenal Syndrome.”

Dr Danková’s study will focus on the investigation of levels of urinary neutrophil gelatinase-associated lipocalin as a predictor of acute renal injury/failure before serum creatinine increases, establishing its levels in patients with and without acute heart failure, and determining its prognostic value in patients with acute coronary syndromes and acute heart failure.

Dr Danková and her colleagues will investigate urine samples on admission and after 24 hours in a group of patients with acute heart failure and acute coronary syndrome. Urinary neutrophil gelatinase-associated lipocalin will be examined by enzyme-linked immunosorbent assay. The team will also monitor the level of serum creatinine (on admission and after 24 and 72 hours) and the level of N-terminal prohormone of brain natriuretic peptide in blood samples, and each patient will undergo echocardiographic examination. Dr Danková says, “I hope that the increase in urinary neutrophil gelatinase-associated lipocalin will predict kidney damage before creatinine increases, allowing early therapeutic interventions to prevent the development of renal failure.”

Dr Danková is conducting the study with Professor Peter Pontuch, MD, PhD, head of the IV Department of Internal Medicine, and Stanislava Remisova, MD, head of the Coronary Care Unit, IV Department of Internal Medicine, and the lab Medirex, JSC. The grant is being used to purchase lab materials. Dr Danková says, “I hope the grant will enable me to work independently.”

Dr Danková’s PhD research focused on the long-term prognosis and survival of patients after acute myocardial infarction.

Peter Solik, MD, PhD, internal medicine physician and cardiology trainee, Department for Heart Failure and Transplantation, National Cardiovascular Institute, Bratislava, Slovakia

Dr Solik received a grant from the Slovak Society of Cardiology in 2009 for a project titled “The Estimation of Pulmonary Pressure in Patients with Pulmonary Arterial Hypertension and Pulmonary Venous Hypertension: Echocardiography Versus Right Heart Catheterisation.” Data analysis is currently being completed. For the study, Dr Solik and his colleagues examined 217 consecutive patients with suspected pulmonary hypertension with echocardiography and estimated the right ventricular systolic pressure gradient from the maximal tricuspid regurgitation flow velocity. The right atrial pressure was extrapolated using vena cava inferior width. Right heart catheterisation was performed on the same day. Linear regression analysis was used, and systolic pulmonary arterial pressure determined by right heart catheterisation and echocardiography were compared using a Bland-Altman plot.

“We are trying to find out which factors influence the accuracy of systolic pulmonary arterial pressure assessment by echocardiography (eg, image quality, accuracy of measurement of tricuspid regurgitation flow velocity, extrapolation of right atrial pressure),” says Dr Solik. “Knowledge of these factors can reduce the need for invasive measurements.” Preliminary results were presented in a poster at the 19th International Meeting of the Alpe Adria Association of Cardiology, Budapest, Hungary, September 16–18, 2011. Dr Solik comments, “Taking into account these preliminary findings, we can conclude that echocardiography is an adequate method for screening evaluation of patients with suspected pulmonary hypertension, but it is inadequate for precise assessment of systolic pulmonary arterial pressure. Diagnosis of pulmonary hypertension must be confirmed by right heart catheterisation.”
Narcis Tribulová, PhD, DSc, head scientist, Institute for Heart Research, Slovak Academy of Sciences, Bratislava, Slovakia

Dr Tribulová received funding from the Slovak Society of Cardiology for 3 years in 2012. Her research team includes postdoctoral students, PhD students, and undergraduates. The team collaborates with other Slovak Academy Institutes and universities, the National Cardiovascular Institute, and colleagues from the Czech Republic, Germany, Japan, Israel, Canada, and South Africa.

Dr Tribulová’s research goals are to elucidate mechanisms of sudden cardiac death and, ultimately, to suggest novel therapies to prevent life-threatening arrhythmias. “Our research is focused on the characterisation of structural and molecular determinants of intercellular coupling, namely, connexin-43 channels, in the normal and diseased heart,” she says. “Our intention is to reveal possible pleiotropic effects of currently used cardioprotective drugs as well as effects of natural products in modulation of cell-to-cell communication.”

Dr Tribulová and her colleagues have shown the role of deranged intercellular coupling at gap junctions mediated by connexin-43 channels in the pathogenesis of sudden cardiac death.1 Diverse structural and molecular features of intercellular coupling appear to determine the special electrophysiological properties of atrial and ventricular myocardium.2 However, upregulation of connexin-43 by atorvastatin, melatonin, omega-3 fatty acids, or red palm oil resulted in protection from lethal arrhythmias.3–6

Dr Tribulová’s group takes advantage of multiple experimental techniques, including general molecular biological analyses of gene and protein expression, histochemistry and biochemistry, quantitative morphometric methods involving immunofluorescence microscopy, and electron microscopy.

Other sources of funding include the Slovak Research and Development Agency; the Scientific Grant Agency of the Ministry of Education, Science, and Sport of Slovak Republic; and the European FP7 Cooperation Work Programme.

Dr Tribulová concludes, “Our research is creative work and is important for the understanding of physiological and pathological processes to prevent cardiovascular diseases and sudden death.”

References

Jennifer Taylor is a freelance medical journalist.
Spotlight: Geerten P. van Nieuw Amerongen, PhD

Surprising Resolution of Pulmonary Oedema: Showing That Imatinib Protects Against Endothelial Barrier Dysfunction Via Inhibition of the Tyrosine Kinase Abl-Related Gene

Geerten P. van Nieuw Amerongen, associate professor, Department of Physiology, Institute for Cardiovascular Research, VU University Medical Center, Amsterdam, the Netherlands, and visiting professor of pharmacology, University of Illinois, Chicago, IL, is last author of a recent article in *Circulation* on the effect of imatinib on endothelial barrier dysfunction and oedema.1 The accompanying editorial describes the article as “an excellent example of translational medicine.”2 Professor van Nieuw Amerongen says, “90 percent of the work was done in the Amsterdam lab. It started as a clinical observation by Professor Anton Vonk Noordegraaf, MD, PhD. He is a pulmonologist, and he was treating a patient with a rare form of pulmonary hypertension, and standard therapy did not work. He experimented with imatinib. Surprisingly, after 24 hours, the patient improved with resolution of pulmonary oedema.”

Professor Vonk Noordegraaf thought that maybe the imatinib was affecting vascular permeability and asked Professor van Nieuw Amerongen to give it a trial in the lab. Imatinib’s mechanism of action on vascular permeability had not previously been identified. One of Professor van Nieuw Amerongen’s PhD students, Jurjan Aman, MD, was investigating vascular permeability but with a different focus. In view of Professor Vonk Noordegraaf’s observation, Dr Aman shifted his focus to imatinib. Professor van Nieuw Amerongen says, “Luckily the Dutch Heart Foundation allowed us to deviate somewhat from the original research.” It was a good decision: the group found that imatinib protects against endothelial barrier dysfunction via inhibition of the tyrosine kinase Abl-related gene (Arg). “We would never have come across Arg without good clinical observation,” adds Professor van Nieuw Amerongen.

Conducting Translational Research on Vascular Permeability

Professor van Nieuw Amerongen decided early in his career to pursue a PhD after his master’s degrees in chemistry and pharmacochemistry. He obtained a position with Professor van Hinsbergh, now professor of physiology and director of the Institute for Cardiovascular Research, VU University Medical Center, who was then at the Department of Vascular and Connective Tissue Research, TNO Prevention and Health, Leiden, the Netherlands. Since those early days, Professor van Hinsbergh has been his mentor “providing tremendous support,” says Professor van Nieuw Amerongen. “After my PhD, I wanted a career in academia, but I needed to get 1 year of experience abroad. I was put forward by Professor van Hinsbergh for postdoctoral research to go to a place of scientific interest, where my family and I would also flourish.”

As a result, Professor van Nieuw Amerongen continued his studies at the Center for Cardiovascular Research in Rochester, NY, under the supervision of Professor Bradford C. Berk, MD, PhD, professor of medicine and director of cardiovascular research at the University of Rochester. “Professor Berk was inspiring. At the time he was in his early medical career, and the centre was a new institution that pooled the best people from the United States and abroad,” says Professor van Nieuw Amerongen. Professor Berk is now chief executive officer of the university, and runs the medical centre, having partially recovered from a bicycle accident a few years ago.

In 1998, Professor van Nieuw Amerongen received the Young Investigator Award from the German Society of Histochemistry for his studies on the elucidation of the pivotal role in prolonged endothelial hyperpermeability of the RhoA/rho kinase signal transduction pathway. In 2001, he
Professor van Nieuw Amerongen and his family during a hiking vacation in Austria, summer 2012. He says, “I am married and we have 2 daughters and 3 sons, the eldest of whom is 17 years old. My family is very important to me.” The whole family joined him for his postdoctoral studies and his mini-sabbatical in the United States. Professor van Nieuw Amerongen concludes, “When people feel happy, they flourish in creative jobs like sciences, if they are not, creativity is a problem.” This life philosophy underpins his work as a researcher and his private life.

Photograph courtesy of Professor van Nieuw Amerongen.

In 2003 and 2007, Professor van Nieuw Amerongen received the Dekker Career Development Award from the Dutch Heart Foundation. He says, “Over the years, I received funding to establish my own research group. I have been fortunate to be funded by the Dutch Heart Foundation.”

The Dekker award allowed Professor van Nieuw Amerongen to set up his own permeability lab at the Department of Physiology, Institute of Cardiovascular Research. The lab is used as a platform for animal studies by the clinical departments within the Institute, and in return, Professor van Nieuw Amerongen’s team conducts translational research on vascular permeability with insight from clinicians from the pulmonary disease, anaesthesiology, and intensive care units.

Professor van Nieuw Amerongen is still closely connected to the US research environment. In 2008, he spent a sabbatical with Professor Asrar B. Malik at the Center for Lung and Vascular Biology, University of Illinois at Chicago, “the epicentre of vascular permeability research,” says Professor van Nieuw Amerongen. “I have a cross-appointment at the University of Illinois as a visiting professor twice a year through collaboration grants.” One of the authors of the imatinib article, Steven Vogel, PhD, is from Chicago.”

In 2008, the American Physiological Society presented Professor van Nieuw Amerongen with the John F. Perkins, Jr., Memorial Award for International Physiologists. In 2012, he received the Rembrandt Research Award from the Rembrandt Institute.

Professor van Nieuw Amerongen is now an established investigator of the Dutch Heart Foundation, which is supporting his research from 2012 to 2016. His research team consists of 5 PhD students and technicians. Recently, his team secured a grant for further research on pulmonary arterial hypertension. They are now looking at acute lung injuries for which no current treatment exists. “We are pursuing Arg as a specific disease marker, and we collaborate with pharmaceutical parties to develop better small molecule inhibitors for Arg,” says Professor van Nieuw Amerongen.

References

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