

JANUARY 2010

Foundation grant recipients 2010

Researcher and PhD scholar, Dr Levi Bassin

Electrocardiographic (ECG) changes remain the 'gold standard' for diagnosing heart attack. But when a patient has hypothermia or stroke, the ECG changes can be confusing. For instance, ECG changes during a stroke can mimic an impending heart attack and delay effective therapy, so that heart and brain damage may occur.

Dr Bassin is investigating the ECG changes in hypothermia and stroke in order to create extremely detailed 3-D, colour-coded, electrical 'roadmaps' of the heart.

By enhancing knowledge of electrical changes in the heart, the research will aid the development of better treatment for stroke and hypothermia. Early recognition will also improve effective management of heart and brain damage.

This study is being conducted in conjunction with a renowned electrophysiology research group at the University of Tasmania.

Project title: Effect of myocardial ischaemia, hypothermia, and subarachnoid haemorrhage on the wavefront of electrical activation and recovery in the myocardium: possible role in arrhythmogenesis.

For more information about this project visit:

<http://www.heartresearch.com.au/early-recognition-of-heart-damage.html>

Researcher and PhD scholar, Brad McEwen

Diets rich in fish claim to produce a wide range of cardiovascular health benefits, including modified platelet function, decreased triglycerides and blood pressure, lowering cardiovascular risk and mortality. Most studies test high doses of omega-3 on platelet function and lipid profile but there is less understanding of the mechanism of the anti-platelet and hypocoagulant effects of omega-3.

With the support of the Foundation researcher and PhD scholar, Brad McEwen is investigating the effect of low dose omega-3 fish oil on platelet function and coagulation.

These include studies on healthy volunteers of various ages and a study recruiting people with diagnosed cardiovascular disease, such as coronary artery disease, in a placebo-controlled cross-over study. Comparisons between these studies will measure the effect of omega-3 fish oil in healthy people and in people with established cardiovascular disease. If successful, this research has the potential to prevent major vascular events.

Project title: Omega-3 PUFA in coronary artery disease study

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The sodium-potassium pump in cardiac and vascular cells

The sodium-potassium (Na-K) pump is regarded as a significantly important molecule (a protein) in cell biology. However to date, little is known about how the body controls and regulates the Na-K pump, in health or disease. Furthermore, oxidative stress is well known in the scientific community as a destructive process involved in a number of disease processes such as cardiovascular disease. In addition, oxidative stress is needed to regulate the Na-K pump to perform its normal function.

The North Shore Heart Research Group (based at Sydney's Royal North Shore Hospital) with the support of the Foundation, has identified mechanisms whereby increased levels of oxidative stress prevents the Na-K pump and heart muscle cells from functioning correctly. This can cause heart disease.

The Foundation is funding several parallel projects in this potentially groundbreaking area. In 2010, the following grant recipients are embarking on two additional projects:

Dr Chia-Chi Liu is studying the effects of insulin on altering the Na-K pump function. In investigative trials, it was discovered that insulin could be used as a form of protection against harmful levels of oxidative stress. The objective in furthering this research is to evaluate the clinical applications of this finding. This research presents great therapeutic potential as knowledge about these mechanisms are likely to lead to drug therapies for heart diseases, benefiting many Australians.

Project title: Molecular mechanism of insulin induced Na-K pump stimulation in cardiac myocytes

Researcher and PhD scholar, Dr Kevyan Karimi Galougahi is investigating the changes in the Na-K pump in heart muscle in diabetes and heart failure. After characterising such changes, it will then be possible to examine the effect of drugs that specifically modify the function of the pump. This research could potentially explore novel ways of cardio-protection and treatment, leading to a reduction in deaths and disability associated with diabetes and heart failure.

Project title: The effect of diabetes and infarct-induced cardiomyopathy on function of the cardiac Na-K pump, oxidative modification of its beta-1 subunit and interaction of alpha 1/beta 1 subunits.

For more information on research into the sodium-potassium pump in cardiac and vascular cells (including an animation on how the pump works) visit:

<http://www.heartresearch.com.au/towards-novel-treatments-for-cardiovascular-disease.html>

For more information about the Foundation's research program visit:

<http://www.heartresearch.com.au/our-work.html>