Big potential from DWORF peptide

Heart Foundation Award Recipient 2018

Dr Prisca Mbikou

A Heart Foundation Project Grant of $111,892 was gratefully received by Dr Prisca Mbikou who is investigating the importance of the peptide DWORF and its potential in helping patients recover from heart disease.

DWORF is a newly discovered small peptide that is present in normal healthy people.

"Surprisingly, DWORF is produced from what we call 'long non-coding RNA' which is a part of the genome by-products thought of no interest for cellular activity by the scientist community. But what is even more interesting is that not only its expression is reduced in human failing hearts, but also DWORF promotes key cellular mechanisms responsible for cardiac contraction," Dr Mbikou said.

"All these initial findings suggest that a reduction of DWORF may contribute to heart disease, and my research will test this assumption. I will investigate the significance of the role of DWORF as a potential tool in helping patients recover from heart disease."

This study will bring the first evidence of the role and effect of DWORF administration on heart disease.

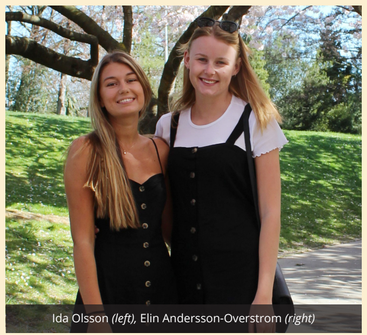
"As a possible future treatment, ultimately, if we know how to increase the level of DWORF either as a medicine (in the form of a pill or injection for instance) or gene targeting, we may be able to help patients with impaired cardiac function to get better."

Just for good measure

Swedish medical students, Elin Andersson-Överström and Ida Olsson, who are in the third year of their training, are spending 15 weeks gaining research experience alongside Dr Moritz Lassé, in the Molecular Biology and Genetics laboratory.

Elin and Ida heard about the reputation of the CHI team from fellow students at Linköping medical school, Adam Runesson and Mike Sommer, following their very positive experience in the lab last year.

Ida's project is to establish a new method for our lab to measure the concentration of seven kidney function proteins simultaneously. The assay utilises the basic principles of an ELISA assay, whereby a soluble protein from patient blood is captured between two antibodies for detection and quantification.



Ida Olsson *(left)*, Elin Andersson-Overstrom *(right)*

"I am developing a method whereby the target proteins in the patient sample stick to tiny beads, allowing us to detect how much of that specific protein is present. The project slots into wider research of the CHI programme which addresses the early risk recognition of acute kidney injury in patients with heart failure," commented Ida, "We are starting to acquire data and it seems that it does work but there's a way to go yet. If this assay is precise and accurate it will save testing time, cost and improve our ability to compare the concentrations of all seven proteins using a single sample rather than having to use seven times the sample volume, seven times the cost and seven times the time if testing one protein at a time."

On the other hand, Elin is working with plasma samples from the Canterbury Healthy Volunteer Cohort. Elin is using the traditional gold-standard method for protein quantification known as ELISA, for measuring three potential protein biomarkers in patient blood. This assesses the usefulness of these proteins to predict future acute cardiac events such as heart attacks or unstable angina.

"I am looking at three different proteins in the plasma of two separate groups – those who have had an acute cardiac event within five years and those who have lived without cardiac events for more than seven years. In a pilot study carried out by Dr Lassé the three proteins were found to be present in different concentrations in the two groups and the aim is to validate these findings in a larger group of 200 participants. This is to find out if the proteins differ between the two groups. The information may help improve prediction of who is at risk of future heart attacks."

Ida and Elin have been making the most of their time in New Zealand, travelling to the 'tourist hotspots' of both islands. Although more travelling is scheduled once their research projects finish.

"We feel so welcomed and at home with the CHI," said Elin, "The lab group is very friendly and helpful. We will recommend this experience to other medical students."

The CHI looks forward to welcoming them.

Inflammation and heart disease

Heart Foundation Award Recipient 2018

A new study into inflammation and associated impact in cardiovascular disease is underway at the Christchurch Heart Institute, supported by a recently awarded Heart Foundation small projects grant of $15,000.

The study aims to discover the effectiveness of a biomarker, known as soluble urokinase plasminogen activator receptor (suPAR), as a prognostic tool to predict adverse outcomes and risks from cardiovascular disease.

"Atherosclerosis is a condition where arteries become narrowed and hardened due to a buildup of plaque around the artery walls. Inflammation plays a fundamental role in atherosclerosis as it mediates all stages from initiating plaque buildup, progressing to cardiovascular disease, through to disease complications. My research, therefore, is to tap into the inflammatory pathway using a relevant blood biomarker called suPAR," explains researcher, Dr Janice Chew-Harris.

> "The results of this research will form the basis for ongoing studies into diagnosis of different types of heart disease, new treatments and prognosis, with the ultimate future goal to decrease premature death rates from cardiovascular diseases."

Different from other inflammatory markers, suPAR has a key role in coordinating mechanisms involved in atherosclerotic plaque breaking away from the artery wall into the blood stream.

"As high concentrations of suPAR has been found to be associated with worsening outcomes, I hope to reveal suPAR concentrations that are clinically meaningful in relation to cardiovascular disease severity, and whether it could improve risk prediction and potentially assist in its management. Better identification of individuals at risk will in turn provide an earlier opportunity to either initiate beneficial treatments or to have lifestyle modifications."

Dr Janice Chew-Harris

The research will also be a novel approach for assessing new disease markers.

"The results of this research will form the basis for ongoing studies into diagnosis of different types of heart disease, new treatments and prognosis, with the ultimate future goal to decrease premature death rates from cardiovascular diseases," Dr Chew-Harris said.

Find us on Facebook

We invite you to donate and/or bequeath to the Christchurch Heart Institute. If this is something you would like to do or find out more about, please contact Lorraine Skelton, Clinical Studies Co-ordinator on **03 364 1063**, email: **lorraine.skelton@cdhb.health.nz.**

Please post a cheque, or direct credit our bank account **02-0800-0877177-00** – with your name as a reference. If you would like a receipt for either a cheque or direct credit, return the slip below to us, including your address details.

The Nicholls Clinical Research Centre,
Otago University Christchurch Medical School,
PO Box 4345, Christchurch 8140

First Name:_____ Last Name:_____

☐ Yes, I want to help research into cardiovascular disease.

I am making a gift of ☐ $20 ☐ $40 ☐ $60 ☐ or my choice

☐ A cheque is enclosed payable to the Christchurch Heart Institute Trust

☐ I have paid by direct credit to your bank account

Heart 2 Heart 7

Newsletter of the **Christchurch Heart Institute - *A University of Otago Research Centre***
December 2018

University of Otago Te Whare Wānanga o Otāgo New Zealand — Christchurch

Heart Foundation

hrc Health Research Council of New Zealand Te Kauntihera Rangahau Hauora o Aotearoa

Christchurch Heart Institute Rangahau Manawa o Ōtautahi

Professor Mark Richards, Director, Christchurch Heart Institute.

As another year draws to a close and with the Christmas break upon us, it is a time for celebration and reflection on CHI teams' achievements during 2018.

The high caliber of each member of the team is reflected in their dedication, focus and enthusiasm towards their work. The individual contributions, from the research nurses, technical staff, data managers, statisticians, scientists and clinicians create a formidable team resulting in significant findings that improve cardiovascular disease diagnosis and treatments both in NZ and around the world.

Our success this year in gaining Heart Foundation research grants (Sarah Appleby, Janice Chew-Harris and Prisca Mbikou) is notable and commendable in an extremely competitive environment. In 2018 we have progressed over 20 projects ranging from bench work on DNA through to testing of new treatments in the clinic, as well as provided information on our work to international publications and at multiple national and international meetings.

Associate Professor John Pickering of the CHI has been involved in a joint study initiative between the CHI and Canterbury District Health Board, developing a new measurement of the heart injury marker protein, cardiac troponin. The new version of this test aims to provide a faster and more efficient diagnosis of heart attack.

Achievements are not only notable in the workplace, we like to celebrate our team's personal accomplishments as well. We are pleased that Dr Danielle Thompson and Research Nurse Ruth Jardine are heading over to New York in March to sing at Carnegie Hall, no less! In this issue, we hear about how that came about.

But our work accomplishments would be nothing without our highly valued study participants! I would like to personally thank you for your willingness to take part in the studies. We are humbled and privileged that you do so, without you our level of research could not happen.

So 2019 is almost upon us. To maintain research momentum, the CHI team leaders have consolidated established collaborations and formed new partnerships with other researchers throughout New Zealand and around the globe. Our plans are moving us towards nation-wide and multi-nation research as well as continuation of our local projects. We are launching research which taps into the national information systems on all heart attack patients in the country, using de-identified data, to maintain privacy. Our exploration for new markers and clinical tests is also moving from hospital clinic to involve the community and to gain from useful partnerships with fellow researchers in Singapore, the UK, US and Europe. Grant applications, which require tremendous attention to detail and careful coordination of many contributors, have been submitted to the Health Research Council of New Zealand and other providers of competitive research funding. This is to seek resources to launch new, and complete existing, research projects, while the team are turning their focus towards a New Year in anticipation of exciting new discoveries. We have several promising new targets for clinical tests and improved management of heart attack and heart failure in our sights.

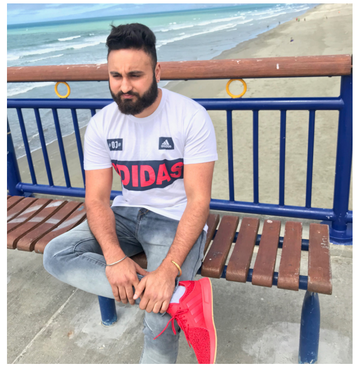
In the immediate future the Christmas break offers a well-deserved pause in the proceedings for the team and our participants. I wish everyone a very happy Christmas and successful 2019.

Professor Mark Richards

Five minutes with ...
Jasmail Singh

The team at the Christchurch Heart Institute is a wonderful mix of nationalities and cultures, bringing views and experiences that are enriching and keeps the CHI further in touch with the wider world. We have people originating from Africa, Korea, Japan, Europe and in the case of Jasmail Singh, a village in Punjab, India.

Jasmail tells us about his role at the CHI and how he came to New Zealand.



How was life growing up in your village, Kot Badal Khan?

I am from the Punjab, a State near the Pakistan border in Northern India. Our nearest town was Jalandhar. I am from a middle-class Sikh farming family, growing wheat, maize, rice and rearing buffalos. Most tasks are carried out using machinery, although a lot of work is still done by hand. It was a happy life for my brother and I, with extended family living in the same village.

Can you describe your education?

Our parents encouraged us to study. I worked hard and have a BA in Computer Applications and a Postgraduate Diploma in Computer Applications from the college in Punjab. When I came to New Zealand I completed a Graduate Diploma in Computing at the NZ School of Education in New Lynn, Auckland.

How was it for you arriving in New Zealand?

I needed to experience the world, having never been outside Punjab. In 2010, I arrived in Auckland not knowing anyone. It was a very big step for me to come to New Zealand. At first I wondered what I had done! It took a few months to get my head around the culture shock and to settle a little. Although much of my education had been in English we didn't actually speak a lot of the language – only reading and writing it. I had a lot of catching up to do and rapidly! Luckily, New Zealanders are very cheery, polite and respectful.

How did you establish yourself?

I first worked as a Sales Assistant and was then promoted to Duty Manager in an Auckland liquor store. That role helped me develop my English language skills. I gained a Diploma in Management during that time as well. The next role lasted 4½ years, as an Analyst Programmer

And then to Christchurch ...

I decided to move to Christchurch in June 2017. It took about 4 months before I found a permanent job – right here with the CHI! I am a Clinical Data Analyst – assessing and analysing data, as well as programming, that is modifying the current database coding. Everyone in the CHI is very friendly and approachable. I really enjoy working here. It feels good to be contributing in some way, towards helping to change peoples' lives through effective heart research, which leads to improved treatments and diagnosis. I feel like I am making a bit of a difference.

What do you like best about living in New Zealand?

I really like the scenery and beaches - although I prefer the warmer water and colour of North Island beaches compared to the South. Having said that, I want to buy a house in Christchurch and stay here long term. Maybe even do some farming!

World First Large Pre-clinical Model of HFpEF

A global need for new studies in certain areas of heart failure is the driving force behind what will be one of the world's few large pre-clinical models of a type of heart failure known as HFpEF (preserved Ejection Fraction) characterised by stiff and thickened heart muscle action.

Professor Chris Charles, who heads up the preclinical lab of both the Christchurch Heart Institute (CHI) and the Cardiovascular Research Institute of Singapore (CRIS) said that the new model will be an essential tool in the development of new treatments to halt or reverse cardiac fibrosis and the progression to heart failure.

"We think we've nailed this model in Singapore. The model has potential for use in developing new treatments in HFpEF which represents approximately one third of all patients with heart failure in New Zealand and Singapore. Our research paper describing findings to date is currently being written."

Chris is now working with fellow pre-clinical team members Associate Professor Miriam Rademaker and Dr Nicola Scott to develop the Singapore model in Christchurch for incorporation into current research at the CHI.

The idea to transfer the methodology to Christchurch, was driven by Professor Mark Richards, Director of the CHI and CRIS, who supervised its development, with later help from Professor Charles in Singapore.

"It is a model which will serve well for testing new generation therapies of pEF," he said.

Spotlight on iron deficient heart failure patients

Heart Foundation Award Recipient 2018

New research is underway in Christchurch, with the goal of reducing the rate of hospital stays and even deaths of patients with heart failure that are also deficient in iron.

> "Iron deficiency is the most common nutritional disorder worldwide ..."

Dr Sarah Appleby of the Christchurch Heart Institute, is investigating a recently discovered protein called Erythroferrone (ERFE) which plays a key role in regulating iron. Sarah recently received a Heart Foundation small project grant of $14,989 to support her study.

"Iron deficiency is the most common nutritional disorder worldwide and independently of anaemia, has emerged as a highly prevalent co-morbidity in patients with heart failure resulting in worsened symptoms and increased rates of hospitalisations and mortality. Therefore, I am working to identify new biological markers that will aid in earlier diagnosis and prognosis for heart failure patients with iron deficiency."

The Christchurch study will assess whether protein levels are elevated in heart failure patients and if it is a good predictor of adverse clinical outcomes. "By documenting levels of ERFE in the circulation of patients with acute heart failure, this work could provide the first evidence that ERFE has merit as an iron related factor that may be useful in the diagnosis or prognosis of heart failure."

Dr Sarah Appleby

Just wondering ...?....

How can I manage my risk of heart attack or stroke?

Heart disease is commonly thought to be a 'male' problem but cardiovascular disease is the number one killer of women globally.

- Women who smoke are three times as likely to have a heart attack compared to women who don't smoke
- Nearly 60 Kiwi women die from heart disease every week, that's more than 3,000 New Zealand women a year and 65,000 live with it
- New Zealand women are five times more likely to die from heart disease than breast cancer.

When should women get a heart check?

Women without known risk factors:
From 55 years of age

Women with significant known heart disease risk factors:
From 45 years of age

Maori, Pacific or South Asian women:
From 40 years of age

Women with type 2 diabetes:
As part of the annual diabetic review

Women with severe mental illness:
from 25 years of age

Did you know

The Heart Foundation website is a great place to find answers to some of your heart health related questions

www.heartfoundation.org.nz

New test for heart disease diagnosis

John Pickering

A joint study initiative between the Christchurch Heart Institute and Canterbury District Health Board has led to an exciting new development in heart attack diagnosis.

According to Associate Professor John Pickering of the CHI, a new version of the test for measuring blood protein, cardiac troponin, can now yield a very fast and efficient diagnosis.

"When a patient comes to ED with symptoms that suggest a potential heart-attack, current laboratory blood-testing procedures can take 1-2 hours to reveal the risk level, whereas with this new test we can get a result in just 15 minutes, from the bedside, or 'point-of-care'. The patient can then either be cleared to leave, or quickly progressed to specialist cardiac care. The benefits are therefore a speedier diagnosis and treatment, and a reduction in the time and effort current testing procedures require of ED staff, beds, and equipment."

Emergency Medicine Specialist, Dr Martin Than of the CDHB says the test could have a positive bearing on healthcare around the world.

"Our results have extremely exciting potential for not only EDs, but also isolated healthcare providers - such as those in rural communities - worldwide. Given the concerning impact heart disease and other cardio-vascular conditions have on, not only New Zealand society but also internationally, we have something that could benefit tens of millions of patients globally, while also freeing up EDs and isolated healthcare staff and resources."

The study findings have been published in the Journal of the American Medical Association. Support for the study came from the New Zealand Heart Foundation, Canterbury Medical Research Foundation, the Emergency Care Foundation and the Health Research Council.

Paper hyperlink: **https://jamanetwork.com/journals/jamacardiology/fullarticle/2705683**

Carnegie Hall, Here we come!

Dr Danielle Thompson *(left)*, Research Nurse Ruth Jardine *(right)*

Singing at one of the world's most famous concert venues is a dream come true for Dr Danielle Thompson and Research Nurse, Ruth Jardine. The pair are travelling to New York in March 2019 to take part in a special acapella workshop and concert at Carnegie Hall.

Danielle and Ruth, who work with the CHI in the Nicholls Clinical Research Centre, will join other members of their Christchurch choir, The Vocal Collective (formerly The Christchurch Pops Choir), for the event 'Total Vocal' which is run by Deke Sharon, co-musical director of the movie Pitch Perfect.

The choir's artistic director, Matt Everingham, has liaised with Deke Sharon regarding their New York trip, since The Vocal Collective grabbed the singer's attention during a workshop he held in Christchurch in 2016. Sponsored by Christchurch Airport, the group's concert calendar is an impressive line-up, including singing the New Zealand and French national anthems at the Crusaders vs French Barbarians rugby game and providing half time entertainment at the Super Rugby final during 2018.

"We went to Hainan, China, last year for a five day singing festival," said Ruth, "We sang in Chinese at Christchurch Airport. Members of the Chinese Tourism Department, who were assessing Christchurch for Chinese visitors, liked us so much we were invited to take part in the festival."

The opportunity to express themselves through singing has very positive results, as Danielle explains, "We are a pop choir, so sing a wide range of popular songs, and at many different places and events – we sang at Christchurch's Coca Cola Christmas in the Park each year from 2011 to 2013. To sing, especially in a group, is very uplifting, even therapeutic!"

Salmon with cranberry, parsley and nut crust

Christmas is around the corner and with the festive season comes a variety of food and beverages that can sometimes make heart healthy eating seem difficult to manage. This recipe uses salmon which is a wonderful source of heart healthy omega-3 fatty acid. As well as being fantastic for heart health this fatty acid has also been linked with improved mood/mental health and improved cognition. This Nadia Lim recipe would be a hit at any Christmas lunch or dinner party and can be served with baby potatoes and your choice of vegetables or salad.

Enjoy!

Sara Widdowson, Registered Dietitian

www.nadialim.com

Recipe by Nadia Lim

Panko breadcrumbs **1 cup**
dried cranberries **½ cup chopped + 2-3 tablespoons extra for garnish**
sliced almonds **¼ cup**
pine nuts **¼ cup**
flat-leaf parsley **1/3 cup chopped + extra for garnish**
thyme leaves **2-3 tablespoons finely chopped**
lemon Finely grated zest of **1**
orange Finely grated zest of **1**
melted butter **1/3 cup + 2-3 tablespoons extra for drizzling**
fresh salmon **1 whole side (about 1.5kg)**
lemon **1, cut into wedges, to serve**

Preheat oven to 200degC. Line a large baking or oven tray with baking paper.

1. In a medium bowl, mix panko breadcrumbs, cranberries, almonds, pine nuts, parsley, thyme and lemon and orange zest together. Stir in melted butter and season with salt and pepper.
2. Pat salmon dry with paper towels and remove any remaining pin bones. Place salmon on prepared tray, skin-side-down. Season well with salt and sprinkle crust mixture evenly on top, pressing down gently to adhere. Drizzle over a little more melted butter. Place on a shelf in the middle of the oven, and bake for about 20-25 minutes or until salmon is just cooked through (it is best cooked medium) and crust is golden.
3. Garnish with more chopped cranberries and parsley for colour. Serve with lemon wedges to squeeze over, baby potatoes and salad (I like baby Jersey Bennies, boiled and tossed with butter, garlic, parsley and lemon, and a salad of watercress, orange segments, avocado and blanched asparagus).