

Ground-breaking human heart tissue study

Research predicting the impact on heart muscle during a heart attack is being unravelled in the field of genetics, in a ground-breaking study, using human heart tissue.

Looking at a particular type of gene product called long non-coding RNA, this mysterious side-kick generated by the part of our genome which was once considered 'junk', is emerging as a potential novel predictor of heart health.

Taking current knowledge to a new level is a collaboration between the Christchurch Heart Institute (CHI), and Brigham & Women's Hospital in Boston, USA, home of Harvard Medical School.

Zoe Ward, PhD student in the CHI's Molecular Biology Laboratory, is analysing data, obtained via heart surgery by the Harvard team, to gauge the significance of the link between long non-coding RNA and heart attacks.

"The Harvard team operated on 85 volunteer patients who were requiring cardio pulmonary bypass. Blood must be diverted from the heart to allow the operation and the heart is temporarily starved of its normal supply of blood and oxygen. This partially and safely simulates what happens when a patient's coronary arteries around the heart become blocked during a heart attack. A tiny biopsy of heart muscle was taken before and after the surgical "heart attack". These tissue samples hold the genetic information that will help us see what changes in long non-coding RNA which turn selected genes on and off are occurring during a heart attack. This gives us a better understanding of the biology that is happening and potentially therapeutic targets" said Zoe.

Zoe applies her exceptional skills in a specialist area of computer-based medical data analysis called bioinformatics to search through terabytes of data. Exploring new areas of the genome, Zoe has potentially found 86 possible new non-long coding RNAs. Because long non-coding RNAs are known to be tissue specific, these may be unique to the heart.



Zoe Ward

"I aim to find out which of the non-coding genes, potentially responsible for generating long non-coding RNAs, are turned on or off when the heart is under stress. This will give us some insight into what these genes do and how they may turn other genes on or off, to help support the heart at a time of crisis."

Because new, novel, genes are studied, the current software is modified for 'boutique' analysis. Modifications have been made by Zoe with support from her supervisors, Dr Sebastian Schmeier of Massey University, as well as Dr Anna Pilbrow and Professor Vicky Cameron of the CHI and Associate Professor John Pearson at the University of Otago, Christchurch. The data is set up and analysed on a powerful computer dedicated to bioinformatics analysis at University of Otago, Christchurch.

"I am in a privileged position to have access to the data from Harvard," said Zoe, "The number of patients is rare – offering more scope for accuracy. I am always appreciative of the people who volunteer to be involved, this wouldn't be possible without them."

Hearty Humble Crumble

Winter is upon us and what's better than finishing off an evening meal with a warm and nourishing pudding.

Puddings and desserts can often get a bad rap nutritionally, however, there are plenty of nourishing options. One being the humble crumble.



www.nadialim.com

Crumbles have many nutritional merits including their hearty fruit base and wholegrain crumble topping.

Crumble topping's traditionally contain oats. Oats are little power houses when it comes to heart health as they contain a type of soluble dietary fibre called beta glucan. Research has shown that oat beta glucan lowers both LDL and total cholesterol. Beta glucan's prevent the absorption of LDL cholesterol in the gut which reduces circulating levels in the

blood stream, therefore benefiting your heart.

Please enjoy this Feijoa and Blackberry Crumble to up your intake of beta glucans!

Eva

Eva
Registered Dietitian

Feijoa and Blackberry Crumble

Recipe by Nadia Lim

Feijoas **1.5kg, flesh scooped out and roughly chopped**
blackberries
or boysenberries **1 cup fresh, frozen or canned (drained well)**
liquid honey **2 tablespoons**
orange **zest of ½**
brown sugar **½ cup**
fine rolled oats **¾ cup**
ground almonds **¾ cup**
butter **50g, diced**
ground cinnamon **1 teaspoon**
baking powder **1 teaspoon**
salt **pinch of**

To Serve

yoghurt, ice cream or whipped cream

Method

1. Combine feijoas, blackberries, honey, orange zest and juice in a medium-sized baking dish.
2. Combine brown sugar, rolled oats, ground almonds, butter, cinnamon powder, baking powder and salt in a bowl. Rub the butter into the mixture with your finger-tips, until it resembles breadcrumbs. Spoon crumble topping over the feijoa blackberry mixture.
3. Bake until the topping is golden and crunchy, 30-40 minutes. Serve crumble with yoghurt, ice-cream or whipped cream.

A new cardiologist on the block

We extend a warm welcome to Dr Philip Adamson, Consultant Cardiologist and Researcher who recently joined the CHI team.



CHI/CHI/19

Dr Adamson, completed his medical and cardiology training in Auckland and Christchurch before heading to Edinburgh, Scotland where he completed a PhD in Cardiovascular Science.

"A highlight of my research so far is taking part in the SCOT-HEART Trial which was published in the New England Journal. We enrolled over 4000 outpatients who had been referred by their General Practitioner for assessment of suspected stable angina. They were randomly assigned to standard care (most were put through their paces in treadmill tests) or to have a CT scan of the heart. We discovered that the use of a CT scan in patients with suspected angina due to coronary heart disease, clarifies the diagnosis, enables better targeting of care and reduces the future risk of heart attack.

This resulted in the UK National Institute for Health and Care Excellence (NICE) guidelines for the assessment of chest pain being changed. A CT scan is now recommended as the first step in diagnosis of chest pain in patients with stable angina.

Dr Adamson returned to NZ with his wife and family in January this year although retains an honorary contract with the University of Edinburgh to maintain ongoing collaborative research projects. "It was time for my family and I to return to New Zealand, and I was delighted to be offered this position with the CHI."

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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

Heart2Heart



Newsletter of the **Christchurch Heart Institute - A University of Otago Research Centre**
July 2019



At the start of this year, none of us could have anticipated the horrifying events of 15th March. The pointless loss of life, shocked the country. We at the CHI lost a colleague and friend in the Al Noor mosque. Dr Amjad Hamid had worked with the team for many years. He will be greatly missed for his kindhearted and generous approach to patients and colleagues coupled with his expertise in cardiology, as well as his sincere friendship.

Days after the attack, Dr Danielle Thompson and Research Nurse Ruth Jardine from the Nicholls Clinical Research Centre, travelled to Washington DC and New York to sing. Their choir, The Vocal Collective, joined other choirs from around the world with the intention of singing to unite the world through music. What a timely event. Congratulations to Ruth and Danielle for making a stand for peace through something as positive as singing.

Many of our doctors and researchers have artistic talent. For Dr Khai Sin Oon, painting is her outlet for relaxation. We meet Khai Sin in this issue and receive a small glimpse of the artwork she likes to create.

Maintaining balance is key to good health and a healthy heart. Our genetics team has been working collaboratively with an international consortium called GENIUS-CHD that showed high genetic risk of having a heart attack did not increase risk of death in the years following a heart attack. In addition, other studies show that choosing a healthy lifestyle and living environment overall, can influence our heart health for the better, even if we have already had a heart attack.

International collaboration is key to broadening the CHI's research scope. Zoe Ward, PhD student in the Molecular Biology and Genetics team, is working with Harvard University Medical School to analyse huge data for insight into what microRNA genes do in supporting the heart at a time of crisis. Read more about that and the GENIUS-CHD story in this newsletter.

I would like to introduce our newest staff member, Dr Phil Adamson, who joined us at the start of the year. As a Consultant Cardiologist and researcher, Phil is proving a great asset to the CHI team.

I wish you all well and look forward to bringing you more news of the CHI activities later in the year.

Professor Mark Richards



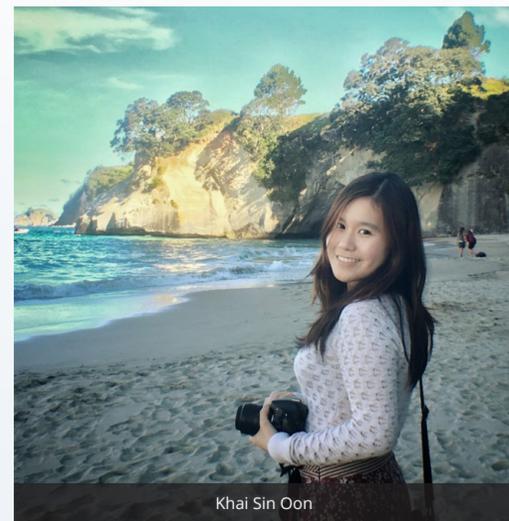
Professor Mark Richards, Director,
Christchurch Heart Institute.

Five minutes with ... Khai Sin Oon

Drawing on her medical training, Khai Sin Oon, works with the CHI as a Clinical Research Assistant in the Nicholls Clinical Research Centre. New Zealand lured her from her home country of Malaysia and from what she is saying, it sounds as though she's here to stay for as long as possible...

What drew you to New Zealand?

I came to New Zealand to study at Otago University. I did a Bachelor in Medicine and Surgery (MBChB). New Zealand is one of the most beautiful countries in this world. It has lots to offer and I love the untouched natural beauty here – superb natural environment.



Why have you joined the Christchurch Heart Institute?

I completed my medical training here at Christchurch Hospital including one year as a Trainee Intern. There is a surplus of doctors back at home in Malaysia so that makes it difficult to find a long-term role as a hospital doctor. Thankfully, I was given an opportunity to join CHI. I have worked with the CHI since December 2018.

Do you have a particular interest in heart health?

I am so glad to be exposed to heart research through working with the CHI. I suppose you could say I have a deepening interest in heart health. I am a Clinical Research Assistant, which draws on my medical training. My role includes taking patient health histories, processing bloods, examining patients, interpreting basic investigations such as ECGs as well as chest x-rays, under supervision. I also help with data entering and sample storing. I am enjoying sharing the importance of heart health with patients and encouraging them to maintain good health



in general. Research has become my passion, I endeavour to have a role in both clinical and academic fields in the future.

You create beautiful artwork, could you tell us more about that?

I enjoy working with oil and water paints, or pencils. My favourite paintings are portraits but I paint most things including fruits, flowers and landscapes. I donated an oil painting of an apple as a fundraiser for Art for Autism held at University of Otago, Dunedin. It was called "Apple of my eyes: regardless of Autumn or Autism". Art has always been part of who I am. I started going to art classes when I was very young – 3 or 4 years old – after that, I taught myself.

And you also get creative in the kitchen...

I love to bake. It's very therapeutic – great stress relief! I like to share my baking with other people. I usually bring baking to the Research Centre once a week. I won the University of Otago Christchurch BakeOff recently. The theme was Apples. I made apple tarts that looked like roses.



How do you experience living in New Zealand compared to Malaysia?

In New Zealand there are more choices. It is more liberal here, with freedom of speech and it's an increasingly multicultural society. Malaysia is more conservative in my opinion. Here in New Zealand, I have a very good work/life balance. I enjoy getting out and seeing the beautiful scenery – it's unbelievable! I go tramping around New Zealand whenever I have holiday. Tongariro Alpine Crossing and Roy's Peak are the tracks I have enjoyed the most so far. I also tramp around Christchurch, in the Port Hills and out to Godley Head.

Where do you see yourself heading?

The CHI has broadened my horizons regarding research – how it works and how it benefits people now and into the future, it is very different to experience! I gained in clinical medicine. I would love to continue with research while trying to find my feet in clinical ground. I may do a Masters or PhD in Medical Science in the future if there is opportunity.

Dr Amjad Hamid Rest in Peace

The loss of our esteemed colleague and friend, Dr Amjad Hamid, in the Al Noor Mosque attack has been hard for the CHI team to face. Amjad will always have a special place in our hearts. We extend our deepest sympathy and love to his wife and family.

Professor Mark Richards,
Director, Christchurch Heart Institute

This is an excerpt from a tribute to Dr Amjad Hamid, published in the Canterbury District Health Board CEO Update bulletin ...

Amjad Hamid is remembered as a special doctor who was a very humble, caring and gentle person and will be dearly missed by many.

Amjad, aged 57, who was much loved and respected by his colleagues and patients, was killed in the shootings at Al Noor Mosque, in Christchurch on 15 March. He was among six Palestinians killed in the attack.

The senior doctor with a special interest in cardiology was known for being caring and approachable, always happy to stop and answer questions or explain something.



Amjad worked in Cardio-Respiratory Integrated Specialist Services (CRISS) at Christchurch Hospital and at Ashburton Hospital until moving to Hawera Hospital in South Taranaki three years ago.

He remained living in Christchurch with his wife and family but travelled to Hawera for work.

His widow, Hanan, says he was a good husband and father to their two sons, Husam, 22, and Mohammed, 20. They migrated to Christchurch in 1995 from Palestine, for a better future, and he loved the city.

Amjad also worked for the Christchurch Heart Institute research team and led the outpatient cardioversion service for the past few years at Canterbury DHB.

Not doomed by genetics

It is well-known that heart disease runs in families. The good news is our genetic inheritance does not mean we are doomed, even if we have already experienced a heart attack.

Geneticists at the Christchurch Heart Institute (CHI), a University of Otago Research Centre, have been studying a common DNA variant that increases your risk of a heart attack. Dr Anna Pilbrow and Professor Vicky Cameron are part of a large international collaboration, which has recently published two scientific papers in the journal *Circulation: Genomic and Precision Medicine*. The international collaboration, called The Genetics of Subsequent Coronary Heart Disease Consortium (GENIUS-CHD) collated data from 57 studies and nearly 200,000 people of European ancestry, including 3000 from NZ.

The CHI researchers were invited to participate in the GENIUS-CHD study based on their previous work showing that the DNA variant, while increasing your risk of having a heart attack, did not increase the risk of death following a heart attack. In other words, heart patients carrying the high risk DNA variant survived equally well as those who carry the low risk DNA form. These findings were based on a cohort of 2000 New Zealanders.

"The findings of the much larger international study have convincingly replicated the earlier research done here in Christchurch," said Professor Cameron.

Meanwhile, other researchers have shown that medication and improving lifestyle reduced the likelihood of people with high genetic



Anna Pilbrow



Vicky Cameron

risk of heart disease dying of a heart attack. "In fact, when those with high genetic risk take their medications as prescribed by their doctor and maintain a healthy lifestyle, their chance of a heart attack is reduced to the same as those lucky enough to be born with low level genetic risk."

According to Dr Pilbrow, "We cannot change our DNA but we are not doomed by it either. Even if we have a strong family history of heart disease, we can mitigate our heart disease risk by having a healthy lifestyle and taking our meds. Our lifestyle choices influence our heart health for better or worse."

It has been a delight to contribute to the consortium and we are pleased that at least 10 further studies are emerging as a result," Dr Pilbrow said. Although GENIUS-CHD is led out of the Netherlands and United Kingdom, the Christchurch team need send only anonymised summary data from the New Zealand patients to the consortium analysts for completion. No samples or individual data leaves our shores, but the combined data contributes to the international effort to understand the genetics of heart disease.

Singing for Unity

Singing to unite the world through music, was the intention of a trip to the United States for research nurse Ruth Jardine and Dr Danielle Thompson, who work in the Nicholls Clinical Research Centre.

The pair, who are members of Christchurch pop choir, The Vocal Collective, joined choirs from around the world for the 'Total Vocal' event, organised by "the father of contemporary a cappella" Deke Sharon, accomplished musician, and musical director for movies such as *Pitch Perfect*.

"The highlight of the trip was singing inside the George Washington Memorial Hall in Washington DC," said Ruth, "It was very emotional because the concert was dedicated to the victims and families of the Christchurch mosque attacks, which had occurred three days before we left for the trip.

"Representatives of the local Muslim community were invited. New Zealand's Ambassador to the United States, Rosemary Banks, gave a heart-felt speech acknowledging the attacks and the unity this had instilled in NZ. We performed Maori lullabys, *Pokare Ana* and *Hine e Hine*, the moving song, *Into the West* from the film *Lord of the Rings*, as

well as *The Rising* by Bruce Springsteen, dedicated to the victims of 9/11."

The choir raised \$6000 for victims of the Christchurch mosque shootings.

According to Danielle, the group performed a number of 'pop-up' gigs at various sites, including the Lincoln and Jefferson memorials in Washington, and the Statue of Liberty, and Empire State Building in New York.

"There were also plenty of impromptu performances such as on the Potomac river ferry for the other ferry passengers, and on the train to New York for a group of American ladies celebrating a 50th birthday."

The finale of the trip was a concert at the famed New York venue Carnegie Hall, where the group sang as part of an ensemble of 250+ singers to a sold out audience of 2800. Danielle said it was "certainly an honour to be there."

Ruth had her sights set on another singing adventure overseas, "Next stop, the Royal Albert Hall in London next year!"



Just wondering ..?..

What kinds of heart treatments are available?

The most important and widely used heart treatments are lifestyle changes and increasingly effective medications (for blood pressure, cholesterol control and preservation of heart function) which together can markedly improve outcomes for heart patients. Occasionally these mainstays of treatment are supplemented when appropriate with catheter-based or surgical procedures and implanted devices as below:

Angioplasty and stents - Angioplasty is a treatment that uses stents to improve blood flow to the heart by opening a narrowed or blocked coronary artery.

Coronary artery bypass graft surgery – Bypass surgery is used to get blood to part of your heart muscle when your arteries are blocked.

Heart valve surgery

Heart valve surgery is used to either repair or replace diseased heart valves. There are various procedures that can help to improve or stop symptoms of heart valve disease and prevent further damage to your heart.

Pacemakers – Pacemakers can be used to treat slow or irregular heartbeats called arrhythmias. If your heart rate is too slow, the pacemaker will send an electrical signal to the heart muscle to start a heartbeat.

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