



**Victor Chang**  
Cardiac Research Institute

# THEBEAT

Through heart surgery, Dr Victor Chang was able to save hundreds of lives. But he knew that through research, he could save millions.



Breagha Patterson and her family (second from left)



24 women die every day of heart disease in Australia

## THANK YOU FOR HELPING SAVE YOUNG BREAGHA'S LIFE

Two weeks after losing her younger sister to dilated cardiomyopathy, 19 year-old Breagha Patterson received the results of a genetic test carried out by the Victor Chang Institute's Professor Diane Fatkin. The results revealed that she too was likely to develop the potentially deadly heart condition.

**Characterised by stretching and thinning of the left ventricle, the condition gradually leads to total heart failure by which stage, the only cure is a heart transplant.**

"When you're young you don't really pick up on symptoms that your heart is not normal," she says. "My sister was the same and only noticed symptoms when she became very ill."

Breagha was placed on medication but fairly quickly needed an implanted cardioverter defibrillator. Then with further deterioration in her health she became the first Australian recipient of the Mini Ventricular Assistance Device (MVAD).

The MVAD is a pump inserted in the heart, with a wire trailing outside the body to an external battery-pack. It's roughly a third smaller than previously used devices and

provides short-term life support for someone on the heart transplant list.

Breagha's sister had not survived the wait for a new heart. It was the desperate hope of Breagha's medical team that the MVAD would buy her the time she needed until a new heart became available.

After seven months she got the call. It was mid-February last year and the most precious gift of all – a donor heart – was on its way to her.

Thanks to the game-changing research at the Victor Chang Institute and St Vincents Hospital, the heart – which had stopped beating – was reanimated by our unique preservation solution and the heart-in-a-box technology.

Taking more than a decade to perfect, the technique keeps a heart oxygenated with blood

pumping through it until it is transplanted into another person. It is an amazing development when you think about it. After all, this sort of "world first" is only possible due to the philanthropic support of people like you who recognise the value of heart research.

Our unique preservation solution has revolutionised heart transplant surgery. Thousands of lives will be saved globally and many more donor hearts will be available for transplant.

It saved Breagha's life. The bubbly 23 year-old is now enjoying university and realises she needs to start planning for the future.

"Before my transplant, the future wasn't something I even contemplated," she says frankly. "It just wasn't on the table – but yeah, I'll have to sort that out now," she laughs.

# 80%

of cases of congenital heart disease remain unsolved – doctors have no idea what caused them

# 3x

More women die of heart disease than breast cancer in Australia



# Every 4 hours

a baby is born with congenital heart disease

## RESEARCHER PROFILE



Dr Louise Dunn

## Researcher's work could dramatically help heart attack sufferers

**Dr Louise Dunn, a Senior Scientist in the Vascular Biology Division of the Victor Chang Institute is working on a 'super enzyme' that could really turn things around for the 45,000 people who suffer heart attacks in Australia each year.**

With her colleagues, Dr Dunn believes the enzyme that she is investigating, is the key to reducing atherosclerosis in heart attack sufferers and even in type 2 diabetics. Atherosclerosis, the leading cause of heart attacks, is a disease in which plaque or fat builds up inside your arteries or blood vessels.

Over time, the plaque hardens and narrows your arteries. As plaque builds up the flow of oxygen-rich blood is gradually reduced or blocked. When a blood vessel in the heart becomes blocked, the muscle of the heart is starved of oxygen leading, in many cases, to a heart attack.

Similarly, atherosclerosis can happen in other parts of the body, such as the major blood vessels of the legs. In this case, atherosclerosis leads to peripheral vascular disease which can ultimately lead to amputation.

As Dr Dunn explains, "patients who are at high risk of having a heart attack or amputation often need surgery to open their blocked arteries. However, there is a downside. The surgery is only a temporary solution for some patients and blood vessels may become blocked again"

"We have found that the 'super enzyme', known as **heme oxygenase-1**, can promote the growth of new blood vessels and also help muscle tissues adapt to low oxygen levels, which may prevent amputation"

"We are now looking at ways to increase the enzyme in the body... if we can do this, the body could be able to protect and repair itself from atherosclerosis with less need for medical interventions"

"We've been working on this breakthrough now for the past eight years. When we finally realised we could get these new blood vessels to grow, we knew we were onto a winning approach," says Dr Dunn.

Obviously, hearing about the work of Dr Louise Dunn is very heart warming. It is such a promising step in our push against heart disease. It is the sort of research that ultimately may save millions of lives and it is so encouraging to know that your dollars are having such impact.



## Inspiring stories – inspiring research

Welcome to another issue of THE BEAT. Another issue packed with inspiring researchers doing work that we are very proud about.

But make no mistake. We don't for a minute consider we are doing breakthrough research on our own. Every day we are mindful of only being able to do this vital work because of the generous help of people like you.

Maybe the most intriguing story here is the one about our zebrafish which demonstrates the fascinating work coming out of Professor Diane Fatkin's laboratory. The researchers are using high frequency ultrasound to examine the hearts of zebrafish. We are very hopeful that this initiative will give us new insight for progressing our understanding of heart diseases, including heart attacks and dilated cardiomyopathy.

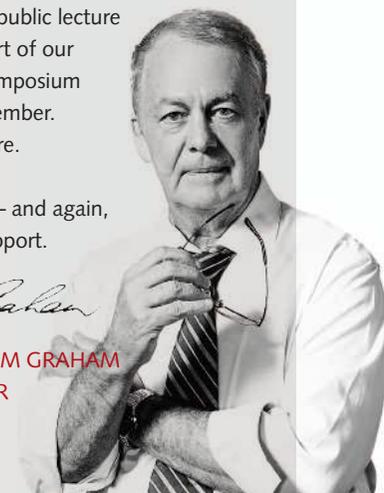
I am sure you will also be keen to read about our very capable researcher, Dr Amy Nicks who spends her time investigating heart regeneration. The sky is the limit on this one. When we reach a point where the human heart can be regenerated, there is no telling how many millions of people will be liberated from heart disease.

Most obvious, of course, is the extraordinary front page story of a young woman named Breagha Patterson, who was given new life by a revitalised heart transplant which was only made possible by our unique preservation solution and heart-in-a-box machine. It is a compelling story, I'm sure you will agree.

And in our list of events, please don't miss the details about the free public lecture that will be held as part of our Sydney Cardiology Symposium on Wednesday 6 December. I hope you can be there.

Best wishes to you all – and again, thank you for your support.

**PROFESSOR ROBERT M GRAHAM**  
EXECUTIVE DIRECTOR





Heart disease remains the single biggest killer of all Australians



Many women have different heart attack symptoms to men



Heart disease claims the life of 1 Australian every 26 mins

## INNOVATION & DISCOVERY



Artist impression of one of the new laboratories in the Victor Chang Innovation Centre



Victor Chang Innovation Centre aims to reduce the burden of heart disease and stroke

# YOUR NEW INNOVATION CENTRE – AN EXCITING STEP FORWARD

Construction of the new Victor Chang Centre for Cardiovascular Research Innovation is well under way with plans to open in 2018.

**The new centre, which will focus on tackling Australia's most deadly disease, is a major step forward for us and all cardiovascular researchers in NSW. The NSW Government has generously provided funds to equip the centre, but the operations of the centre will be dependent on the generosity of supporters like you.**

The Victor Chang Innovation Centre will herald a medical research revolution that promises to reduce the burden of heart disease and stroke, which tragically claims the life of one Australian every 12 minutes.

Featuring cutting-edge technology and equipment, the new centre will attract world-class researchers to Australia, encouraging collaboration and allowing previously impossible solutions to be discovered.

Our Executive Director, Professor Bob Graham, said the Innovation Centre is critically needed to help the 3.7million children and adults affected by cardiovascular disease.

"What we are establishing is unique in Australia," said Professor Graham. "It will ensure patients in NSW receive the best possible cardiovascular care. The Victor Chang Innovation Centre will play a key role in making NSW the Premiere State in Heart

Health. It will keep us at the forefront of medical research infrastructure."

Cardiovascular disease currently costs the healthcare system more than \$7.6 billion. It is Australia's most expensive disease and the cost is expected to rise even further over the next 10 years given our ageing and growing population. The new centre will address this urgent problem.

"If we do nothing, Australia will continue to spend an ever-increasing amount of its health budget on treating patients with heart disease and stroke. It's time to radically rethink our approach by working together to fight heart disease, if we want to achieve a brighter future," Professor Graham explained.

Comprised of several new facilities, the Victor Chang Innovation Centre will feature:

- A cardiac stem cell and regeneration facility
- A dedicated children's cardiac research facility
- Cardiogenomics and gene editing facility
- Cardiac imaging facility
- Cardiac arrhythmia division
- Heart transplant and devices facility
- Metabolomics faculty.

The Victor Chang Innovation Centre will be fitted with state-of-the-art equipment

including two MRI scanners, a sophisticated 3D organ printer, a bioengineering 3D printer, the latest organ care system for reanimating hearts (coined the heart-in-a-box), a mass spectrometer to measure minute chemicals in the heart and a zebrafish echocardiogram. (You may be surprised to hear that we work with zebrafish – this is because the zebrafish heart is surprisingly similar to a human heart but it can regenerate and heal itself).

The main objective of the new centre will be to improve diagnosis and treatment and ultimately to prevent heart disease and stroke – which, of course, is also the aim of our dedicated scientists and supporters.

Our Chairman, Mr Matthew Grounds commended everyone involved, including the NSW Government, for having the vision to support the development of the new centre-of-excellence, which marks a new era in cardiovascular research for the state.

"There's no doubt the Victor Chang Innovation Centre is critically needed. It will allow us to address the ravages of heart disease that currently afflict our population, by prioritising heart research. It will accelerate progress, generating an enormous benefit for the community," Mr Grounds added.



# 2 out of 3 people

who develop heart failure die within five years of diagnosis

# 54,000

The average number of Australians who suffer heart attacks every year



# 1 in 100 babies

are affected by congenital heart disease

## RESEARCH UPDATE



Prof Diane Fatkin, Dr Renee Johnson and Dr Claire Horvat at the Jindabyne Medical Centre

## Fifteen year follow-up with visit to Jindabyne family

Members of Professor Diane Fatkin's laboratory recently spent an invaluable few days visiting a family in the Snowy Mountains town of Jindabyne south west of Sydney.

The purpose of the visit was to do a 15 year follow-up screening of a large extended family with an inherited heart disease, known as cardiomyopathy.

"The visit was very productive and we saw about 50 people in the three and a half days," explains Professor Fatkin.

"Our work in Jindabyne involved doing genetic testing and counselling, as well as echocardiograms and ECGs. The family is very informative from a research point of view and we were pleased to identify two new branches that we did not know about," says Diane.

"At the 15-year follow up, we saw grandchildren of some of the original participants. We were very impressed with the enthusiastic participation of family members and hopefully this work will be of benefit to this family directly as well as to the many other families who carry variants in the same gene."

The visit to Jindabyne may allow us to identify, who else in the family has the genetic mutation. We want to be able to treat these members of the family with a view to delaying or preventing the onset of the disease within the family. **Equally, we want to reduce the severity of it and possibly even stop heart disease from developing at all.**

The aim, of course, is to expand this work generally to families everywhere who are affected by inherited heart disease.

## NEWS

### Researching hearts of tiny fish leads to major discovery

Dedicated scientists in our laboratory are right now making amazing discoveries through research into zebrafish. They are using high frequency ultrasound to examine the hearts of these tropical fish. It is probably a shock for most of us to imagine that such incredibly small fish can help in the ongoing battle with heart disease.

This transformative technology is beginning to shed new light on numerous heart diseases, including heart attacks and dilated cardiomyopathy. This development is just one example of the sort of impact you can have with your generous support of the Victor Chang Institute.

Passionate researcher Doctor Inken Martin believes the breakthrough could lead to new investigations into heart regeneration and causes of heart failure.

"A zebrafish heart is surprisingly similar to a human heart, with one vital difference: a zebrafish can regenerate and heal its own heart, much like a lizard can grow back its tail," Dr Martin explains.



High frequency ultrasound used to examine the hearts of zebrafish

"If we can understand the complexities of how the heart works, we will be able to come up with better ways to diagnose, treat, or even prevent adult onset heart disease," she adds.

Until now, detailed analysis of the heart has not been possible on such a tiny scale. Would you believe, each heart is smaller than a grain of sand!

But thanks to a giant leap in technology, high resolution, high frequency echocardiographic images can now be captured with a new level of detail and clarity. This is the same type of test that is used to look at human heart function, but on a much smaller scale.

The technique is performed underwater and takes just minutes to complete with no harm

to the freshwater creatures.

So far, some one thousand ultrasounds have been performed on one thousand zebrafish to create a live picture of their beating hearts. The investigation is giving scientists a picture of heart function that has never been possible before.

Within the Victor Chang Institute there is a strong suggestion that this breakthrough will also help explain why heart failure is more likely to happen with some people rather than others. As a supporter of the Victor Chang Institute, it is encouraging to know that your gifts are helping our researchers achieve so much in heart disease treatment.

2016

Victor Chang Institute scientists have found powerful evidence, that dad's nutrition and metabolic health can influence his sons, and even his grandsons.

2016

Our scientists believe they've discovered that environmental stresses can cause birth defects, giving hope to the 2,180 babies born with heart defects every year.

2015

Our scientists discover how to limit the damage to the heart after a heart attack, which could help 54,000 Australians who suffer a heart attack each year.

OPEN UP YOUR HEART

### Your legacy can help us find cures for heart disease

Leaving a bequest in your Will to the Victor Chang Cardiac Research Institute is a very special way to contribute to heart research.



Recently, while visiting the Victor Chang Institute, I heard about a man who was brought back to life after being clinically dead for six minutes. I absolutely admire the focus and dedication of the scientists at the Institute. They really do make a difference which is why I have proudly included a bequest in my Will to the Victor Chang Cardiac Research Institute." **Reg**

A gift in your Will – no matter how big or small, will have a major impact on those suffering from cardiovascular disease. Your gift will honour your memory by funding innovative ideas that could lead to world first treatments, speed up lifesaving discoveries and train the next generation of researchers.

Your legacy could help prevent the premature deaths of thousands of men, women and children who continue to die from cardiovascular disease each year.



I have left the Victor Chang Institute a gift in my Will as heart research doesn't receive the funding it deserves and I'm hoping my bequest will help them find cures." **Krythia**

If you have included a bequest to the Victor Chang Institute in your Will or if you are thinking about it, we would very much like to thank you. In fact, we would be delighted if you would join us and our other generous supporters at a special morning tea where our world class researchers can share their most recent breakthroughs with you.

- Date:** Tuesday 17 October, 2017
- Time:** 10:00 am to 11.30 am
- Venue:** Victor Chang Cardiac Research Institute  
Lowy Packer Building 405 Liverpool Street, Darlinghurst
- RSVP:** Tuesday 10 October, 2017

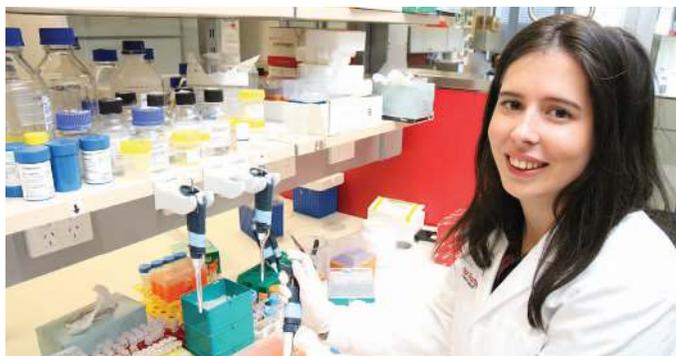


### We are pleased to introduce our new Bequest Manager, Samantha Burns.

Please contact Samantha on (02) 9295 8753 or [s.burns@victorchang.edu.au](mailto:s.burns@victorchang.edu.au) to RSVP our morning tea event. She will also be happy chat to you about leaving a gift in your Will, and help organise a tour of the Institute.

SPOTLIGHT ON

### Getting closer to heart regeneration



The thought of having a human heart that can fix itself when something goes wrong, is no doubt appealing to everyone.

**Our researcher, Dr Amy Nicks, is working on doing just that. Her time at the Victor Chang Institute is spent on investigating heart regeneration.**

Ultimately, the aim is to provide a treatment for patients with cardiac injuries and those born with smaller hearts, including congenital heart disease, as well as pre-term babies. Of course, like all our researchers, Dr Amy is acutely aware that her work is possible only because of the practical giving of people like you.

As Dr Nicks explains, "heart failure is the end-result of many cardiovascular diseases in adults, resulting from a loss of functioning heart muscle cells, which are not replaced because adult hearts are not good at regenerating."

"Babies born with certain types of congenital heart diseases have smaller hearts, and similarly babies born prematurely may have disrupted heart growth, predisposing them to an increased risk of cardiovascular disease," says Dr Nicks.

"Through my work I want to identify suitable therapeutic targets for heart regeneration. The approach I have taken to achieve this aim is to understand what changes occur in gene expression and regulation when heart muscle cells divide (babies and young infants) and when they stop dividing, and only continue to grow in size (adolescence)."

At this point, Dr Nicks is very pleased with progress. "The research is exciting because we are one step closer to discovering molecular targets that could potentially be stimulated to achieve heart regeneration for all types of diseases at all ages," she says.



If you want to give a regular gift, you can become a **One Heart** Supporter [www.victorchang.edu.au/oneheart](http://www.victorchang.edu.au/oneheart)



# Dates

for your diary...

**WEDNESDAY 6<sup>TH</sup> DECEMBER 2017**

**Sydney Cardiology Symposium**

**Location:** NAB Auditorium (Garvan Institute of Medical Research), 384 Victoria Street Darlinghurst 2010

**Time:** 3pm - 5pm

**Cost:** Free

**RSVP or Enquiries:** Events Coordinator on (02) 9295 8600 or email [events@victorchang.edu.au](mailto:events@victorchang.edu.au)

**FRIDAY 17<sup>TH</sup> NOVEMBER 2017**

**Hearts and Mind Conference**

**Location:** Sydney Opera House, Bennelong Point Sydney 2000

**Time:** 8am to 3pm

**Cost:** \$3,000

**Enquiries:** [sonia.karoll@sohnheartsandminds.com.au](mailto:sonia.karoll@sohnheartsandminds.com.au) or phone 0413 168 771

**Register:** visit [www.sohnheartsandminds.com.au](http://www.sohnheartsandminds.com.au)

## PAST EVENT – RAISING VALUABLE FUNDS FOR OUR SCHOLARSHIP PROGRAM



Bay Soiree attendees

Thanks to the more than 200 guests who attended the annual Bay Soiree, some \$60,000 was raised to support the Victor Chang PhD scholarship program.

The scholarship program funds the training of the next generation of cardiovascular researchers. The funding is vital and the generosity of those who attended the evening is much appreciated by everyone at the Victor Chang Institute. We are also particularly grateful to our event sponsors.

Even wild rain on the night couldn't dampen the spirits of the guests – all dressed in white for the event held at the famous Watsons Bay Boutique Hotel in March.

A huge "thank you" goes to our unstoppable host, Todd McKenney who managed proceedings with good humour and poise. Guests sipped champagne while being entertained by the talented 2015 X-Factor contestant, Michaela Baranov. The dinner was a superb three course meal served with matching wines and a delicious dessert created by Australian patissier and chef, Adriano Zumbo just for the night.

A highlight of the evening was our inspirational guest speaker Melissa Hargrave, a courageous heart transplant survivor.

From everyone at the Victor Chang Institute, thank you to all our supporters who attended the Bay Soiree evening.



## UPCOMING EVENT – TOP GOLF DAY



St Michael's Golf Club

Join us for our 19th Annual Scentre Group Victor Chang Cardiac Research Institute Charity Golf Day to be held on Wednesday 20 September 2017.

Proudly sponsored by Scentre Group, the event will once again raise funds to help the Victor Chang Cardiac Research Institute discover better ways to diagnose, treat, cure and, importantly, prevent cardiovascular disease.

The venue for this year's event will once again be St Michael's Golf Club at Little Bay and the day promises to be as enjoyable as ever!

This is your opportunity to join us and play one of Australia's leading courses, enjoy first class hospitality, gain premium exposure and networking opportunities for your company all whilst supporting heart research.

We expect a strong response from companies wishing to participate in the event again this year, so please be aware positions are limited. It is advisable to confirm your booking early to avoid disappointment. For more information on packages and benefits please visit [www.victorchang.edu.au](http://www.victorchang.edu.au) or contact **Luke Matthews** on 0402 564 251 or email [luke@meridiancorporate.com.au](mailto:luke@meridiancorporate.com.au).

Please join us in supporting this wonderful event. We look forward to seeing you there!

## PUBLIC LECTURE – SYDNEY CARDIOVASCULAR SYMPOSIUM

### The computer will see you now: artificial intelligence and the future of cardiology

Surprisingly for some people, computers are now doing what doctors can't always do.

- Computers can stay on top of every detail of every patient no matter how many specialists they have seen.
- Computers can stay abreast of all new research, and immediately incorporate that knowledge into diagnosis or treatment options.
- Computers can predict disease outbreaks, how to stem them, and make public health recommendations on how to avoid them.

*The Victor Chang Institute is delighted to partner with the Heart Research Institute to launch the Sydney Cardiovascular Symposium.*

Please join us and learn about how these great advances also present many new challenges.

Dates and RSVP details are located at the top of this page.

