



The secrets in our genes

We are all a product of those who came before us. You may know you inherited your blue eyes from your grandmother or your oddly shaped thumb from your father but what about the more fundamental things? The very things that make us prone to this disease or immune to that virus?

Some of those things that make us “us” came from ancestors that were not quite the same species and the impacts of these genetic artifacts are profound.

Dr Irene Gallego Romero, the head of SVI's new Human Genomics and Evolution Lab, is delving deeply into the secrets hidden in our DNA in order to provide a clearer picture of the human genome.

“The human genome was mapped in 2003 but it still isn't completely understood,” Irene said. “We still don't really understand how a cell knows to become a liver cell or a heart cell.”

“One of the foundational aims of human genomics is understanding the genetic causes of human traits, with a particular focus on disease,” she says. “I look at it through an evolutionary lens.”

Creating a Rosetta Stone for the human genome can't be done, however, until there is more diversity in the data.

“The lack of diversity in human genomic datasets limits even the questions we can ask about genetic diseases,” she said. “It's only when we start to explore a greater breadth of human populations can we even begin to understand the ways natural selection and evolutionary change have shaped us as a species.”

An internationally recognised leader in the field of human genomics, Irene has published papers in influential peer-reviewed journals, as well as being featured in the Australian Broadcasting Commission documentary, “The Human Revolution”.

When asked what made her choose to shift her lab to SVI, Irene says she has long been interested in exploring the medical side of her work.

“My work has been in what we call ‘fundamental science’ and the move to SVI gives me the opportunity to explore how it can inform and intersect with research occurring at the Institute into a wide range of different diseases.”

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TOM SAYS

As we bid farewell to winter and welcome the warmer months it is fitting that we also welcome some new faces to SVI.

In this edition of In Focus we have the pleasure of introducing you to Dr Irene Gallego Romero, the head of our new Human Genomics and Evolution Lab.

Irene and her team are focussed on exploring the genetic differences between human populations, advancing personalised medicine and championing global health equity.

Irene, originally from Spain, studied as an undergraduate at The University of Chicago and completed her PhD at Cambridge University in Biological Anthropology. Through her research, Irene is addressing an important area which has, for far too long, been overlooked. Although we mapped the human genome decades ago, we still have very few answers because the lack of diversity in human genomic datasets limits even the questions we can ask about genetic diseases. Irene's work will expand this dataset, laying the groundwork for new discoveries in inherited illnesses.

I am also delighted to welcome Associate Professor André La Gerche as head of our new Heart, Exercise and Research Trials (HEART) Lab.

André is a cardiologist who did his clinical training and PhD here on the St Vincent's campus and then spent several years at the University of Leuven in Belgium. He has gained international recognition as an expert in exercise cardiac imaging, sports cardiology and pulmonary vascular physiology. André is doing some interesting work to embed state-of-the-art personalised diagnostics and therapeutics within clinical care.

His appointment is supported by a partnership with the Victor Chang Cardiac Research Institute which is also a member of the St Vincent's family.

Both Irene and André bring new, energetic teams with them which has expanded our research bench strength. The fact that we are able to attract talent of the calibre of Irene and André speaks volumes about our scientific excellence here at the Institute.

We are immensely grateful to all of our donors who continue to support us in a range of ways. We know that you, like us, are inspired by discovery and driven by purpose.

We have our sights set on finding new opportunities to make a real difference now as well as into the future. With your help, we will continue to find new ways to respond to the health challenges that affect so many of us.

Thank you for continuing on this journey of discovery with us.

Professor Tom Kay
SVI Director

NEW LAB HEAD AT THE HEART OF IT

Clinician-researcher Associate Professor André La Gerche is a busy man. Not only is he a well-respected cardiologist, but he has gained international recognition as an expert in exercise cardiac imaging, sports cardiology and pulmonary vascular physiology.

As the head of SVI's new Heart, Exercise and Research Trials Lab (HEART Lab), André and his team will expand the Institute's cardiac research capabilities.

"My work aims to embed state-of-the-art personalised diagnostics and therapeutics within clinical care," says André. "The intersection between research and the clinic makes SVI and its close relationship with St Vincent's Hospital Melbourne ideal for my team."

But there was also a more personal reason that drew him to the St Vincent's campus.

"I completed my PhD here in 2010 so, in a way, this is like coming home," he said. "My colleagues at the St V's campus have always been so supportive of my work and I am excited to again join forces."

"The talent pool is immense and I look forward to mentoring the next generation of scientists. We will make a difference for people affected by heart disease."

André's new lab is also being supported by the Victor Chang Cardiac Research Institute (VCCRI) in Sydney, and will aim to accelerate the discovery of new ways to treat heart disease.



"We have a history of turning curiosity into clinical discoveries with global impact here in Fitzroy, and we are sure that this will continue with André's appointment," said Professor Kay.

"I completed my PhD here in 2010 so, in a way, this is like coming home," he said. "My colleagues at the St V's campus have always been so supportive of my work and I am excited to again join forces."



FOR THEY ARE JOLLY GOOD FELLOWS

Three of SVI's brightest rising stars have been awarded philanthropic fellowships to continue their work on a range of diseases.

DR JARMON LEES

Rare genetic diseases have the disadvantage of not only being inevitable for someone with the specific hard-wiring to develop them, but also because, by virtue of the relatively small population affected by them, they are often rarely studied.

Friedreich ataxia is just such a disease. Ataxias are rare neurological diseases that affect movement, speech and come with a range of other symptoms. Affecting around 1 in 30,000 people in Australia and New Zealand, Friedreich ataxia is the most common form of hereditary ataxia.

Supported by a Fellowship from the Marian & E.H. Flack Trust, Dr Jarmon Lees and his team from the Cardiac Regeneration Lab are focussed on developing new treatments for its most common complication, heart disease.

"Friedreich ataxia is caused by a mutation in the Frataxin gene resulting in neurological symptoms, but also very frequently, heart disease. This is the leading cause of death in people affected," says Jarmon.

There is currently no treatment to slow the progression of Friedreich ataxia heart disease, so Jarmon is taking a novel approach to finding one.

"We take ordinary cells from someone with Friedreich ataxia and coax them into becoming stem cells. Stem cells are the building blocks of everything so they give us a window into the causes of the disease, and allow us to look at new treatments," says Jarmon.



DR JIAN KANG

As a cancer biologist, Dr Jian Kang has a unique insight into the mechanics of one of the deadliest forms of the disease, ovarian cancer.

"Ever since I graduated with my PhD in 2011, I have been focussed on developing new therapies for cancer. My ultimate goal is to improve our understanding of the molecular basis of drug resistance in ovarian cancer," says Jian. "Once we have that, we have the basis for effective treatments that will save lives."

Recently awarded the Christine Martin Fellowship, funded by 5point Foundation, Jian's research is laying the groundwork for potential new treatments.

"Less than half of women who find out that they have ovarian cancer today will be alive in five years," she said.

This startling fact is mainly due to the tenacious nature of the disease which is resistant to most of the drugs commonly used to treat cancer.

"Cancer cells can evade the action of cancer therapy and keep growing by altering a process of how they build proteins," explains Jian.

"This is called mRNA translation and understanding how ovarian cancer cells modify this has allowed us to develop a new drug that blocks this alteration."

The new drug, also being tested by Jian's colleague and lab head, Associate Professor Elaine Sanij, is showing the potential to be an effective new treatment for a range of cancers.

"It is still very early days in our testing. Clinical trials take a long time and go through a lot of different stages before a drug is made available in the clinic, but we are optimistic that this could lead to new treatments for ovarian cancer."

DR KIRYU YAP

Liver disease is a painful, debilitating illness that is often fatal. The most common cause is fat accumulation in the liver, which results in a condition called non-alcoholic fatty liver disease.

This particular form of the disease causes liver inflammation and scarring progressively over time, which ultimately compromises the liver's function, leads to liver failure, and a high risk of death.

"Non-alcoholic fatty liver disease affects more than 25% of Australians, including children, and this is set to grow. Once livers are irreversibly damaged, the only treatment is a liver transplant," says Dr Kiryu Yap, whose Rising Star Fellowship has been supported by the L.E.W. Carty Signature Grant.

But transplantation is not always a lasting cure.

Any kind of transplant carries a risk of rejection along with side effects caused by anti-rejection drugs. Non-alcoholic fatty liver disease has an additional risk though when it comes to transplant – that the disease will return.

"Up to 30% of patients have the disease come back again in the newly transplanted organ," say Kiryu. "This means the cycle starts all over again but without the hope of a transplant."

Kiryu, however, is aiming to improve those odds.

"I am working on developing a new type of treatment based on regenerative medicine, using a patient's own cells to grow their own replacement liver tissue," he explains.

"We aim to transplant miniature liver tissues grown in the lab which are called organoids, from stem cells generated from blood."

"This project will pave the way to further development of an actual cure for patients with non-alcoholic fatty liver disease."



AHEAD OF THE GAME

Could the answer to obesity be, quite literally, all in the head? Dr Kim Loh certainly thinks so.

Recently awarded a highly competitive ARC Future Fellowship, Kim is investigating the role of a specific protein in the brain on metabolic function.

“Obesity is directly connected to diseases like type 2 diabetes and cardiovascular disease. It affects 30% of Australian adults and cost \$11 billion a year to treat. We suspect a novel protein in the brain is responsible for the disease development,” he said.

Affecting billions of people worldwide, obesity is also difficult to treat with any lasting success.

“One of the hardest things about obesity is that losing weight and keeping it off is really difficult.

“Our goal is to understand how this protein in the brain controls appetite and energy metabolism in order to then develop new, effective and lasting weight management strategies to combat obesity.”

Kim is among a distinguished group of a hundred Future Fellows across Australia who will collectively receive over \$97 million in grants.

The Future Fellowships scheme aims to support outstanding mid-career researchers in conducting high-quality research that contributes to both national and international benefit.

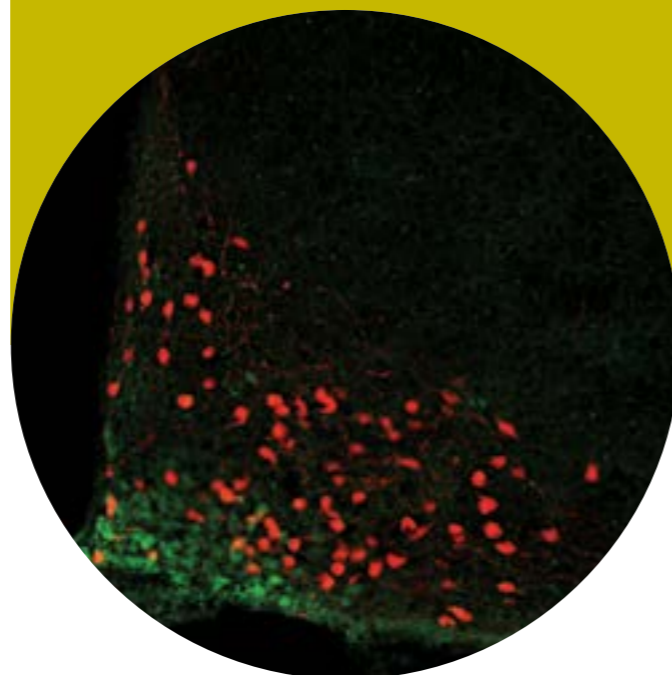
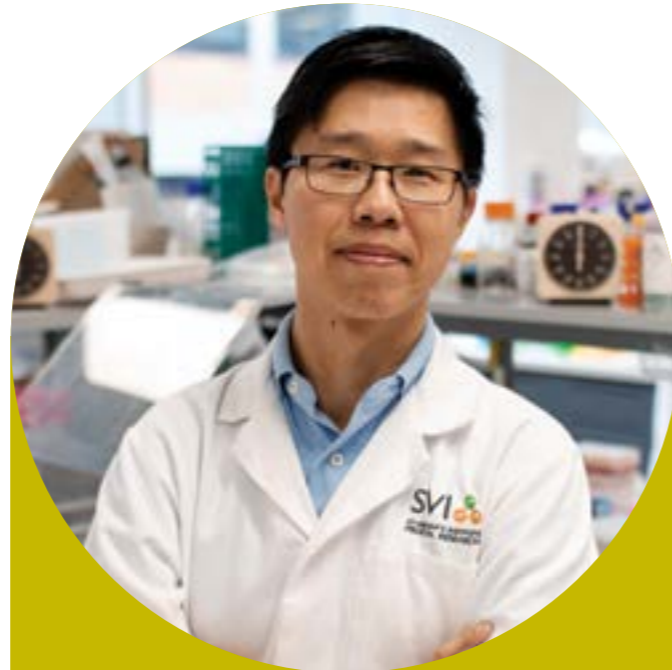


Image: Hunger neurons



Inspiring support

Shalini Sundramurthi Chelliah knew she wanted to be a researcher when she was barely in her teens.

After watching her beloved grandmother succumb to cervical cancer, Shalini was determined to better understand the disease that took the “iron lady” of their family.

“I was nine years old when my grandmother was diagnosed with cervical cancer and it was shocking to see what it did to her,” says Shalini.

“I knew even then that I wanted to study this disease and, hopefully, one day aid in the discovery of a cure for cancer.”

After completing her undergraduate degree, Shalini was determined to work with Associate Professor Elaine Sanij.

“Elaine’s lab was the only one I wanted to be in even before completing my Honours. After the pandemic chaos settled down, I got on a plane from Malaysia to start my PhD working with her on a potential new treatment for ovarian cancer.”

Shalini is a part of a team that is researching a new drug that could prove to be an effective new treatment for this and other types of cancer.

“My research involves identifying specific genes which, if targeted with this drug, could stop ovarian cancer from continuing to grow. It’s very exciting to be on the cutting edge of science like this,” she said.

The drug which is in early phase clinical trials, could be just the beginning of a new class of cancer therapy for a range of cancers such as multiple myeloma, ovarian cancer, and prostate cancer.

Shalini, along with two other recipients of a PhD Top-up Scholarship, presented her work at a recent Support Group morning tea and was so impressive she inspired additional support.

“Long standing donors, John and Barbara Ralph were so impressed with Shalini that they have doubled their support of the Top-up Scholarship Program,” said Associate Professor Elaine Sanij.

“Shalini is a rising star in the making. We’re very lucky to have her here at SVI.”

Image: John Ralph AC and Barbara Ralph with Associate Professor Elaine Sanij and PhD students Kezia Gitareja and Shalini Chelliah

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SVI UPCOMING EVENTS

2023 Scholarship Dinner

Hosted by the SVI Support Group, the dinner aims to raise funds to support Student PhD Top-Up Scholarship Program.

The PhD Top-Up Scholarship Program is a highly successful community-led fundraising initiative which has been helping to support exceptional students for more than 30 years. By relieving financial pressure on our students, the Scholarships allow our next generation of research talent to keep their focus where it's needed – being inspired by discovery and driven by purpose.

Venue: Kooyong Tennis Club -
489 Glenferrie Road, Kooyong 3144

When: Thursday 19th October 2023

Time: 7.00 pm until 11.00 pm

Cost: \$175 per person

Dress: Cocktail – Men: Suit and Tie

RSVP: by Monday 2nd October 2023

*To purchase your tickets to this event,
scan this QR code (to the right)
or contact Genny Nunan,
genny.nunan@gmail.com
or Margaret Batrouney,
margaretbatrouney@gmail.com
for more information.*



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