



Working under the grip of a global public health crisis

Since our last newsletter the world has been in the grip of an unprecedented global public health crisis. We are very fortunate to live in New Zealand at this strange and unsettled time, as our country's political and health leadership have taken early and decisive action to protect people. This, together with the collective engagement of Kiwis, has so far brought the situation under control. Of course this is not the beginning of the end or even the end of the beginning, as the country recovers from far-reaching social, health and economic disruptions. We at the GMRI trust that you and your families have been staying well and safe in this difficult and challenging time.



We've still been hard at work

Like everyone else around New Zealand, the GMRI team spent the last few weeks adhering to Government advice about working under COVID-19 Alert Level 4. While meeting the restrictions, we have still been hard at work. Although most of us have been based at home, our staff and students have been busy analysing data, preparing manuscripts for publication in journals, planning, reading papers, and preparing for what they'll need to do once the country moves forward.

Contributing to insights into unsolved problems

In our latest newsletter, we take a look at our summer student and intern programmes. We look at how the research that arises from these programmes contributes to insights into unsolved medical problems that may underscore novel treatments. And we talk to two former students about their experiences.

Behind the scenes — meet our resident pathologists

We introduce you to our two resident pathologists, Dr Helen Brasch and Dr Bridget Chang-McDonald. You'll find out about the important role they play in the work we do. We also take you through the non-cancer research we undertake at the GMRI. And we give you a wrap-up of the papers we've published over the last six years, since we moved into our premises in Wellington.

Remember that you can get more regular updates by following us on Facebook.

Dr Swee Tan ONZM, MBBS FRACS PhD
Executive Director

We do ground-breaking work in areas you might not know about



Our research spans several medical conditions.

Image by [ThisisRngineering RAEng](#) / [Unsplash](#).

While we are best known for our work on cancer, the GMRI team also carries out world-leading work in other fields.

Dupuytren's disease is a debilitating hand condition that causes the fingers to bend into the palm. While surgery is the main treatment for Dupuytren's disease, it recurs in up to 40% of patients within 5 years.

While doing an elective placement with us as a medical student from Auckland University, Dr Kirin Tan co-authored a paper titled [The Role of Stem Cells in Dupuytren's Disease: A Review](#). The paper analysed publications including our novel discovery of stem cells and the role of the renin-angiotensin system in Dupuytren's disease, and how this may underscore a new treatment for this common affliction.

Our paper suggests a potential novel treatment by targeting the stem cells in Dupuytren's disease by modulating the renin-angiotensin system, using simple oral medications.

The paper won the 2019 Best Oceanic Paper Award at the American Society of Plastic Surgeons' annual conference, the world's largest annual plastic surgery conference, which was held in San Diego.

We've been recognised before for similar work

Working under the team at the GMRI led by Dr Swee Tan, summer student Nicholas On received a commendation from the International Dupuytren Society in 2018 for his paper [Embryonic Stem Cell-like Population in Dupuytren's Disease Expresses Components of the Renin-Angiotensin System](#).

Summer student Sabrina Koh won the Society's 2017 basic research award for her paper [Embryonic Stem Cell-like Population in Dupuytren's Disease](#). Read this page [to find out more about Sabrina's work](#).

Nicholas and Sabrina are now house surgeons at the Wellington Regional Hospital.

Investigating the molecular origin of diseases

The GMRI is investigating the cellular and molecular causes of disfiguring conditions and life-threatening diseases. Our research into these areas will help us gain a greater understanding of the causes of cancer, vascular birthmarks and fibrotic conditions.

Discovering how to make strawberry birthmarks self-destruct

A strawberry birthmark is a benign tumour that grows rapidly for about a year after birth. These disfiguring birthmarks affect 10% of children and can negatively impact their appearance, health, or even threaten their lives.

Traditionally, strawberry birthmarks were treated by harsh medications, chemotherapy, plastic surgery or laser therapy. These treatments are unpleasant and expensive, and can take several years.

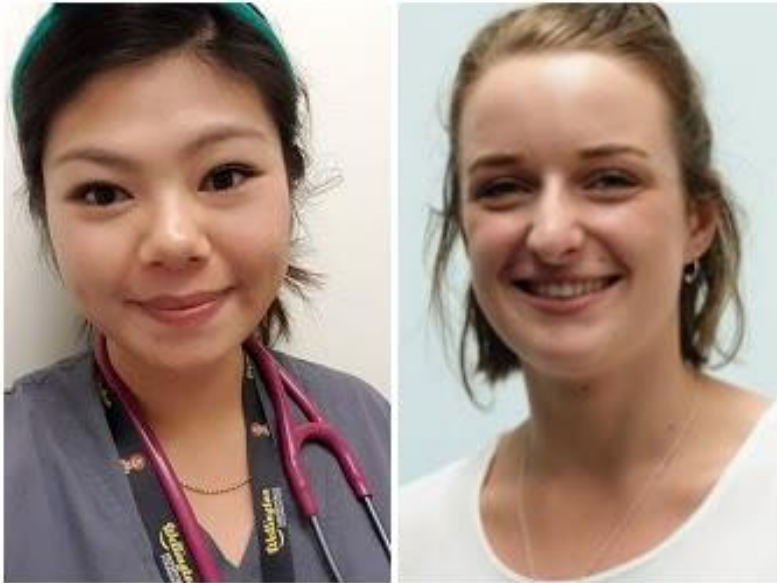
Dr Tan and the GMRI team discovered the stem cell origin of strawberry birthmarks, and how these cells are controlled. They found that strawberry birthmarks are caused by stem cells arising from the placenta, and learned how to manipulate these cells. They also showed that the renin-angiotensin system controls the stem cells.

The discovery of the stem cell origin of strawberry birthmarks and the associated renin-angiotensin system underscore the new effective treatment with propranolol – a low-cost oral medicine taken over months, rather than years. Children taking this treatment enjoy a higher quality of life and fewer side effects.

This work provides insights into other types of vascular birthmarks, fibrotic conditions and cancer, under investigation by the GMRI team. It has led to our identification of cancer stem cells that express the renin-angiotensin system in numerous cancer types. These discoveries form the basis of our current clinical trials to treat glioblastoma and malignant melanoma.

Read this page to [find out more about our work on strawberry birthmarks](#).

Students and interns contribute to understanding of diseases



Dr Sabrina Koh and Therese Featherston have both been involved in the GMRI's summer student programme. Their respective experiences helped shape their career aspirations.

In addition to the GMRI's staff and a PhD student, we take on summer students and interns every year to undertake research. In this article, we explain our summer student and intern programmes, and talk to 2 past students about their experiences.

Our summer student and intern programmes benefit everyone

involved. The GMRI benefits from valuable research results and students and interns leave with valuable research experience. Some of the summer students are inspired by their experiences to pursue an academic career.

The GMRI's executive director, Dr Swee Tan, says the findings from the summer student and intern programmes 'have the potential to revolutionise the understanding and treatment of cancer and other diseases.'

A privilege to work with 'these very fine young people'

Dr Tan says the GMRI team is privileged to have worked with the students and interns they've had through their programmes.

'It has been a very rewarding experience to work with these very fine young people,' Dr Tans says.

'They are wonderful human beings who are intellectually capable, immensely curious and have a remarkable capacity for hard work.

'We at the GMRI have made a conscious decision to put aside some of our time and resources to nurture these young people who, afterall, are our future.'

Forty summer students so far

The summer student programme was introduced in 2013, taking on 5 or 6 students each year. A total of 40 students have completed the programme since it began, with some returning for further summer studentships. We are very grateful to Sir Roderick and Lady Gillian Deane for their sponsorship of the programme.

Each student is given a project in the GMRI's current areas of research, which include cancer, fibrotic conditions and vascular birthmarks. These are based on the role of stem cells and the renin-angiotensin system in disease and health.

Interns delve deeper into GMRI research

The GMRI's intern programme was started in 2019. Three students have completed the programme so far, including Jazmean Williams from Drexel University in Philadelphia, USA. Jazmean and another intern, Claire Luke-Krishnan, have submitted manuscripts of their research for publication. They're also presenting their work at the upcoming International Society for the Study of Vascular Anomalies online conference in May.

Depending on a student's availability, our intern programme spans between 3 and 6 months, outside of the summer break.

In this article we talk to 2 former summer students, Dr Sabrina Koh and Therese Featherston, and find out how their experiences have shaped their careers so far.

An opportunity to flourish

Dr Sabrina Koh and Therese Featherston were involved in the GMRI's summer student programme 3 times, between 2015/2016 and 2017/2018.

Both Sabrina and Therese feel their experiences at the GMRI, including the close mentorship they received from staff members, have shaped who they are and what they're doing today.

Fostering a passion for biomedical research

For Sabrina, being part of the summer student programme helped foster a passion for biomedical research.

Sabrina is currently a first-year junior doctor at Wellington Regional Hospital, at the start of her career as a doctor. Her experiences with the GMRI sparked an interest in pursuing a career in academic surgery.

[Read about Sabrina's first summer student experience over the summer of 2015/2016](#)

Working on different projects at the GMRI opened Sabrina's eyes to the potential that exists to improve the quality of life for individuals with conditions like Dupuytren's disease, cancer and vascular birthmarks.

Results of Sabrina's research at the GMRI have been published, so far, in 5 papers in international peer-reviewed journals. Sabrina has also made 4 presentations at international conferences and received the 2017 International Dupuytren's Award. She has a further paper submitted for publication, currently under review, and is preparing a manuscript for her project on port-wine stain (a type of vascular birthmark) with the team at the GMRI. Sabrina is also presenting her work at the International Society for the Study of Vascular Anomalies online conference in May.

[Read about Sabrina winning the 2017 International Dupuytren's Award](#)

'These experiences, in conjunction with the excellent mentorship I've received from the team (particularly Dr Tan), have contributed to shaping me into the person I am today,' Sabrina said.

'Over this time, I have been challenged to think critically and question the unknown.

Experiencing the life of a biomedical researcher

For Therese, undertaking 3 summer studentships opened her eyes to the world of biomedical research. She has carried her experiences through to subsequent research, where she continues to focus on cancer and investigating new approaches to its treatment.

In the time Therese was involved with the GMRI, she completed an extended essay for her [International Baccalaureate Diploma](#) as a Year 12 student. She has published 3 papers in international peer-reviewed journals (with another paper under revision), and presented at 4 international conferences.

Last year Therese completed a Bachelor of Biomedical Science with First Class Honours at the University of Otago. She has recently been awarded a University of Otago Doctoral Scholarship and will begin her PhD in the Department of Pathology and Biomedical Sciences later this year at the University of Otago's Christchurch campus.

'The summer studentships gave me an opportunity to experience what it is like to have a career in biomedical research. The experience provided me with skills that I have carried through my post-graduate study, such as carrying out experiments and writing up scientific manuscripts.'

[Read about Therese's experience in the summer student programme](#)

[Read how Therese first connected with the GMRI](#)

A unique and challenging experience

Both Therese and Sabrina are quick to praise the professional nature of the summer student programme, and to express their gratitude for their respective experiences.

'The GMRI summer student programme is extremely well set up,' said Therese. 'I believe it provides incredible opportunities for undergraduate students to experience what research is really like.'

Therese is also thankful for the opportunity she has had to present her research at international conferences.

'These skills are hard to come by as an undergraduate student, so I am extremely grateful that the GMRI gave me those opportunities.'

Sabrina also praised the programme and the staff members involved. 'I would highly recommend the opportunity to do a summer studentship programme at the GMRI,' she said.

'It is a well-supported programme, while allowing you to have the independence to flourish and take ownership of a project — a unique experience for medical students.'

Fresh perspective a valuable tool for prospective students

Following their respective experiences with the GMRI, Therese and Sabrina have advice for future summer students.

'Take every opportunity that's offered to you, as often they are hard to come by,' Therese said.

'Also, don't be afraid to ask questions, especially in the research meetings. Although it can be quite daunting, your fresh perspective on the research is valuable.'

Sabrina encouraged students to step out of their comfort zone.

'Ask questions and seize every opportunity. Research is about challenging the known and venturing into the territory of the unknown. Let your imagination wander!'

Our manuscripts, our heart



Reflecting on our hard work over the years.
Image by [Linus Schütz](#) / [Pixabay license](#).

Our manuscripts record the hard work of our researchers, our students and interns, and our supporters over the years. We've had 99 manuscripts on our discoveries published in peer-reviewed journals around the world since we moved into our new premises at the end of 2013. Our team has presented papers at over 70 international and national conferences and won a number of prizes and awards. We've also secured 9

international patents from our discoveries across the range of diseases we investigate. We wouldn't be here today without the huge efforts of our people and many supporters along the way.

We love sharing our findings with colleagues around the world. We present our research and conclusions in our manuscripts. These papers are reviewed through a rigorous peer-review process when we submit them to the journals. One of these papers, [Cancer Stem Cell Hierarchy in Glioblastoma Multiforme](#), has been viewed nearly 19,000 times since it was published in April 2016. Some international journals have also invited us to publish reviews of specific areas of research. We've published 23 major reviews.

Our papers have received a lot of international attention and many have been accepted for presentations at international conferences. A highlight was the [88th Annual Scientific Congress of the Royal Australasian College of Surgeons](#) in Bangkok last year. Four of our team gave 8 presentations between them. Dr Swee Tan was invited to deliver the Tom Reeve Lecture, named after the renowned cancer surgeon Professor Tom Reeve. It was a great honour to give this highly regarded lecture in the Surgical Oncology Section.

We've received 13 prizes and awards for our papers since 2009. A highlight was receiving the John Mulliken Prize for the best basic science paper in 2010. Professor John Mulliken, from Harvard Medical School, established the first classifications for vascular birthmarks — a big part of what we investigate. We were greatly honoured to receive this prestigious international award.

As you may know from articles in past newsletters, we love seeing the students who study with us grow. Over the years we've successfully supervised a number of post-graduate students: 4 PhD students, 1 Masters student, and 2 Biomedical Science (Hons) students. We hope our students continue as forces for discovery and knowledge in the world of science and medicine.

You might remember our current PhD student, [Matt Munro](#). Matt presented at the Congress in Bangkok last year and is continuing with us this year. He continues to research cancer stem cells in colon cancer and has published 3 papers in international journals so far. Two of these papers were published in the prestigious journal *PLoS ONE*.

We're proud of our team for everything they've accomplished since the GMRI began. We look forward to further achievements in the future.

Meet our pathologists — Dr Helen Brasch and Dr Bridget Chang-McDonald



Dr Bridget Chang-McDonald, *left*, and Dr Helen Brasch are the GMRI's two resident pathologists.

Our pathologists often work behind the scenes, so we want to share more about their important roles in our research. 'We are very fortunate to have in-house anatomical pathology expertise – among other things, an in-depth knowledge and understanding of the characteristics of the disease tissues we are studying – an envy of many biomedical research institutes', says Dr Tan. 'Our pathologists' contributions are hugely significant and fundamental to our quest for a better solution to unsolved medical problems.'

Dr Helen Brasch has been a Research Associate with the GMRI since we officially opened in 2013. She has been a collaborator with Dr Swee Tan for over 20 years and her work underpins some of our most important research.

Dr Bridget Chang-McDonald joined the GMRI as a Research Fellow in September 2019. She enjoys working with a team of dedicated people who share the aim of improving the lives of people with cancer and other diseases. She takes satisfaction in knowing that she plays a part in that.

Dr Helen Brasch — Research Associate and member of the GMRI team since 2013



Dr Brasch has a long history of working with the founder of the GMRI, Dr Swee Tan.

Dr Brasch's research at the GMRI focuses on vascular birthmarks and different cancers. Her areas of interest in pathology include breast cancer and skin cancer. She is a well-known expert in the pathology of vascular birthmarks and has worked with Dr Tan since 2002, contributing to many of the team's publications.

She is a member of the Centre for the Study and Treatment of Vascular Birthmarks at Hutt Hospital, the Multidisciplinary Head and Neck Cancer Team based at Wellington Regional Hospital, and an active member of the International Society for the Study of Vascular Anomalies.

Dr Brasch has a medical degree from Otago University. She specialises in anatomical pathology, becoming a Fellow of the Royal College of Pathologists of Australasia in 1999 and a consultant pathologist at Hutt Hospital in 2000.

She was the clinical head of Hutt Hospital's Pathology Department from 2006 to 2014, before joining the GMRI as a part-time Research Fellow in 2013.

We ask Helen some questions about her work with the GMRI

How are you involved in the GMRI's research?

Using a microscope, I check slides made from the paraffin-embedded tissue coming into the tissue bank, and select suitable samples for use in research projects. I also supervise students at the GMRI in using a microscope to examine immunostained slides of proteins in vascular birthmarks, fibrotic conditions and cancers.

I have expertise in histology and immunohistochemistry, two of the several techniques we use to study vascular birthmarks, fibrotic conditions and cancers.

What do you do as a pathologist?

At Hutt Hospital I examine tissue specimens removed during surgery, looking at them through a microscope. From these specimens, I make a diagnosis and provide more information to the doctors treating patients with inflammatory conditions and tumours.

Why did you want to get into this field?

I enjoy working with a microscope and being involved with research, in addition to my hospital work.

What's the best part of working at the GMRI for you?

Being part of the team and getting the opportunity to see the slides of specimens that come through the tissue bank.

Dr Bridget Chang-McDonald — Research Fellow and Anatomical Pathologist



Dr Chang-McDonald Joined our team in September 2019.

Bridget studied medicine at the University of Otago, graduating with the degrees of Bachelor of Medicine and Bachelor of Surgery in 1991. She then specialised in anatomical pathology and became a Fellow of The Royal College of Pathologists of Australasia in 1999.

Bridget went on to work as a consultant anatomical pathologist at Waikato Hospital (Hamilton), Diagnostic Laboratory (Auckland), Singapore General Hospital, and Hutt Hospital. She taught pathology, dermatology and surgical registrars during this time.

Bridget's areas of experience include breast, skin, gynaecological, gastrointestinal, and head and neck pathology. In 2007 she became the lead pathologist for Wellington's breast screening unit, BreastScreen Central, before taking a break from practising pathology to start a family.

We ask Bridget some questions about her work with the GMRI

What do you do as a pathologist?

Pathology is a branch of medicine that studies the nature, effects, causes and consequences of disease and therefore has an important role in research.

Anatomical pathologists examine tissue that has been removed during surgery. Once this tissue has been removed we select samples and make them into slides to examine under a microscope. We can then make diagnoses and provide more information such as prognostic factors for the surgeons and other clinicians, which helps to determine a patient's treatment.

In my role at the GMRI, I select cases from the tissue bank and check the diagnosis by examining the slides under a microscope. Next we examine special stains done on the tissue, including markers we are trying to identify in our research. I help students and colleagues to interpret these slides and stains. I also help edit manuscripts and take photos for research projects, which are submitted to journal articles to show to our peers.

Why did you want to get into this field?

I am interested in how diseases affect us and how we can improve the outcome for people with cancer and other diseases. My pathology background allows me to contribute to the research being done at the GMRI.

Private donor pledging: your opportunity to make a real difference



By supporting our research, you'll play a part in making a real difference in the lives of people suffering from cancer. [Image](#) by [Lina Trochez](#). [Unsplash licence](#).

Our goals as a charity are not small — the Gillies McIndoe Research Institute exists to reduce human suffering and improve lives. You can help us to achieve our aspirations.

What we're trying to achieve

Our research is working towards making cancer treatment more effective and less invasive, more accessible and affordable. Our team has developed a novel cancer treatment by repurposing existing off-patent (generic) low-cost oral medications. If proven effective, this regime will reduce the need for surgery, radiotherapy and chemotherapy and help to reduce the cancer patient treatment disparities that currently exist.

We're a team of world-class experts dedicating our knowledge and time towards reaching our goals. One of our biggest challenges, however, is securing funding to carry on with our research.

That's where you can play a part.

Why we need your help

Our research shows enormous promise and could transform how cancer is treated. But we've got a lot more work ahead of us yet. We need to undertake clinical trials over several years to test our novel cancer treatment on different types of cancer – glioblastoma (a type of brain cancer), malignant melanoma, mouth cancer and metastatic squamous skin cancer. But clinical trials are expensive.

We need \$1 million per trial per year to complete these trials and the associated research. Unfortunately, businesses aren't very interested in funding research into repurposing low-margin generic drugs for cancer treatment. They don't have the usual commercial incentives to be involved.

To reach our goals we need a shared funding solution involving the Government and public sector agencies, businesses, charitable organisations and private donations from people like you.

How you can make a difference

By supporting our research, you could make a real difference in the lives of people suffering from cancer. Imagine if cancer treatment was gentle and affordable and involved minimal time away from home. That's what we're aiming for. But we need your support and donations to make it happen.

All donations in support of our novel cancer treatment clinical trials and the associated research programme are deeply appreciated. Small or large donations, regular or one-off, anonymous or recognised — we need and value each and every one. As the GMRI is a charity, donations are eligible for a tax rebate subject to the usual IRD rules.

[Find out more or make a donation now](#)