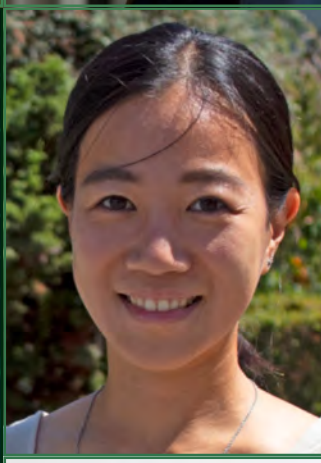




ANNUAL REPORT 2024




Auckland Medical Research Foundation

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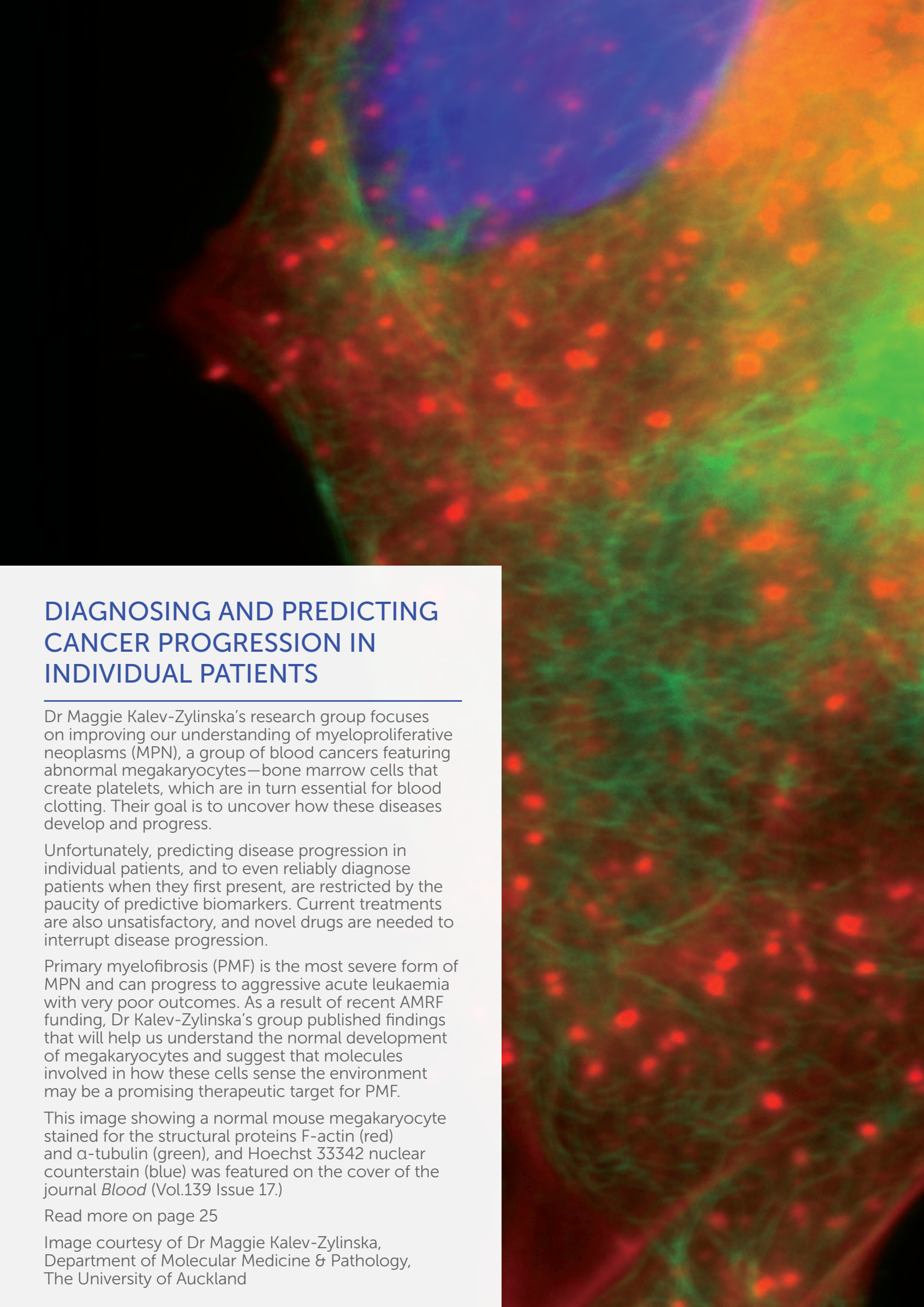
SUPPORTING MEDICAL RESEARCH FOR OVER *65 years*





DIAGNOSING AND PREDICTING CANCER PROGRESSION IN INDIVIDUAL PATIENTS

Dr Maggie Kalev-Zylinska's research group focuses on improving our understanding of myeloproliferative neoplasms (MPN), a group of blood cancers featuring abnormal megakaryocytes—bone marrow cells that create platelets, which are in turn essential for blood clotting. Their goal is to uncover how these diseases develop and progress.

Unfortunately, predicting disease progression in individual patients, and to even reliably diagnose patients when they first present, are restricted by the paucity of predictive biomarkers. Current treatments are also unsatisfactory, and novel drugs are needed to interrupt disease progression.

Primary myelofibrosis (PMF) is the most severe form of MPN and can progress to aggressive acute leukaemia with very poor outcomes. As a result of recent AMRF funding, Dr Kalev-Zylinska's group published findings that will help us understand the normal development of megakaryocytes and suggest that molecules involved in how these cells sense the environment may be a promising therapeutic target for PMF.

This image showing a normal mouse megakaryocyte stained for the structural proteins F-actin (red) and α-tubulin (green), and Hoechst 33342 nuclear counterstain (blue) was featured on the cover of the journal *Blood* (Vol.139 Issue 17.)

Read more on page 25

Image courtesy of Dr Maggie Kalev-Zylinska, Department of Molecular Medicine & Pathology, The University of Auckland

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PRESIDENT'S REPORT 2024

As we reflect on 2024, the Auckland Medical Research Foundation (AMRF) proudly marks its 69th year of advancing medical research in New Zealand. Despite ongoing global upheaval and economic challenges, this year has been one of remarkable achievement and continued impact.

Thanks to the enduring generosity of the Goodfellow family and the unwavering support of you—our loyal donors—we awarded $4.42 million in research funding this year. This brings our total funding since our founding in 1955 to over $100 million, a milestone that speaks volumes about the strength and vision of our community.

Our success is rooted in our steadfast commitment to funding world-class medical research. Time and again, we hear from researchers whose careers were launched and sustained through AMRF support. As we look ahead to our 70th anniversary in 2025, we honour the visionaries who laid the foundation for AMRF and whose legacy continues to inspire our mission.

This year, we were privileged to receive a generous $40,000 donation from the Chinese New Year Charity Banquet Dinner, organised by the Rotary Club of Auckland Harbourside. This successful fundraiser was made possible through the tireless efforts of Donald and Jennie Sew-Hoy, co-Chairs of the Rotary Chinese New Year Committee, and the dedicated Harbourside Rotarians. We are deeply grateful for their commitment and support.

On pages 4 and 8, you will find the inspiring stories of Dr Annie Jones, Dr Mikaela Garland, and Dr Cervantée Wild—recipients of 2024 fellowships. Each year, we are humbled by the talent and dedication of our emerging researchers. Yet, we are also reminded of the many we are unable to support due to limited resources.

It is with great sadness that we acknowledge the loss of Dr Peter Freestone from the research community. Despite years of AMRF support, the lack of further funding and academic opportunities led to a halt of his research career. His story underscores the importance of our fundraising for the Futures Fellowship Fund, which is designed to support mid-career researchers at a pivotal stage in their careers. We remain committed to growing this fund to prevent such losses in the future.

We also extend our heartfelt thanks to two long-serving Board Members who stepped down this year. In June, we farewelled Professor Peter Browett, who dedicated an extraordinary 35 years to AMRF, including serving as Chair of the Medical Committee since 2007. Later in the year, Professor Peter Thorne concluded his tenure after many years of valued service on both the Board and Medical Committee. Their contributions have been exceptional, and we are deeply grateful for their leadership and commitment.

We were pleased to welcome Professor Larry Chamley as the new Chair of the Medical Committee, with A/Prof Vanessa Selak and A/Prof Julie Lim stepping into the roles of Deputy Chairs. We are also delighted to have A/Prof Lim join our Board.

As we close the chapter on 2024, I extend my sincere appreciation to the AMRF team for their unwavering dedication to our mission; to our volunteer Board of Trustees for their strategic guidance; and to our Medical Committee members for their expertise and passion in upholding the highest standards of research excellence.

To you—our donors and supporters—thank you for being an essential part of our journey. Your generosity and belief in our mission make a profound difference in the health and wellbeing of countless lives.

Richard Taylor

President

MEDICAL COMMITTEE REPORT 2024

It is a privilege to present my first report as Chair of the Medical Committee, having taken on this role in June. I would like to begin by acknowledging the exceptional leadership and enduring contribution of Professor Peter Browett, who stepped down as Chair and from the AMRF Board earlier this year.

Professor Browett joined the AMRF Board and Medical Committee in 1989, at a time when the Foundation's largest grant was $90,000. He was appointed Chair of the Medical Committee in October 2007, following two earlier terms as Acting Chair in 1998 and 2005. Over the past 17 years, Peter has generously shared his time, deep expertise, and inspiring leadership and his retirement marks the conclusion of a remarkable chapter in the AMRF's history.

I would also like to extend our sincere thanks to Professor Peter Thorne, who retired from the Board and Medical Committee in December. Peter's association with AMRF spans more than two decades, having joined the Medical Committee in 1999 and the Board in 2008. His very considered approach, extensive knowledge and understanding of the research landscape and steadfast support have been invaluable. Like Professor Browett, Professor Thorne has numerous professional commitments, and for both their decision to step down reflects the ongoing demand for their time and expertise.

As two chapters close, another begins, and we were pleased to welcome A/Prof Julie Lim into the role of Deputy Chair of the Medical Committee and as a new member of the AMRF Board.

A/Prof Lim has been a valued member of the Medical Committee since 2019, and her appointment reflects her longstanding commitment to the Foundation's mission. She brings with her a wealth of scientific expertise and sector knowledge and her collaborative spirit make her a great addition to the leadership of the Committee.

The AMRF's work would not be possible without the generous contributions of time and expertise from our Medical Committee members and guest reviewers. Their dedication ensures a rigorous and contestable assessment process for every grant round. In 2024, we welcomed Associate Professor Amy Chan from the University of Auckland's School of Pharmacy. As the current AMRF–UoA Senior Research Fellow, Amy brings valuable clinical research expertise to our committee.

This year, we received one of our highest volumes of applications—216 across six grant rounds. Of these, 81 grants were awarded, reflecting a success rate of 37.5%. The quality of applications continues to improve, and it is thanks to the hard work of the Medical Committee, Board, AMRF team, and our generous supporters that we can fund outstanding research across the full spectrum of medical and health sciences.

The Goodfellow family name is synonymous with the AMRF's mission. Through another of their charitable arms, the Goodfellow Foundation, we awarded two grants focused on primary healthcare. The first, funded by the Douglas Goodfellow Primary Healthcare Research Fund, was a project grant awarded to Dr Jackie Robinson and Ms Stella Black to explore advance care planning in the homeless community. Ms Xin Yi Lim was awarded the Maclaurin & Barham Doctoral Scholarship to study pharmacovigilance for natural health products. Xin Yi shared:

"The Maclaurin & Barham Doctoral Scholarship is much more than a financial award—it's a recognition of my potential and a reminder of the support I've received throughout this journey. It is a vote of confidence in my future endeavours and a reminder of hope."

Additionally, with support from the Douglas Goodfellow Charitable Trust, we were able to repatriate Dr Cervantée Wild. More about her fellowship can be found on page 4.

In May, the AMRF became a Supporter ANZCCART's Openness Agreement on Animal Research and Teaching in New Zealand. As a medical research funder, we are committed to informing the public about the role of animal research in scientific discovery, the regulatory framework in New Zealand, and the efforts researchers and animal care staff make to promote welfare, reduce usage, and minimise suffering. We will continue to strive to uphold these objectives through open communication.

On behalf of the Medical Committee, I extend our sincere thanks to the Board of Trustees, led with distinction by Richard Taylor, and to the AMRF team, expertly guided by Sue Brewster. Their dedication drives our mission to support world-class medical research. Special thanks to Dr Hannah Gibbons, Research Programme Manager, for her outstanding stewardship of the grants portfolio and invaluable support to the committee.

Finally, to our loyal supporters—your belief in our work and continued generosity makes everything we do possible. Thank you.

Professor Larry Chamley
Chair, Medical Committee
Professor, Department of Obstetrics,
Gynaecology and Reproductive Sciences,
The University of Auckland/Waipapa Taumata Rau

THE WAITING GAME: CHILDREN ON WAITLISTS FOR SPECIALIST HEALTH SERVICES

Dr Cervantée Wild

Dept of Paediatrics: Child and Youth Health, The University of Auckland

The Douglas Goodfellow Repatriation Fellowship is a prestigious AMRF award, designed to bring our brightest emerging researchers back home to New Zealand. This year, the honour goes to Dr. Cervantée Wild, a New Zealander with a dedicated focus on child health and health systems research.

Cervantée's journey is nothing short of inspiring. Born and raised in Taranaki, she has always been committed to making a difference in health care.

"This fellowship is a game-changer for me," she says. "It allows me to return home at a crucial time in my career and re-establish myself as a leader in a field of work that I am very passionate about."

With her internationally gained skills, Cervantée is keen to make a significant impact here in New Zealand with her focus firmly fixed on improving health services for tamariki (children), rangatahi (young people), and their whānau (families).

"Untreated health conditions in children can have serious impacts on their development and wellbeing."

"In New Zealand, long wait times for specialist healthcare have been a persistent issue since the early 1990s so it's crucial to understand how many children are affected, the systemic factors behind these delays, and the inequities faced by Māori and other disadvantaged groups."

Dr Wild's background makes her ideally qualified to take the lead on research in this area of public health.

After receiving the Girdlers' Research Fellow HRC fellowship in 2021, she travelled to England and undertook advanced research training at the University of Oxford's Nuffield Department of Primary Care Health Sciences, one of the top-ranked centres for academic primary care in the UK.

It was in the UK that Cervantée led one of the first studies to understand the experiences of children, young people and parents/caregivers dealing with a new disease: Long Covid. This work resulted in the creation of an online, public resource; academic and policy publications; and submissions to the Scottish Long Covid Inquiry and the Westminster All-Party Parliamentary Group.

Cervantée's expertise continued to grow and to be recognised globally and, in 2023, she spoke as part of a panel at the 'Europe A Patient' Policy and Values conference in Warsaw and facilitated workshops for the leads of the NHS Integrated Care Board.

She was also the coordinating author on a World Health Organisation Europe report on non-communicable diseases and authored two case studies, receiving an Oxford Policy Engagement Network Fellowship to work with WHO's Alliance for Health Policy and Systems Research team on research and policy agendas for commercial determinants of health in low-middle income countries.

Before her time in the UK, Cervantée completed her PhD at the University of Auckland and worked as a Research Fellow in the Department of Paediatrics. She maintains an honorary position there, reflecting her ongoing commitment to child health.

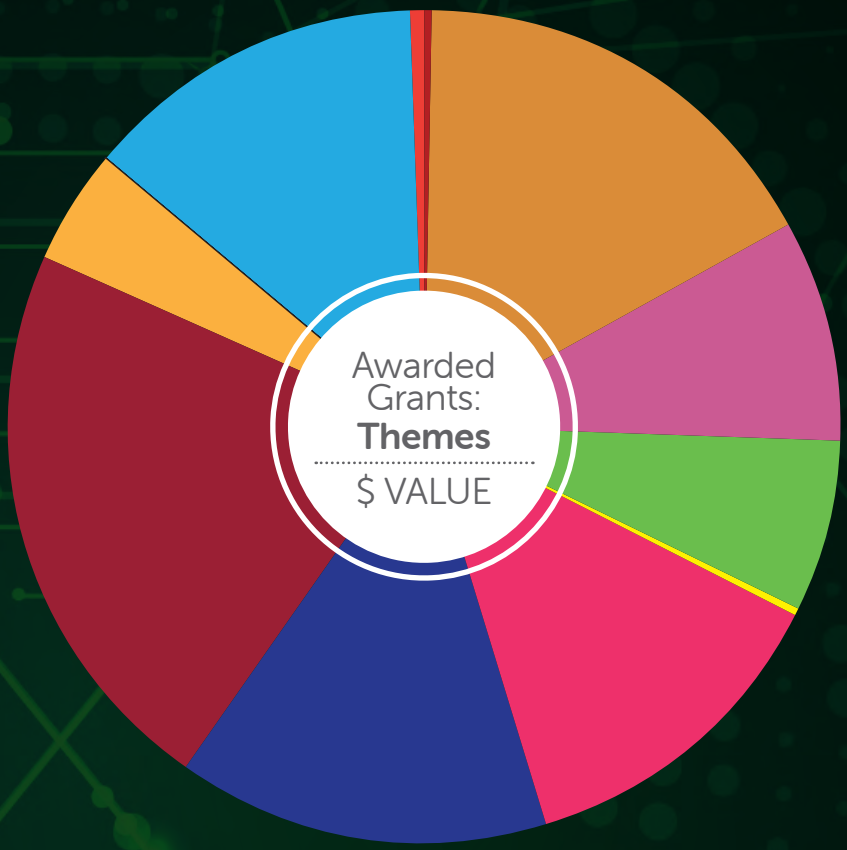
With the Douglas Goodfellow Repatriation Fellowship bringing Cervantée home in late 2024, she was ready to put her research plans into action by early 2025. Her study is entitled 'The Waiting Game: Children on waitlists for specialist health services'.

She says, "Reducing wait times for specialist services has been a priority of the Aotearoa New Zealand government for decades – with a target announced in March 2024 – yet reporting shows that more and more people are waiting longer for necessary healthcare. However, current reporting tells us very little about the children who are on these waiting lists, many of whom are waiting alongside adults for services.

"This research aims to provide a comprehensive understanding of paediatric wait times in NZ, addressing both the quantity and quality of healthcare access for children. By highlighting any inequities and systemic issues through mixed methods, the study seeks to inform policy changes that ensure timely and equitable access to specialist health services for all children in NZ."

"Given the current policy focus on waitlists yet lack of policy focus on child health, this is time-critical work to understand the unintended consequences of wait list targets and their impact"

GRANTS AWARDED



2024 AWARDED GRANTS — THEMES
82 GRANTS AWARDED TOTALLING $4.42M*

- Biomedical Imaging (4) | **$0.01M** | 0.33%
- Cancer (7) | **$0.74M** | 16.87%
- Cardiovascular Science (8) | **$0.38M** | 8.54%
- Cellular & Molecular Biology (4) | **$0.30M** | 6.72%
- Endocrinology, Metabolism and Nutrition (2) | **$0.00M** | 0.10%
- Infection and Immunity (5) | **$0.56M** | 12.71%
- Musculo-skeletal Science (2) | **$0.01M** | 0.17%
- Neuroscience (13) | **$0.64M** | 14.43%
- Other (15) | **$0.97M** | 6.58%
- Population Health (4) | **$0.19M** | 4.34%
- Pulmonary, Renal, Nephrology & Gastrointestinal Sciences (2) | **$0.01M** | 0.16%
- Reproduction, Development, Maternal & Newborn Health (11) | **$0.59M** | 13.35%
- Sensory Sciences (4) | **$0.01M** | 0.34%
- Surgery (2) | **$0.00M** | 0.06%

(n) Number of grants
$ Value each theme
% Total expenditure
*Includes AMRF Researcher Network Fund

J.I. SUTHERLAND DOCTORAL SCHOLARSHIP

MELANOMA MIGRATION ACROSS BLOOD-BRAIN BARRIER ($155,000 - 3 years) 1224003

Mr Jayden Gibson

School of Biological Sciences,
The University of Auckland

The highest global incidence of melanoma occurs here in Aotearoa. Melanoma can metastasise to the brain, which is usually terminal. Melanoma reaches the brain by leaving the skin, entering the circulation, and finally crossing the blood-brain barrier. The blood-brain barrier is formed by a special layer of cells that line the blood vessels in the brain. These cells are tightly knitted together to create this barrier. The blood-brain barrier usually protects the brain from damaging blood components; however, some melanoma cells can migrate from the blood, across this barrier and enter the brain. Precisely how these circulating melanoma cells cross the blood-brain barrier remains poorly understood. My PhD research will use a new human cell model that mimics the flow of blood over the blood-brain barrier. This model will enable me to study how circulating melanoma cells migrate across the blood-brain barrier to get into the brain. This research will provide valuable new knowledge about how melanoma metastasises in to the brain. Furthermore, my findings may lead to the development of new therapies that can hinder or halt this devastating metastatic step, providing better hauora (health benefits) for New Zealanders afflicted with metastatic melanoma.

FUNDED BY: J.I. Sutherland Fund for Melanoma Research, in memory of John Sutherland

MACLAURIN & BARHAM DOCTORAL SCHOLARSHIP

PHARMACOVIGILANCE FOR NATURAL HEALTH PRODUCTS: THE CONTRIBUTION OF THE NATURAL HEALTH PRODUCTS INDUSTRY IN NEW ZEALAND ($130,000 – 2.5 years) 1224004

Ms Xin Yi Lim

School of Pharmacy, The University of Auckland

In a new study on safety monitoring (known as pharmacovigilance) for natural health products (NHPs), researchers from the University of Auckland's School of Pharmacy are exploring the views and experiences of key stakeholders on this topic, including the contributions that the NHPs industry makes. Through interviews and surveys with key stakeholders, such as consumers of NHPs, industry representatives, medicines regulators, and pharmacovigilance professionals, my PhD research attempts to understand the current and potential contributions that the NHPs industry makes towards safety monitoring for NHPs. In addition, the research will explore these stakeholders' views on recent regulatory changes regarding NHPs, with a focus on safety monitoring obligations and responsibilities of the industry. Finally, the research aims to gather input on designing a new, more proactive method for the safety monitoring of NHPs tailored to the New Zealand context. Given recent shifts in the regulatory situation for NHPs and future plans by the Government for alternative new regulations for NHPs, this research is timely in collecting insights that can inform policy makers and medicines regulators about the needs and challenges of safety monitoring for NHPs in New Zealand.

FUNDED BY: The Goodfellow Foundation's Campbell Maclaurin and Phil Barham fund for research in the field of primary care, including aged residential care.

AMRF DOCTORAL SCHOLARSHIPS

MENINGEAL FIBROSIS AND CENTRAL NERVOUS SYSTEM CLEARANCE ($155,000 - 3 years) 1224002

Miss Kate Hitpass Romero

Department of Pharmacology & Clinical Pharmacology, The University of Auckland

Waste removal from tissues is essential for their function and is achieved by a series of drainage pipes called the lymphatic system. Unlike most organs, the brain lacks a traditional lymphatic system to remove waste, instead relying on a lymphatic network in the tissues surrounding the brain, called the meninges. While this lymphatic clearance is typically sufficient for waste removal, during aging and following traumatic brain injuries (TBIs) this pathway is impaired, leading to waste accumulation and neurological deficits. The cause was unclear, but I recently identified fibrosis—production of scar-like tissue—in the meninges as a factor that impairs waste clearance, likely by "clogging" these brain drains. Importantly, this meningeal fibrosis is also seen in aging and following TBIs. I will investigate how meningeal fibrosis impairs brain waste clearance and find ways to prevent this for patient benefit. Using a combination of mouse models of meningeal fibrosis, cultures of human meningeal cells, and drug libraries, I will identify novel compounds to prevent fibrosis and evaluate their therapeutic potential in aged and TBI mouse models. I aim to develop new therapies that can essentially "unclog" these brain drains, enabling effective waste removal and neurological function during aging and after TBIs.

UNDERSTANDING STANDING IN POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME ($155,000 - 3 years) 1224001

Miss Greer Pugh

Department of Physiology,
The University of Auckland

Postural Orthostatic Tachycardia Syndrome (POTS) is a common condition where the heart rate increases excessively on standing. Patients often suffer from debilitating symptoms like dizziness, light-headedness, chest pain, shortness of breath, extreme fatigue, brain fog, and fainting. Quality of life is poor in POTS, but its causes are not well understood. The mechanisms behind POTS likely vary among patients, so they need personalised treatment. However, a limited understanding of the mechanisms challenges symptom management. Excessive blood pooling in the legs is a common issue in POTS and may be linked to abnormal blood vessel structure, function, or regulation. To address this, we will non-invasively measure artery and vein stiffness and function in patients with POTS and healthy controls. Then, we will assess the regulation of the blood vessels by the "sympathetic" nervous system because this has been neglected in POTS. Finally, we will investigate whether quickly drinking a certain amount of water improves symptoms of POTS whilst standing. Understanding the blood vessel differences in POTS will help us find personalised treatment options for patients to help improve symptom management and quality of life.

FUNDED BY: Bruce Cole Fund and the Rose Richardson Estate

POSTDOCTORAL FELLOWSHIP

VISUALISING PAEDIATRIC RADIOTHERAPY: CO-DESIGNING AN INTERVENTION TO SUPPORT PATIENTS AND WHĀNAU ($279,294 - 2 years) 1324001

Dr Annie Jones

Department of Psychological Medicine,
The University of Auckland

Childhood cancer is a devastating illness for whānau to experience. In Aotearoa, 1 in every 285 tamariki will develop cancer, with 150 tamariki newly-diagnosed each year. During this physically and emotionally demanding time, patients and whānau receive complex information about treatments, such as radiotherapy. Patients and whānau want to understand treatment and what to expect, and can feel distressed when these needs are unmet. Whānau in Aotearoa have highlighted the need for improved information about radiotherapy. A visualisation intervention (which uses imagery such as animations and 3-D models to help patients understand how treatment works) could better meet the needs of whānau facing childhood radiotherapy. This fellowship will create and test a new visualisation intervention to communicate information about radiotherapy to patients and whānau in Aotearoa, to improve understanding and reduce concerns and anxiety. The intervention will be created alongside rangatahi with experience of radiotherapy, their whānau, and healthcare professionals. This project will test 1) how easily this intervention can be delivered in routine care, and 2) how this improves understanding and reduces concerns for tamariki/rangatahi and whānau. The project findings will inform a future national study to test the intervention across child cancer services in Aotearoa.

FUNDED BY: Anonymous donor

DOUGLAS GOODFELLOW MEDICAL RESEARCH FELLOWSHIP

EVALUATING THE USE OF TOPICAL SEVOFLURANE ($260,000 - 3 years) 1424001

Dr Mikaela Garland

Department of Anaesthesiology,
The University of Auckland

This project aims to address two issues; chronic pain and antibiotic resistance. Sevoflurane is used as a general anaesthetic gas during surgery. It is stored as a liquid, and has recently shown promise as a topical agent applied directly to skin. In small overseas studies, topical sevoflurane has resulted in rapid and profound pain relief for patients with chronic painful wounds, and has resulted in healing chronic wounds. There is little known about its use as a topical agent. This doctoral project aims to address three questions raised by topical use: (1) how does topical sevoflurane produce relief from pain, (2) whether sevoflurane is antibacterial and, (3) whether sevoflurane produces significant pain relief for patients with chronic painful wounds in New Zealand. This research has the potential to revolutionise wound care and pain relief, and provide an alternative treatment for infections with multidrug resistant organisms.

Grants Awarded

PROJECTS


Dr Jennifer Barrowclough

POPPIL FEASIBILITY STUDY ($89,999 – 1 year) 5124009

Dr Jennifer Barrowclough, Mrs Ebba Petersen, Ms Misty Edmonds, Ms Emmanuelle Pauleau, Mr Ayenew Yismaw, Dr Charlotte Oyston, A/Prof Nick Garrett, Ms Lisa Mravicich, A/Prof Christopher McKinlay, Dr Robin Cronin

Department of Midwifery, School of Clinical Sciences,
Auckland University of Technology

When babies lie 'back-to-back' with their mother in labour, known as occiput posterior or OP, it often obstructs the birth passage and results in operative birth. There can also be heavy blood loss, severe tears, and sometimes babies are injured or admitted to intensive care. Maternal posture may help gravity turn the baby's spine to the mother's front for safer, natural labour and birth. This study will see whether it is feasible to conduct a larger later study comparing use of semi-prone lateral posture to free posture when the baby is OP, to see if spontaneous vaginal birth is statistically more likely. Interested, eligible pregnant people at Middlemore and Auckland City Hospitals are offered a scan in labour to check baby's position. If the position is OP, they can join the study if they wish. A computer randomly assigns the posture they use. The posture is ideally used for 40 minutes or more each hour till birth. All other care is as usual. Mothers are invited to complete a post birth survey about their satisfaction with labour and their trial experience. The feasibility study will run for 6 months to recruit 50 pregnant people.


Dr Rebecca Handley

HUNTINGTON'S DISEASE LIVER PATHOGENESIS ($93,040 – 1 year) 1124010

Dr Renee Handley, Dr Andrew Jiang, Prof Russell Snell

School of Biological Sciences, The University of Auckland

Although Huntington's disease is considered a brain disorder, our research suggests that at least some of the brain pathology may in fact originate in the liver. Huntington's disease is caused by a mutation in the 'huntingtin' gene. Individuals with the disease-causing version of the gene develop characteristic movements (chorea), as well as behavioural changes and cognitive decline over the disease course. There is currently no treatment to prevent or slow the debilitating disease course, which is on average 15 years from motor onset (typically in a person's 30's or 40's). We have discovered that levels of a metabolite called urea are elevated in the Huntington's disease brain. Urea is a waste product of normal metabolism, however excess levels of urea are toxic to brain cells and could cause brain cells to die in Huntington's disease. Intriguingly urea is made in the liver, not the brain. Our research will use cutting-edge gene sequencing technology to discover how huntingtin influences other genes to control metabolic function of the liver, and particularly urea production. We hope this will reveal disease mechanisms and potentially advocate for the trial of existing therapies that are able to reduce levels of urea and its precursor ammonia.


Dr Christopher Lear

AN OBSTETRIC BLIND SPOT ($180,000 – 2 years) 1124003

Dr Christopher Lear, Prof Laura Bennet, Prof Alistair Gunn, Dr Victoria King

Department of Physiology, The University of Auckland

Approximately 70 babies born each year in New Zealand will develop brain injury because of oxygen deprivation during birth, which may lead to death or severe lifelong disability. The emotional toll on survivors and families is devastating, and the financial and socio-economic costs are immense, with each case costing New Zealand ~$36-56 million across a lifetime. Diabetes and high blood glucose levels during pregnancy increase the risk of oxygen deprivation. Less is known about the dangers of high glucose during birth itself, but our preliminary work shows that it impairs a baby's ability to tolerate oxygen deprivation and worsens brain injury. This research will utilise a well-characterised, clinically relevant sheep model of brain injury during birth to help understand these dangers. The findings may suggest that a simple, immediately available intervention including tighter glucose control and a low threshold of escalation to expedited delivery in mothers with diabetes may significantly reduce the risk of severe oxygen deprivation and long-term neurodevelopmental disability. By making birth safer, this research will improve quality of life for mothers, children, and families with greater numbers of infants surviving to become contributing members of society and may bring substantial economic benefits to New Zealand's health care system.

Grants Awarded continued


Dr Jacelyn Loh

GROUP A STREPTOCOCCAL ADHESIN VACCINE ($178,753 – 2 years) 1124015

Dr Jacelyn Loh, Prof Thomas Proft

Department of Molecular Medicine & Pathology, The University of Auckland

Group A Streptococcal (GAS) bacterial infections such as sore throats and school sores are common among school-aged children. If left untreated, these infections pose a risk of triggering acute rheumatic fever (ARF), a severe autoimmune disease. Additionally, GAS can cause severe invasive infections. These diseases are inequitably prevalent in Aotearoa's Māori and Pacific populations. While several GAS vaccine candidates are in development, none have been licensed yet, highlighting an unmet health need. The GAS pilus, a hair-like structure on the bacterium's surface, plays a crucial role in infection. Ancillary protein 1 (AP1) sits at the tip of this hair-like structure and is responsible for helping the bacteria stick to your throat or skin. Blocking this function by generating antibodies to this protein could prevent infection. The proposed research aims to identify the most effective part of the AP1 protein to use in a vaccine. We will use our established host cell binding assays and rabbit antisera to test this in a culture dish. A well-established mouse nasopharyngeal challenge model will also be used to confirm if immunisation with AP1 can prevent the colonisation of GAS in the mouse nose and throat. The significance of this research lies in its potential to develop a new vaccine against GAS, addressing a significant disease burden in New Zealand.

FUNDED BY: AC Horton Estate


Dr Leon Lu

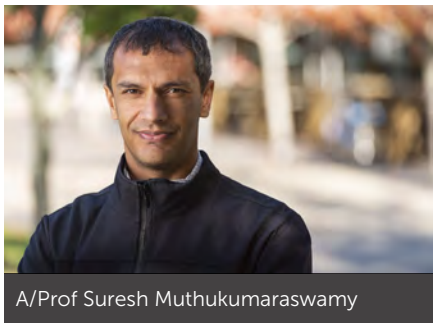
NITRIC OXIDE-PLATINUM CONJUGATE PRODRUG FOR CANCER ($179,853 – 2 years) 1124013

Dr (Leon) Guo-Liang Lu, Dr Petr Tomek

Auckland Cancer Society Research Centre, The University of Auckland

Platinum-based chemotherapy drugs like cisplatin, oxaliplatin, and carboplatin are vital in cancer treatment, yet their effectiveness is often hampered by severe side effects and resistance linked to elevated glutathione (GSH) levels in cancer cells. Our research aims to overcome these challenges by developing innovative platinum-based prodrugs that are selectively activated by high GSH levels in tumour cells. Building on a pilot study that created a mono-nitric oxide (NO) donor-platin conjugate prodrug—enhancing treatment efficacy but producing lower-than-optimal NO levels—we now propose developing dual NO donor-platin conjugates. These new prodrugs are designed to release higher NO concentrations, potentially increasing treatment effectiveness and providing more targeted cancer therapies while minimising harm to healthy tissues.

FUNDED BY: Anonymous donor


A/Prof Suresh Muthukumaraswamy

MENSTRUAL CYCLE DRUG DEVELOPMENT ($180,000 – 2 years) 1124012

A/Prof Suresh Muthukumaraswamy, Ms Robin Murphy, Dr Rachael Sumner

School of Pharmacy, The University of Auckland

The menstrual cycle causes major fluctuations in hormones. Changes to progesterone and estrogen in particular are known to dramatically affect not just reproductive systems but brain function. In health, the female brain adapts to these changes, however, for females with disorders such as depression, epilepsy and schizophrenia, symptoms may get worse around menses or ovulation. Females are majorly overrepresented in adverse reactions to common medications which suggests that menstrual cycle linked hormones may not just change disorder symptoms but also the response to drug therapies. We will study how the brain's response to drugs changes over the menstrual cycle. We are particularly interested in the serotonin system and how the menstrual cycle may change how females are affected by and process serotonergic acting drugs. We will study this by using a drug that modifies serotonergic signalling, measuring EEG and taking blood samples. This research may help to improve treatments by taking the menstrual cycle into account and potentially reduce symptoms and adverse reactions over the menstrual cycle. We will also use the findings to inform future work into developing new treatments for the debilitating menstrual-cycle related mood disorder premenstrual dysphoric disorder – a severe form of premenstrual syndrome (PMS).

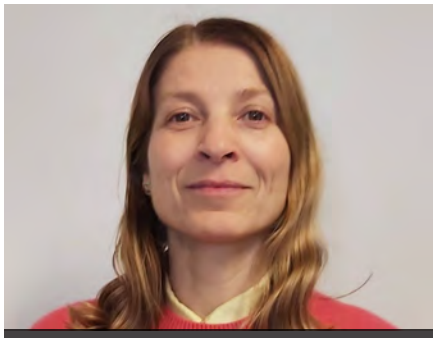
The University of Auckland Swallowing Research Laboratory in action. Dr Shakeela Saleem, postdoctoral fellow conducting aerodynamic voice assessment

EARLY DYSPHAGIA REHAB IN CRITICAL CARE ($176,972 – 2 years) 1124005

A/Prof Anna Miles, Mrs Ceara Mellon, Dr Rachael Parke, Dr Craig Hourigan, Mr Kane White, Dr Kylie Julian, Mrs Gwen Kerrison, Mrs Lucy Stevens, Mrs Sarah Sykes

Speech Science, School of Psychology, The University of Auckland

Swallowing difficulties are common in patients in intensive care units (ICUs) for a combination of reasons including their underlying condition, prolonged intubation, deconditioning and the multiple medical / surgical / pharmaceutical interventions received. Swallowing difficulties come with risks of secondary complications that can be life threatening and significantly prolong hospital stays, increase health costs and increase burden of care. Yet currently there are very few evidence-based interventions for swallowing difficulties in the ICU. In addition, many ICUs across New Zealand do not have access to adequate speech-language therapy support to provide intensive therapy. Expiratory muscle strength training (EMST) has been shown to improve swallowing and cough function in neurological populations. In a complex ICU population, where patients are weak and deconditioned, EMST may have merit. It does not require specialist staff to perform and can be done independently or with family support. In this randomised control trial, we will explore the effects of EMST in patients with intensive care unit-acquired weakness and swallowing difficulties. Patients will be randomised to EMST or standard care and assessed pre-treatment, 1 month and 3 months post-treatment. This easy-to-use and cost-effective device, if effective, will support equitable New Zealand health outcomes irrespective of locality.



Dr Rosica Petrova

IS AQP3 A REGULATOR OF OXIDATIVE STRESS? ($134,569 – 2 years) 1124001

Dr Rosica Petrova, A/Prof Julie Lim, Prof Paul Donaldson

Department of Physiology, The University of Auckland

Despite safe and effective surgical treatments, lens cataract is still the leading cause of blindness in the world today. This is in part because researchers do not completely understand how the lens maintains its transparent and refractive properties over many decades of life. Research by our laboratory has shown that in the absence of a blood supply the lens generates a circulating flux of water that maintains lens functionality. They have proposed these water fluxes are a target for the development of novel medical therapies to treat cataract. The water flow in the lens is mediated by several different water channels from the Aquaporin (AQP) family of proteins, which are critical to the maintenance of lens transparency. Recently, we have identified an additional water channel, AQP3, in the lens. Unlike the other lens AQPs, AQP3 has unique properties that implicate it in the transport of hydrogen peroxide, a known oxidative stress that has been linked to the initiation of cataract. Hence, by studying AQP3, we will determine not only the role played by AQP3 in the regulation of oxidative stress in the lens, but whether it is a potential target for the development of novel anti-cataract therapies.

Dr Sandar Tin Tin

DCIS IN NEW ZEALAND WOMEN ($180,000 – 2 years) 1124002

Dr Sandar Tin Tin, Dr Alana Cavadino, Dr Nicholas Knowlton, Dr Annette Lasham, Dr Phyu Sin Aye

Department of Epidemiology & Biostatistics, The University of Auckland

The incidence of in situ (non-invasive) breast lesions has increased in many countries after the introduction of population-based breast screening programmes. Ductal carcinoma in situ, the most common in situ lesion, now accounts for 20-25% of screen-detected cancer cases. These lesions may confer an increased risk of subsequent invasive cancer and therefore are treated extensively, putting a substantial burden on individual women, whānau and the health care system. Yet, little is known about their long-term outcomes in New Zealand women. Findings from overseas research may not be directly applicable to the ethnically diverse population in New Zealand, particularly for wāhine Māori and Pasifika women. We will fill this important gap in knowledge by linking individual patient data from a range of national data sources including breast screening data from BreastScreen Aotearoa and Te Rēhita Mate Ūtaetae (Breast Cancer Foundation National Register). The findings will guide clinical practice and help drive progress toward equitable cancer care.

FUNDED BY: Anonymous donor

Grants Awarded continued

Dr Yia-Yun (Catherine) Tsai

GAS PILUS VACCINE PLATFORM ($179,996 – 2 years) 1124011

Dr Catherine (Jia-Yun) Tsai, Dr Kerry Hilligan

Department of Molecular Medicine & Pathology, The University of Auckland

Infections cause a high health burden worldwide, and Māori and Pacific peoples represent disproportional high rates in New Zealand. Vaccination is an effective prevention measure for life threatening and debilitating infectious diseases; however, many infectious diseases still await an effective vaccine. Mucosal vaccination holds promise in inducing local immunity that prevent the intruding pathogens from entering the host. We have developed PilVax, a novel mucosal vaccine platform using the pilus (fimbriae) structure of Group A Streptococcus (GAS) as a peptide carrier, and the food-grade bacterium Lactococcus lactis as a naturally adjuvanting vehicle. Previous results demonstrated that the stabilised and amplified antigens integrated in the PilVax construct can elicit desirable immune responses in mice. The aim of this project is to investigate the feasibility of using the PilVax platform to develop mucosal vaccines against respiratory syncytial virus (RSV) infection, a disease that causes high burdens, has significant unmet needs, and signals health inequity. In this proposal we will trial new designs of PilVax vaccination that can deliver multiple antigens and use animal infection models to demonstrate that these new designs can enhance immunisation efficiency and broaden vaccine coverage. This research will expand the versatility of PilVax, which holds promise to offer an inexpensive, safe and effective strategy for infectious disease control.

Members of the research team with a banner advertising the BEAD Trial. From left to right: Lynn Sadler, Meghan Hill, Jordon Wimsett

THE BEAD STUDY ($178,384 – 2 years) 2124004

Dr Lynn Sadler, Dr Jordon Wimsett, A/Prof Kathleen Antony, Dr Richard Edlin, Dr Karyn Anderson, Dr Erena Browne, Dr Matthew Drake, A/Prof John Thompson, A/Prof Jane Alsweiler, Dr Karaponi Okesene-Gafa, Mrs Robin Cronin, Dr Meghan Hill, Dr Charlotte Oyston

Women's Health, Te Whatu Ora Te Toka Tumai

Each year in New Zealand, 1500 women have a Caesarean section after the cervix is fully open. Caesarean at this time is more difficult because the baby's head is low in the pelvis. It is associated with increased injuries to mother and baby, including tearing of the uterus into the cervix and nearby organs, excessive blood loss, and injury to the baby's head and brain. These are serious injuries with potential long-term consequences and therefore costs to whanau and to the health system. The Fetal Pillow is a disposable silicon balloon, costing $615, placed in the vagina to elevate the baby's head, to reduce injuries to the mother and baby. Many doctors started to use the device without evidence that it works. In 2023 the original industry-funded trial was retracted due to integrity concerns. There remains a 60 women industry-funded trial supporting the device, and a number of retrospective studies (including one from Auckland) which mostly suggest the device is not useful. We plan to provide the first large, well designed, industry-independent, double-blinded randomised controlled trial evidence to determine whether the Fetal Pillow reduces maternal and neonatal injuries. In August 2023, the BEAD (Fetal Pillow) feasibility study began, which has recruited 55 women in 6 months. We are now applying for funding to complete recruitment of 400 women to this trial.

A/Prof Jackie Robinson

ADVANCE CARE PLANNING IN THE HOMELESS COMMUNITY ($179,586 – 2 years) 1124008

A/Prof Jackie Robinson, Ms Stella Black, A/Prof Janine Wiles, Dr Natalie Anderson, Dr Helen Hamer, Prof Merryn Gott

School of Nursing, The University of Auckland

People living with homelessness experience a high prevalence of chronic, often untreated physical and mental health conditions. As a result, their life expectancy is 20-30-years shorter than in the housed population. Death may appear sudden but is not entirely unexpected given the health risks associated with being homeless. People typically die alone, in public spaces or in private vehicles. Advance Care Planning (ACP) is a process that provides people an opportunity to express and document their preferences for care at the end of life and can improve end of life outcomes. However, ACP in its current form assumes that people have agency and choice at the end of life. This is not the case for people who are homeless. Working with Tapu Atawhai/Auckland City Mission, the aim of this study is to explore the preferences, priorities, values and beliefs about death and dying in the homelessness community in order to develop a modified ACP document which is aligned with the needs of the community addressing preferences for place of care and dying, advocacy and legacy. We will also develop resources to support ACM staff with the skills, knowledge and confidence in having conversations about death, dying and advance care planning.

FUNDED BY: Goodfellow Foundation's Douglas Goodfellow Primary Healthcare Research Fund

Prof Thomas Proft and Dr Jacelyn Loh

DEVELOPMENT OF A ROMV-TEEVAX VACCINE ($179,995 – 2 years) 1124007

Prof Thomas Proft, Dr Jacelyn Loh

Department of Molecular Medicine & Pathology, The University of Auckland

Group A Streptococcus (GAS) causes many different diseases in humans. Pharyngitis and tonsillitis are rather harmless diseases, but if untreated they can develop into acute rheumatic fever (ARF) and rheumatic heart disease (RHD). ARF and RHD in Māori and Pacific peoples remain one of Aotearoa NZ's most pressing health problems and we continue to have some of the highest rates in the world. There is currently no vaccine against GAS. We have developed a vaccine candidate (TeeVax) and have shown moderate efficacy in a mouse infection model. This vaccine was formulated with Alhydrogel 2% (alum), a commonly used vaccine adjuvant. Our results and reports from other GAS vaccine studies suggest that alum might not be ideal to adjuvant a GAS vaccine. We have recently started to collaborate with the U.S company Versatope Therapeutic which has developed a new vaccine platform. The goal of our study is to use the Versatope platform to develop a mucosa TeeVax-based GAS vaccine. The vaccine will be generated by Versatope and efficacy will be evaluated in our lab in Auckland using an established mouse nasopharyngeal colonisation model. We are also interested to analyse the specific immune responses to better understand the differences in adjuvant activities.

Prof Mark Vickers

NEXT-GENERATION WEIGHT LOSS DRUGS AND MATERNAL AND OFFSPRING HEALTH ($118,673 – 2 years) 1124014

Prof Mark Vickers, Prof Paul Hofman

Liggins Institute, The University of Auckland

The popularity of a class of drugs known as GLP-1 agonists is rapidly growing due to their off-label use as weight loss medications. However, current recommendations advise that the use of such medications should be avoided during pregnancy due to potential side effects. As is also observed globally, a high proportion of pregnancies in New Zealand are unplanned (>40%). Further, almost 60% of women of reproductive age are either overweight or obese. A limitation of the experimental data to date is that it has been undertaken in the setting of normal pregnancies. However, pregnancies characterised by maternal overweight/obesity carry significant risks for both mother and infant including gestational diabetes and increased obesity and type 2 diabetes in the children. As such, the use of GLP-1 agonists before and during these pregnancies may actually represent a beneficial trade-off and improve pregnancy outcomes with reduced obesity. However, this has yet to be examined in a preclinical setting. We will use our validated animal model of maternal obesity to investigate the potential differential effects of GLP-agonists on maternal and infant outcomes in normal and obese pregnancies. This work addresses an important knowledge gap and such pre-clinical studies are essential to further our understanding of the potential risks and beneficial trade-offs of such treatment approaches in the setting of compromised pregnancies.

Members of the Muscle Cell Function research group. From left to right, Master's student Liam Zhang, Dr Marie Ward, Dr Amelia Power, and newly submitted Master's student Amanda Groenewald

THE IMPACT OF METABOLIC SUBSTRATE ON THE DIABETIC HEART ($178,076 – 2 years) 1124006

Dr Marie-Louise Ward, Dr Amelia Power

Department of Physiology, The University of Auckland

Type 2 diabetes is a growing epidemic with over 300,000 diagnosed in New Zealand, and many more people estimated to be pre-diabetic. Diabetes damages the working cells of the heart leading to weakened contraction and poor heart function. Our research group has ethical approval to obtain tiny muscle samples from the hearts of consenting patients undergoing routine surgery. We have recently shown that heart muscles from diabetic patients do not contract as well as those from non-diabetics, and that the supply of mitochondrial energy that fuels contraction is impaired. This research project aims to use a new tissue culture system to monitor the contractile performance of isolated muscles over several weeks while optimising the metabolic fuel (glucose, fats, ketones) supplied to the muscle. We will utilise a novel muscle culture system (MyoDish) that is the first of its kind in New Zealand. The MyoDish will enable us to monitor beating muscle for periods of days-weeks. This allows us sufficient time to manipulate the metabolic fuel supplied during culture to determine whether optimising energy supply can "rescue" the contractile performance of muscles from diabetic patients. Results of our study will better inform management of diabetic heart disease, and improve patient outcomes.

FUNDED BY: Hugo Charitable Trust

Grants Awarded continued

GAVIN AND ANN KELLAWAY MEDICAL RESEARCH FELLOWSHIPS

Dr James Morse

Department of Anaesthesiology,
The University of Auckland

$17,499 - 1724002

Clinical Pharmacology/ Pharmacometrics Training and Research Fellowship.

Dr Marta Seretny

Department of Anaesthesiology,
The University of Auckland

$47,688 - 1724003

Fellowship to complete a Master's degree in Practical Ethics at the University of Oxford, UK.

SIR HARCOURT CAUGHEY AWARD

Dr Augusto Simoes-Barbosa

School of Biological Sciences, The University of Auckland

$18,656 - 1724001

Visit of Prof Raina Fichorova to the University of Auckland and Bi-directional Research Exchange

KELLIHER CHARITABLE TRUST

Dr Claudia Paterson, Prof Andrew Hill, A/Prof Darren Svirskis, Dr Parry Singh

Department of Surgery,
The University of Auckland

LIGNOCAINE IMPLANT FOR PAIN RELIEF IN COLON SURGERY ($25,000 – 6 months)

1123015

Project grant funding to cover research costs.

FUNDED BY: Kelliher Charitable trust

Kelliher Charitable Trust

HEALTHEX EMERGING RESEARCHER AWARDS

Sophie Piesse

Department of Physiology,
The University of Auckland

$3,000 - 6724004

2024 AMRF Outstanding Emerging Researcher Award: Enduring impacts of placental extracellular vesicles on the maternal cardiovascular system in spontaneously hypertensive rats

Carina Donegan

Department of Psychological Medicine,
The University of Auckland

$2,000 - 6724005

2024 AMRF Doctoral Oral Presentation Runner Up Award: Set and setting the stage: Expectancies of individuals with major depressive disorder about to undertake LSD microdosing.

Grace Donaldson

Department of Obstetrics & Gynaecology,
The University of Auckland

$2,000 - 6724006

2024 AMRF Best Poster Presentation Award: Development of a non-invasive embryo quality evaluation tool for equine embryos.

FUNDED BY: Wellington Sisters

with you for generations to come Public Trust

SUMMIT POSTDOCTORAL RESEARCH PRESENTATION AWARD

Dr Ayah Elsayed

Auckland Bioengineering Institute, The University of Auckland

$3,000 - 6724001

AMRF Best Presentation Award: 4D flow cardiovascular magnetic resonance cardiac flows. A multicohort New Zealand based study

FUNDED BY: Heather & Noel Davies Fund

DOUGLAS GOODFELLOW REPATRIATION FELLOWSHIP

THE WAITING GAME: CHILDREN ON WAITLISTS FOR SPECIALIST HEALTH SERVICES ($482,188 - 2 years) 1424002

Dr Cervantée Wild

Department of Paediatrics: Child and Youth Health, The University of Auckland

Reducing wait times for specialist services has been a priority of the Aotearoa New Zealand government for decades – with a target announced in March 2024 – yet reporting shows that more and more people are waiting longer for necessary healthcare. However, current reporting tells us very little about the children who are on these waiting lists, many of whom are waiting alongside adults for services. This study will provide vital information to improve access to timely specialist health services for children. We will: (i) examine how many children are waiting for specialist services, what proportion receive appointments, follow-ups, and treatment within target times, and whether there is inequity in waiting times based on where children live or their age, gender, and ethnicity; (ii) explore how the wait list target is implemented and how this is experienced by different groups. This research will help us to understand which children may be affected by long wait times, allowing us to advocate for timely service provision for those who need it.

FUNDED BY: Douglas Goodfellow Charitable Trust

See story on page 4.

AMRF SUPPORT OF THE 2024 AOTEAROA CLINICAL TRIALS TE WHATU ORA COUNTIES MANUKAU RESEARCH WEEK

Ann Anson

Neurology, Te Whatu Ora Counties Manukau

$1,000 - 6724007

AMRF Best Student/Emerging Research Award: Demographic, Ethnic and Imaging Patterns in Moyamoya Disease.

AMRF SUPPORT OF THE 2024 TE WHATU ORA WAITEMATĀ COLLABORATIVE RESEARCH SYMPOSIUM

Dr Kate Parker

Planning Funding and Outcomes, Te Whatu Ora Waitematā

$500 - 6724008

AMRF Best Senior Researcher: Te Oranga Pūkahukahua: Interim results of a randomised clinical trial of primary care versus central hub-based invitation to lung cancer screening for eligible Māori participants.

FUNDED BY: Cancer Fund

Dr Katie Babbott

Anaesthesia and Perioperative Medicine, Te Whatu Ora Waitematā

$500 - 6724009

AMRF Best Emerging Researcher: Your body is your home: The feasibility of an intuitive eating intervention for early adolescents.

Grants Awarded continued

TRAVEL GRANTS

Dr Tim Angeli

($4,000 - 6624001**)**

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the International Gastrointestinal Electrophysiology Society Conference and the Digestive Disease Week Conference, Washington DC, USA, and a presentation at a medical device company in the USA, Lenexa USA, 16 - 27 May 2024

Dr Recep Avic

($3,089 - 6624002**)**

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2024), Orlando, USA and Lab Visit at Vanderbilt University, Nashville, USA, 14 - 24 July 2024

Dr Jennifer Barrowclough

($4,000 - 6624003**)**

Midwifery, Auckland University of Technology

Attendance and presentation at the Cochrane Colloquium 2024, Prague, Czech Republic, 31 Aug - 14 Sept 2024

Dr Kristi Biswas

($3,805 - 6624027**)**

Department of Surgery, The University of Auckland

Invited Seminar and establish a new collaboration at Singapore Centre for Environmental Life Sciences Engineering (SCELSE), Singapore, 2 - 11 December 2024

Dr Christina Buchanan

($3,158 - 6624028**)**

Neurology, Te Whatu Ora Te Toka Tumai

Attendance and presentation at the "PINK1 pathway to Parkinson's disease: 20 years on" meeting, London, UK, 26 - 28 November 2024

Dr Laura Carman

($4,000 - 6624029**)**

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the European Society for Movement Analysis in Adults and Children (ESMAC) conference, Oslo, Norway, 9 - 14 September 2024

Dr Erin Cawston

($3,538 - 6624030**)**

Department of Pharmacology & Clinical Pharmacology, The University of Auckland

Attendance and presentation at the Australasian Winter Conference for Brain Research (AWCBR), Queenstown, New Zealand, 31 August - 4 September 2024

Dr Yadi Chen

($3,359 - 6624004**)**

Department of Physiology, The University of Auckland

Attendance and presentation at the Association for Research in Vision & Ophthalmology 2024 Annual Meeting, Seattle, USA, 5 - 9 May 2024

Dr Robin Cronin

($4,000 - 6624031**)**

Women's Health, Te Whatu Ora Counties Manukau

Attendance and presentation at the 19th Annual Conference of the International Stillbirth Alliance, steering committee meeting and other activities, Columbo, Sri Lanka, 1 - 5 November 2024

Dr Simerdeep Dhillon

($4,000 - 6624005**)**

Department of Physiology, The University of Auckland

Attendance and presentation at the Hershey conference on developmental brain injury in Marstrand, Sweden, and the annual Fetal and Neonatal Physiological Society meeting, Nottingham, UK, 9 - 22 June 2024

Dr Alicia Didsbury

($1,192 - 6624032**)**

School of Biological Science, The University of Auckland

Attendance and presentation at the Queenstown Research Week Cancer Satellite Meeting, Queenstown, New Zealand, 31 August - 1 September 2024

Dr Jarrah Dowrick

($4,000 - 6624006**)**

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the International Gastrointestinal Electrophysiology Society Conference and the Digestive Disease Week Conference, Washington DC, USA, 16 - 24 May 2024.

A/Prof Scott Graham

($4,000 - 6624033**)**

Department of Molecular Medicine & Pathology, The University of Auckland

Attendance and presentation at the European Society of Medical Oncology (ESMO) Immuno-Oncology Congress 2024, Geneva, Switzerland and collaborator visit, Ljubljana, Slovenia, 11 - 19 December 2024

Dr Angus Grey

($4,000 - 6624034**)**

Department of Physiology, The University of Auckland

Attendance and presentation at the International Congress on Eye Research Biennial Conference, Buenos Aires, Argentina, 21 - 24 October 2024

Dr Bruce Harland

($4,000 - 6624007**)**

School of Pharmacy, The University of Auckland

Attendance and presentation at the Gordon Conference on Advances and challenges in Neurotech development and translation, Galveston, USA, 8 - 15 March 2024

Dr Neera Jain

($4,000 - 6624008)

Centre for Medical and Health Sciences Education, The University of Auckland

Attendance and presentation at AMEE: The International Association for Health Professions Education annual meeting, and meet with UK collaborators regarding ongoing research project, Basel, Switzerland, 23 Aug - 6 Sept 2024

Dr Marie Jardine

($4,000 - 6624035)

Te Kupenga Hauora Māori, The University of Auckland

Attendance and presentation at the Dysphagia Research Society Annual Conference and laboratory visit, Philadelphia, USA, 25 - 28th March 2025

Dr Annie Jones

($2,448 - 6624036)

Department of Psychological Medicine, The University of Auckland

Attendance and presentation at the Innovations in Health Psychology invited meeting, Clyde, New Zealand, 16 - 21 March 2025

Dr Alyssa Lie

($4,000 - 6624037)

School of Optometry and Vision Science, The University of Auckland

Attendance and participation at the Interdisciplinary Seminar on Neurodegenerative Disease and Vision, and laboratory visit to Universidad Santo Tomás, Santiago, Chile and XXVI Biennial Meeting of the International Society for Eye Research (ISER), Buenos Aires, Argentina, 12 - 25 October 2024

Dr Luling Lin

($4,000 - 6624009)

Liggins Institute, The University of Auckland

Attendance and presentation at the Global Evidence Summit 2024, Prague, Czech Republic, 7 - 13 September 2024

Dr Salvador Lopez

($4,000 - 6624010)

School of Pharmacy, The University of Auckland

Attendance and presentation at the World Biomaterials Conference 2024 in Daegu, South Korea, 26 - 31 May 2024

A/Prof Eileen Lueders

($3,925 - 6624011)

School of Psychology, The University of Auckland

Attendance and presentation at the annual international conference of the Organization for Human Brain Mapping (OHBM), Seoul, Korea, 23 - 27th June 2024.

Dr Kate MacKrill

($4,000 - 6624038)

Department of Psychological Medicine, The University of Auckland

Attendance and presentation at the Health Scares Conference, London, UK, 9 - 12 November 2024

Dr Sanjay Marasini

($4,000 - 6624012)

Department of Ophthalmology, The University of Auckland

Attendance and presentation at the Association for Research in Vision and Ophthalmology (ARVO), Seattle, USA, 5 - 9 May 2024

Dr Kimberly Mellor

($4,000 - 6624013)

Department of Physiology, The University of Auckland

Attendance and presentation at the 2024 Meeting of Cardiac Regulatory Mechanisms Gordon Research Conference, New London, USA, 22 - 29 June 2024

Dr Mariana Muelbert

($1,670 - 6624014)

Liggins Institute, The University of Auckland

Attendance and presentation at the Perinatal Society of Australia and New Zealand (PSANZ) Annual Congress, Christchurch, NZ, 7 - 10 April 2024

Dr Nipuni Nagahawatte

($2,677 - 6624039)

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the Virtual Physiological Human (VPH) Conference (Stuttgart), visits labs of Dr. Okan Avci (Stuttgart) and Prof. Christian Cyron (Hamburg), and Humboldt meets Leibniz network symposium (Hannover), Germany, September 2024

Dr Serey Naidoo

($4,000 - 6624040)

School of Science, The University of Auckland

Attendance and presentation at the 35th International Symposium on ALS/MND, Montreal, Canada, 6 - 8 December 2024

Dr Mridula Pachen

($4,000 - 6624015)

Department of Physiology, The University of Auckland

Attendance and presentation at the 2024 American Physiology SUMMIT, Long Beach, USA, 3 - 8 April 2024

Dr Nadun Palmada

($3,000 - 6624016)

Auckland Bioengineering Institute, The University of Auckland

Attendance and presentation at the International Conference on Food and Digestion (ICFD) 2024, Porto, Portugal, 6 - 12 April 2024

Dr Wilson Pan

($4,000 - 6624041)

Department of Physiology, The University of Auckland

Attendance and presentation at the International Society of Eye Research Biennial Meeting, Buenos Aires, Argentina, 19 - 25 August 2024

Grants Awarded continued

A/Prof Rachael Parke

($3,505 - 6624017**)**

School of Nursing, The University of Auckland

Collaborative research visit to Guys and St Thomas' NHS Foundation and King's College London to explore virtual visiting to improve equity of family access to intensive care, London, UK, 1 Sept - 13 Oct 2024

Dr Maryam Pirouzi

($4,000 - 6624042**)**

School of Pharmacy, The University of Auckland

Attendance and presentation at the biennial Health Service Research (HSR) Conference, Brisbane, Australia, 3 - 7 December 2024

Dr Beau Pontre

($4,000 - 6624018**)**

Department of Anatomy & Medical Imaging, The University of Auckland

Attendance and presentation at the I2024 MR in RT symposium, Rome, Italy, and the European Society for Radiotherapy and Oncology (ESTRO 2024), Glasgow, UK and a visit to UMC Utrecht, Utrecht, Netherlands, 1 Apr - 8 May 2024

Dr Farha Ramzan

($3,892 - 6624019**)**

Liggins Institute, The University of Auckland

Attendance and presentation at the International Society for Extracellular Vesicles (ISEV 2024), Melbourne, Australia, 7 - 13 May 2024

Dr Manuela Romano

($4,000 - 6624020**)**

School of Biological Sciences, The University of Auckland

Attendance and presentation at the International Society for Cell & Gene Therapy (ISCT) annual conference, Vancouver, Canada, 29 May - 1 June 2024

A/Prof Ilva Rupenthal

($4,000 - 6624043**)**

Department of Ophthalmology, The University of Auckland

Attendance and presentation at the International Society of Eye Research Meeting, and Velux grant discussions with collaborators, Buenos Aires, Argentina, 18 - 27 October 2024

Dr Pushkar Silwal

($3,960 - 6624021**)**

School of Optometry, The University of Auckland

Attendance and presentation at the '2030 IN SIGHT LIVE 2024' event organised by the International Agency for the Prevention of Blindness, Mexico City, Mexico, 23 - 29 June 2024

Dr Irene Vorontsova

($2,909 - 6624044**)**

Department of Ophthalmology, The University of Auckland

Attendance and participation at the International Society for Eye Research Congress Buenos Aires, Argentina, and laboratory visit with a collaborator, Montevideo, Uruguay, 19 - 27 October 2024

Dr Sarah Ward

($3,571 - 6624022**)**

Department of Exercise Sciences, The University of Auckland

Attendance and presentation at the OARSI World Congress on Osteoarthritis 2024, Vienna, Austria, 18 - 21 April 2024.

Dr Petra White

($3,770 - 6624023**)**

Department of Physiology, The University of Auckland

Attendance and presentation at the Hershey Conference on Developmental Brain Injury, Marstrand, Sweden, 11 - 14 June 2024

A/Prof Siouxsie Wiles

($3,992 - 6624024**)**

Department of Molecular Medicine & Pathology, The University of Auckland

Attendance and presentation at the New Antibacterial Discovery and Development Gordon Research Conference, Ventura, USA, 11 - 22 Mar 2024

Dr Deborah Wilson

($4,000 - 6624025**)**

Clinical Sciences, Auckland University of Technology

Attendance and presentation at the Society for Prevention Research (SPR) Conference then meetings at Johns Hopkins University (JHU) Center for Indigenous Health and Johns Hopkins School of Nursing (JHSON), Washington DC and Baltimore Maryland, USA, 26 May

Dr Debbie Zhao

($5,000 - 6624045**)**

Department of Ophthalmology, The University of Auckland

Attendance and participation at the Virtual Physiological Human Conference, Stuttgart, Computing in Cardiology Conference, Karlsruhe, and Cardiac Physiome Workshop, Freiburg, Germany, 4 - 14 September 2024

Dr Kelly Zhou

($4,000 - 6624026**)**

Department of Physiology, The University of Auckland

Attendance and presentation at the Hershey conference on developmental brain injury in Marstrand, Sweden, and the annual Fetal and Neonatal Physiological Society meeting, Nottingham, UK, 9 - 22 June 2024

BRIDGING THE GAP BETWEEN CLINICAL PRACTICE AND ETHICAL THEORY

Dr Marta Seretny

Dept of Anaesthesiology,
The University of Auckland

From the operating room to the ethics committee, Dr Marta Seretny's career has been a testament to the power of interdisciplinary learning. With AMRF's prestigious Gavin and Ann Kellaway Medical Research Fellowship awarded in 2024, she has begun a new chapter of learning at the University of Oxford Uehiro Institute.

"The advanced research ethics modules I completed during my Master's in Public Health highlighted (MPH) the chasm between ethics as applied by medical practitioners and the realities of ethics as a branch of philosophy, where comprehensive ethical arguments and varied research methodologies are employed. This experience spurred me on to learn more," says Marta, a specialist anaesthetist and part-time senior lecturer.

Throughout her PhD and postdoctoral clinical research, Marta applied the knowledge gained from her MPH. Over the past two years, she has served as a member and, more recently, deputy chair of the Auckland Health Research Ethics Committee (AHREC).

"These experiences underscored the need for cross-disciplinary communication and understanding between ethicists and medical practitioners," she says.

Her time on the AHREC fuelled her desire to pursue formal education in ethics, aiming to bridge the gap between ethics as a humanities subject and its practical application in clinical medicine and research. She aspires to gain a deeper understanding of ethics and its practical application, leading her to pursue a Master of Practical Ethics at the University of Oxford.

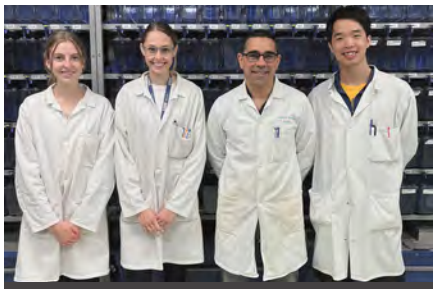
This fellowship is unique in its support for part-time education abroad for specialist clinicians, covering the tuition fees for this degree. It will not only enable her to complete her Master's degree but also open new avenues for research and opportunities, significantly impacting her career and the field of medical ethics.

Marta's overarching goal is to utilise her newly gained knowledge to improve clinical ethics locally. She hopes to form new research collaborations during her time at Oxford, fostering grassroots changes to address local inequities.

"Receiving the Gavin and Ann Kellaway Medical Research Fellowship is transformative for my career and personal growth."

Grants Completed

PROJECTS



Marguerite Sandleback, Caitlin Herbert, Dr Jonathan Astin, Wenxuan Chen

LYMPHATIC VESSEL GROWTH ($102,034 - 2 years) 1120014, CRF-1120014 ($6,793)

Dr Jonathan Astin

Department of Molecular Medicine & Pathology, The University of Auckland

Lymphatic vessels are a component of our vascular system with critical roles in tissue fluid homeostasis and immune cell trafficking. Abnormal or insufficient lymphatic vessel growth contributes to the pathogenesis of many health conditions, including lymphoedema, kidney transplant rejection and cancer cell metastasis. Our lab uses zebrafish larvae to study lymphatic vessel development. Lymphatic vessels can be readily observed in transparent larvae and studies have shown that the role and development of zebrafish lymphatics are very similar to human lymphatics. This project focused on a specific lymphatic vessel that develops in the zebrafish's otic vesicle (ear), called the otolithic lymphatic vessel (OLV). We conducted a forward genetic screen and identified two zebrafish mutants in which the OLV does not develop correctly. In this project, we completed the characterisation of these unique lymphatic mutants and used RNA-Sequencing of mutant cells to identify the insulin-like growth factor (IGF) signalling pathway as a novel lymphatic growth factor. This is an exciting finding, as IGF-signalling has not previously been implicated in lymphatic vessel development and will likely synergise with existing lymphatic drug targets to allow additional therapeutic control of lymphatic vessel growth. Future work will focus on the mechanisms by which IGF-signalling regulates lymphatic vessel growth.

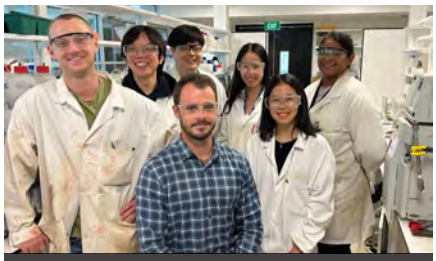
Dr Erica Beilharz (EpiNet Administrator), Dr Peter Bergin, Dr Sunayana Sasikumar

INCIDENCE STUDY OF SUDEP IN NEW ZEALAND ($75,367 – 2 years) 2118014

Dr Peter Bergin, Prof Jonathan Skinner, Dr Yannan Jiang, Dr Claire Spooner, Dr Simon Stables, Dr Elizabeth Walker, Dr Nicholas Child, Dr Ian Rosemergy, A/Prof Roderick Duncan, Dr Melinda Nolan Neurology, Auckland District Health Board

We asked doctors, coroners, pathologists, epilepsy nurses and Epilepsy New Zealand staff to inform us of anyone with epilepsy who died suddenly. We also obtained information from the Ministry of Health when epilepsy was mentioned on the death certificate. We reviewed the details regarding the circumstances of death for each person. We determined whether patients died of Definite, Probable or Possible SUDEP (sudden unexpected death in epilepsy) or whether the deaths were due to another cause. We identified 103 cases of definite or probable SUDEP, and 55 cases of possible SUDEP, over two years (01/08/2019 – 31/07/2021). The most common age range for people to die of SUDEP was 20-40, confirming that SUDEP affects people in the prime of life. Males greatly outnumbered females. The incidence of SUDEP we detected (10.1 / million) was higher than reported in other Western countries. We assume that this is due to the very comprehensive approach that we have taken to case ascertainment. SUDEP is a significant risk for people with epilepsy and disproportionately affects young adults. Further research is needed to understand why people with epilepsy die. We hope to continue the prospective case ascertainment to see if changes in the management of epilepsy are associated with a reduction in the incidence of SUDEP.

CO-FUNDED with the Neurological Foundation **FUNDING CONTRIBUTION BY:** The Peter and Jenny Vincent Charitable Trust



Dr Alan Cameron (seated), standing left to right: Dr Oscar Shepperson, Rolland Lin, Tae Ung (Tony) Na, Polly Sun, PhD candidate Jesse Wijaya, Dr Shama Dissanayake

ELIMINATING GROUP A STREPTOCOCCUS ($160,000 – 2 years) 1121008

Dr Alan Cameron, Dr Jia-Yun Tsai, Prof Thomas Proft, Dist. Prof Dame Margaret Brimble

School of Chemical Sciences, The University of Auckland

Applying a new chemical method, a new treatment modality for Group A Streptococcus (GAS) was demonstrated. GAS is a disease responsible for severe inequities in health outcomes for New Zealander's. Currently available treatments fail to eliminate host cell internalised bacteria, leading to recurring infections that cause severe autoimmune complications that can be life threatening and debilitating. Our work establishes stapled antimicrobial peptides (StAMPs) as a novel strategy with real potential to eliminate these issues, by successfully eradicating internalised bacteria, where antibiotics currently used in the clinic were shown to fail. We expect our work will generate significant interest in this approach in the field and may stimulate development of new and more effective treatments for this high priority infectious disease. We are also developing our current lead compounds further and seeking further funding based on these preliminary results which were supported generously by AMRF. We are exploring IP opportunities to support the development of these stapled peptides as therapeutics. This project has led to community outreach regarding antibiotic resistance and research opportunities for undergraduate and postgraduates, including a PhD completion.

A/Prof Gary Cheung and Dr Rosemary Frey

EXPERIENCES OF THE END OF LIFE CHOICE 2019 ACT AMONGST HEALTH PRACTITIONERS, WHĀNAU AND FAMILIES ($156,142 – 2 years) 1121014

A/Prof Gary Cheung, Dr Rosemary Frey, A/Prof Frederick Sundram, A/Prof Sarah Cullum, A/Prof Susan Bull, A/Prof David Menkes, Dr Nicholas Hoeh, Dr Alisha Vara, Dr Adam Sims, Dr Jackie Robinson, Dr Deborah Balmer, Dr Melissa Carey, Dr Helen Cassidy

Department of Psychological Medicine, The University of Auckland

In a two-year project, we explored the experiences of health practitioners who have been directly or indirectly involved in providing assisted dying under the End of Life Choice Act. We also explored the perspectives of Māori whānau and non-Māori families of individuals who used the Act, considered using the Act but ultimately did not, or did not use the Act. This study provided an opportunity for health professionals and whānau/families to reflect on their experiences of assisted dying in Aotearoa. The research employed a multi-phase, iterative approach, integrating both qualitative and quantitative data collection methods. A total of fifty-seven individuals participated in qualitative interviews for this research. The research has produced seven studies: two published articles, two currently under review, one awaiting submission, and two in development. These studies have been presented to stakeholders on multiple occasions. This research uncovered knowledge and service gaps in the Act's implementation (e.g. assessing informed consent/capacity and other assessment challenges, and recognising undue influence in complex situations), along with understanding the emotional and other impacts of assisted dying on health practitioners and whānau/families.

Dr Melissa Cadelis and Professor Brent Copp

ANTIBIOTIC HYBRIDS ($10,000 – 18 months) 1122009

Prof Brent Copp, Dr Melissa Cadelis

School of Chemical Sciences, The University of Auckland

The growing incidence of antibiotic resistance is a global health threat requiring the development of improved treatment methods. Many strains of bacteria gain resistance to frontline antibiotics by altering the ability of the antibiotic to penetrate the bacteria or the bacteria increases its ability to pump the drug out of the cell. The immediate aims of this project are to prepare proof-of-concept antibiotic hybrids, molecules that combine ineffective legacy antibiotics with a cell penetration enabling fragment. A first set of antibiotic hybrids, combining the structure of the clinical agent doxycycline and a polyamine-based membrane disrupting agent were synthesised. Preliminary biological testing was disappointing with the hybrids being considerably less effective than our original two molecule combination. Taking stock of the results, we have synthesised a second-generation of hybrids that link the membrane disruptor and antibiotic in three different ways. We are currently awaiting biological results for these hybrids. Projects in medicinal chemistry, the discipline of developing new medicines, seldom work the first time. It is an iterative process, taking information learned from both disappointing and promising results to help direct research towards the eventual goal – the development of new treatments for otherwise untreatable bacterial infections.

Grants Completed continued

Dr Catherine Crofts

ASSESSING METHOD AGREEMENT IN INSULIN QUANTIFICATION BETWEEN BIOVOLT AND AUT ROCHE ($5,480 – 6 months) 5119007

Dr Catherine Crofts, Mrs Marie Mckay, Dr Amira Hassouna

School of Interprofessional Health Studies, Auckland University of Technology

We aimed to assess whether the BioVolt capillary insulin quantification point of care system could be used as an alternative to quantifying insulin from a venous blood sample at a pathology laboratory. There were many logistical and analytical challenges, which were further complicated by Covid. We were able to commence a new round of collaboration to assist with data analysis and interpretation. Our interim findings show that the point-of-care system allows for almost real-time sample quantification and result feedback. Being able to travel to the people who need/want insulin quantification may improve adherence to the processes, however, the 50µL sample size is impractical for the majority of people who need insulin quantification, especially with the current point of care sampling equipment in New Zealand. Currently, while assistance from the BioVolt company was declined to prevent commercial influence in the report, we have kept in contact with the company and provide scientific advice.

Dr David Crossman

COLLAGEN VI KNOCKOUT ($79,593 - 2 years) 1119001, CRF-1119001 ($8,202)

Dr David Crossman, Dr Carolyn Barrett, Prof Christian Soeller, Prof Peter Ruygrok, Prof Bruce Smaill, Dr David Baddeley, Dr Prasanna Kallingappa

Department of Physiology, The University of Auckland

In our previous research, we identified an understudied protein called collagen-VI is involved in the pathology of the failing human heart. Interestingly mutation of this protein results in muscular dystrophy. Notably muscular dystrophy patients often developed heart failure. In this project, to understand the function of collagen-VI we have been able to successfully generate a rat model that lacks this protein. Our functional assessment with echocardiography has demonstrated the heart of these animals has reduced contractile function. Analysis of muscle cell function demonstrated that there is a profound disturbance in the calcium signalling that controls muscle contraction and that these changes are pro-arrhythmogenic. Importantly, these results resemble changes in calcium sigalling that occur in muscular dystrophy caused by mutations in the protein dystrophin suggesting the same protein complex is involved. Using STED microscopy, a super-resolution imaging method with 30 nm resolution we have been able to identify that collagen-VI spatial locates to the dystrophin complex. Future studies will now use this animal model to better understand the role of collagen-VI in heart failure a protein that has recently been shown to independently predict outcomes in heart failure patients.

FUNDED BY: Bruce Cole Fund

Ms Serah 'Otukolo, Dr Summer Hassan, Dr David Crossman, Dr Anna Krstic, Dr Hussam Moammer, and Dr Jizhong Bai

NATURE'S PACEMAKER ($159,859 - 2 years) 1121003, CRF-1121003 ($9,480)

Dr David Crossman, Dr Jizhong Bai, Dr Kyriakos Varnava, Dr Angus Grey, Dr Rohit Ramachandra, Prof Julian Paton

Department of Physiology, The University of Auckland

In this project, we explored the mechanisms behind our new pacemaker that reinstates the natural variability in the heartbeat called the respiratory sinus arrhythmia (RSA). In our previous research, we documented a massive ~20% improvement in heart function in heart failure (HF) sheep that were RSA-paced (HRSA). This research used mass-spectrometry to identify changes in proteins between three groups of sheep: HRSA, HF and control animals. We identified that mitochondria proteins that were reduced in HF were partially restored in HRSA animals back towards levels found in control animals. Mitochondria are the powerhouse of the cell. This finding was confirmed with both super-resolution imaging and transmission electron microscopy which showed restoration of mitochondria structure. This data supports the novel hypothesis that RSA pacing drives reverse remodelling through optimally tuning cardiac energetics powered by the mitochondria.

FUNDED BY: Specific Use Bequest - Heart Research

FUNDING CONTRIBUTION BY: T. M. Hosking Charitable Trust

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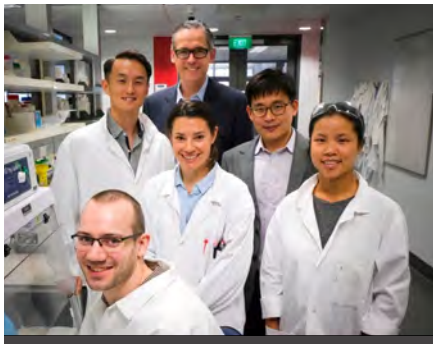
Justin Dean and colleagues

CONNEXIN 43 AND PRETERM BRAIN INJURY ($159,351 – 2 years) 1121016

Dr Justin Dean, Dr Joanne Davidson, Prof Alistair Gunn, Dr Panzao Yang

Department of Physiology, The University of Auckland

The aims of this project were to determine the effects of inflammation in brain connexin 43 hemichannel expression and structural changes in early brain development and whether blocking connexin hemichannels will improve long-term brain outcomes. We have established a newborn rat inflammation model that causes brain inflammation, impaired brain development, and white matter injury involving oligodendrocyte cell death. We quantified the connexin 43 hemichannel expression in the brain at 3 days after inflammation using histological method called immunofluorescent staining and gene expression detection method called digital PCR. Histological results showed increased total connexin 43 hemichannels and those expressed on astrocytes in the white matter. Digital PCR results also showed increased expression of connexin hemichannel genes in the frontal lobe of the brain after inflammation We then found that blockade of connexin 43 hemichannels after inflammation using the inhibitor tonabersat cell prevented apoptosis and oligodendrocyte cell death. Thus, targeting abnormal Cx43 hemichannel activity may be a novel target for reducing brain injury after early life inflammation.



Dr Christan Lux (sitting), Dr Tary Yin, Dr Brett Wagner Mackenzie (standing front), Prof Richard Douglas (standing at the back), Dr Raymond Kim, Dr Joey Siu

LONGITUDINAL ANALYSIS OF AIRWAY MICROBIOTA IN CYSTIC FIBROSIS ($159,003 - 2 years) 1120008, CRF-1120008 ($7,152)

Prof Richard Douglas, Dr Kristi Biswas, Dr Brett Wagner, Dr Mark O'Carroll

Department of Surgery, The University of Auckland

The funds awarded by the Auckland Medical Research Foundation enabled my group to undertake valuable research that advances the understanding of how the respiratory bacterial community is shaped by cystic fibrosis and impacts severity of disease. This has led to six publications, and the data has been shared at both NZ-based and international conferences. The salary of Research Fellow Dr Brett Wagner Mackenzie was generously provided through this grant and enabled her oversight of the project, including coordinating sample collection from 13 patients diagnosed with cystic fibrosis over a two-year period, sample processing, and preliminary data analysis. She established the protocol for the new type of sequencing utilised in this project and set up the bank of clinical isolates which are a valuable resource for research in this area going forward. She is very grateful to the AMRF for their generous support. We are continuing to analyse the vast amount of data generated from this project. Once the additional analyses are completed a manuscript will be submitted for publication to Journal of Cystic Fibrosis.

FUNDING CONTRIBUTION BY: NR & JH Thomson Charitable Trust

Melissa Vercoe, Dr Lynn Sadler, Dr Lucy Prentice, Prof Cindy Farquhar

THE FIIX STUDY ($152,825 - 2 years) 1119003, CRF-1119003 ($34,468)

Prof Cynthia Farquhar, Dr Sarah Lensen, Dr Lynn Sadler

Department of Obstetrics & Gynaecology, The University of Auckland

The FIIX Study is a national clinical trial comparing the two main fertility procedures available through public funding in Aotearoa New Zealand – The Fertility and In Vitro Fertilisation (IVF) and Intra Uterine Insemination (IUI) trial in couples with uneXplained infertility (FIIX). Whānau/couples with unexplained infertility who have been accepted for publicly funded fertility treatment are suitable to participate. IUI involves the placement of prepared sperm into the uterus, often using ovulation induction medication. It is a less invasive procedure than IVF. We suspect that IUI will result in the same number of whānautanga (birth) as IVF. The study has recruited over 700 participants, and the final target is 730. Results will be available 2025.

FUNDED BY: AC Horton Estate

Grants Completed continued

A/Prof Vanessa Selak

PREDICTION OF CARDIOVASCULAR RISKS IN CANCER PATIENTS ($159,944 - 2 years) 1120015, **CRF-1120015 ($8,091)**

Prof Mark Elwood, Dr Essa Tawfiq, Dr Corina Grey, Dr Matire Harwood, Prof Rod Jackson, Dr Arier Chi Lun Lee, Prof Mark McKeage, Dr Vanessa Selak, Dr Sandar Tin Tin, Dr L. Susan Wells

Epidemiology and Biostatistics,
The University of Auckland

In the Auckland and Northern regions of New Zealand, clinicians use the PREDICT decision support software to assess 5-year risk of cardiovascular disease (CVD) in patients aged 30 years or older when patients utilise primary care facilities. Data on risk profile of patients are securely stored for the PREDICT study, which is an open cohort recruiting participants at the time of first CVD risk assessment by clinicians who use the PREDICT decision support. The PREDICT decision support is embedded with PREDICT equations; one for men and another for women. It has been shown that PREDICT equations accurately predict 5-year CVD risk in the primary care general population. However, this important clinical tool was not validated in cancer survivors until 2022 when we assessed it among cancer survivors. We published a paper on the validation of PREDICT equations in cancer survivors in the Lancet in February 2023, showing that the New Zealand cardiovascular disease risk prediction equations reasonably predicted the observed 5-year cardiovascular disease risk in survivors of cancer, in whom risk prediction was considered clinically appropriate. Prediction could be improved by adding cancer-specific variables and considering competing risks. A second paper investigating risk of incidence of CVD (fatal or non-fatal) and CVD death in cancer survivors compared with people without cancer showed CVD risk management needs to be prioritised among cancer survivors overall, and particularly in those with myeloma, lung cancer and non-Hodgkin lymphoma given consistent evidence of increased risk.

FUNDING CONTRIBUTION BY: Rose Richardson Estate

Prof Paul Donaldson, Dr Gus Grey,
Dr Luis Knight

ANTI-CATARACT NANOVESICLE DEVELOPMENT ($158,539 – 2 years) 1119015, **CRF-1119015 ($18,884)**

Dr Angus Grey, Prof Paul Donaldson, Dr Ilva Rupenthal, A/Prof Zimei Wu

Department of Physiology, The University of Auckland

Age-related nuclear (ARN) cataract is the major form of lens opacity and causes blurred vision and blindness if left untreated. It affects the lens centre specifically, and while there is a cure that surgically implants a synthetic lens, this comes at an increasing cost to our health system due in part to our aging population. We are therefore in need of novel ways to deliver potential anti-cataract therapeutics specifically to the lens centre to delay or prevent the onset of ARN cataract. Our research established uptake and transport patterns of lens antioxidants and ocular drugs that furthered our understanding of small molecule transport within the lens. In addition, we synthesised and trialled a variety of different nanovesicles as a delivery mechanism for potential anti-cataract compounds. Our next steps are to load antioxidant compounds into the optimised nanovesicle preparation to test their ability to prevent lens cataract formation in a laboratory model of ARN cataract.

FUNDING CONTRIBUTIONS BY: Room-Simmonds Charitable Trust and the Reed Charitable Trust

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Top L-R: Professor Nickola Overall, Professor Annette Henderson, Dr Rachel Low. Bottom L-R: Dr Nina Waddell, Dr Caitlin McRae, Dr Valerie Chang

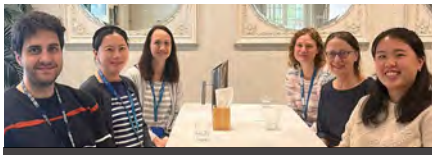
FROM CRISIS TO RECOVERY: PROTECTING CHILD HEALTH AND WELL-BEING THROUGHOUT THE PANDEMIC ($159,611 – 2 years) 1121012

A/Prof Annette Henderson, Prof Nickola Overall

Department of Psychology, The University of Auckland

Extensive theory and research in the psychological and health sciences warn that the stress of the COVID-19 pandemic will take a considerable long-term toll on mental and physical health. Yet, how the COVID-19 crisis has impacted the health of children remains unknown. This project answered an urgent call to comprehensively examine the family processes that elevate versus buffer the risk to children's long-term health and well-being. We leveraged and extended an existing longitudinal family study that began prior to the pandemic by collecting an additional data collection wave. This wave involved comprehensive in-lab and questionnaire-based assessments of parents', family, and children's health and wellbeing. The data produced an unmatched dataset that will allow us to identify the key risk (inter-parental conflict, poor parenting) and resilience (family cohesion, co-operative coparenting) processes on children's health and wellbeing during the COVID-19 pandemic, precisely when family dynamics are crucial to children's health and well-being. Intensive behavioural coding and data analyses are ongoing. Analyses combining this dataset with the other study phases will offer valuable insights into how to cultivate family resilience in the face of stress and insecurity and thus protect the health and quality of life of NZ families and their children.

FUNDING CONTRIBUTION BY: Reed Charitable Trust



Blood and Cancer Biology Laboratory. (L-R) Leandro Ladvanszky (PhD student), Dr Ally Choi (research fellow), Taryn Green (senior technician), Dr Tracey Immanuel (research fellow), Dr Maggie Kalev (group leader), Xini Puah (Masters student)

UNFOLDED PROTEIN RESPONSE IN MYELOPROLIFERATIVE NEOPLASMS ($159,999 – 2 years) 1119009, CRF-1119009 ($17,932)

Dr Maggie Kalev-Zylinska, Prof Stefan Bohlander, Dr Dean Singleton

Department of Molecular Medicine & Pathology, The University of Auckland

This research focuses on improving our understanding of myeloproliferative neoplasms (MPN), a group of blood cancers that affect the bone marrow and include conditions like primary myelofibrosis (PMF). PMF is the most severe form of MPN and can progress to aggressive acute leukaemia with very poor outcomes. Our goal is to uncover how these diseases develop and progress, especially by looking at a process in cells called the unfolded protein response (UPR). UPR is crucial in how cells handle stress, and its malfunction may contribute to MPN progression. This project generated significant discoveries in all our research objectives. We identified key genes and pathways linked to MPN, including differential expression of specific biological processes associated with inflammation and cellular metabolism that are more active in PMF than other MPNs. Our findings also suggest that molecules involved in cell stress response may be a promising therapeutic target for PMF. Notably, our work has led to five publications, including in BLOOD, a premier haematology journal, which featured our results on its cover. Our findings have advanced the understanding of MPN. We now focus on validating these discoveries and exploring their potential to inform new treatment strategies.

FUNDED BY: Anonymous

Back: Courtney Leith, Fatima Faroze, Anton Chu, Dr Clinton Lewis
Front: Shaileshkumar Patel, Raisa Mathias, Sharlyn Benmerito, Nigel Tan

BM12 CAST STUDY: CYCLOPHOSPHAMIDE AFTER SIBLING-DONOR ALLOGENIC STEM-CELL TRANSPLANTATION ($98,982 - 2 years) 2121002

Dr Clinton Lewis, Dr Richard Doocey, Dr Timothy Hawkins, Prof Peter Browett, Dr Nicole Chien

Cancer and Blood Services, Auckland District Health Board

CAST is the only study of its kind focusing on allogeneic transplants in matched sibling donors, testing this new treatment to reduce side-effects and improve the quality of life for post-transplant patients. Related international studies have shown promising results and positive results from our study will have an important impact on local and international practice. We have now completed recruitment and await the final results of the study. Recruitment to the CAST study at Auckland City Hospital was exceptionally successful. Our team's efforts have made us one of the top recruiting sites in Australasia with 18 patients recruited from across the upper North Island including rural patients as well as Pacific Island and Māori patients.

FUNDED BY: Anonymous donor

Grants Completed continued

Dr Michal Kluger, Monica Skarin, Jill Collier

MIDODRINE TO PREVENT ORTHOSTATIC INTOLERANCE AFTER HIP AND KNEE JOINT REPLACEMENTS ($159,132 - 2 years) 8119004, CRF-8119004 ($27,720)

Dr Michal Kluger, Ms Monica Skarin, Dr David Rice, Prof Peter McNair

Anaesthesiology and Perioperative Medicine, Waitemata District Health Board

The MObILE study is a clinical trial aiming to help us understand if midodrine (a drug working by constricting the peripheral blood vessels, and thereby improving blood pressure), can prevent orthostatic intolerance (described as dizziness, nausea and vomiting, blurred vision, feeling of heat, and eventually fainting) after hip and knee replacement surgery. The study was carried out at North Shore Hospital, Auckland. During this study, we were faced with significant challenges; the study was highly affected by cancellations and reduction in elective surgery due to COVID lockdowns. Nevertheless, our research team has stayed highly committed and continued with recruitment under demanding and challenging clinical circumstances. We were grateful for additional COVID Relief funding from AMRF in 2022, and we were granted a 12 month no cost-time only extension with a revised end date of 31/3/2024. To facilitate study completion, we used other funds during the third and final year. We are thrilled to inform we have now completed recruitment of the planned 170 participants. Our research team is currently busy collating and analysing the data. We are excited to hint that our preliminary findings look very promising. Our results indicate an important effect of midodrine on clinically important symptoms that will translate into improved safety and possibly reduced length of stay.

Dr Tess Moeke-Maxwell accepting the 2022 HRC Rapua Ora research medal from The Royal Society of NZ for research excellence working with and for Māori communities

END OF LIFE CARE DURING COVID-19 RESTRICTIONS ($120,079 - 18 months) 1120010, CRF-1120010 ($7,889)

Dr Tess Moeke-Maxwell, Prof Merryn Gott, Dr Jackie Robinson, Dr Lisa Williams, Dr Rosemary Frey, A/Prof Janine Wiles, Dr Melissa Carey, Dr Natalie Anderson, Dr Jenny Parr

School of Nursing, The University of Auckland

This COVID study investigated the qualitative and quantitative experiences of bereaved families and whānau in the Auckland region who had a family member die during the COVID pandemic restrictions in 2020. We also sought the views of health professionals and community support workers/organisations in the Auckland region. We conducted a mixed methods study involving over 1,000 bereaved family and whānau, caregivers and health professionals, and NGO and community development workers. We also completed the survey and survey data has been analysed. Due to the impact of COVID-19 our health workforce participants were unable to commit to attending a focus group and therefore we conducted individual interviews in 2022 and 2023. These findings will be published and have informed the development of an evidence-based guideline to support hospitals, hospices, primary healthcare organisations, Aged Residential Care facilities and the Ministry of Health to support them with equitable palliative care during a pandemic.

A/Prof Mike Hay

SYNTHETIC LETHALITY AND DNA DAMAGE RESPONSE ($159,636 - 2 years) 1121007, CRF-1121007 ($12,702)

A/Prof Michael Hay, Dr Barbara Lipert, Dr Tet-Woo Lee, A/Prof Stephen Jamieson

Auckland Cancer Society Research Centre, The University of Auckland

This research project sought to identify synthetic lethal interactions between a new DNA-dependent protein kinase (DNA-PK) inhibitor (SN39536) and mutations within the DNA damage response (DDR) network. We conducted two CRISPR cas9 screens using a custom library of guide RNAs to inactivate DDR genes to explore the effects of radiation, DNA-PK inhibitor, and radiation plus DNA-PK inhibitor. Technical challenges with the radiation screen precluded identification of any hits for radiation and the combination with the DNA-PK inhibitor. The screen with the DNA-PK inhibitor alone identified two established synthetic lethal interactions (ATM and POLQ) and several potential interactions (NEK8, SSBP3, TERF1, SMG1). We explored the magnitude of the synthetic lethal interactions between DNA-PK inhibition and Pol-θ inhibition but found the interaction to be disappointingly small. Similarly, using siRNA knockdown of target genes (NEK8, SSBP3, TERF1, SMG1) did not provide actionable interactions with DNA-PK inhibition. The focus of future studies will explore further characterising the interactions between DNA-PK inhibition and genetic deficiencies for ATM and POLQ to identify a suitable clinical context for application of the DNA-PK inhibitor.

FUNDED BY: W & WAR Fraser Bequest Fund

Dr Lola Mugisho, Prof Rinki Murphy, Charisse Kuo, A/Prof Ilva Rupenthal

THE INFLAMMASOME AND DIABETIC RETINOPATHY ($155,995 – 2 years) 1121013

Dr Odunayo Mugisho, Prof Rinki Murphy

Department of Ophthalmology, The University of Auckland

Diabetes is one of the most common health problems in New Zealand affecting over 250,000 New Zealanders. It is associated with several complications, one of which is diabetic retinopathy (DR), a chronic disease that can lead to vision loss. While there are a range of therapies currently available, these only treat late-stage DR signs without slowing the disease progression. Previous work done in our lab and by others has identified a new disease mechanism, the inflammasome pathway, that plays a role in the development and progression of DR. Furthermore, we have shown using several disease models that blocking this pathway using our anti-inflammasome drugs can prevent the development of DR. In this study, we used human donor eye tissues and blood samples to better understand how the inflammasome contributes to DR progression and to determine the best time to treat patients to prevent or reverse disease signs.

FUNDED BY: Marion Ross Memorial Fund

Eric Ai (Technician), Robyn Hirst (PhD student), Anne Jaquiery (Senior Lecturer), Gregg Pardoe (Livestock and Facility Manager), Mark Oliver (Senior Research Fellow)

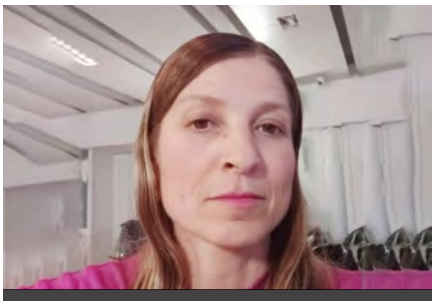
CNP AND FETAL GROWTH RESTRICTION ($50,680 – 2 years) 1120017, CRF-1120017 ($3,167)

Dr Mark Oliver, A/Prof Katie Groom, Prof Frank Bloomfield, Prof Eric Espiner, Dr Timothy Prickett

Liggins Institute, The University of Auckland

Grant-in-aid funding from AMRF was needed to produce data for larger grant applications. We wanted to determine whether a hormone found in a mother's blood could indicate if a baby she was carrying was not growing well and suffering from low oxygen supply. The hormone is C-type natriuretic peptide (CNP) and is found in the blood of both pregnant women and pregnant sheep. Detecting poor growth of a baby with current methods is not always accurate. Measuring the oxygenation of an unborn human baby with any accuracy is not easy or practical. For women, including Māori who may have poor access to advanced medical screening facilities and live in remote areas the situation is worse. In experiments we can measure a baby lamb's oxygenation before birth in pregnant sheep so we hoped mum's blood CNP could be a simple blood test marker for poor growth and oxygenation. Because of COVID restrictions and the borders being closed to overseas students, we were unable to do sheep research in 2021, 2022 but did some in 2023. The type of complex sheep work we undertake is very expensive and we were reliant on getting far more funding from a larger grant. With no additional funding we understood a statistically sound experiment was no longer achievable and we suspended the work from both a financial and animal ethical perspective. The remaining AMRF funds were returned.

CO-FUNDED WITH Cure Kids



Dr Rosica Petrova

VERIFICATION AND FUNCTIONAL CHARACTERISATION OF AQP3 IN THE LENS ($113,016 – 2 years) 1121011

Dr Rosica Petrova, Prof Paul Donaldson, A/Prof Julie Lim

Department of Physiology, The University of Auckland

In this project, we aimed to understand the expression and functional role of the water channel Aquaporin (AQP) 3 in the mammalian lens. AQPs of the lens are a vital component of the microcirculation system which in the absence of blood vessels delivers nutrients and removes metabolic waste from the lens center. We report that we have successfully identified that AQP3 is present in several mammalian lenses including the human lens. This discovery is very exciting because of the properties of AQP3. In addition to water, AQP3 also transports hydrogen peroxide (H_2O_2) with the age-dependent accumulation of which has been shown to cause oxidative damage to lens proteins that manifests as cataract. Ongoing functional studies have revealed that AQP3 is translocating into the cell membranes when exposed to high levels of H_2O_2. This result suggests, that the membrane trafficking of H_2O_2-permeable AQP3 channel regulates the levels of H_2O_2 in the lens and hence the oxidative damage induced by H_2O_2 and that AQP3 protein may be implicated in the protection of the lens against the generation of oxidative stress, and the onset of lens cataract.

Grants Completed continued

A/Prof Helen Pilmore

COVID-19 VACCINATION IN PATIENTS WITH CHRONIC KIDNEY DISEASE - NEW ZEALAND (C-VAK NZ study) ($159,505 - 12 months) 2121006, CRF-2121006 ($11,620)

A/Prof Helen Pilmore, Dr Michael Collins, Dr Ian Dittmer, Prof Germaine Wong, Dr Paul Manley, Dr Sally Roberts

Department of Renal Medicine, Auckland District Health Board

Patients with kidney failure on dialysis and with kidney transplant are at least five times more likely to die from COVID-19 than patients without kidney disease. We aimed to examine how well the vaccine worked in terms of antibody production in dialysis and transplant patients who had not had COVID-19 infection. Kidney transplant and dialysis patients in our centre underwent spike antibody testing prior to vaccination, at 1 and 3 weeks after the second vaccination dose and at 1 month and 3 months after the third vaccination dose. 389 patients underwent vaccination, and all had antibody levels tested (163 Kidney Transplant, 226 Dialysis). None had Covid-19 infection prior to vaccination. Mean Covid spike antibody levels were higher in dialysis patients than transplant recipients at week 1 while 3 weeks after vaccination, 32% of transplant recipients had seroconverted compared to 96% of dialysis patients. Transplant recipients were younger than dialysis patients and less co-morbid. After the third vaccination, 76% of transplant patients had seroconverted however mean antibody levels were significantly lower at one month compared to dialysis patients, 98% of whom had detectable antibodies. The findings from this study were extremely helpful to encourage patients to get vaccinated in our centre.

A/Prof Lindsay Plank

SYNBIOTICS AND LIVER TRANSPLANTATION ($123,943 – 2 years) 1118011

A/Prof Lindsay Plank, A/Prof Mike Taylor, Prof John McCall, Prof Edward Gane, Dr Adam Bartlett

Department of Surgery, The University of Auckland

Several clinical trials have shown that provision of probiotics combined with prebiotics (i.e. synbiotics) for 14 days after liver transplantation resulted in significant reductions in bacterial infections over the 30 days following the surgery. These trials, however, were not without issues that could have affected the results. We therefore carried out an additional trial in 82 patients randomised to a placebo or a synbiotic preparation previously tested. The 30-day bacterial infection rates in our trial, however, did not differ between the synbiotic and placebo groups (38.5% vs 33.3% respectively). We verified that the synbiotic preparation at the end of the trial had maintained its level of live bacteria that the manufacturer specified. We also examined other clinical outcomes such as length of stay in hospital, use of antibiotics, and organ rejection episodes with again no differences between the groups. Our measurements of markers of inflammation in blood samples support the lack of an effect of synbiotics. We will also verify, in faecal samples obtained at the end of treatment, that the probiotic organisms are present in the synbiotic group.

A/Prof Viji Sarojini and Dr Delsa Joseph

SELF-CLEANING ANTIMICROBIAL SURFACES ($160,000 - 2 years) 1120012

Dr Viji Sarojini, Prof Jadranka Travas-Sejdic, A/Prof Jun Lu

School of Chemical Sciences, The University of Auckland

Urinary catheters are the most commonly used medical devices. Long-term indwelling catheterisations are associated with catheter-associated urinary tract infections (CAUTIs). Conventional antimicrobial surfaces suffer from loss of efficacy resulting from the dead bacteria/debris accumulation, toxicity to the host and lack of long-term stability. Herein, we report a smart pH-responsive non-leaching bactericidal surface coating based on antimicrobial peptides (AMPs) capable of switching between kill and release of bacteria under urinary pH variations. The surface of commercially available silicone Foley catheter was modified using a hierarchical coating of a covalently immobilised antimicrobial peptide (AMP) outer layer for the killing role and a pH-responsive polymer, poly-methacrylic acid) (PMAA) inner layer to perform the releasing task. The pH-responsive bacteria kill-release property results of the hierarchical coating which was determined using live/dead assay of the surface adhered urinary pathogen in addition to the long-term efficacy (7-15 days) of the developed surface established from the 30-day continuous bacterial contact challenge engrained the success of the proposed project.

Dr Giuseppe Sasso

PACE C: INTERNATIONAL RANDOMISED STUDY OF CONVENTIONALLY FRACTIONATED RADIOTHERAPY VS SBRT FOR ORGAN-CONFINED PROSTATE CANCER ($68,320 - 1 year, 5 months) 2121005

Dr Giuseppe Sasso, Dr Maria-Lee Pearse

Radiation Oncology Department, Auckland District Health Board

Prostate cancer is the most common cancer affecting men in New Zealand. Traditionally, prostate cancer was treated with radiotherapy over a period of 7-8 weeks. The impact of prolonged treatment in terms of increased hospital visits and its effect on the budget was quite significant. Evidence then showed that we could effectively treat over 4 weeks safely and thus that was adopted as our standard of care. PACE-C aims to reduce this further to just 5 fractions, allowing patients to return to normal life faster while reducing economic and psychological burdens of radiotherapy treatments. Participating within the PACE-C trial at our site provided us a way to safely and confidently implement a prostate SBRT technique through the credentialing process ran by the trial centre's radiotherapy quality assurance program (RTTQA) prior to opening for accrual on our end. Our site screened 14 patients and enrolled 8 to the trial. Randomisation was done on a 1:1 basis where patients were allocated conventional radiotherapy (60 Gy in 20 fractions) or SBRT (36.25 Gy in 5 fractions). Treatment was completed approximately two years ago and all of our patients remain in follow-up. Participating on the trial has enabled us to offer this option to patients meeting off-trial as part of standard care.

Dr Anna Serlachius

COMPASS FEASIBILITY STUDY ($179,980 – 2 years) 1122003

Dr Anna Serlachius, Prof Nathan Consedine, Dr Sarah Hopkins, Dr Alana Cavadino, Ms Anna Boggiss, Ms Susan Reid, Mr Nicholas Cao, A/Prof Craig Jefferies, Dr Martin de Bock

Department of Psychological Medicine, The University of Auckland

The key objective of the funded research was to undertake a feasibility study of the COMPASS app (a mental health app) in 40 adolescents aged 12 to 16 years over 12 weeks to test the acceptability and usability of COMPASS, as well as test the methods, recruitment approach, and feasibility for a subsequent multi-centred randomised clinical trial. Briefly, the results together demonstrated COMPASS to be safe, engaging and feasible amongst adolescents with type 1 diabetes. In addition, our data suggests that COMPASS may improve diabetes distress, diabetes strengths and resilience, self-efficacy, self-care behaviours, wellbeing, and self-compassion. Amongst our qualitative feedback, acceptability was shown to be high, and adolescents expressed a desire for additional information and support with the practicality of diabetes management.

Ms Barbara Angoro, Dr Manisha Sharma, Dr Mahsa Moteshakeri

ELECTROCHEMICAL DETECTION OF IRON ($155,032 - 2 years) 1120016, CRF-1120016 ($11,973)

Dr Manisha Sharma, A/Prof Darren Svirskis, Prof Paul Kilmartin, Prof Anthony Phillips, Dr Claire Hemmaway

School of Pharmacy, The University of Auckland

Iron plays a significant role in various biological processes such as the transport of oxygen around the body. In normal physiological conditions, iron in blood is present in a bound form to the protein transferrin and is nontoxic. However, in certain pathological conditions excess free iron is found in blood, unbound to protein transferrin, known as non-transferrin, bound iron (NTBI). NTBI is very toxic, capable of generating highly reactive free radical species responsible for oxidative damage to various organs of the body. NTBI is a potential diagnostic indicator to assess the iron status of patients at-risk. To date there is no direct method available to measure NTBI levels, and excess iron is diagnosed indirectly by determining haematological clinical tests, which often underestimate free toxic iron levels and are inaccurate. Therefore, this project aimed to develop an electrochemical method for accurate and rapid detection of NTBI in human blood plasma. The redox nature of the NTBI was exploited, and an electrochemical method was developed, optimised and validated using the stripping voltammetry technique to quantify NTBI, which exists in the plasma as iron(III). The preliminary data generated suggests that the electrochemical method has the potential for clinical translation in the future.

Grants Completed continued

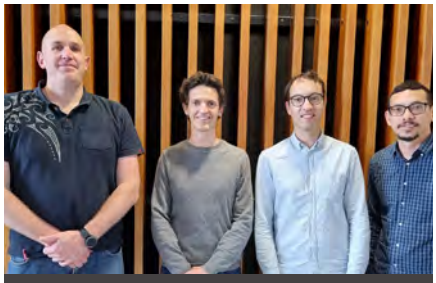
L to R - Dr. EJ Loef, Dr Hilary Sheppard, Dr Vaugan Feisst, Alex du Rand (PhD student), John Hunt (PhD student) (missing Dr Diana Purvis)

GENOME-CORRECTED FIBROBLASTS FOR USE IN 3D SKIN SHEETS ($160,000 - 2 years) 1120018

Dr Hilary Sheppard, Dr Sarah Meidinger, Dr Vaughan Feisst, Dr Diana Purvis

School of Biological Sciences, The University of Auckland

We aimed to develop a genome-engineered, regenerative skin product for people with a fragile skin condition called epidermolysis bullosa (EB). EB is caused by a defect in one of the genes that create the 'adhesive' that glues skin cells together. Although the numbers affected are not large (approximately 150 in NZ), health care costs and impact on the individual are considerable. We recruited five people with EB to this study. Using a small sample of patient skin we have developed methods to repair the defective gene using CRISPR/Cas9 genome engineering. For all donors we have demonstrated that we can "fix" both of the cell types that are present in the skin and use them to generate sheets of full-thickness skin that could be used to permanently cover/treat the chronic wounds of EB patients. In one approach we remove the disease-causing faulty DNA and in another we directly repair the faulty DNA. We are currently testing gene edited skin cells in in vivo models, which is an essential step towards clinical translation. The gene editing methods we have developed can target a range of conditions, including cancer and blood disorders. Therefore, this research has helped to build a genome-editing capability with numerous clinical and research uses.



Dr Kimiora Henare, Associate Professor Stephen Jamieson, Dr Dean Singleton, Dr Tet-Woo Lee

ATOVAQUONE FOR IMPROVED CANCER IMMUNOTHERAPY ($159,275 - 2 years) 1120013

Dr Dean Singleton, Dr Kimiora Henare, Dr Stephen Jamieson, Dr Tet-Woo Lee

Auckland Cancer Society Research Centre, The University of Auckland

Oxygen-starved (hypoxic) regions are found in most solid tumours due to inefficient oxygen delivery by the undeveloped tumour blood vessels and excessive oxygen consumption by proliferating tumour cells. These hypoxic regions are immunosuppressive because they exclude tumour killing immune cells (T cells) and attract and reprogramme immunosuppressive cells (particularly macrophages). While immunotherapy has emerged as a cornerstone of systemic cancer therapy, the presence of these hypoxic tumour compartments, and the immunosuppressive cells they harbour, represents a significant impediment to their activity. In this project we investigated the role that hypoxia plays in shaping macrophage behaviour. Macrophages make up a large proportion of the cells within a tumour. Their plasticity means they can either kill cancer cells (by acquiring pro-inflammatory states) or they can act to promote tumour growth (by acquiring anti-inflammatory/immunosuppressive states). Our research showed that hypoxia causes silencing of certain pro-inflammatory genes, seemingly due to changes in the gene organisation. Loss of these specific inflammatory genes in macrophages confers poorer prognosis for certain cancers and also predicts unfavourable response to immunotherapy. This new understanding supports the development of therapies that can re-oxygenate the tumour as a strategy to decrease hypoxic tumour compartments and restore pro-inflammatory immune cell features.

FUNDED BY: Anonymous donor

Dr Sachin Thakur

PROTECTING THE GUT FROM ISCHAEMIC INJURY ($175,353 – 2 years) 1122006

Dr Sachin Thakur, Dr Anthony Hickey, Prof Anthony Phillips, Prof John Windsor

School of Pharmacy, The University of Auckland

Patients suffering from critical illness frequently experience gut injury that is provoked by reduced blood and oxygen supply. In this project, we designed a new treatment approach to limit both the development and progression of the injury. We were able to successfully use our approach in a laboratory-based model and have published these findings. Following from this, we have worked on continually improving our treatment to allow its use in the clinical setting. Our current focus is to ensure that the designed treatment can reliably travel through and work on the human body. We are also working to maximise the amount of our treatment that we can deliver to the body at once without causing any undue harm. While our research primarily explored the treatment for gut injury in critical illness, we have found that it can potentially be used across a range of injuries that may be caused due to reduced blood and oxygen supply. As a result, we have actively started exploring how the formulation may be used for other types of injury around the body.

FUNDING CONTRIBUTION: N H Taylor Charitable Trust

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Dr Sandar Tin Tin

MEDICATION USE IN BREAST CANCER PATIENTS ($159,253 – 2 years) 1118017, CRF-1118017 ($7,143)

Dr Sandar Tin Tin, Prof Diana Sarfati, Prof Ross Lawrenson, Prof Mark Elwood, A/Prof Ian Campbell, Prof Bruce Arroll, A/Prof Vernon Harvey

Section of Epidemiology & Biostatistics, The University of Auckland

Cancer patients are commonly burdened with comorbidities and often use multiple medications. This may have an impact on their cancer treatments and outcomes. We therefore evaluated the use of prescription medications for non-cancer related indications in women with primary invasive breast cancer, using the data from Breast Cancer Foundation National Register linked to routinely collected data held by the Ministry of Health. Based on this work, we have produced several high quality research outputs (four peer-reviewed journal articles, one more article currently under review and ten conference presentations) to advance our understanding of the effects of medications such as beta blockers and statins on breast cancer outcomes. This particularly involved the excellent work of our PhD student, Oliver Scott, who was also supported by the AMRF doctoral scholarship. As the next step, we are investigating the effects of beta blockers on outcomes from triple negative breast cancer, in collaboration with a researcher from Norway.

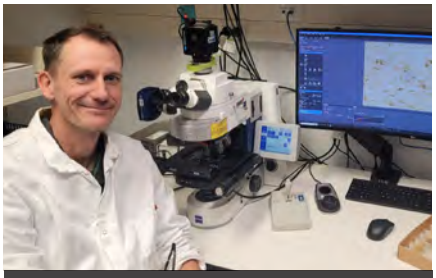
Dr Marie-Louise Ward and Dr Amelia Power in the Muscle Cell Function laboratory

ARRHYTHMOGENIC CALCIUM LEAK IN DIABETES ($158143 – 2 years) 1121010

Dr Marie-Louise Ward, Dr Kenneth Tran, Dr Amelia Power, Prof Peter Ruygrok

Department of Physiology, The University of Auckland

Cyclical changes in intracellular calcium are key to controlling contraction and relaxation of heart muscle cells. For the heart to function effectively the calcium changes must be rapid and precisely synchronised. Increased cellular calcium leads to chamber contraction, and for relaxation chamber filling to occur, calcium must be kept low between heart beats. Previously, we found atrial tissue from consenting diabetic patients had higher levels of calcium between beats than non-diabetic tissue. Such "calcium leak" is arrhythmogenic, impairs relaxation, and requires more energy expenditure. The aim of our study was to better understand the cellular mechanisms associated with impaired calcium cycling in tissue isolated from diabetic hearts. We first used drugs that targeted calcium cycling in arrhythmic muscle preparations and found arrhythmias were prevented when intracellular calcium stores were reduced. We then measured mitochondrial calcium uptake and subjected muscles to protocols that increased energetic demand to see if diabetes disrupted energy supply via impaired mitochondrial calcium. Finally, we investigated the role of the contractile proteins in tissue with permeabilised cell membrane. These data were used to develop computational models which showed key differences in the cellular and tissue function between non-diabetic and diabetic groups.



Dr Guido Wassink

rEPO AND HYPOTHERMIA FOR NEONATAL ENCEPHALOPATHY ($160,000 - 2 years) 1121001

Dr Guido Wassink, Prof Alistair Gunn, Prof Laura Bennet

Department of Physiology, The University of Auckland

Perinatal brain injury from severe oxygen deprivation at birth is the leading cause of neonatal encephalopathy and has a high rate of infant mortality and severe long-term disability such as impaired cognition and cerebral palsy. In New Zealand alone, nearly 70 babies are born with this disorder every year. Therapeutic hypothermia (mild brain cooling) is the only available treatment for these sick infants, but its protection of the brain is partial, and nearly a third of babies still die or survive with disability. New strategies that can further improve brain cooling are needed. Critically, recent research shows that brain inflammation persists after therapeutic hypothermia treatment and contributes to ongoing cell death. In this project we, therefore, investigated whether very delayed therapy with recombinant erythropoietin (rEpo), a pleiotropic hormone with neurorestorative and anti-inflammatory effects, could further improve hypothermia treatment. Our data suggests that delayed rEpo therapy may further improve axonopathy after therapeutic hypothermia, even if it did not further improve hypothermic protection of gross white or grey matter. This is likely mediated by rEpo's anti-inflammatory effect. Further investigation will now focus on the effect on neural EEG transmission and the involvement of signaling interneurons, and the neurorestorative aspect of rEpo.

Prof John Windsor, Prof Anthony Phillips

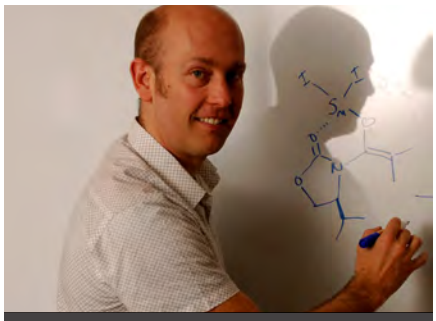
NOVEL TREATMENT FOR ACUTE PANCREATITIS (159,266 - 2 years) 1118007

Prof John Windsor, Dr Jiwon Hong

Department of Surgery, The University of Auckland

Acute pancreatitis is a common gastrointestinal disease, which when severe is associated with systemic inflammation and organ failure. In part these are mediated by toxic changes in gut lymph which includes increased pancreatic lipase and proteases. Orlistat is a lipase inhibitor designed to stay within the gut lumen to induce fat malabsorption and weight loss. This project involved developing a new and patented formulation for orlistat to facilitate preferential uptake into gut lymph to inhibit lipase. In an experimental AP model this gut-lymph targeted treatment with orlistat reduced plasma lipase, improved blood pressure and reduced biomarkers of organ dysfunction (including heart, kidney and liver). This novel approach to treatment now warrants clinical validation studies and might be considered as a potential treatment of other acute and critical illnesses.

AMRF COVID-19 RESEARCH ROUND



A/Prof Daniel Furkert

ANTIVIRAL THERAPEUTICS AND DEVELOPMENT PLATFORM FOR COVID-19 ($74,470 - 12 months) 1720013, CRF-1720013 ($14,240)

Dr Daniel Furkert, Prof Vernon Ward, Mr Dan Fellner, Dr Sung Yan, A/Prof Paul Harris

School of Chemical Sciences, The University of Auckland

AMRF support enabled our team at the UoA School of Chemical Sciences to design and prepare a large series of new drug compounds for potential treatment of COVID-19. The compounds were planned to inhibit a key enzyme found in SARS CoV-2, to prevent its replication and release en route to infection of new cells. Several of the new compounds made in our work were shown to be highly effective against the target enzyme by collaborators at the University of Otago and could be identified bound at the active site of the enzyme in images obtained by crystallography. Due the recent availability of Paxlovid for treatment of COVID-19, the new science derived from our research work has been re-focused into a 5-year MBIE programme led by Prof Vernon Ward, directed towards development of clinical treatments for Norovirus, for which there are no therapeutic treatments or vaccines currently available. Due to our work in the original stages, several promising Norovirus inhibitors have already been identified and will continue to be refined by the MBIE team.

DOUGLAS GOODFELLOW REPATRIATION FELLOWSHIP

CO-DESIGN AND PILOT TRAIL OF A SMARTPHONE APP TO SUPPORT YOUNG PEOPLE WHO SELF HARM ($432,293 – 3 years) 1417001/1417001-1, CRF-1417001 ($11,218)

A/Prof Sarah Hetrick

Department of Psychological Medicine, The University of Auckland

I am incredibly grateful to AMRF for this funding and delighted to provide a final report on the outcomes of this funding: 1. co-design, development and pilot testing of Tune In 2. capacity development enabling co-design and development of additional apps for young people: a. a safety planning chatbot called Bro (co-funded by Ember Innovations); b. a mood monitoring app (co-funded by Faculty of Medical Health Sciences, University of Auckland) 3. HRC funding of an RCT to test Tune In and Bro 4. development of expertise and interventions in the social media space including co-funding from Cure Kids and from Ember Innovations to develop guidelines and a social media marketing campaign for social media 5. establishment of my role as a leading digital and social media suicide prevention expert in Aotearoa New Zealand, and ability to attract significant funding and develop a team to undertake an increasingly large programme of work in this space. I am now the co-director of Te Ata Hāpara Suicide Prevention Research Centre, Faculty of Medical and Health Sciences, University of Auckland and maintain a role as the Principal Clinical Advisor Suicide Prevention at the Ministry of Health 6. a number of publications describing the body of work, including Tune In, are drafted and ready for submission for publication and I will forward these publications when available.

FUNDED BY: Douglas Goodfellow Charitable Trust

THE DAVIS & CARR SENIOR RESEARCH FELLOWSHIP

The Freestone Lab. Tame Vialahi, Dr Jordan Lloyd, Dr Peter Freestone, Bronwyn Riley, Paul Idowu, Chris Carson

PARKINSON'S DISEASE RESEARCH PROGRAMME: TO DISCOVER POTENTIAL NEW THERAPIES FOR PARKINSON'S DISEASE ($375,000 – 3 years) 1718008, **($130,000 – 1 year)** 1722001

Dr Peter Freestone

Department of Physiology, The University of Auckland

Dopamine is a key neurochemical released in the brain. Loss of dopamine or incorrect release of dopamine is at the core of neurodegenerative diseases like Parkinson's disease, and neurological disorders like schizophrenia and ADHD. Understanding what processes regulate dopamine release are key to understanding disease processes and exploring novel treatments. My research uses advanced techniques to measure the release of dopamine and electrical activity of brain cells. We have found that part of the brain called the subthalamic nucleus is key to driving dopamine release in parts of the brain associated with processing sensory information (vision, hearing). Ongoing studies are further investigating this dopamine release to understand how it affects normal processing of sensory information and importantly, how changes to this dopamine release contribute to the non-motor symptoms of Parkinson's disease, and also ADHD and schizophrenia.

FUNDED BY: Estate of Ernest Hyam Davis & The Ted and Mollie Carr Endowment Trust

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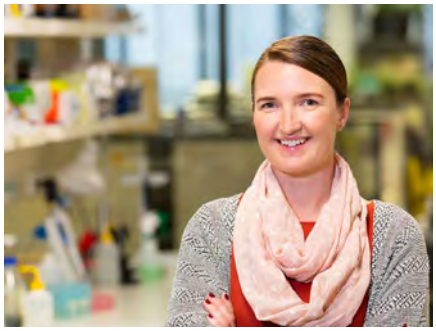
ONE YEAR EXTENSION FUNDED BY: Douglas Goodfellow Charitable Trust

EDITH C COAN RESEARCH FELLOWSHIP



EARLY CHANGES IN FRONTOTEMPORAL DEMENTIA ($198,225 – 2 years) 1317001, **CRF-1317001 ($4,030), ($106,199 – 1 year)** 1720017, **CRF-1720017 ($13,431)**

Dr Brigid Ryan

Department of Anatomy & Medical Imaging, The University of Auckland

FTDGeNZ is a unique, long-term study of a NZ family with genetic dementia. We established the study in 2015 with the aim of identifying the very early changes that are happening before people develop the symptoms of dementia. Our objective is to contribute to the early detection of dementia, thereby enabling successful prevention of symptoms. Funding from AMRF and the Kelliher Charitable Trust has supported us to establish a large cohort of participants from a single family, who are at risk of developing genetic dementia. By measuring potential biomarkers in these participants annually over 7 years, we have identified changes that are happening very early in the disease process, up to 30 years before expected symptom onset. These findings are contributing to the global search for early dementia biomarkers. To date, we have completed over 120 clinical assessments, and measured changes in blood samples, sense of smell, cognition, brain imaging, retinal structure and function, hearing and balance. Our team is continuing to study this cohort to track these changes over time, building up an invaluable dataset.

FUNDED BY: Edith C. Coan Trust and the Stilson Endowment Trust **ONE YEAR EXTENSION FUNDED BY:** Kelliher Charitable Trust

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Kelliher Charitable Trust

KELLIHER CHARITABLE TRUST EMERGING RESEARCHER START-UP AWARDS

Dr Brigid Ryan

Department of Anatomy & Medical Imaging, The University of Auckland

$30,000 – 1718004

Research support for her Postdoctoral Fellowship titled 'Early changes in frontotemporal dementia'.

FUNDED BY: Kelliher Charitable Trust

Kelliher Charitable Trust

Grants Completed continued

AMRF POSTDOCTORAL FELLOWSHIP

Dr Arezoo Malihi (middle) receives Research Impact Award for the Centre for Asia Pacific Refugee Studies with Prof Jay Marlowe (left) and Prof Juliet Gerard (right)

CULTIVATING BETTER MENTAL WELLBEING FOR REFUGEES ($214,184 – 2 years) 1321002

Dr Zarintaj (Arezoo) Malihi

Department of Counselling, Human Services and Social Work,
The University of Auckland

This study has advanced our understanding of mental health service utilisation patterns, main mental health issues, and accessibility challenges for refugees in New Zealand. By highlighting key barriers and disparities, the findings have informed policymakers and stakeholders, paving the way for evidence-based interventions to improve equity in mental health care. The study's insights have catalysed further research, including longitudinal analyses of 1.5 and second-generation refugees to evaluate long-term outcomes of compromised mental health service access. Additionally, gaps in administrative data led to a transdisciplinary research proposal that secured NZ$60,000 in funding. This two-year pilot study will create a tailored survey and conduct qualitative interviews, laying the groundwork for larger studies exploring cultural identity, integration complexities, and well-being using refugees' voices. These investigations build upon the project's foundation, providing an invaluable opportunity to engage with former refugees and service providers. This collaboration ensures that refugees' voices, concerns, and experiences are integrated into New Zealand's health and social policy discussions. I am profoundly grateful to the AMRF funders for their support. Their commitment to research benefiting vulnerable communities has been instrumental to this project's success. This work is a tribute to refugees' resilience and a step toward a more inclusive and equitable society.

RUTH SPENCER MEDICAL RESEARCH FELLOWSHIP

Distinguished Professor Dame Jane Harding (left), Trisha Meagher-Lundberg (ANCHOR Project Research coordinator, middle) and Dr Anthony Walters (right).

LONG-TERM EFFECTS OF ANTENATAL CORTICOSTEROID EXPOSURE ($302,000 - 3 years) 1421003

Dr Anthony Walters

Liggins Institute, The University of Auckland

Antenatal corticosteroids are a recommended treatment for pregnant people at risk of giving birth early (preterm or less than 37 weeks) to reduce the risk of breathing problems and improve survival of their babies. However, little is known about the long-term health effects of this treatment. The goal of this project was to understand the later-life effects of antenatal corticosteroid treatment. The first study in the world to assess the effectiveness of corticosteroids was performed in Auckland between 1969-1974. We followed up 424 of the now 50-year-old children of mothers who took part in that study, using questionnaires and routinely collected data to assess their current health status. Findings have indicated no difference in the risk of diabetes, high blood pressure, high cholesterol or heart disease between those who had the antenatal corticosteroid treatment and those who did not. Asthma, mental health problems and educational achievement also did not differ for those who had received antenatal corticosteroid. This information will help clinicians to counsel parents and whānau of those born preterm and help improve future life-long care of those who receive antenatal corticosteroid treatment.

FUNDED BY: Ruth Spencer Estate

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DOCTORAL SCHOLARSHIPS

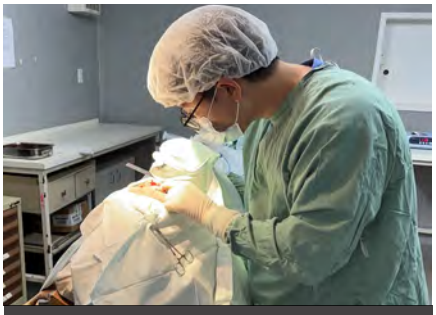
ENZYME-MEDIATED STABILIZATION OF THE BLOOD-BRAIN BARRIER ($128,000 - 3 years) 1217002, CRF-1217002 ($7,000)

Dr James Hucklesby

Department of Pharmacology & Clinical Pharmacology, The University of Auckland

Ischemic stroke is a leading cause of death and disability, for which current treatments are technically challenging and have limited efficiency. During an ischemic stroke, a clot blocks a blood vessel in the brain and the protective layer of brain microvascular endothelial cells (BMEC) loses integrity and begins to leak, allowing toxic blood factors to enter and damage the brain. Current treatments for ischemic stroke work by generating the clot-busting enzyme plasmin to restore blood flow. However, plasmin's effect on the integrity of the BMEC layer remains unknown. To address this, we developed a new BMEC model, the barrier integrity of which could be monitored in real-time using tiny electrical currents. These electrical measurements revealed that plasmin caused the BMEC barrier to leak. Subsequent imaging confirmed this finding, by revealing that plasmin caused a reduction in key BMEC cell junction molecules. Together these observations suggest that plasmin is a major contributor to the loss of BMEC barrier integrity during the treatment of ischemic stroke and suggest that this effect requires consideration when designing future therapeutics.

FUNDING CONTRIBUTION BY: John Jarrett Trust



Sang Ho Kim (PhD candidate) performing a neurosurgical procedure in preparation for implanting the medical device in the brain of an anaesthetised sheep

A NOVEL BRAIN IMPLANT FOR PATIENTS WITH HYDROCEPHALUS ($143,000 – 3 years) 1221005

Dr Sang Ho-Kim

Auckland Bioengineering Institute, The University of Auckland

In my PhD research, I'm part of a collaborative effort to transform hydrocephalus care with a novel wireless brain pressure monitoring sensor. We conducted extensive long-term testing in sheep (over one year) which provided robust evidence of the sensor's accuracy and safety, instilling confidence for its application in the first human trial. My project also delved into the limitations of the current shunt system — the standard treatment for hydrocephalus. The shunt's role is to drain excess brain fluid but often they lead to unnecessary hospital visits due to diagnostic challenges of shunt malfunction. My findings offer a comprehensive analysis of the long-term consequences faced by individuals living with shunts, quantifying the burden associated with them. Importantly, this underscores the clinical imperative for our innovative sensor — a more reliable method to detect shunt failures, which can be life-threatening. Although I had to conclude this project with AMRF earlier than planned due to a scholarship change, the groundwork laid is invaluable. It sets the stage for the upcoming first-in-human trial, a pivotal milestone in my PhD journey. Now, with the support of Health Research Council's fellowship, I am dedicated to progressing this significant work, aiming to alleviate the healthcare burden and enhance the lives of individuals with hydrocephalus.

MODELLING NEWBORN CARDIOVASCULAR DEVELOPMENT ($106,000 – 2 years 6 months) 1220006, CRF-1220006 ($7,125)

Dr Robyn May

Auckland Bioengineering Institute, The University of Auckland

This project aimed to develop computational models of the cardiovascular system for newborn babies and investigate why babies born preterm are predisposed to a greater risk of cardiovascular disease later in life. In our first year, we developed a computational model for a term baby's circulation and in our second year, we began a prospective observational study to collect ultrasound measurements of cardiovascular anatomy and function in newborns, which was greatly affected by the covid pandemic. In our third year, data collection and analysis were completed, and proof-of-concept modelling personalisation completed for one term and one preterm baby. In the final six months of this project, partially funded by the AMRF COVID Relief Fund, our models were personalised for the remainder of the dataset; term and preterm model outputs were analysed; models were calibrated and validated; and, finally, open-source term and preterm computational models were created as a resource for the in silico modelling community. This is the first and largest subject-specific computational modelling study of the cardiovascular system in early life and demonstrates how clinical data and modelling together can provide insights into cardiovascular remodelling related to prematurity.

FUNDED BY: Curtis-Tonkin Paediatric Fund

Grants Completed continued

CARDIOVASCULAR MEDICATIONS AND CANCER OUTCOMES IN NEW ZEALAND ($128,000 - 3 years) 1217004, **CRF-1217004 ($7,000)**

Dr Oliver Scott

Department Epidemiology & Biostatistics, The University of Auckland

Breast cancer is the most common cancer in women and the leading cause of female cancer mortality worldwide. My thesis set out to examine the association between two commonly used cardiovascular medications (beta blockers and statins) and breast cancer outcomes. Preclinical and epidemiological evidence has suggested that these medications may favourably alter the course of breast cancer prognosis. Cohort studies were undertaken for each medication, and several original and unique findings were elucidated, such as the potential for a dose-response relationship for beta blockers. For statins, there was a suggestion of a more protective effect in patients with ER+ tumours, postmenopausal women, and in women with advanced stage disease. Meta analyses were also undertaken for each medication, which showed that any beta blocker use likely does not affect the prognosis of breast cancer. Contrarily, the results for statins showed that they may favourably impact the prognosis of breast cancer, and that lipophilic statins may be more efficacious than hydrophilic statins. It is likely that future clinical trials will be able to fully elucidate the findings presented in my thesis and ultimately provide recommendations on the potential future use of beta blockers and statins as standard adjuvant breast cancer therapies.

FUNDING CONTRIBUTIONS BY: Cardiac/Heart Research Fund; Rose Richardson Estate

SIR HARCOURT CAUGHEY AWARD

Dr Joanna James

Department Obstetrics & Gynaecology, The University of Auckland

$11,664 - 1723001

With the support of the Sir Harcourt Caughey Award, A/Prof Chris Moraes was able to visit New Zealand from the 5th-27th of September 2023. A/Prof Moraes' research at McGill University, Canada focusses on developing precision-engineered culture systems to recapitulate the complex physical and chemical forces experienced by cells/tissues. His trip started by sharing his work on the role that mechanical stress forces play in the formation of the outer cell layer of the placenta at the International Federation of Placenta Associations conference. Following this, A/Prof Moraes spent the rest of his trip in Auckland, with time split between the Department of Obstetrics and Gynaecology and the Auckland Bioengineering Institute, as well as delivering an Award lecture entitled "Microscale tissue engineering: leveraging mechanical feedback loops in building organs-on-a-chip" His time in Auckland was extremely beneficial and productive for all parties and has formed the base for an enduring collaboration. I would like to end the report with a quote from the thank you note left by A/Prof Moraes that encapsulates his appreciation of the award "Thank you so much for making this trip happen. I learnt a TON and had so many outstanding conversations. I find myself quite enthused about so many ideas!".

SUMMIT POSTDOCTORAL RESEARCH PRESENTATION AWARDS

Dr Sien Yee (Sandy) Lau

Department of Obstetrics & Gynaecology, The University of Auckland

$3,000 - 6723001

Thank you to the Auckland Medical Research Foundation for the support of my travel to Columbus, USA and Vancouver, Canada through an AMRF Travel Grant and the AMRF Best Research Presentation Prize at the University of Auckland's Faculty of Medical and Health Sciences Postdoctoral Society annual research symposium SUMMIT 2023. This trip covered a laboratory visit to the Ohio State University School of Engineering and Wexner Medical Center in Columbus, Ohio, USA to visit Assistant Professor Colin Hisey and Associate Professor Eduardo Reátegui to continue to expand this established collaboration. The second part of my visit was to attend the 2024 Society for Reproductive Investigations Conference in Vancouver Canada where I met with several clinicians regarding my research. One clinician, Professor Tony Wen, Chief of the Division of Maternal-Fetal Medicine at the University of Florida, expressed his interest in participation as one of the first sites for human trials when our current research is ready for human therapy trials. Excitingly, my research abstract was rated as the Best Obstetrics abstract at a conference with over 1100 participants. It was wonderful to travel to share some of the amazing research we do at the University of Auckland. Whilst this earns prestige for the University, it also provided me with a stage to introduce myself to researchers in my field in the best possible light and help me begin to build an international network.

Dr Lola Mugisho

Department of Ophthalmology, The University of Auckland

$3,000 - 6722004

I feel honoured to have been awarded the SUMMIT 2022 AMRF Best Research Presentation Award. Due to this award, I was able to support my travel and accommodation costs to attend the International Society for Eye Research (ISER) Biennial meeting that was held from 19 to 23 February 2023 in the Gold Coast, Queensland, Australia. I presented a poster at the conference titled, "Orally delivered connexin43 hemichannel blocker prevents vascular breakdown and inflammasome activation in a mouse model of diabetic retinopathy". My poster was attended by dozens of other conference attendees, and I received several constructive feedback, most of which I have incorporated into my future studies. For instance, Assistant Professor Simon Kaja from Loyola University, Chicago, gave some valuable advice with regards to assessing inflammation in our mouse models. Industry representatives, for example Professor Boris Ferger from Boehringer Ingelheim, also showed great interest in our work. In summary, I successfully connected with valuable colleagues and future collaborators during the conference, thanks to the generous support of the AMRF.

AMRF SUPPORT OF THE WAITEMATĀ DHB HEALTH EXCELLENCE AWARDS

Dr Jacqui Allen

Otolaryngology, Te Whatu Ora Waitematā

$500 - 6719005

Best Oral Presentation (Research) Award at the 2019 Waitematā DHB Health Excellence Awards: The real costs of swallowing complaints in a public health system.

Prof Rita Krishnamurthi

National Institute for Stroke and Applied Neurosciences, Auckland University of Technology

$500 - 6723002

AMRF Best Senior Researcher: Changes in hospital admission for stroke: Findings from the ARCOS studies (1981-2022).

Grants Completed continued

GAVIN AND ANN KELLAWAY MEDICAL RESEARCH FELLOWSHIPS

Dr Erin Cawston

Department of Pharmacology & Clinical Pharmacology, The University of Auckland

$27,044 - 1722006

The travel proposed in my Gavin and Ann Kellaway Medical Research Fellowship was to build upon and advance on my previous research efforts in the field of blood biomarkers to aid in the prediction, diagnosis, and progression of Alzheimer's disease (AD). I was hosted by the University of Gothenburg Neurochemical Pathophysiology and Diagnostics Research Group for advanced training in the field of ultrasensitive blood biomarkers for AD. Additionally, I was able to enhance my international collaborations with experts in this field and present my research at Alzheimer's Association International Conference (AAIC) in Amsterdam, Netherlands. The main project for my fellowship was to determine if there were statistically different amounts of brain-derived blood tau protein across the AD continuum, both cross-sectionally and longitudinally. Through working on this project, I gained crucial experience in the workflow for measuring samples from large cohorts. I learnt several key pre-analytical, analytical, post-analytical and statistical aspects that will aid in my obtaining accurate data for my future studies. While being in the laboratory and carrying out my fellowship projects I was also able to be involved in aspects of method development for bespoke assay creation using Simoa technology. This experience was invaluable, and something I wish to build on this work in the future.

Dr Beau Pontre

Department of Anatomy & Medical Imaging, The University of Auckland

$44,360 - 1719003

This Fellowship was designed to develop skills and knowledge in the role of magnetic resonance imaging (MRI) in radiotherapy. The aim of this Fellowship was to grow research capability in MRI-guided radiotherapy planning and transfer that capability to clinical research in New Zealand. I achieved this spending 10 months with radiotherapy world-leading experts in MR-linacs at the University Medical Centre (UMC) Utrecht, The Netherlands. My research project was to develop and test novel cardiac imaging approaches for cardiac radiotherapy on the MR-linac system that could be performed in the presence of a cardiac pacemaker, and without patients needing to hold their breath. The project involved developing the technique, testing it using a device that simulated breathing and cardiac motion, and then validating it in healthy volunteers scanned on the MR-linac system. I also attended a training course, observed clinical sessions with patients being treated on the MR-linac, and presented my work at various research group meetings. The combination of my acquired knowledge and skills, collaborations with international experts, and a growing reputation for research, is the ideal foundation from which to obtain funding and local support to develop my professional reputation as a local expert in MRI-guided radiotherapy research as well as build research capability in this field.

AMRF SUPPORT OF THE TE WHATU ORA COUNTIES MANUKAU RESEARCH WEEK

Elaijah Tuivaiti and Hemi Young

Kidz First Hospital,
Te Whatu Ora Counties Manukau

$1,000 - 6722006

Best Oral Presentation Award in Population Health at the 2022 Te Whatu Ora Counties Manukau Research Week: Achieving Pae Ora for children surviving injury: a call to action.

AMRF SPONSORSHIP OF THE 2024 NEW ZEALAND MEDICAL STUDENT'S ASSOCIATION ANNUAL CONFERENCE

Ms Parnia Naeimasa
MBChB Programme, The University of Auckland

$750 - 6724002

Mr Tamin Rezai
MBChB Programme, The University of Otago

$750 - 6724003

HEALTHEX EMERGING RESEARCHER AWARDS

Mr Wenxuan Chen
Department of Molecular Medicine & Pathology, The University of Auckland

$2,000 - 6721005

I was awarded the 2021 AMRF Doctoral Oral Presentation Runner Up Award, recognising the quality and significance of my research presentation. The original intent of the award was to cover the travel costs associated with attending a conference; however, due to the unprecedented challenges posed by the COVID-19 pandemic, the funds were redirected to support my research project, covering the cost of research materials and laboratory supplies. This financial support facilitated a crucial experiment of my project, contributing to its successful execution and furthering its impact. The flexibility of the funds was beneficial to the smooth progression of my research endeavours during the unprecedented circumstances. Importantly, the recognition from this award has elevated the visibility of my work within the academic community. This not only boosts my confidence as a researcher but also enhances the credibility of my research program. I would like to thank AMRF and its donors for bringing their continued support and recognition to emerging researchers. This award holds particular significance within my academic journey.

Miss Vanshika Chinchalkar
Department of Physiology, The University of Auckland

$2,000 - 6720003

I was awarded the "Best Poster" prize at the 2022 HealtheX conference which consisted of a generous travel grant from AMRF. This funding allowed me to present my research at the Australasian Auditory Neuroscience Workshop (AANW) in Melbourne and network with likeminded researchers from various parts of the world. By being able to participate and present at AANW, I was provided a platform to disseminate findings and engage with peers in the field of audiology. Presenting my research outcomes facilitated valuable discussions and networking opportunities as well as discovering collaboration potential. Furthermore, the conference offered insights into emerging trends and advancements in auditory diagnostics, enriching the research program with new perspectives and methodologies. Being a student, I have been able to attend local conferences in the past, however through the AMRF awarded travel grant, I was able to take part and present at a conference which not only helped gain valuable insight in my field of interest, but it also pushed me out of my comfort zone and helped build confidence in my presentation skills. Participation in the conference allowed for invaluable experiences and ultimately contributing to the advancement of my research program by helping me both personally and professionally and I would again like to thank both HealtheX and AMRF for this award.

Grants Completed continued

Dr Robyn May

Auckland Bioengineering Institute, The University of Auckland

$3,000 - 6721004

I would like to thank the Auckland Medical Research Foundation and their donors for the Outstanding Emerging Researcher Award for HealtheX 2021. This travel award funded an unforgettable research trip to Europe. I attended the Virtual Physiological Human (VPH) Institute conference in Porto, Portugal. This was my first opportunity to present in-person at an international conference, and I received positive feedback and thoughtful insights at critical early stages of my computational modelling project. Useful activities at the VPH conference included the opportunity to chair a session alongside an experienced academic, a "meet the mentor" lunch where I had a fascinating conversation about the European in silico modelling regulatory landscape and a chance to connect in-person with my colleagues on the VPH Student Committee. Following this, I had a research visit at the University of Trento in Northern Italy. A/Prof. Lucas Muller graciously hosted me in the Department of Mathematics where we collaborated on adding 1D extensions to my 0D models of the newborn cardiovascular system. Once again, I would like to offer my sincerest gratitude to the AMRF for a trip that allowed me to broaden my research networks, build confidence presenting and, most importantly, was so much fun that I knew for sure then that a career in research is the right choice for me.

Miss Alana Whitcombe

Department of Molecular Medicine & Pathology,
The University of Auckland

$2,000 - 6719003

2019 AMRF Doctoral Oral Presentation Runner Up: The Group A Streptococcus antigen SpnA, combined with bead-based immunoassay technology, improves streptococcal serology.

Miss Phoebe Burns

Auckland Cancer Society Research Centre,
The University of Auckland

$2,000 - 6721006

2021 AMRF Best Poster Presentation Award: Investigating the influence of hypoxia on cGAS-STING signalling in macrophages

ALL HEALTHEX AWARDS FUNDED BY: Wellington Sisters Charitable Trust

with you for generations to come Public Trust

AMRF makes a commitment to openness on the use of animals in health research.

The Auckland Medical Research Foundation recognises that animal research is essential for discoveries to improve the health and well-being of humans and makes vital contributions to understanding biological and disease processes. Some of the research projects funded by the Foundation may involve animals.

The Foundation is a signatory of the Openness Agreement on Animal Research and Teaching in New Zealand, developed by the Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART). As a signatory we commit to better inform people about the use of animals in research through our website and communications.

It is a requirement of the Foundation that the institution or organisation that contracts any AMRF-funded researcher ensures research projects meet all current ethical codes and legislation concerning the use and welfare of animals in research and including the legislatively required implementation of the Three Rs (replacement, reduction and refinement of animal use).

anzccart HUMANE SCIENCE SUPPORTER Openness Agreement on Animal Research and Teaching in New Zealand

CELEBRATING AMRF ALUMNI

2024 marked a year of heartfelt farewells at AMRF.

In June 2024 we farewelled Professor Peter Browett, and acknowledged his extraordinary contribution to AMRF, after dedicating an incredible 35 years of voluntary service to our Board and Medical Committee.

After graduating from the University of Otago Medical School, Peter pursued his postgraduate training in clinical and laboratory haematology in Auckland; joining the AMRF Board and Medical Committee in 1989 at a time when the highest grant AMRF awarded was $90,000.

By 1998, Peter's clinical research career had moved ahead in leaps and bounds when he first took up the mantle of Acting Chair of AMRF's Medical Committee.

In 2005, during AMRF's 50th anniversary, Peter once again took on the role of Acting Chair and in October 2007, became the permanent Chair, a role he embraced with commitment and verve.

Bruce Cole, Chair of the Board during that time, aptly described Peter's appointment: "It is symptomatic of the Foundation's strength that Peter, and busy people like him, are prepared to give generously of time and effort without thought of reward, other than advancing the cause and practice of research."

Peter continued to selflessly gift his time, boundless expertise and charismatic persona for a further 17 years as Chair, only retiring from the AMRF Board and Medical Committee when he needed to start reducing the number of commitments he had contributed to during his illustrious career.

We are so thankful to have had the honour of working with Peter for the last 35 years. His tenure at AMRF and his contribution to medical research have created a lasting impact on countless lives.

After 27 years of voluntary service on the Medical Committee—with 16 of those on the board—Professor Peter Thorne stepped down, leaving behind a legacy that will continue to shape the Foundation for years to come.

Peter joined AMRF in 1997, bringing with him not only an extraordinary depth of knowledge in auditory neuroscience, but also a quiet wisdom, generosity, and unwavering commitment to advancing medical research. His academic journey began at the University of Auckland, where he earned his PhD and later undertook post-doctoral studies, also spending time at the prestigious Kresge Hearing Research Institute at the University of Michigan.

Throughout his career, Peter's work focused on the mechanisms, diagnosis, and treatment of inner ear disorders; creating deeper understanding of sensorineural deafness and noise-induced hearing damage.

Beyond his research, Peter's contributions to education and public health have included co-leading of the Aotearoa Brain Project; being a Director of the Eisdell Moore Centre for Hearing and Balance Research helping to introduce New Zealand's national newborn hearing screening programme.

Peter's distinguished service was recognised with the awarding of a Companion of the New Zealand Order of Merit (CNZM) in 2009.

AMRF and the research community have been the incredibly fortunate recipients of Peter's compassion, vision and dedication, along with the entire hearing health landscape of Aotearoa New Zealand.

ROTARIAN GALA TO SUPPORT MEDICAL RESEARCH

The Rotary Club of Auckland Harbourside Organising Committee

The Rotary Club of Auckland Harbourside generously selected AMRF as the primary beneficiary of their 2024 Chinese New Year Charity Banquet Dinner.

In December 2023, seven years on from a fundraiser ball that raised $70,000, the Rotary Club of Auckland Harbourside were in touch with exciting news: AMRF was again the nominated beneficiary of their highly-anticipated 2024 Chinese New Year Charity Banquet Dinner.

Donald and Jennie Sew-Hoy, co-Chairs of the Rotary Chinese New Year Committee, together with a team of Rotarians, spend months every year planning and coordinating this prestigious event. Donald and Jennie are well known for their philanthropy and in 2015 Donald was awarded 'Senior New Zealander of the Year' for his community and charitable initiatives.

On 9 March, their hard work and tireless efforts paid dividends when 270 Rotarians, esteemed guests, and dedicated supporters of AMRF gathered at the Grand Harbour Restaurant for a most memorable evening. The night was full of delights with attendees being treated to an incredible feast and captivating live performances, including mesmerising lion dancers, a masterful face changer, and a gifted vocalist.

Another highlight of the night was the auction and raffle, featuring numerous items generously donated by supporters: a remarkable replica of Sir Edmund Hillary's pickaxe, an exclusive lunch experience with Deputy Mayor Desley Simpson and Peter Goodfellow at Baduzzi Restaurant, and a one-of-a-kind 3D-printed chess set crafted at The University of Auckland's CDAM Lab specifically for this event, were just some of the many wonderful items available on the night.

Professor Peter Browett, Chair of the AMRF Medical Committee and Board member, took to the stage to share insights into the strides being made in cancer research, emphasising the pivotal role AMRF funding has played in driving these advancements forward.

With immense gratitude, and thanks to the efforts and dedication of Rotary Club volunteers, AMRF received $40,000 from the evening's proceedings at a special presentation during the the club's meeting in June.

"We couldn't be more happy with our relationship with this Rotary club over the years and are so grateful to the Rotarians and supporters who contributed so much to make this event a success, said Sue Brewster, AMRF Executive Director.

"It's wonderful to work with organisations that understand the power of medical research and this donation will help researchers working so hard to create medical advancements that provide a better quality of life for days, years and centuries to come."


L to R: Peter Goodfellow, Johnny Cheung, Praew Malaivongse and Deputy Mayor Desley Simpson.

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2024 ANNUAL RESEARCH AWARDS

Donors, stakeholders, partners and family members joined us in recognising our scholars, fellows and special award recipients.

The 2024 Research Awards recognised our scholars, fellows and special award recipients and celebrated the breakthroughs they are making in medical and health science. It was also the opportunity to continue raising support for our the Futures Fellowship Fund (FFF) initiative, designed to sustain our mid-career researchers at a critical point in their career.

To find out more about the Futures Fellowship Fund and how you can help, please contact Sue Brewster, Executive Director on sue.brewster@medicalresearch.org.nz or call on 09 923 1701 or 027 569 7777.

Financial Highlights 2024

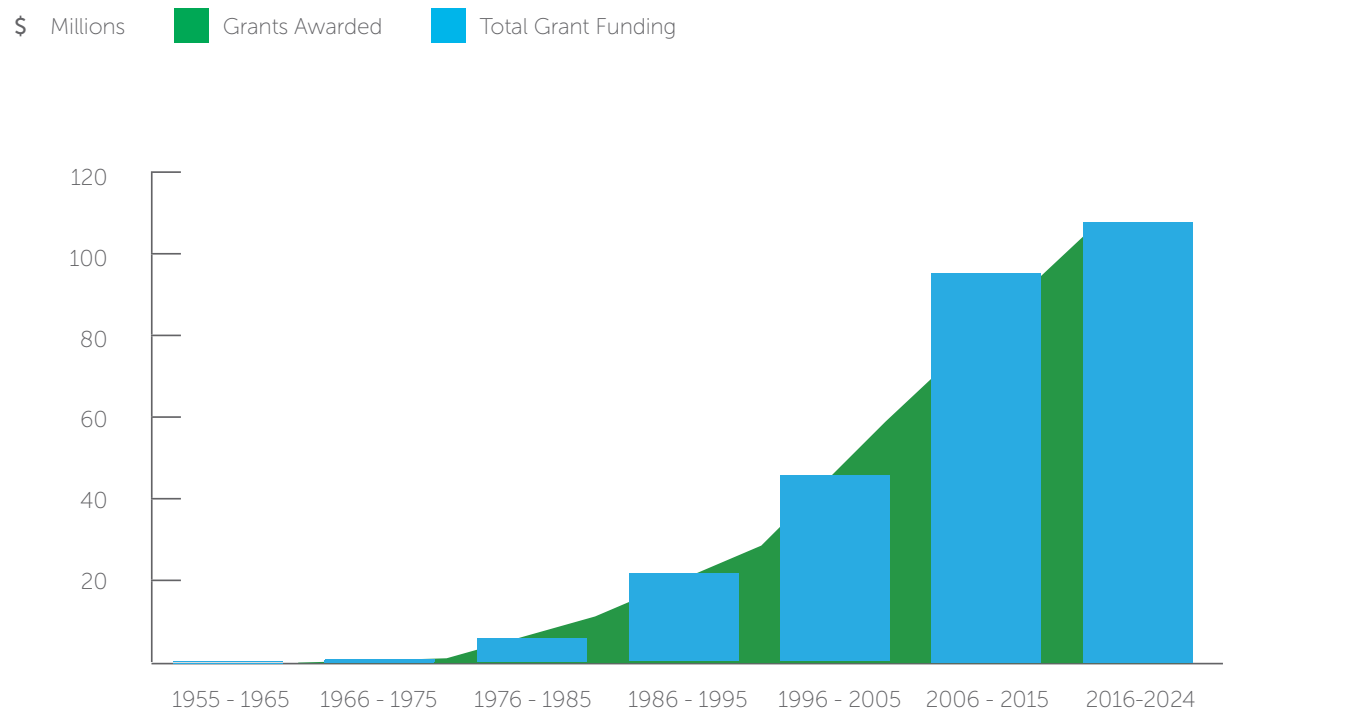
RESEARCH FUNDING 2024 $4.42 MILLION TOTAL RESEARCH FUNDING SINCE 1955 $100.6 MILLION

FINANCIAL PERFORMANCE

	Note	2024 $		2023 $	
Revenue					
Donations/Research Income	1	1,846,900		1,877,736	
Investment Income (Total Return)	2	11,001,090		8,365,585	
Other Comprehensive Revenue / (Expense)	1	1,915,171		3,046,014	
Total		**14,763,161**		**13,289,335**	
Expenditure					
Operational expenses		610,286		559,712	
(Less Donation)	3	(610,286)	-	(559,712)	-
Net Research Grant Expenditure	4	3,864,345		3,572,136	
Net Surplus / (Deficit)		**10,898,816**		**9,717,199**	
Trust Equity		**82,715,239**		**71,816,423**	

The summary financial highlights above have been extracted from the Audited Financial Statements which can be obtained by contacting the Foundation's office, or via Charities Services www.charities.govt.nz

AMRF GRANT FUNDING 1955 - 2024



Notes to the 2024 Financial Report

1. Donation & Research Income includes grants, donations (general and specific use), trust distributions and external funding received from the following organisations:

Perpetual Guardian Administered Funds	
The Edith C Coan Trust	120,000
John A Jarrett Trust	40,000
C E Lawford Estate	3,493
The Peter & Jenny Vincent Trust	40,000
Rose Richardson Estate & Trust	37,409
The John & Poppy Stilson Endowment Trust	100,000
The NH Taylor Charitable Trust	18,000
Thomson Charitable Trust	15,000
The Room Simmonds Charitable Trust	15,000
The Ted & Mollie Carr Travel Fund	29,400
The Ernst Hyam Davis / Ted & Mollie Carr Trusts	70,000

Public Trust Administered Funds	
Acorn Charitable Trust	7,690
The Audrey Simpson Trust Fund	6,750
Ralph Dingle Trust	2,320
Pauline Gapper Charitable Trust	7,500
The Reed Charitable Trust	10,000
Wellington Sisters Charitable Trust	8,000

Other Trusts/Funds over $10,000	
Anonymous	600,000
Douglas Goodfellow Charitable Trust	100,000
The Goodfellow Foundation	309,586
The JI Sutherland Fund	30,000
Marion Ross Memorial Fund	42,225
The Kelliher Charitable Trust	25,000
Dr Y K Tseung Memorial Trust	50,563
Rotary Club of Auckland East	40,000
Paul Stevenson Memorial Trust	25,000
G & F Green	20,000

2. Investment Income (Total Return)

AMRF Investments are held in a series of Custodial Managed Funds, with all investment income recorded on a Total Return basis. Portfolio Total Income includes: all direct income (interest and dividends), investment management fees and annual portfolio gains or losses which are recorded via the Statement of Financial Performance.

Following the global investment market decline of 2022, the AMRF investment portfolio has seen significant recovery, and continues to report strong performance thanks to the skill of our Investment Managers.

3. Operational Expenses

The Foundation is grateful to the Harry, Hector, Douglas, and TB Goodfellow Funds for the ongoing funding of operational expenses.

4. Research Funding Awarded 2024

PROJECT GRANTS (15)	2,407,896
POSTDOCTORAL FELLOWSHIPS (1)	279,294
DOCTORAL SCHOLARSHIPS (4)	595,000
AMRF TRAVEL GRANTS (45)	166,460
OTHER GRANTS	
UoA / AMRF Senior Research Fellowship	100,000
Douglas Goodfellow Medical Research Fellowship	260,000
Douglas Goodfellow Repatriation Fellowship	482,188
Gavin & Ann Kellaway Travelling Fellowship (2)	65,187
Sir Harcourt Caughey Award (2)	43,538
HealtheX Emerging Research Awards (3)	7,000
NZ Medical Students Association (NZMSA) (2)	1,500
Summit Award	3,000
Te Whata Ora Award (2)	2,000
Research Network Fund	2,495
TOTAL GRANT FUNDING 2024	4,415,558
Less amounts allocated but not required	
NET GRANT EXPENDITURE 2024	**4,415,558**

Other Comprehensive Revenue including: Legacies, Bequests and Capital Gifts

Estate of Mrs J Goodfellow	Dwerryhouse Estate
Estate of Mrs N Stevenson	Douglas Goodfellow Charitable Trust
Estate of Mary Harrison	Aotea Group Holdings Ltd
Estate of J M Hanna	Helen Goodwin
Estate of L M Corkery	James Mutch
Estate of M R Till	

Special Acknowledgements

WE ARE MOST GRATEFUL TO ALL THE INDIVIDUALS, TRUSTS AND ORGANISATIONS LISTED WHO HAVE GIVEN GENEROUS SUPPORT TO THE FOUNDATION DURING THE YEAR.

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Chan, Rebbeca and David
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Gibson, Debbie
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LEGACIES, SPONSORS, CAPITAL GIFTS & FUNDING PARTNERS 2024

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Douglas Goodfellow Urology Fund
Gooduck Charitable Trust
The Kelliher Charitable Trust
The JI Sutherland Fund
Marion Ross Memorial Fund

Capital Partners / Funds in Perpetuity

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Hugh Green Fund
Gavin & Ann Kellaway Fund
W & WAR Fraser Fund
Sir William Goodfellow Fund
GS Blanshard Fund
Doug Brown Fund
Sir Harcourt Caughey Fund
Sir Henry Cooper Fund
LH Corkery Fund
MJ Merrilees Fund
Sir Douglas Robb Fund
Sir Lewis Ross Fund
Brian Jones Fund
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MRI ERD Trust Fund
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Douglas Goodfellow Fund
David Christie Fund
Curtis-Tonkin Paediatric Fund
Hugo Charitable Trust Fund
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Noel & Heather Davies Fund
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Thanks also to our benefactors who wish to remain anonymous.

Thank You!

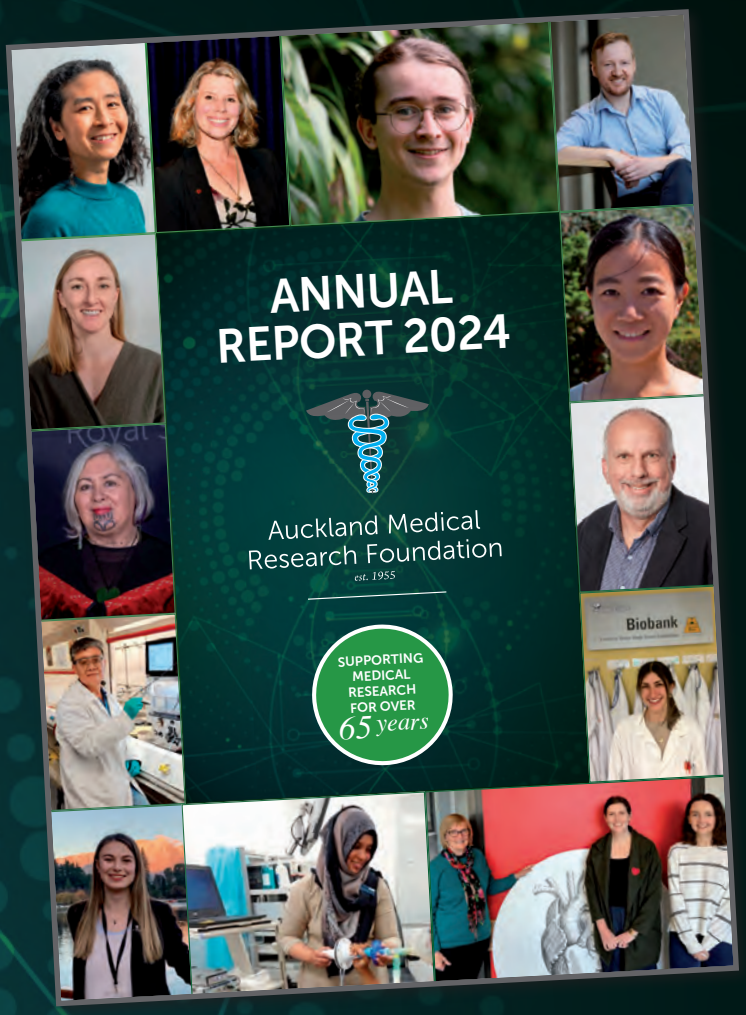
The cover photos of this annual report showcase some of the remarkable people whose work you have enabled – be it researching for more effective treatments, better understanding of how to prevent a specific disease or disorder, improved ways to reduce medical trauma or just enhancing overall health outcomes for us all.

Front cover, clockwise from top left:

- Dr Jacelyn Loh, Project Grant, page 10 & 13
- Dr Anna Miles, Project Grant, page 11
- Jayden Gibson, J.I. Sutherland Doctoral Scholarship recipient, page 6
- Dr Christopher Lear, Project Grant, page 9
- Dr Catherine (Jia-Yun) Tsai, Project Grant, page 12
- Prof Mark Vickers, Project Grant, page 13
- Kate Hitpass Romero, AMRF Doctoral Scholarship, page 7
- From left to right: Dr Marie Ward, Dr Amelia Power, Amanda Groenewald, Project Grant, page 13
- Shakeela Saleem, Project Grant, page 11
- Greer Pugh, AMRF Doctoral Scholarship, page 7
- Dr (Leon) Guo-Liang Lu, Project Grant, page 10
- Dr Tess Moeke-Maxwell, Project Grant, page 26
- Dr Renee Handley, Project Grant, page 9

Back cover, clockwise from top left:

- Dr Mikaela Garland, Douglas Goodfellow Medical Research Fellowship, page 8
- A/Prof Suresh Muthukumaraswamy, Project Grant, page 10
- Prof Raina Fichorova (left) with Dr Augusto Simoes-Barbosa, Sir Harcourt Caughey Award, page 14
- Dr Cervantée Wild, Douglas Goodfellow Repatriation Fellowship, pages 4 & 15
- From left to right: Dr Lynn Sadler, Dr Meghan Hill, Dr Jordon Wimsett, Project Grant, page 12
- Ann Anson, AMRF Best Student/Emerging Research Award at 2024 Aotearoa Clinical Trials Te Whatu Ora Counties Manukau Research Week, page 15
- Dr Jennifer Barrowclough, Project Grant, page 9
- Dr James Morse, Gavin and Ann Kellaway Medical Research Fellowship, page 14
- Dr Marta Seretny, Gavin and Ann Kellaway Medical Research Fellowship, page 14
- Dr Ayah Elsayed left with Dr Hannah Gibbons (AMRF Research Programme Manager), AMRF Best Presentation Award at 2024 SUMMIT Postdoctoral Research Symposium, page 15
- Dr Justin Dean (middle) and colleagues, Project Grant, page 23



HOW YOU CAN HELP TO CHANGE LIVES

Imagine a healthier tomorrow.

We all know how medical research has impacted our lives and it's almost unthinkable to imagine a world without it. No cure for smallpox, no vaccine for influenza, no life-saving organ transplants - and the list goes on.

You would have read about the loss of Dr Peter Freestone, pictured below. This is a poignant reminder of what can be lost when researchers don't receive the funding they need to continue their lifetime of work.

Your support, no matter the size, truly makes a difference.

There are so many ways you can support our researchers: become a member, donate, leave a legacy gift, set up a regular contribution or support our Futures Fellowship Fund - a permanent fund dedicated to helping mid-career researchers at a critical point in their journey.

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PREDICTING OUTCOMES IN HEART FAILURE PATIENTS

Dr Crossman's research group has previously identified an understudied protein called collagen-VI and shown its involvement in the pathology of the failing human heart. Mutation of this protein results in muscular dystrophy. Notably muscular dystrophy patients often developed heart failure.

To understand the function of collagen-VI, the researchers generated a rat model that lacks this protein. Functional assessment with echocardiography demonstrated the heart of these animals has reduced contractile function. Analysis of muscle cell function demonstrated that there is a profound disturbance in the calcium signalling that controls muscle contraction and that these changes can lead to heart arrhythmia.

Importantly, these results resemble changes in calcium signalling that occur in muscular dystrophy caused by mutations in the protein dystrophin suggesting the same protein complex is involved.

Dr Crossman's team used a super-resolution imaging method called STED microscopy with 30 nm resolution to identify collagen-VI's spatial location in rat heart. STED microscopy demonstrates that collagen-VI is within the molecular binding distance of biglycan, a protein that is part of critical structural and signalling unit in normal functioning cardiac muscle cells. This image is a confocal micrograph showing the co-localisation of collagen VI (green) and biglycan (red) in rat heart.

Future studies will now use this animal model to better understand the role of collagen-VI in heart failure. Read more on page 22.

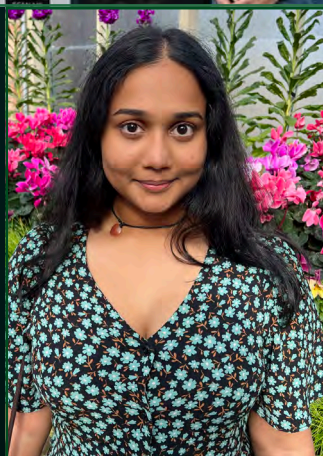
Image courtesy of Dr David Crossman, Department of Physiology, The University of Auckland











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