Childhood Leukaemia: One family’s journey

The AMRF thanks Ursula Elliott for sharing her daughter Kiriana’s story of her leukaemia diagnosis and treatment.

In March 2015 our lives were turned upside down. Kiriana woke up one morning with a sore ankle and was not her usual self – she was tired and worn down. Being the youngest of 4 we told her it would come right but after a couple of days it wasn’t coming right.

Kiriana had managed to do her jazz exam and her afternoon gymnastics but she was still limping. I took Kiriana to our GP who thought it may be a sprained ankle with a virus on top. We decided to do a blood test and an X-ray but nothing showed up.

Another 2 weeks went by and Kiriana was not improving. She was managing to get through the day but by the end of each she was just so exhausted. She was also starting to get small red dots on her hands – I learned later this brusing is called petechiae – and sore finger joints. I didn’t realise at the time that these were symptoms of leukaemia.

I knew of a friend’s daughter who had similar symptoms but she was diagnosed with juvenile rheumatoid arthritis. So I booked Kiriana into a rheumatologist! We managed to get an appointment around 3 weeks after Kiriana started getting sick.

That doctor knew we weren’t in the right place so she sent us straight to Starship for further tests. Not once before did I ever think Kiriana had cancer. The next morning when our rheumatologist came back to us with the results. She calmly advised me that we would be seeing a haematologist. I still didn’t click.

The rheumatologist had a feeling Kiriana had leukaemia, and she was right. Kiriana was officially diagnosed the weekend before Easter 2015.

That was the worst day of our lives and a bit of a blur those first few weeks. But Kiriana has been the most amazing little patient. Kids are just so resilient and tough. We have met some amazing kids along the way.

We are also blessed to have the best nurses and Doctors from Starship that have helped Kiriana get to where she is now. They have made our journey as comfortable as they can. They are absolute legends having to work in this environment where kids are suffering and are in pain.

We are also very lucky to have Dr Andy Wood who has been our primary doctor throughout Kiriana’s treatment. He always has a smile and is so honest, caring and kind. He has really looked after Kiriana so well and always gives just the right advice we need to get us through some of the tougher times during treatment.

We can’t believe it but on the 28th of May 2017 will be the end of Kiriana’s treatment! Our family will be so relieved for her to enter remission, and we will all be hoping for no recurrence.

We would like to thank Dr Wood, his fellow Oncologists and all the amazing nurses and frontline staff. Thank you so much!

Read more inside about Dr Andy Wood’s research into treatments for childhood leukaemia.

AMRF Free Public Lecture

The Auckland Medical Research Foundation invites you to attend our free public lecture:

Childhood Leukaemia: Why do treatments fail?
Dr Andy Wood
Dept of Molecular Medicine & Pathology, Faculty of Medical & Health Sciences, The University of Auckland

7 PM, Thursday, 1 June 2017
AMRF Auditorium - Ground Floor, Faculty of Medical & Health Sciences, University of Auckland, 85 Park Road, Grafton, Auckland

To register phone 09 923 1701 or email amrf@medicalresearch.org.nz
GRANTS AWARDED FROM PREVIOUS GRANT ROUNDS
2016 Grant Round Awards Total $2,314,926 in second half of year

The Auckland Medical Research Foundation continued to see a high number of quality grants received by the Medical Committee for consideration in the second half of the year. Grants were awarded in a variety of biomedical, clinical, and population health research areas including Cancer; Cellular and Molecular Biology; Infection and Immunity; Neuroscience; Population Health; Psychology; Reproduction, Development, Maternal and Newborn Health; Sensory Sciences; and Musculoskeletal Science. The successful grants included 12 research projects, 1 Postdoctoral Fellowship, 4 doctoral scholarships, 1 Douglas Goodfellow Repatriation Fellowship extension, 2 Kelliker Charitable Trust Emerging Researcher Start-up Awards and 11 travel grants for researchers to present their research at international conferences.

A selection of grants is summarised below:

BRIAN DE LUEN DOCTORAL SCHOLARSHIP
UNDERSTANDING GABA SIGNALLING IN HUMAN PERICYTES IN HEALTHY AND ALZHEIMER’S DISEASE BRAINS ($111,500 - 2 years, 5 months)

Mr Karan Govindpani Dept of Anatomy and Medical Imaging, University of Auckland

Alzheimer’s disease (AD) is a common neurodegenerative disorder, and the leading cause of dementia in elderly patients. It is well-known that the brain vasculature is severely affected in AD, often years to decades before the appearance of clinical symptoms. Pericytes are cells that wrap around small blood vessels in the brain, causing them to expand or contract to change blood flow. The neurotransmitter y-aminobutyric acid (GABA) is present at high levels in the healthy brain and has a range of important functions, including the regulation of neuronal excitability. However, the GABA system may become dysfunctional in AD. Since GABA regulates blood flow, we are interested in determining whether GABA may exert this role through contractile pericytes. In this study, we will attempt to detect and locate components of the GABA neurotransmitter system in pericytes and other cells of the brain circulatory system, and to study whether these are altered in AD. In addition, we will test the responses of pericytes to drugs that target the GABA system, with the aim of trying to compensate for changes that we might detect in AD. This research will help to determine whether GABA dysfunction contributes to vascular changes in AD.

FUNDED BY: Brian De Luen Estate

Karan Govindpani and his supervisor Dr Andrea Kwakowski

DOCTORAL SCHOLARSHIP
CORTICAL EXCITATION-INHIBITION BALANCE IN HEALTH AND DISEASE ($87,000 - 2 years)

Ms Rachael Sumner Dept of Psychology, University of Auckland

Despite the widespread prevalence of depression, currently accepted treatments do not work for approximately one third of patients. One of the key reasons for this is that there remains a fundamental lack of understanding of the biological basis and causes of depression. Continuing advancement in brain imaging techniques provide potentially valuable new methods for measuring biomarkers of central nervous system diseases. Biomarkers can potentially be used for understanding the causes of diseases and for the prediction and evaluation of treatment outcomes. The application of brain imaging techniques for measuring biomarkers of depression will allow new mechanistic insights into the disease process that have not been possible in the past. The main aim of this research is to investigate the use of electroencephalography (EEG) to measure biomarkers of cortical excitation/inhibition and neural plasticity in depression. Reduced neural plasticity has been implicated in a number of brain based disorders, including depression. By targeting visual and auditory evoked neural activity this project will explore how measuring changes in sensory neural plasticity could be used as biomarkers of general brain health in depression.

FUNDED BY: NH Taylor Charitable Trust

POSTDOCTORAL FELLOWSHIP
EDITH C COAN RESEARCH FELLOWSHIP & KELLIHER CHARITABLE TRUST EMERGING RESEARCH START-UP AWARD

ENDOSCOPIC MAPPING OF GASTRIC SLOW WAVES ($199,473 - 2 years)

Dr Timothy Angeli Auckland Bioengineering Institute, University of Auckland

The mechanical contractions that are responsible for breaking down and transporting food through the gastrointestinal (GI) tract are initiated and coordinated by underlying bioelectrical events, termed ‘slow waves.’ In the healthy stomach, slow waves propagate in a routine, highly-organised pattern down the stomach. Abnormal slow wave patterns, termed ‘dysrhythmias,’ have been associated with many digestive disorders, where patients suffer frequent debilitating symptoms including abdominal pain, bloating, nausea, and vomiting. Diagnosis of digestive disorders can be difficult, causing frustration for patients and clinicians, and current approaches for detecting the spatially-complex GI dysrhythmias require surgery. To address this clinical problem, I aim to develop and validate endoscopic (down the throat) gastric electrical mapping as a minimally-invasive technique for diagnosing gastric dysrhythmias, where a custom-designed electrode array will be applied to the inside of the stomach to map slow wave activation patterns. A safe and effective approach for endoscopic delivery will be developed, and the accuracy of the endoscopic electrical recordings will be verified intraoperatively against highly-validated but surgically-invasive recordings. Finally, minimally-invasive gastric mapping will be validated in patients undergoing routine endoscopy. Altogether, this project has the potential to deliver a novel diagnostic approach for debilitating digestive disorders.

FUNDED BY: Edith C Coan Trust and Kelliker Charitable Trust

Rachel Sumner with an EEG cap

Your family trust or estate can support a named scholarship or project. Ask us how!
Why do childhood leukaemia treatments fail?

Acute leukaemias are a group of aggressive cancers that arise from blood cells. These cancers were universally fatal, but with modern therapy the majority of children survive – a true marvel of modern medicine. However, not every type of acute leukaemia has enjoyed such dramatic improvements in survival. The acute myeloid leukaemias (AML) are the most diverse group of leukaemias. Despite this diversity, we treat the majority of AML the same way and AML treatment protocols have barely changed over thirty years...so we achieve essentially the same results. To the field’s frustration, treatment paradigms that worked in other cancers have frequently failed patients with AML. How do we overcome these roadblocks?

Cancer is caused by the stepwise accumulation of mutations in DNA causing blood cells to divide and grow excessively. For the first time, we can routinely catalogue these mutations for an individual patient. However, we are only beginning to decipher the avalanche of genetic information. Key questions are emerging: How are these mutations cooperating to initiate and maintain this particular leukaemia? And how is chemotherapy resistance created?

In my work, I try to answer these questions by creating new models of leukaemia at the University of Auckland. We hope these models will allow us to watch how mutations cooperate to cause cancer and defeat chemotherapy, like studying a slow-motion replay to see exactly why the other side scored a try, and understand why we lost. We hope this information will allow us to ultimately develop gentler and more effective therapies.

“The prestige of the award and the reputation of the AMRF review process are instrumental in helping to attract other research funding to carry on this project.”

Dr Andrew Wood is the recipient of the Auckland Medical Research Foundation’s 2013 Douglas Goodfellow Repatriation Fellowship. He is a graduate of the Auckland School of Medicine and a New Zealand trained paediatrician with subspecialty training in haematology-oncology (FRACP 2010). In 2007 he was a researcher and clinician at the Children’s Hospital of Philadelphia, a world renowned centre for child and adolescent health that receives more NIH funding than any other children’s hospital. He entered the US as a Fulbright research scholar supported by Genesis Oncology Trust, an AMP scholarship, and the Child Cancer Foundation. Upon returning to New Zealand he took up appointments at Starship Children’s Hospital and University of Auckland’s Department of Molecular Medicine & Pathology.

Research Highlights

• Our laboratory research led to four phase 1 trials in children. This is the first stage of testing a new treatment in children.
• One trial was a “first-in-human trial” for a drug combination that was specifically active in children’s cancer.
• A treatment we researched has progressed to a phase 3 clinical trial which is the most advanced stage of testing a new treatment.
• We have discovered a novel mechanism to explain how children can inherit subtle genetic variations from their parents that predispose these children to cancer.

Funded by the Douglas Goodfellow Charitable Trust

Leukaemia in New Zealand

• Leukaemia is cancer of the bone marrow and other blood forming organs leading to increased number of abnormal blood cells, and decreased production of healthy bloody cells to fight infection, stop bleeding, and transport oxygen.
• Leukaemia is the most common childhood cancer, but about 90 per cent of all leukaemias are diagnosed in adults.
• Acute lymphoblastic leukaemia, or ALL, increases the number of white blood cells called lymphocytes and accounts for 30 per cent of childhood cancers. On average, over 90% of children with ALL survive, however survival rates are worse for adolescents and young adults, at 51 per cent.
• Acute myeloid leukaemia, or AML, is usually harder to treat than ALL and average survival rates are even lower. Fifty per cent of childhood AML patients and 42 per cent of adolescent AML patients are long-term survivors.

From the New Zealand Herald
Rotarians provide new hope for premature babies

A glamorous Chinese New Year ball at SkyCity in February raised funds for New Zealand researchers working to develop a mid-pregnancy blood test to predict premature birth that could help millions of mothers and babies worldwide.

The research – by a team from the Liggins Institute and the University of Auckland Medical School – could revolutionise the care of pregnant women at risk of giving birth too early (before 37 weeks pregnancy).

About 60 percent of preterm births occur spontaneously, often in women with no prior history or warning. Currently, there is no way of reliably predicting whether an individual woman will go into labour prematurely.

This may be about to change.

The researchers have already identified a unique molecular fingerprint in blood taken from women at 20 weeks of pregnancy who all went on to have their babies early. The fingerprint was not present in blood taken from women at the same stage in pregnancy who went on to deliver at term.

The team are now following up that pilot study with a two-year study that will test a bigger pool of samples, including samples taken at 15 weeks as well as at 20 weeks, to check whether the fingerprint is a reliable biomarker for preterm birth.

“This is exciting, as it could potentially lead to much better outcomes for the babies and their mothers, in the short and long term,” says study co-lead and Liggins Institute Professor Mark Vickers. “It could enable the targeting of existing and future therapies to delay or even prevent preterm birth.”

“If we can develop a reliable blood test to identify women who will have a spontaneous preterm birth by mid pregnancy this has potential to lead to a huge advance in clinical practice.”
– Professor Lesley McCowan

The current research got underway with a grant from the Auckland Medical Research Foundation, which supports research in the region. Auckland’s Harbourside Rotary Club chose the project from a shortlist provided by the Foundation to receive funds raised at its annual Chinese New Year gala ball.

“We are highly excited about the opportunity to team up with the Foundation to raise funds to support this research,” says Donald Sew Hoy from the Rotary Club of Auckland Harbourside. “Success of this project will benefit not only New Zealand, but also the whole world, and we’re proud and honoured to be asked to assist.”

The potential biomarker revealed in the pilot study was derived from micro-RNA (miRNA) analysis. MiRNAs are small non-coding RNA molecules that play key roles in the regulation of gene expression. MiRNAs are also known to be involved in the development of and protection from a range of diseases. Recent studies in this fast-emerging field have highlighted the potential for miRNAs as biomarkers for osteoporosis, cancer and the pregnancy complication pre-eclampsia.

The Auckland researchers used state-of-the-art digital technology called NanoString that is much more sensitive and faster than other available methods.

Study co-lead, Professor Lesley McCowan from the Obstetrics and Gynaecology Department at the University of Auckland Medical School, says “Women at high risk could then receive tailored care that may reduce the risk of early birth and optimise the health of those babies who are born early.

Auckland Medical Research Foundation executive director Kim McWilliams says: “We are pleased to support Professor Vickers and Professor McCowan’s project to improve health outcomes for mothers and babies.”

The New Zealand Herald

‘She’s our miracle’: Parents of baby born at 23 weeks and two days back Auckland study to help predict premature births

Globally, more than one in 10 babies are born too early. In New Zealand, around 5000 babies are born prematurely every year – that’s about one in 13 of all live births, and one in seven for Maori. If born earlier than 24 weeks the large majority of these children die. While the majority born after 24 weeks survive the health care costs can be huge. These children carry a greater risk of problems with learning and development, cerebral palsy, growth, and later adult diseases such as obesity and diabetes.

Study co-lead, Professor Lesley McCowan from the Obstetrics and Gynaecology Department at the University of Auckland Medical School, says “Women at high risk could then receive tailored care that may reduce the risk of early birth and optimise the health of those babies who are born early.

Auckland Medical Research Foundation executive director Kim McWilliams says: “We are pleased to support Professor Vickers and Professor McCowan’s project to improve health outcomes for mothers and babies.”

The AMRF is grateful to The Rotary of Auckland Harbourside Chinese New Year Gala Ball Committee with their sponsors and donors and thanks the AMRF’s sponsors and donors:

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Tuesday Feb 14, 2017

Courtesy of the NZ Herald and reporters Cherrie Howie and Martin Johnston (published 14 Feb 2017)