ANNUAL REPORT

2012

Auckland Medical Research Foundation

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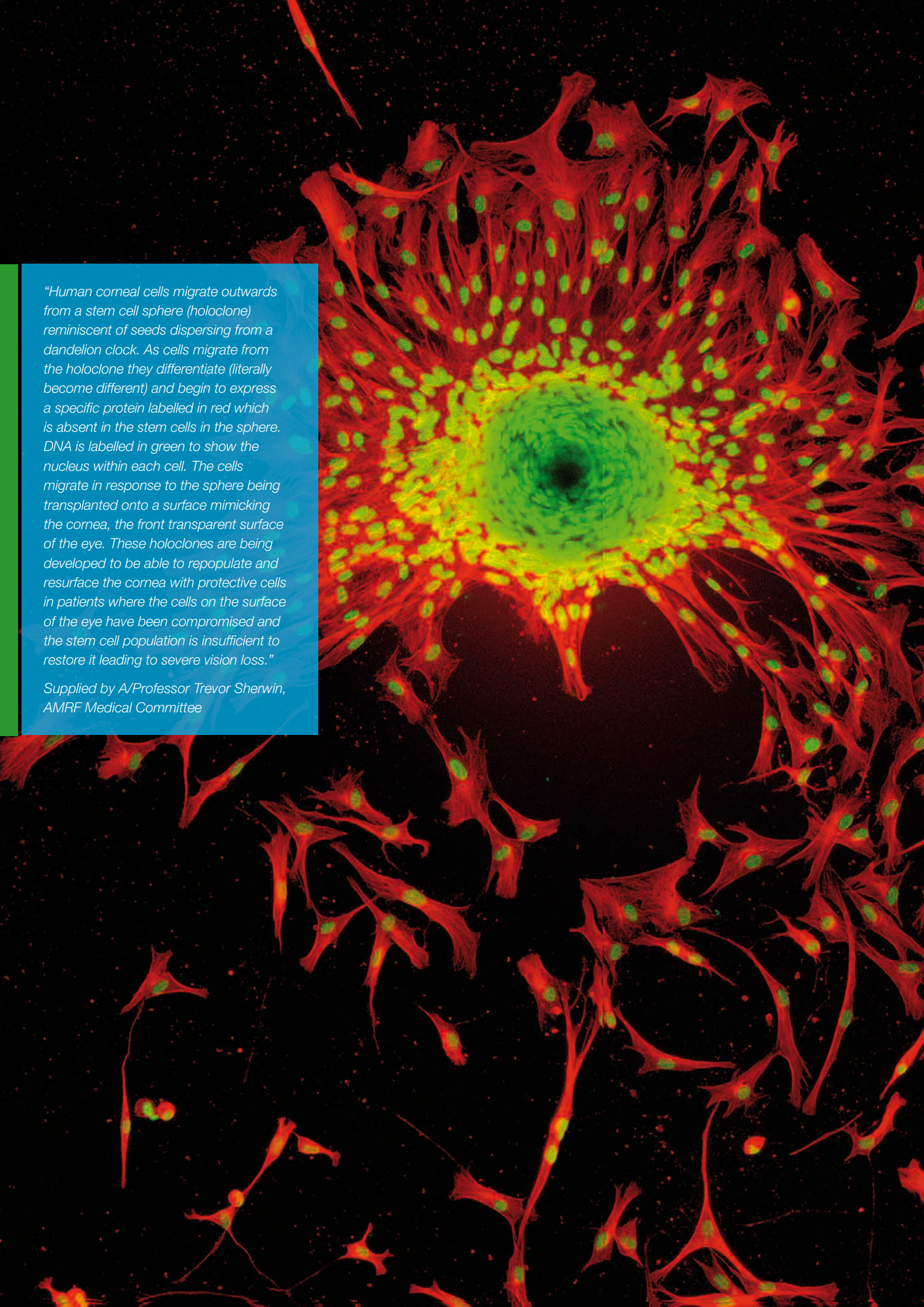
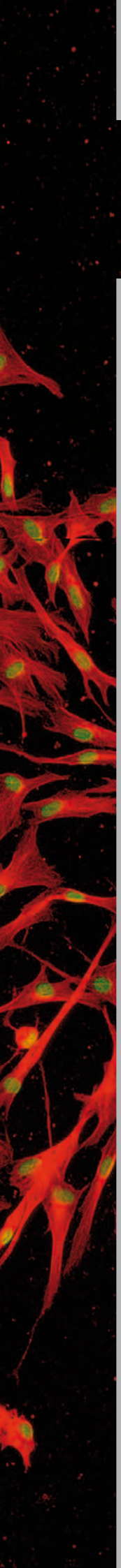


"Human corneal cells migrate outwards from a stem cell sphere (holoclone) reminiscent of seeds dispersing from a dandelion clock. As cells migrate from the holoclone they differentiate (literally become different) and begin to express a specific protein labelled in red which is absent in the stem cells in the sphere. DNA is labelled in green to show the nucleus within each cell. The cells migrate in response to the sphere being transplanted onto a surface mimicking the cornea, the front transparent surface of the eye. These holoclones are being developed to be able to repopulate and resurface the cornea with protective cells in patients where the cells on the surface of the eye have been compromised and the stem cell population is insufficient to restore it leading to severe vision loss."

Supplied by A/Professor Trevor Sherwin, AMRF Medical Committee



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Charity Commission Registration Number: CC22674

President's Report

YEAR ENDED 31 DECEMBER 2012

On behalf of the Board, I am pleased to present the President's Report for the 2012 year. This is my second Annual Report as President. I have been a Trustee of the Auckland Medical Research Foundation (AMRF) since 2003.

The AMRF believes that Research is the Lifeline of Medicine. The Foundation strives to improve the health of New Zealanders through funding the highest quality medical research of all kinds.

In pursuing this objective we have now distributed more than $47 million since our inception. Through 2012, the Foundation approved research grants totalling more than $2.7 million - a significant achievement in difficult economic times.

In July we saw the official opening of the AMRF Auditorium, made possible by a generous AMRF benefactor. The opening was part of the official opening of The University of Auckland Grafton Redevelopment with the Prime Minister, the Rt Hon John Key officiating. This is a valuable facility where we are able to hold free public lectures on topical areas of medicine and share exciting developments in research with our communities.

Building capacity and capability for a world-class research community in New Zealand is also at the heart of our philosophy and vision. We encourage personal research development gained through overseas experience but also support the repatriation of researchers home to New Zealand. The AMRF has been privileged to follow the journey of many of our country's distinguished scientists including Sir Brian Barratt Boyes, Prof Sir Peter Gluckman and Prof Sir Graham Liggins, all of whom received our support early in their careers and subsequently achieved significant recognition internationally.

The Foundation is most grateful for all contributions made in 2012, in particular once again for the generous endowment received each year that covers funding of administration expenses.

Our Executive Director, Kim McWilliams, and her small team have ensured the Foundation's operations have been conducted with professionalism and efficiency. The team has been tireless in its efforts and innovative in its approach to growing our capital and in turn our support, in a very competitive philanthropic environment.

My thanks are extended to Trustees, Board Committee Chairs and Members who have all contributed generously with their time and experience to the work of the Foundation during the year. In particular, I pay tribute to the Medical Committee, under the Chairmanship of Professor Peter Browett, whose demanding but essential work in reviewing applications for grants absorbs many hours in evaluation and assessment.

With the continuing commitment of Trustees, staff, members, grant holders and donors the future success of the Foundation is assured.

Jeff Todd
President

Medical Committee Report

YEAR ENDED 31 DECEMBER 2012

The Auckland Medical Research Foundation is one of the leading supporters of medical and health research in New Zealand. Our funding supports innovative and on-going research initiatives as well as supporting investigators to attend national and international scientific meetings where they can present and discuss their results with international colleagues.

2012 saw the Medical Committee assess 157 grant applications across six Committee meetings covering project grants, postdoctoral fellowships, doctoral scholarships, travelling fellowships, travel grants and other small grants. This resulted in us committing $2,728,417 to top quality research led in the Auckland and Northland region for the benefit of all New Zealanders.

Eighty-one project grants were submitted and the Committee and Board approved 20 for funding (24.7%), which is a slightly higher percentage than we funded in 2011 (21.5%). Although this figure may seem low, we are the leading funder of medical research in Auckland outside government, and it reflects the quality of projects submitted for review and the level of funding provided by the AMRF to support research. Project grants were awarded across a broad range of biomedical and clinical research themes, ranging from investigating brain injury in the laboratory and in the clinic, investigating the role of hormones in breast cancer, research into hearing and sight loss, to projects focusing on the management of patients pre- and post-operation as well as investigating surgical staff teamwork.

The Committee were also able to award three doctoral scholarships and one Edith C Coan Postdoctoral Fellowship to exceptional young researchers, as well as 22 travel grants, two Sir Douglas Robb Memorial Fund grants and a Sir Harcourt Caughey Award.

We were also pleased to again provide an AMRF Outstanding Emerging Researcher Award at the University of Auckland's HealtheX 2012 meeting where medical and health science graduate students present the results of their research to colleagues and fellow students.

Once again I would like to acknowledge the hard work of the Medical Committee who have given their time voluntarily over the past 12 months. I would like to welcome Dr Maurice Curtis to the Medical Committee this year. Maurice is a Senior Lecturer in the Department of Anatomy with Radiology at The University of Auckland, who heads up a laboratory within the Centre for Brain Research with a focus on human brain stem cells. I would also like to thank Dr Hannah Gibbons, the Foundation's Research Programme Manager for the outstanding stewardship of the Grants Portfolio and support to the Medical Committee.

Peter Browett
Chair, Medical Committee
Professor of Pathology, Department of Molecular Medicine and Pathology

AN AMRF SUCCESS STORY

COUNTERING BRAIN DAMAGE AT BIRTH

Cerebral palsy is one of the most devastating consequence of exposure to low oxygen levels or infection before birth. It can happen both after term and premature birth. Despite 35 years in electronic fetal monitoring, earlier C-sections and advances in obstetric care, the incidence of cerebral palsy of perinatal origin has not decreased and has even increased in some Western countries. The costs to society are huge, estimated in 2002 for USA patients as $8.2 billion USD with 800,000 persons affected in USA alone, due to the combination of loss of potential productive members of society and the direct burden of care on the individual, family, and social institutions for the whole of life.

At term abnormal brain function occurs in two or three babies out of every thousand births. Twisted cords, weak placentas or contractions that are too strong can all cause such damage. Until recently, there was no treatment for these brain injuries.

Brain cooling, the first ever practical treatment for brain injury in babies was developed at the University of Auckland over nearly two decades. The possibility that getting a little cold might be good for babies was first proposed in antiquity, and strongly argued in Britain more than 300 years ago. What changed was that the team of researchers supported by the Health Research Council systematically showed in animal models that brain damage developed over time after the initial injury, and that key stages of this developing brain injury could be identified using brain monitoring. Professor Alistair Gunn and his colleagues found that cooling was actually a side effect of many supposedly brain protective drugs, and showed for the first time that cooling by itself was highly protective in certain stages after injury but not others. Cooling also had to be continued for several days, long enough to let the brain irritation settle down.

Using this knowledge, they first cautiously tested cooling in newborn babies who had signs of brain injury after birth. They introduced practical innovations that have been widely taken up, including the use of a simple neurological examination as well as brain monitoring shortly after birth to select babies for treatment. This led to the first large, randomised trial of head cooling, in collaboration with an American company, and other trials around the world. Together these trials have shown that cooling reduces severe disability in about one in eight affected babies, providing the first practical and effective treatment for this devastating problem. This research has established a critical base that will let the team find ways to further improve babies' care.

Q. We would like to include some information about you and how you came to choose this career. Please can you tell us a bit about yourself and how you came to be in this area of research?

A. While I was training as a Paediatrician, I became fascinated by the way that after resuscitating babies who had been exposed to low oxygen, some would seem to improve for a few hours, and then get worse again, often with bad seizures. Nobody at the time knew for sure what this meant but some wondered if the damage was still progressing. I undertook a PhD with Sir Peter Gluckman in order to try to understand what was happening. My first experimental studies were giving rats supposedly protective drugs. I found that often the drugs made the animals cold - and when I kept them warm, the protection was much less. It seemed to me at the time that it would be more sensible to study this side effect directly, and leave out the middle man, so to speak.

Q. How has AMRF funding allowed your research to evolve or progress to the next stage?

A. Grants from the AMRF allowed me to purchase cooling machines for both preclinical studies and the clinical pilot studies. Further, project support helped me to complete preclinical studies that were vital to establish how deeply too cool, how late we could wait after cooling and how long we needed to continue cooling for to achieve protection. This information provided the critical scientific basis for a series of randomized clinical trials around the world, and gave clinicians and funding bodies the confidence that this was an important treatment that needed to be pragmatically tested.

Q. Please can you tell us a bit about how your research outcomes are being used in New Zealand, and the benefit to New Zealanders from your research:

A. Our research was the first to show that delayed cooling up to 6 hours after a severe insult could reduce brain injury, the first preclinical studies to define when and how much cooling was needed to protect the brain, the first clinical study to show that early neurological examination

within the first few hours after birth could reliably identify babies at high risk of long-term death or disability, and the first large, international randomized trial to show that therapeutic hypothermia could improve the outcome of babies with hypoxic brain injury at birth. The trial led to licensing of the CoolCap by the FDA for Olympic Medical, USA.

Q. Have there been significant overseas breakthroughs or collaborations resulting from your research? Please can you describe your team's contribution to the global research effort in your area:

A. Our research led directly to collaboration on the first ever international randomized clinical trial, the CoolCap trial. Its results were published in the Lancet in 2005. As a result of this research, therapeutic hypothermia is now the standard of care for babies with abnormal brain function after hypoxia (low oxygen) at birth around the world. This successful clinical proof that it is possible to prevent brain injury after exposure to severe oxygen deprivation has reinvigorated the search for additional treatments for brain injury.

Q. What is the next step in your research plan?

A. We are now looking for ways to make hypothermia work better. At the moment hypothermia increases the chances of completely normal outcome after hypoxic injury at birth by about 40% (a relative risk of 1.4), that is to say that many more babies surviving with no disability at all. This is a tremendously exciting improvement. Nevertheless, it also means that many babies still die or survive with disability despite cooling. To do this we are improving our knowledge of what combinations of therapies work together to improve outcomes better than hypothermia alone. Finally, I am working with Professor Laura Bennet also of the University of Auckland, an expert on preterm brain injury, to find ways to make it applicable to a wider range of babies, including premature infants.

Q. What is your greatest hope or dream for research in this field?

A. That one day we will be able to prevent or treat all cerebral palsy due to perinatal brain injuries.

Quote: Hypothermia is an overnight success, after 20 years of preclinical research to establish the evolution of injury and testing of many possible approaches.

Baby being cooled with the Coolcap. Credit to Oakland Hospital, USA.

Quote: Many people around the world and in New Zealand made critical contributions to developing brain cooling. Among these, it was my privilege to have worked with my late mother, Professor Tania Gunn, a tertiary care neonatologist at National Women's Hospital, on these studies. Her rueful comment was that she started her career trying to stop babies getting cold and finished it actively cooling selected babies instead!

Professor Alistair Gunn
Dept of Physiology, The University of Auckland

AMRF Auditorium, University of Auckland Faculty of Medical and Health Sciences. *The AMRF Auditorium was made possible through a generous donation from an AMRF benefactor.*

GRANTS AWARDED

Grants Awarded

PROJECT GRANTS

MOLECULAR DEFECTS IN COMMON VARIABLE IMMUNE DEFICIENCY ($54,913 – 10 months) 2112017

A/Prof Rohan Ameratunga, Dr Klaus Lehnert, Dr See-Tarn Woon, Ms Wikke Koopmans, Dr Anthony Jordan
Dept of Virology & Immunology, LabPLUS, Auckland District Health Board

Common variable immune deficiency (CVID) is the commonest symptomatic primary immune deficiency disorder in adults and children. CVID patients are susceptible to multiple and severe infections. Serious infection episodes often require hospitalisation. Up to 90% of CVID patients do not have confirmed genetic diagnoses. Securing a genetic diagnosis can assist with patient management and expand our understanding of this disorder. We present two groups of patients that could benefit from next generation sequencing technology. Group one are seven patients from a kindred. We conclude another gene, not the commonly known mutation TACI C104R, is the cause of CVID. Group two comprises of a family with two affected siblings but asymptomatic parents and brother. The proposed whole exome sequencing project will help identify novel genes, which may be causative. We will use our knowledge of the immune response-associated molecular pathways associated with CVID to help prioritise the mutations we identify. Identifying these genes will result in much improved patient management including family studies, early diagnosis and better prognosis. In the future we will use this technology as the discovery and diagnostic tools for other primary immune deficiency disorders with undefined genetic defects.

POSTOPERATIVE GUT DYSFUNCTION ($63,500 – 18 months) 1112012

A/Prof Ian Bissett, Dr Ryash Vather
Dept of Surgery, The University of Auckland

Postoperative ileus (POI) is an important health problem which affects a considerable proportion of patients following abdominal surgery. It slows patient recovery, increases postoperative morbidity and prolongs length of hospital stay, thereby significantly impacting quality of life and patient-perceived outcomes of surgery. It also confers a significant fiscal burden on healthcare institutions, with its management in the USA alone being estimated at $US1.5 billion annually. The objectives of this research are to characterise for the first time pressure wave movement in the human large bowel peri-operatively and after tissue healing has occurred, and to investigate the therapeutic value of gastrografin in the management of POI. The use of gastrografin for POI has not been previously evaluated. The principal methodologies used will be prospective in vivo observational studies using novel fibre optic technology, and a double-blind placebo-controlled randomised trial. It is hoped that these projects will facilitate a clearer understanding of the pathophysiologic basis of POI and functional tissue healing, and appraise the therapeutic value of an economical, safe and readily available intervention.

FUNDED BY: Gastroenterology Fund

WRITTEN EMOTIONAL DISCLOSURE AND SURGERY ($151,616 – 2 years) 1112013

Dr Elizabeth Broadbent, Prof John Windsor, Prof Andrew Hill, A/Prof Roger Booth
Dept of Psychological Medicine, The University of Auckland

Surgery is a psychological stressor, with patients' concerns including fear of pain, death, and separation from family. Psychological stress has been shown to impair the production of cytokines involved in wound healing and to slow the healing of small experimental wounds. Psychological stress has also been associated with altered levels of pro- and anti-inflammatory cytokines and metalloproteinases involved in wound repair in surgical patients. Furthermore, relaxation exercises have been found to improve indices of wound healing and levels of fatigue following surgery. More research is needed to investigate the effects of other types of interventions on healing after surgery. There is evidence that three, 20-minute sessions of writing about personal emotional events can improve the healing of small experimental wounds, but no research has investigated the effects of expressive writing on the healing of wounds in surgical patients. This research aims to test whether written emotional disclosure can improve wound healing in surgical patients. We will randomise 90 patients scheduled to undergo abdominal surgery to either write about traumatic events or to a control group. We will measure stress, mood, cytokines, fatigue, and wound healing. This research has implications for the delivery of pre-operative care to optimise outcomes.

KIDNEY STEM CELLS ($35,499 – 1 year) 1112001

A/Prof Alan Davidson, Dr Teresa Holm
Dept of Molecular Medicine & Pathology, The University of Auckland

New Zealand has an alarmingly high rate of kidney disease and there is an urgent need to find better therapies. Regenerative medicine utilising tissue-specific stem cells offers the potential to treat a wide range of chronic illnesses. In this study we plan to isolate and characterise renal stem cells from the mouse with the ultimate goal of testing their ability to regenerate the kidney.

FUNDED BY: Edith C Coan Trust

TARGETING EXTRACELLULAR MATRIX IN PRETERM BRAIN INJURY ($139,105 – 2 years) 1112002

Dr Justin Dean
Dept of Physiology, The University of Auckland

Improved hospital care has increased the survival rates of babies born very premature. However, these infants have a high rate of injury to structures in the brain important for movement, which can result in cerebral palsy. Infection of the mother or baby is an important cause of preterm delivery and preterm brain injury. However, at present we do not understand how infection works to cause injury, and treatments such as antibiotics do not improve outcomes. We have recently identified a new enzyme in the brain, PH20, which is important in controlling brain inflammation induced by infection. Further, we propose that this enzyme plays a key role in preterm brain injury, and that it may be useful as a therapeutic target. This study will examine the role of PH20 in regulating brain injury following infection, and determine whether treatments that block its activity may ultimately reduce injury.

THE PEOPLE STUDY ($70,000 – 13 months) 1112010

Prof Robert Doughty, Dr Mayanna Lund
Dept of Medicine, The University of Auckland

Heart failure is a common condition with high rates of hospitalisation and death. Most clinical trials involving patients with heart failure have focused on patients with poor heart pump function (low LV ejection fraction). However, the heart pump function may be normal among a significant subset of patients with heart failure. Currently, there is uncertainty regarding which patients with heart failure with preserved pump function will be at risk of dying or being readmitted to hospital. The objectives of this study are to determine which of these patients will be at risk of these events. This large-scale, multicentre international study will recruit 2500 patients with heart failure in New Zealand and Singapore. The patients will then be followed for 2 years. The study results will impact on the clinical management of patients with heart failure in New Zealand and Singapore and will lead to the development of clinical trials to test newer treatments for patients with heart failure.

DURATION OF ESBLPE COLONISATION ($139,605 – 2 years) 7112007

Dr Dragana Drinkovic, Dr Hasan Bhally, Dr Simon Briggs, Ms Helen Heffernan, Dr David Holland, Dr Susan Taylor, Dr Arlo Upton, Dr Lifeng Zhou
Microbiology Laboratory, North Shore Hospital

Extended-spectrum beta-lactamase-producing Enterobacteriaceae (ESBLPE) are common gut bacteria that have become resistant to multiple antibiotics. When a patient is known to carry an ESBLPE during a hospital admission they must be kept in isolation. Infections due to ESBLPE can be difficult to treat, and it is not known whether humans can ever get rid of ESBLPEs. This study will test for ESBLPE in patients known to be carrying an ESBLPE to see if it continues to be detected in faeces over an extended time period (two years), and thus contribute valuable knowledge for the management of ESBLPE-colonised patients.

FUNDED BY: The Paul Stevenson Memorial Trust

BIOMECHANICAL MODELLING TO EXPLAIN TOPUS FORMATION AND BONE EROSION IN GOUT ($117,304 – 2 years) 1112008

Dr Justin Fernandez
Auckland Bioengineering Institute, The University of Auckland

Gout is the most common inflammatory arthritis, and causes attacks of severe joint pain and also joint damage. The foot

is virtually always involved, and is usually the first area to be affected by gout. Gout is strongly associated with obesity and features of wear-and-tear arthritis, suggesting that loading on certain joints may play a role in the presentation of this disease. This study aims to understand why gout affects certain joints. Using a number of emerging technologies including dual energy computed tomography, motion capture, foot pressure plates and highly detailed 3D computational models, we aim to answer the question, 'is biomechanical loading or tissue stress within the foot linked to sites affected by gout?' This study may provide evidence for the role that biomechanics plays in development of gout and provide justification for future studies assessing gait modification and foot stress rebalance as strategies in the clinical management of gout.

PEPTIDE TECHNOLOGY TO COMBAT BREAST CANCER ($67,686 – 18 months) 1112003

A/Prof Geoffrey Krissansen, Mr Glenn Bell, Ms Yi Yang
Dept of Molecular Medicine & Pathology, The University of Auckland

Novel protein technologies developed in-house will be employed to combat breast cancer, which is the most common cause of cancer-related death in women. Each year in New Zealand more than 2,000 women are diagnosed with breast cancer. Breast cancer growth is driven by the female sex hormone estrogen, and is blocked by anti-hormone drugs like tamoxifen. Unfortunately, some cancers don't respond to tamoxifen and others become resistant to its effects. The novel protein technology we have developed has the potential to overcome these problems, and will be tested for its ability to combat breast cancer.

FUNDED BY: Sir Lewis Ross Fund

TRIPLE NEGATIVE BREAST CANCER ($119,949 – 18 months) 1112006

Dr Euphemia Leung, Prof Bruce Baguley Dr Euphemia Leung, Prof Bruce Baguley
Auckland Cancer Society Research Centre, The University of Auckland

Breast cancer is the major malignancy in women and one of the main treatments, apart from surgery, is to block the action of the hormone estrogen. One form of breast cancer, called "triple negative", is particularly difficult to treat. We are developing cultures of human breast cancer cells which have this triple negative characteristic and our goals are use them to understand the mechanisms involved in their resistance to therapy and to develop new strategies for their treatment.

CYSTEINE DELIVERY TO THE LENS ($126,521 – 2 years) 1112005

Dr Julie Lim, Dr Angus Grey, Prof Paul Donaldson
Dept of Optometry & Vision Science, The University of Auckland

Age related nuclear (ARN) cataract is the leading cause of blindness in the world. Despite effective procedures to restore sight, the number of people afflicted by cataracts is estimated to reach 30 million as the world's population ages. Faced with a looming cataract epidemic, research efforts have focused on developing novel anti-cataract therapies to prevent or delay the onset of cataract. Since ARN cataract is associated with oxidative damage to cells in the centre or nucleus of the lens, our research efforts have concentrated on enhancing the delivery of antioxidants to this region. While glutathione (GSH) is the principal antioxidant in the lens, our work in rat, human and more recently bovine lenses, suggests that the small amino acid cysteine may also be a key antioxidant in the lens nucleus. Furthermore, our identification of cysteine uptake pathways in the lens nucleus indicates that this region is capable of accumulating this antioxidant. In this research proposal, we will expose bovine lenses to high pressure oxygen to mimic the formation of a nuclear cataract. We will then use this model to trial the delivery of cysteine formulations to see if they are effective in preventing or slowing down the progression of cataracts. This rational design and testing of targeted anti-cataract strategies has the potential to delay the onset of ARN cataract thereby reducing the need for expensive surgical intervention.

THE SYNAPTIC BASIS OF HUNTINGTON'S DISEASE ($141,154 – 2 years) 1112018

Dr Johanna Montgomery, Dr Ailsa McGregor
Dept of Physiology & Centre for Brain Research, The University of Auckland

All neurodegenerative diseases have direct or indirect effects on synapses in the brain. Therefore a major step towards

understanding what goes wrong in the diseased brain is to understand how synapse function is altered by disease. In this proposal we seek to determine the source of synapse dysfunction in Huntington's Disease (HD). Previous work on HD mouse models has shown that receptors on the surface of neurons are mis-localised, inducing changes in synapse function. Here we will focus on two synaptic proteins, bSAP97 and aSAP97, which we have recently shown can control the distribution of receptors on neurons (Li et al., 2011, J. Physiology 589, 4491-4510). We will utilise a cellular and an animal model of HD to determine whether changing the expression levels of bSAP97 or aSAP97 can rescue normal receptor distribution, and whether this subsequently rescues normal synapse function. These cellular data will identify whether a and/or bSAP97 are part of the pathological signature for HD and also whether they could be potential therapeutic targets.

MELANOCORTIN TREATMENT FOR OBESITY ($166,636 – 2 years) 1112016

Dr Kathy Mountjoy, Dr Ailsa McGregor
Dept of Physiology & Centre for Brain Research, The University of Auckland

Stress, weight gain and glucose metabolism are influenced by a group of hormones called melanocortin peptides. These peptides comprise chains of amino acids, of varying length, and are derived from one large precursor protein found in the brain and pituitary gland, called proopiomelanocortin (POMC). Special enzymes chop-up POMC to form the melanocortin peptides, according to the body's requirement. We have developed a mouse that lacks a particular 13 amino acid melanocortin peptide called adrenocorticotropic hormone (ACTH1-13). These mice can be used to study what effects of ACTH1-13 on physiological function. The mice appear normal until they reach puberty and then they develop obesity, but not diabetes. Treatment of these obese mice with ACTH1-13 or a natural variant that is slightly chemically altered, called α-melanocyte stimulating hormone (α-MSH), reduced mouse body weight and fat mass when mice were fed a normal diet. In light of the worldwide obesogenic environment, we will now test whether obesity and diabetes in these mice is exacerbated by a feeding a high-fat diet, and whether melanocortin hormone treatment can reverse obesity while animals feed on a high-fat diet. These studies should aid the development of improved tests and treatments for obesity and type-2 diabetes.

AUSTRALASIAN PAEDIATRIC HEAD INJURY RULES STUDY (APHIRST) ($114,000 – 18 months) 3112011

Dr Jocelyn Neutze, Dr Stuart Dalziel, A/Prof Franz Babl
Kidz First, Middlemore Hospital

Many children sustain head injuries and present to emergency departments (EDs) for evaluation. Although head computer tomography (CT) identifies all important injuries, radiation from CTs can increase the risk of fatal brain and blood cancers. However, failure to quickly identify significant intracranial injury may have disastrous consequences including long-term neurological disability and/or death. This study aims to develop a pathway to assist doctors in deciding who should have a CT scan after head injury. Several evidence-based head injury clinical decision rules (CDRs) have been developed to identify patients at risk of significant head injury. None have been validated outside their original settings. We propose to prospectively validate and compare performance of the three highest quality CDRs from the United Kingdom, United States and Canada in 10,000 children presenting to 13 major paediatric EDs in Australia and New Zealand. Identification of optimal CDRs for implementation will help minimise risks of missing clinically significant intracranial injury and radiation exposure from cranial CT scans. The results will have a major impact on head injury management in children both in New Zealand and worldwide.

TARGETING THE HUMAN GROWTH HORMONE RECEPTOR IN ESTROGEN RECEPTOR POSITIVE BREAST CANCER ($138,193 – 2 years) 1112019

Dr Jo Perry, Dr Dong-Xu Liu, Dr Stephen Jamieson, Prof William Wilson
Liggins Institute, The University of Auckland

Humans and animals born with a deficiency in the cell surface receptor for human growth hormone (hGH) have a dramatically reduced, almost absent, risk of developing cancer. Conversely, increased levels of hGH and the hGH receptor are detectable in a variety of different human cancers, including breast cancer, and this is associated with reduced survival for breast cancer patients. However, studies investigating the efficacy of inhibiting the hGH receptor for the purposes of treating cancer are limited. We will use preclinical models of human breast

cancer to test the hypothesis that hGH receptor inhibition will restrict the growth of tumours, and improve response to the anti-estrogen drug, tamoxifen. A clinically available hGH receptor inhibitor will be used in this study. Thus a successful outcome has the potential for rapid translation into the clinic, with the ultimate aim of significantly impacting on treatment outcomes for breast cancer patients.

FUNDED BY: The Hugh Green Diabetes & Breast Cancer Research Fund

Wnt SIGNALLING AS A LINK BETWEEN DIABETES AND ATHEROSCLEROSIS ($78,071 – 2 years) 1112015

Prof Peter Shepherd, Dr Brie Sorrenson
Dept of Molecular Medicine & Pathology, The University of Auckland

Atherosclerotic cardiovascular disease is a leading cause of death and risk of cardiovascular disease is greatly increased in type-2 diabetics. Despite strong evidence linking the high glucose levels observed in diabetics with atherosclerosis, the molecular mechanism linking these states remains elusive. Atherosclerosis is largely the result of lipid accumulation in the arterial wall and we have previously observed that glucose alters lipid metabolism in macrophages, which are the cells responsible for initiating atherosclerosis through the trapping of lipid within the arterial wall. We have also observed that glucose regulates the Wnt signalling pathway in macrophage cells and this study aims to determine whether regulation of Wnt signalling components by high glucose levels could be contributing to the increased rate of atherosclerosis in diabetics. We will test how glucose regulates Wnt signalling factors, such as LRP5/6 and ß-catenin, and determine whether such regulation promotes lipid accumulation in cells of the arterial wall. Overall, this work will expose a mechanism by which cells sense and respond to high glucose levels and will provide important new information on the mechanisms linking diabetes with cardiovascular disease.

FUNDED BY: Marion Ross Memorial Fund

OTOPROTECTION BY ADENOSINE RECEPTORS ($146,752 – 2 years) 1112009

Dr Srdjan Vlajkovic, Prof Peter Thorne, Dr Detlev Boison, Prof Gary Housely
Dept of Physiology, The University of Auckland

Hearing loss affects 10-13% of New Zealanders and this prevalence will increase with the aging population. Exposure to noise and drugs toxic to the inner ear are major contributing factors to this disability. Prosthetic rehabilitation via hearing aids and cochlear implants is the only current treatment for hearing loss. Hence, it is essential to develop therapies that can ameliorate or repair injury to the delicate structures of the inner ear. We have shown that hearing loss in experimental animals exposed to traumatic noise can be substantially restored by administration of drugs acting on adenosine receptors. Here we propose a set of studies that will utilise transgenic mice that lack genes for the two main types of adenosine receptors found in the inner ear to assess their responses to aging, noise stress and drug toxicity. This is critical translational research for therapeutic management of noise-, age- and drug-induced hearing loss.

FUNDED BY: W & WAR Fraser Fund

IMPROVING TEAM COLLABORATION IN THE OPERATING ROOM ($123,626 – 2 years) 1112014

A/Prof Jennifer Weller, Prof Alan Merry, Mr Ian Civil, Ms Wendy Guthrie, Dr Craig Webster, Dr Jane Torrie, Mr Andrew MacCormick, Ms Kaylene Henderson, Dr David Cumin, Dr Matt Boyd
Dept of Anaesthesia, The University of Auckland

Recent, important studies have shown that failures in teamwork and team communication in the operating theatre (OT) lead directly to clinical errors and patient harm. Research also suggests that training as a team for those who are expected to work in teams can significantly reduce these teamwork errors. These findings form the basis of the United States Institute of Medicine's directive that such team-based training is needed. Despite this, training in healthcare tends to occur within professional specialties (professional "silos") rather than in genuine interprofessional teams. Simulation provides a risk-free opportunity to train teams in a realistic environment, yet simulation activities at present remain focussed on single specialities. The current project will engage complete multiprofessional clinical teams comprising surgeons, an anaesthetist, an anaesthetic technician, and theatre nurses in a highly realistic simulated OT environment. The simulated environment and scenarios developed by our group will create a "laboratory" where multidisciplinary team interactions can be systematically studied in ways not possible in the clinical OT. We will measure the effect of a full-day simulation course

intervention on surgical complications in the clinical setting. Ultimately these simulations will lead to development of definitive strategies to improve performance, OT productivity, and patient safety.

EXECUTIVE FUNCTION IN METHAMPHETAMINE EXPOSED CHILDREN ($79,083 – 2 years) 1112004

Dr Trecia Wouldes, A/Prof Linda LaGasse, Prof Barry Lester
Dept of Psychological Medicine, The University of Auckland

P and Crystal Meth are street names associated with potent forms of methamphetamine that have become increasingly problematic in NZ and worldwide. Notable is the number of women using this drug during pregnancy. Yet, scant evidence is available regarding the effect it has on child development and school readiness at 4.5 years of age. This study will investigate whether prenatal exposure to methamphetamine is associated with deficits in higher order thought processes that may interfere with behaviour and learning. We will follow up children currently enrolled in our longitudinal study of 107 children born to mothers who used methamphetamine during pregnancy and 115 children born to mothers who did not to determine whether children exposed to methamphetamine have poorer developmental outcomes than non-exposed children. Early evidence has found behavioural effects of methamphetamine exposure during infancy. In addition, our early results show that mothers who used methamphetamine during pregnancy were at higher risk of mental health problems, ongoing substance abuse problems and lower financial resources. This research will help us to determine whether the early effects of methamphetamine persist and what additional contribution a poor home environment may have for any observed learning or behavioural problems.

FUNDED BY: A C Horton Estate Income

MAPPING STUDY OF PERSISTENT ATRIAL FIBRILLATION ($107,426 – 2 years) 1112020

Dr Jichao Zhao, Prof Bruce Smaill, Dr Nigel Lever
Auckland Bioengineering Institute, The University of Auckland

Atrial fibrillation (AF) causes rapid and chaotic activation of the atrial chambers of the heart. It impacts approximately 37,000 New Zealanders each year and the prevalence of AF in a population increases with age, with 10% of people over 80 having AF. Maori experience morbidity and mortality due to AF at a higher rate and at an earlier stage of life than the general population. AF is associated with a range of clinical conditions including hypertension, valvular disease and heart failure. AF itself is not generally life threatening, but it can cause stroke and exacerbate heart failure. Percutaneous catheter ablation is widely used to treat patients with AF. However, results for persistent AF are much less impressive due to lack of effective technique to detect and analyse AF pattens. We propose a novel approach to atrial electrical mapping in which activation will be mapped simultaneously in both atrial chambers using novel basket catheters and test it on sheep. These data will then be referred to 3D atrial endocardial surface reconstructed from magnetic resonance images (MRI) or computed tomography (CT). A suite of real-time signal processing tools will be developed so that spatio-temporal atrial activation patterns can be analysed in real time.

POSTDOCTORAL FELLOWSHIP

EDITH C COAN RESEARCH FELLOWSHIP

ARE GENERIC MEDICINES ACTUALLY LESS EFFECTIVE AND MORE LIKELY TO CAUSE SIDE EFFECTS? ($165,060 – 2 years) 1312001

Miss Kate Faase
Dept of Psychological Medicine, The University of Auckland

The proposed studies will investigate the impact of branding on medication effectiveness and side effects. Study 1 will look at the impact of branding in a social context in which participants may or may not see another person experience medication side effects. Study 2 will investigate whether generic painkillers work as well as branded painkillers when people know which medication (branded or generic) they are taking compared to when they do not know. This research is relevant to a wide range of medical treatments. As more and more medications become available, government budgets must find ways to accommodate this growth, often through funding generic alternatives rather than branded drugs. Public perceptions of generic medications are generally negative, and these perceptions may influence expectations about medications. Previous research suggests that changing medications can reduce how well a medication works, and

changing to a generic can increase side effects. Additionally, social information transmitted through television and the internet can increase side effect reporting, and may also spread negative expectations about generic medications.

FUNDED BY: Edith C Coan Trust

DOCTORAL SCHOLARSHIPS

DEVELOPMENT OF BIOMARKERS FOR IMPROVED EMBRYO SELECTION IN IVF ($122,000 – 3 years) 1212001

Miss Elizabeth Hammond
Dept of Obstetrics & Gynaecology, The University of Auckland

In New Zealand, there is an increasing trend for women to delay child bearing. This is a significant health issue as female fertility declines during ageing, due to both the loss of eggs and lowering of egg quality. Consequently, there has been increasing use of In Vitro Fertilisation (IVF), a technology which uses drugs to stimulate the ovaries to produce mature eggs which are then collected and fertilised outside the body. One fertilised egg is then put back into the uterus to hopefully establish a successful pregnancy. Clinically, there is a need for improved markers of egg quality so that only the best embryo is transferred into the uterus. We will investigate how egg quality is affected by ageing and ovarian stimulation drugs, which could lead onto the development of a marker of egg quality and improved IVF protocols. We aim to find ways to improve IVF success rates, especially in older women. Premature menopause (under 40 years) is also becoming more of an issue as woman delay child bearing. We wish to identify some genetic causes of premature menopause, and search for early clinical markers that provide a better opportunity for intervention.

FUNDED BY: The John A Jarrett Trust

THE EFFECT OF NEONATAL HYPOGLYCAEMIA ON VISUAL DEVELOPMENT ($97,250 – 2 YEARS, 3 months) 1212002

Mr Nabin Paudel
Dept of Optometry & Vision Science, The University of Auckland

Newborn babies commonly experience low blood sugar, a condition known as neonatal hypoglycaemia. As glucose is the brain's main energy source, this condition may impair neurological function, however, at present, very little is known about the effect of neonatal hypoglycaemia on brain development. As a consequence, the level of neonatal hypoglycaemia that requires treatment in early infancy is currently unknown. This PhD project forms part of a large multidisciplinary study known as the Children with Hypoglycemia and their Later Development (the CHYLD study) which aims to assess the developmental effects of neonatal hypoglycaemia in a cohort of 500 children whose blood glucose levels were measured continuously for several days after birth. The aim of this specific project is to assess visual function in these children at the ages of 2 and 4.5 years. Vision is of particular interest as neonatal hypoglycaemia may preferentially affect visual brain areas. The assessments include a range of vision tests targeting specific regions of the visual cortex and will therefore provide new insights into the effect of neonatal hypoglycaemia on the rate and extent of visual cortex development. The study will also provide important information regarding the treatment and management of hypoglycaemia in newborns.

CHARACTERISATION OF LIVER ANTIGEN PRESENTING CELLS ($83,000 – 2 years) 1212003

Dr Otto Leopold Strauss
Dept of Surgery, The University of Auckland

Antigen presenting cells (APCs) are critical in initiating and directing the immune response in humans. Detailed description of APCs in skin, blood, and lymph nodes has proven their importance in normal and diseased states and has identified them as targets for therapies in disease. Despite this, APCs have not been appropriately characterised in human liver. The liver is unique in that it promotes a state of tolerance and in doing so is not only the most readily accepted transplanted organ, but also harbours infection such as hepatitis and malaria, and malignancy that is both malignant and originating within the organ. In certain situations it can still mount a potent immune response, such as to clear infection of hepatitis A, or in the autoimmune diseases of primary sclerosing cholangitis and autoimmune hepatitis. The project will use modern techniques to accurately describe APC populations in the liver in detail. Improving our knowledge of these cells will help us to understand the biology of health and disease in the liver, but will also define targets on liver APCs to allow for their use in future therapies and drugs to combat disease not only of the liver, but the entire body.

OTHER GRANTS

AMRF HEALTHEX EMERGING RESEARCHER AWARD ($5,000 Travel Award)

Dr Alexandra Wallace

Liggins Institute, The University of Auckland

CARDIOVASCULAR RISK IN ADULTHOOD AFTER INTRAUTERINE TRANSFUSION FOR FETAL ANAEMIA (6712003)

Events before birth can change the risk of developing cardiovascular disease in adulthood. Animals made anaemic and treated with blood transfusions before birth have altered heart function as adults. Our aim was to investigate whether similar changes occur in humans. We have studied adults who suffered fetal anaemia due to Rhesus Disease and received intrauterine transfusion, a technique pioneered in New Zealand in 1963 by Sir William Liley. Our findings provide the first evidence of heart changes in adulthood following intrauterine events.

SIR HARCOURT CAUGHEY AWARD

Dr Peter Huggard ($13,729) 1712001

Goodfellow Unit, The University of Auckland

Funding for visiting academic Prof Christina Puchalski, Director of the George Washington Institute for Spirituality and Health, University of Washington, October 2013

SIR DOUGLAS ROBB MEMORIAL FUND

Dr Jennifer Utter (6712001)

Dept of Epidemiology & Biostatistics, The University of Auckland

Contribution toward publication costs of a manuscript on the topic of unhealthy weight control behaviour among New Zealand adolescents. The research that formed the basis of this research was also supported by the Auckland Medical Research Foundation.

Dr Siouxsie Wiles (6712002)

Dept of Molecular Medicine & Pathology, The University of Auckland

To produce a general public-focused animation showcasing the New Zealand glow worm and how bioluminescent genes isolated from these creatures can be used by scientists to monitor gene expression.

TRAVEL GRANTS AWARDED

Dr William Abbott

New Zealand Liver Transplant Unit, Auckland City Hospital

To attend the International Meeting on Molecular Biology of Hepatitis B Viruses, University of Oxford, England, 22-25 September 2012

Dr Joanne Davidson

Dept of Physiology, The University of Auckland

To attend the Fetal and Neonatal Physiological Society (FNPS) Annual Meeting, Utrecht, Netherlands, 8-11 July 2012

A/Prof Raina Elley

Dept of General Practice & Primary Health Care, The University of Auckland

To attend the WONCA World Family Medicine Conference (Europe), Vienna, Austria, 4-7 July 2012, and the British Journal of General Practice International Advisory Board Meeting, Vienna, Austria, 5 July 2012

Dr Daniel Exeter

Dept of Epidemiology & Biostatistics, The University of Auckland

To attend the Wennberg International Collaborative Meeting 2012, London School of Economics, 10-12 September 2012, and to travel to University of St Andrews to further develop the research tools created as part of PhD 13-20 September 2012

A/Prof Michelle Glass

Dept of Pharmacology, The University of Auckland

To attend the International Cannabinoid Research Society Annual Meeting, Freiburg im Breisgau, Baden-Württemberg, Germany 22-27 July 2012

Dr Yi Wei Goh

Dept of Ophthalmology, The University of Auckland

To attend the International Symposium of Ophthalmology, Hong Kong 14-16 December 2012

Dr Scott Graham

Centre for Brain Research, The University of Auckland

To attend the European Congress of Immunology, Glasgow, Scotland 5-9 September 2012, and to attend Cytokine 2012, Switzerland 11-15 September 2012

Dr Natasha Grimsey

Dept of Neuroscience, The University of Auckland

To attend the International Cannabinoid Research Society 22nd Annual Meeting, Freiburg im Breisgau, Baden-Württemberg, Germany, 22-27 July 2012

Dr Yongchuan Gu

Auckland Cancer Society Research Centre, The University of Auckland

To attend the 5th World Cancer Congress, Beijing, China, 18-20 May 2012, and to visit and present data at three universities

Dr June-Chiew Han

Auckland Bioengineering Institute, The University of Auckland

To attend the Sydney 2012 Joint AuPS/PSNZ/ASB Meeting, University of New South Wales, Sydney, Australia 2-5 December 2012

Dr Debbie Hay

School of Biological Sciences, The University of Auckland

To attend the British Pharmacological Society Neuropeptides Meeting, a joint meeting of the European and American Neuropeptide Societies, Kings College London 7-9 June 2012, and to visit three collaborative researchers

Dr Harvey Ho

Auckland Bioengineering Institute, The University of Auckland

To attend the 15th International Conference on Medical Image Computing and Computer Assisted Intervention, Nice, France 1-5 October 2012

Dr Joanna James

Dept of Obstetrics & Gynaecology, The University of Auckland

To attend the International Federation of Placenta Associations Meeting, Hiroshima, Japan, 18-21 Sept 2012, to visit the laboratory of Dr Takao, Kyushu University, Fukuoka, Japan, and to present an invited lecture at WuXi Women's Hospital, WuXi, China 24-27 September 2012

Dr David Musson

Dept of Medicine, The University of Auckland

To attend the European Calcified Tissue Society Annual Meeting 2012, Stockholm, Sweden 19-23 May 2012, and to visit the Bone & Joint Research Group, Southampton, UK 28 May-1 June 2012 the and Leeds Dental Institute, University of Leeds, Leeds, UK 4-8 June 2012

A/Prof Dipika Patel

Dept of Ophthalmology, The University of Auckland

To attend the Royal Australian and NZ College of Ophthalmologists 44th Annual Scientific Congress, Melbourne, Australia 24-28 November 2012

Dr Matthew Petoe

Dept of Medicine, The University of Auckland

To attend the 19th Biennial Conference of the International Society of Electrophysiology and Kinesiology (ISEK), 17-22 July 2012, Brisbane, Australia

Dr Hilary Sheppard

School of Biological Sciences, The University of Auckland

To Attend the Queenstown Molecular Biology Non-coding RNA Meeting, Queenstown, 30-31 August 2012

Dr Vickie Shim

Auckland Bioengineering Institute, The University of Auckland

To attend the 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Diego, USA 28th August – 1 September 2012, to attend the 3rd World Congress in Tissue Engineering and Regenerative Medicine, Vienna, Austria 5-9 September 2012, and to attend European Congress on Computational Methods in Applied Sciences and Engineering, Vienna, Austria 10-14 September 2012

Dr Avan Suinesiaputra

Dept of Anatomy with Radiology, The University of Auckland

To attend the 15th International Conference on Medical Image Computing and Computer Assisted Intervention, Nice, France 1-5 October 2012

Dr Ehsan Vaghefi

Dept of Optometry & Vision Science, The University of Auckland

To attend the 2012 Engineering and Physical Sciences in Medicine Conference, Gold Coast, Australia 2 - 6 December 2012

Dr Robyn Whittaker

National Institute for Health & Innovation, The University of Auckland

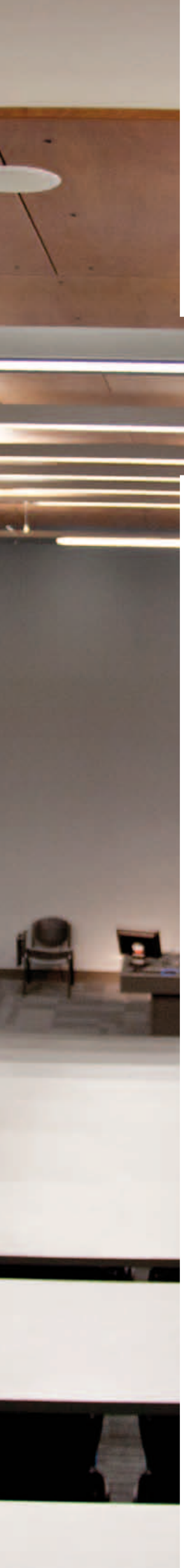
To attend Medicine 2.0 2012, the 5th World Congress on Social Media, Mobile Apps and Internet/Web 2.0 in Medicine and Public Health, Boston, USA, 15-16 Sept 2012, and to travel to various sites in the USA and Canada to meet with collaborators

Dr Lin Zhang

School of Biological Sciences, The University of Auckland

To attend the American Diabetes Association 72nd Scientific Sessions, Philadelphia, Pennsylvania, USA June 8-12, 2012

AMRF Auditorium, University of Auckland Faculty of Medical and Health Sciences. *The AMRF Auditorium was made possible through a generous donation from an AMRF benefactor.*



GRANTS IN PROGRESS

Grants in Progress

FUNCTIONAL ROLE OF LONG NON-CODING RNAS IN HUMAN BREAST CANCER DEVELOPMENT (1111011)

Dr Marjan Askarian-Arimi, Prof Bruce Baguley, Dr Cherie Blenkiron
Auckland Cancer Society Research Centre, The University of Auckland

IDENTIFICATION OF GENES INVOLVED IN TUMOUR-INDUCED LYMPHATIC GROWTH (1111015)

Dr Jonathan Astin, Prof Kathryn Crosier, Prof Phil Crosier
Dept of Molecular Medicine & Pathology, The University of Auckland

NECROTIC SYNCYTIAL KNOTS IN PREECLAMPSIA (1110020)

A/Prof Larry Chamley, Dr Qi Chen, Prof Peter Stone
Dept of Obstetrics & Gynaecology, The University of Auckland

TRAFFICKING OF THE CREATINE TRANSPORTER IN LIVE NEURONS: DELIVERY OF CREATINE FOR MITOCHONDRIAL AND SYNAPTIC FUNCTION (1110002)

A/Prof David Christie, Dr Ashvin Thambyan
School of Biological Sciences, The University of Auckland

OPTIMISING A NOVEL INDUCED NEURAL PRECURSOR-LIKE CELL LINE (1111004)

A/Prof Bronwen Connor, Dr Christof Maucksch, Dr Mirella Dottori, A/Prof Cristin Print
Dept of Pharmacology & Clinical Pharmacology, The University of Auckland

GLYCOSYLATED PROTEINS IN HUMAN HEART FAILURE (1111009)

Dr David Crossman, Dr Mia Jüllig, Dr Peter Ruygrok, A/Prof Christian Soeller, Prof Mark Cannell
Dept of Physiology, The University of Auckland

ROLE OF THE NOVEL PROTEIN PGAF IN RENAL DISEASE (1111001)

A/Prof Alan Davidson
Dept of Molecular Medicine & Pathology, The University of Auckland

PREDICTING RISK OF END STAGE RENAL DISEASE IN DIABETES (1110019)

A/Prof C Raina Elley, A/Prof Tim Kenealy, A/Prof John Collins, Mrs Elizabeth Robinson, Mr Simon Moyes, Dr Tom Robinson
Dept of General Practice & Primary Health Care, The University of Auckland

DIABETES CVD RISK EQUATION VALIDATION (1111003)

A/Prof C Raina Elley, Mrs Elizabeth Robinson, A/Prof Tim Kenealy, Dr Sue Wells, Dr Paul Drury, Prof Bruce Arroll, Mr Simon Moyes, Dr Tom Robinson
Dept of General Practice & Primary Health Care, The University of Auckland

A 'DARTMOUTH' ATLAS OF VASCULAR DISEASE FOR THE AUCKLAND REGION (1110022)

Dr Daniel Exeter, Dr Susan Wells, Prof Rod Jackson, Dr Tania Riddell, Dr Cam Kyle
Dept of Epidemiology & Biostatistics, The University of Auckland

PAIN RELIEF AFTER HIP REPLACEMENT SURGERY: A COMPARISON OF TWO APPROACHES (7110010)

Dr Michael Fredrickson
Anaesthesia Institute, Auckland

ARE CANNABINOID CB2 RECEPTORS IN THE HUMAN BRAIN? (1111007)

A/Prof Michelle Glass, Dr Scott Graham
Dept of Pharmacology & Clinical Pharmacology, The University of Auckland

DOES VITAMIN D STATUS DURING PREGNANCY AFFECT THE RISK OF ATOPY? (1111019)

Prof Cameron Grant
Dept of Paediatrics: Child & Youth Health, The University of Auckland

MOLECULAR MECHANISMS OF CANNABINOID RECEPTOR 1 AND 2 INTRACELLULAR TRAFFICKING (1110018)

Dr Natasha Grimsey, A/Prof Michelle Glass
Centre for Brain Research, The University of Auckland

ADRENOMEDULLIN RECEPTOR ANTAGONISTS (1111005)

A/Prof Michael Hay, A/Prof Debbie Hay, Dr Jack Flanagan
Auckland Cancer Society Research Centre, The University of Auckland

VITAMIN D STATUS IN MAORI AND NON-MAORI PEOPLE OF ADVANCED AGE (1111017)

Prof Ngaire Kerse, Dr Catherine Bacon, Mr Avinesh Pillai, Dr Mark Bolland, Ms Karen Hayman, Dr Mere Kepa, Dr Lorna Dyall
Dept of General Practice & Primary Health Care, The University of Auckland

DOES PACIFIER USE REDUCE THE RISK OF UPPER AIRWAYS OBSTRUCTION IN INFANTS? (1109017)

Dr Christine McIntosh, Dr Shirley Tonkin, Prof Alistair Gunn
Dept of Physiology, The University of Auckland

A RANDOMISED DOUBLE-BLIND PLACEBO-CONTROLLED CROSS-OVER STUDY TO ASSESS THE EFFECTS OF CALCIUM AND MAGNESIUM (CAMG) INFUSIONS ON THE PHARMACOKINETICS, MOTOR NERVE HYPER-EXCITABILITY AND ACUTE NEUROTOXICITY SYMPTOMS OF OXALIPLATIN (1110014)

A/Prof Mark McKeage
Dept of Pharmacology & Clinical Pharmacology and Auckland Cancer Society Research Centre, The University of Auckland

3T MRI CARTILAGE EXTENSION STUDY (1111018)

Prof Fiona McQueen, A/Prof Nicola Dalbeth, Dr Quentin Reeves
Dept of Molecular Medicine & Pathology, The University of Auckland

CARRIERS FOR SKIN GRAFTS (1111012)

Prof Mervyn Merrilees
Dept of Anatomy with Radiology, The University of Auckland

STRUCTURE AND FUNCTION OF THE BACTERIAL DRUG EFFLUX PUMP ACRB IN THE LIPID BILAYER MEMBRANE (1109009)

A/Prof Alok Mitra
School of Biological Sciences, The University of Auckland

CUTTING PROTEINS NOT CALORIES TO MAKE FAT MICE THIN (1110003)

Dr Kathy Mountjoy, Dr Ailsa McGregor, Dr Christina Buchanan
Dept of Physiology, The University of Auckland

PILVAX - A NOVEL PEPTIDE DELIVERY STRATEGY FOR THE GENERATION OF VACCINES? (1111016)

A/Prof Thomas Proft, Dr Fiona Radcliff
Dept of Molecular Medicine & Pathology, The University of Auckland

ANTI-INFLAMMATORY PROPERTIES OF SSLs (1110017)

Dr Fiona Radcliff, Dr Hyun-Sun Jin, Prof John Fraser
Dept of Molecular Medicine & Pathology, The University of Auckland

METFORMIN IN GESTATIONAL DIABETES: THE OFFSPRING FOLLOW UP AT 7-9 YEARS (2111013)

Dr Janet Rowan, Prof Elaine Rush, Dr Jun Lu, Dr Malcolm Battin, A/Prof Lindsay Plank
National Women's Health, Auckland City Hospital

HEALING WITH HOLOCLONES (1111010)

A/Prof Trevor Sherwin
Dept of Ophthalmology, The University of Auckland

STRUCTURE-BASED OPTIMISATION OF HYPOXIA-ACTIVATED PRODRUGS: PROBING THE ACTIVE SITE OF AKR1C3 (1110004)

Dr Christopher Squire, Dr Jack Flanagan
School of Biological Science, The University of Auckland

P2 RECEPTOR SIGNALLING IN THE COCHLEA SUPPORTS HAIR CELL SURVIVAL UNDER STRESS (1110013)

Dr Srdjan Vlajkovic, Prof Peter Thorne, Prof Gary Housley
Dept of Physiology, The University of Auckland

THE CLINICAL UTILITY OF SPUTUM PROCALCITONIN - A NOVEL MARKER OF BACTERIAL INFECTION IN BRONCHIECTASIS (3110015)

Dr Conroy Wong, Dr Sarah Mooney, Dr Susan Taylor, Dr Lata Jayaram, Dr David Holland, Dr Stuart Jones, Dr Irene Zeng
Dept of Medicine, Middlemore Hospital

CAN THE ABNORMAL METABOLISM OF FIBROBLASTS FROM COPD PATIENTS BE RESTORED TO NORMAL BY REDUCING VERSICAN PRODUCTION? (1110016)

Dr Lian Wu, A/Prof Mervyn Merrilees
Dept of Pharmacology & Clinical Pharmacology, The University of Auckland

INTELLIGENT ROBOT ASSISTED GAIT REHABILITATION SYSTEM (1111014)

Prof Shane Xie, Dr John Parsons
Dept of Mechanical Engineering, The University of Auckland

NAMED FELLOWSHIPS

RUTH SPENCER MEDICAL RESEARCH FELLOWSHIP

PERIOPERATIVE USE OF STATINS TO REDUCE MORBIDITY AFTER COLORECTAL SURGERY (1411001)

Dr Primal (Parry) Singh
Dept of Surgery, South Auckland Clinical School, The University of Auckland

GOODFELLOW REPATRIATION FELLOWSHIP

TROPHOBLAST STEM CELLS IN FIRST TRIMESTER PLACENTA: A NOVEL MECHANISM TO STUDY TROPHOBLAST LINEAGE FORMATION (1410002)

Dr Johanna James
Dept of Obstetrics & Gynaecology, The University of Auckland

POSTDOCTORAL FELLOWSHIPS

EDITH C COAN RESEARCH FELLOWSHIP

DISCOVERING BIOMARKERS FOR TREATMENT RESISTANCE IN PEOPLE WITH SCHIZOPHRENIA (1311001)

Dr Valerie Anderson
School of Pharmacy, The University of Auckland

ENDOCANNABINOID REGULATION OF MIDBRAIN DOPAMINERGIC NEURONS – IMPLICATIONS FOR DISEASE (1310001)

Dr Peter Freestone
Dept of Physiology, The University of Auckland

FROM MICROTUBULES TO COMPLEX NEURONS: HOW DOES NEUROSERPIN SIGNAL THE MICROTUBULE NETWORK TO REGULATE NEURONAL DEVELOPMENT (1310002)

Dr Tet Woo Lee
School of Biological Sciences, The University of Auckland

EVALUATION OF SCAFFOLD MATERIALS FOR TENDON REGENERATION (1311002)

Dr David Musson
Dept of Medicine, The University of Auckland

DOCTORAL SCHOLARSHIPS

BRIAN DE LUEN DOCTORAL FELLOWSHIP

THE REGULATION OF NEURAL STEM CELL MIGRATION IN PARKINSON'S DISEASE (1210001)

Miss Sheryl Tan
Centre for Brain Research, The University of Auckland

USING FUNCTIONAL AND STRUCTURAL MRI TO EXPLORE PLASTICITY IN THE HUMAN VISUAL CORTEX (1211004)

Mr Victor Borges
Dept of Optometry & Vision Science, The University of Auckland

EINTRAVITREAL INJECTION OF CONNEXIN43 MIMETIC PEPTIDES FOR THE TREATMENT OF OPTIC NEUROPATHY USING AN IN VIVO GLAUCOMA RAT MODEL (1210003)

Miss Ying-Shan (Erica) Chen
Dept of Ophthalmology, The University of Auckland

THE NMDA RECEPTOR IN HUMAN MELANOMA (1211001)

Miss Stacey D'mello
Dept of Molecular Medicine & Pathology, The University of Auckland

GENETIC VARIANTS AND RISK IN SUDDEN CARDIAC DEATH SYNDROMES (1211002)

Miss Nicola Earle
Dept of Medicine, The University of Auckland

INDOLEAMINE 2,3-DIOXYGENASE (IDO) EXPRESSION IN TUMOURS: EFFECTS ON HOST IMMUNOBIOLOGY (1209001)

Mr (Simon) Sai Parng Fung
Auckland Cancer Society Research Centre, The University of Auckland

HUNTINGTON'S DISEASE INVESTIGATED USING A SHEEP MODEL (1209004)

Miss Renee Handley
School of Biological Sciences, The University of Auckland

LOCALISATION OF THE CREATINE TRANSPORTER IN THE HUMAN BRAIN (1209002)

Mr Matthew Lowe
Dept of Anatomy with Radiology, The University of Auckland

STRUCTURAL & FUNCTIONAL DEVELOPMENT OF THE DORSAL COCHLEAR NUCLEUS IN THE MOUSE (1209005)

Miss Miaomiao (Cherry) Mao
Dept of Physiology, The University of Auckland

MECHANOBIOLOGY OF THE NUCLEUS PULPOSUS; THE ROLE OF NOTOCHORDAL CELLS IN INTERVERTEBRAL DISC DEGENERATION (1210002)

Miss Taryn Saggese
Dept of Anatomy with Radiology, The University of Auckland

COCHLEAR INFLAMMATION: MECHANISMS AND THERAPIES (1209003)

Mr Winston Tan
Dept of Physiology, The University of Auckland

CAN STEM CELLS REPAIR THE INJURED PRETERM BRAIN? (1211003)

Miss Lotte Van den Heuij
Dept of Physiology, The University of Auckland

REGULATION OF FIBRE CELL VOLUME: IMPLICATION FOR LENS TRANSPARENCY (1208003)

Miss Irene Vorontsova
Dept of Optometry & Vision Science, The University of Auckland

ENIGNEERING EFFECTIVE ANTIBACTERIAL PEPTIDES USING MOLECULAR STAPLING (1108007)

Distinguished Professor Margaret Brimble with her team of medicinal chemists. Grant was completed in 2011.

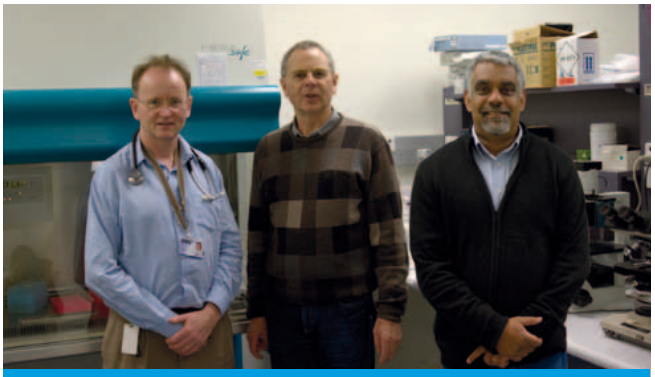
GRANTS COMPLETED

Grants Completed

PROJECTS

HLA AND HEPATITIS B VIRUS (2109026)

Dr William Abbott, A/Prof Edward Gane, Prof Allen Rodrigo
New Zealand Liver Transplant Unit, Auckland City Hospital



From left to right: Dr William Abbott, A/Prof Edward Gane, Prof Allen Rodrigo

There is a group of patients with a hepatitis B virus infection who develop chronic liver inflammation as a result of high levels of viral replication in their liver. This is called chronic hepatitis B; and this disease is a major cause of liver cirrhosis and liver cancer. Our laboratory is working to develop a treatment vaccine that stimulate the immune responses that suppress viral replication without stimulating the immune responses that result in liver inflammation. This will stop the liver inflammation and reduce the risks of cirrhosis and cancer in these patients. Our studies so far indicate that the core protein of the hepatitis B virus produces the strongest immune responses in chronic hepatitis B patients, and we have identified and provisionally patented seven regions of the core gene that have potential for inclusion in a vaccine. Studies of the mechanisms by which these regions of the core gene stimulate anti-viral immune responses are currently being undertaken.

IMAGING BETA-ADRENERGIC SIGNALLING (1110001)

Dr David Baddeley, A/Prof Christian Soeller
Dept of Physiology, The University of Auckland

In this project we used a new form of super-resolution light microscopy to study the distribution of beta-adrenergic receptors and associated G-proteins in association with components of the excitation-contraction coupling pathway in cardiac myocytes. These myocytes are cells that comprise the heart muscle and their contraction propels blood through the heart and around the body. We used antibodies to label isolated cardiac myocytes and were able to collect a large number of images of with a resolution that were approximately 10 times better than that achievable using conventional microscopy techniques. This lead to the novel observation that Gs-alpha proteins formed small clusters near the membrane and within the cytosol of the myocytes, although we are still in the process of performing a full quantitative analysis of these results.

AUCKLAND TRANSIENT ISCHEMIC ATTACK STUDY (1110021)

Pro Alan Barber, Prof Valery Feigin, Dr Neil Anderson, Dr Dean Kilfoyle, Dr Edward Wong, Dr Rita Krishnamurthi
Dept of Medicine, The University of Auckland

Prof Alan Barber

Eight thousand New Zealanders are struck down by the devastating effects of stroke every year. A quarter of these strokes have been heralded by a transient ischemic attack, or TIA. The Auckland TIA study is one of the largest TIA incidence studies ever undertaken. To date, 681 people with TIA have been identified and are being followed to determine the risk of stroke and other adverse outcomes. Follow up is continuing, but the study has the potential to play a central role in the planning of services and health policy in relation to TIA and stroke, within New Zealand and internationally, and be used to inform evidence-based recommendations for health care.

INVESTIGATION INTO THE MECHANICAL VULNERABILITY OF THE JOINT TISSUES TO TRAUMA AND INJURY (1110012)

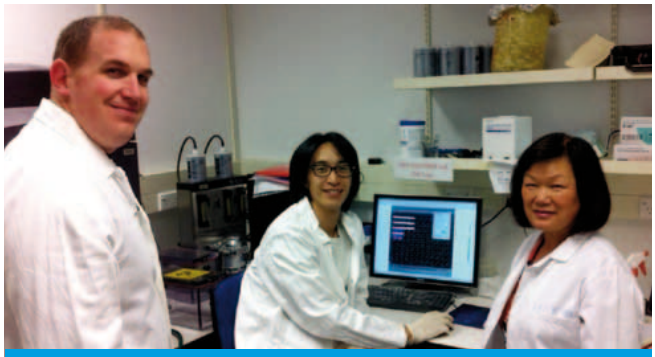
Prof Neil Broom, Dr Ashvin Thambyah
Dept of Chemical & Materials Engineering, The University of Auckland

From left to right: Dr Ashvan Thambyan & Prof Neil Broom in their lab

This project investigated whether sustained pre-loading of the joint tissues renders them more susceptible to structural damage when followed by a transient overloading event. Steadily applied loads actually cause the joint cartilage to 'settle' or consolidate to a degree related to the severity of loading. This study demonstrated that increasing levels of consolidation increased the severity of structural d amage following impact. Consistent patterns of damage were observed and included vertical splitting of the cartilage, delamination at the critical cartilage-bone junction, and secondary damage to the vascular channels in the underlying bone. This research has particular relevance to our understanding of the development of a secondary osteoarthrosis following prior joint injury.

ESTABLISHMENT OF AN ORTHOPTOPIC, INTRACRANIAL MODEL OF MELANOMA BRAIN METASTASES FOR EVALUATING NEW THERAPIES (1110011)

A/Prof Lai-Ming Ching, A/Prof Bronwen Connor, Dr Ailsa McGregor, Dr Phillip Kestell
Auckland Cancer Society Research Centre, The University of Auckland



From left to right: Dr Raymond Yung (staff hired on the grant), with Ms Kimiora Henare and PhD student & A/Prof Lai-Ming Ching imaging brain tumour cells.

In this project we established an intracranial tumour model that could be used to evaluate the ability of novel anti-cancer agents to cross the blood brain barrier to treat tumours and metastases in the brain. As brain tumours are highly vascularised, we used this model to test the efficacy of DMXAA, a novel anti-cancer agent developed at the Auckland Cancer Society Research Centre that can stop the blood flow in tumours. While DMXAA stopped the growth of tumours growing under the skin, we found that concentrations of DMXAA in brain tissue were too low to impede the growth of the tumour nodules in the brain. Our results demonstrate the importance of using intracranial tumour models to correctly assess the potential of novel treatments for brain cancer.

INTERACTIONS BETWEEN OBESITY AND GOUTY INFLAMMATION: A LABORATORY STUDY (1109014)

A/Prof Nicola Dalbeth, Dr Dorit Naot, Dr Rinki Murphy, Prof Jill Cornish
Dept of Medicine, The University of Auckland

Gout is a form of arthritis that causes severe pain and inflammation in the joints. It is the most common inflammatory arthritis affecting men, and is a major cause of musculoskeletal disability in New Zealand, with high rates of early onset, severe disease in Maori and Pacific men. Gout is strongly associated with metabolic syndrome, and the majority of patients treated with gout in Auckland are overweight or obese. The laboratory-based project has studied the way that obesity and obesity-related hormones influence the development of gout attacks. We have identified circulating obesity-related hormones that promote inflammation in response to gout crystals. The clinical relevance of these findings will now be assessed through analysis of patients with gout undergoing surgery for obesity to further clarify whether weight loss may be of benefit in reducing the risk of gout attacks.

CORONARY ARTERY CALCIFICATION: NPC II STUDY (1109020)

A/Prof Rob Doughty, Dr Srija Bhattacharyya, Dr Niels Van Pelt, Dr Jithendra Somaratne, Ms Katrina Poppe, Dr Gillian Whalley
Dept of Medicine, Auckland City Hospital

Coronary artery calcification occurs in the early stages of development of coronary artery disease, and can be assessed using CT scanning (Calcium Score). The NPC II Study was designed to assess for the presence of heart disease among people with diabetes in Auckland. 152 participants in this study underwent Calcium Score and the results revealed that sub-clinical coronary artery disease was common. For people at intermediate risk of heart disease, where decisions regarding whether to start treatment are commonly difficult, the Calcium Score was able to reclassify risk in at least 1 in 5 people. These results suggest that Calcium Score may be a useful test to assist in the assessment of risk of heart disease among people with diabetes.

FLUORIDE FOR BONE HEALTH (1111008)

A/Prof Andrew Grey
Dept of Medicine, The University of Auckland

From left to right: Dr Clare McCann, Prof Suzanne Purdy, Dr Einat Ofek

Previous studies suggested that low doses of fluoride might improve bone health and therefore be an effective treatment for osteoporosis (thin bones). We investigated this possibility by conducting a one year study of the effects of low doses of fluoride on bone density and bone metabolism in older postmenopausal women. Our results demonstrate that, although low doses of fluoride slightly activate bone formation, they do not significantly improve bone density. It is therefore unlikely that low dose fluoride will find a place in the treatment of osteoporosis.

CHILDREN WITH HYPOGLYCAEMIA AND THEIR LATER DEVELOPMENT (CHYLD) (1110009)

Prof Jane Harding, Dr Trecia Wouldes, Prof Geoffrey Chase, Ms Judith Ansell
Liggins Institute, The University of Auckland

Prof Jane Harding with team

Low blood sugar level (hypoglycaemia) is a common problem in newborn babies, and sometimes causes brain damage. However, it is not known which babies will suffer brain damage or at what blood sugar levels; the duration, severity and frequency of hypoglycaemia may all be important. We aimed to learn more about how these factors cause brain damage by assessing the mental and physical development, memory, vision and general health of a group of two-year-olds who had continuous monitoring of their sugar levels in the first few days after birth. Over 330 children have been assessed and approximately 60 additional children are still to be seen to complete this part of the study. We developed some novel techniques to test executive function (memory and learning) and visual function in 2-year-olds, and are also developing the required data analysis approaches to relate these findings to the glucose levels in the newborn period. The findings of this study will provide critical information about how hypoglycaemia should be monitored and treated in order to prevent brain damage, while minimising unneccessary interventions in newborn babies.

THE STRUCTURE AND FUNCTION OF ZPI (81482)

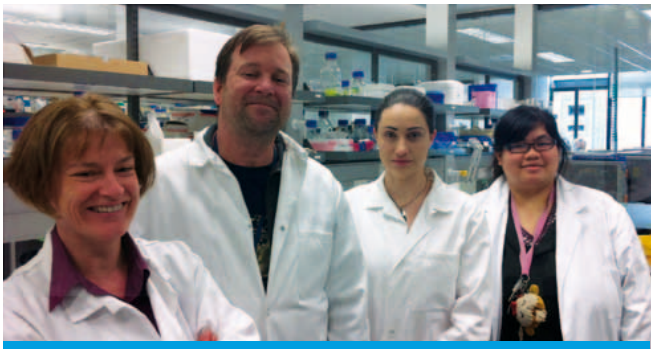
Dr Paul Harper, Dr Neil Van de Water, Dr Paul Ockelford, Prof Peter Browett
Dept of Haematology, Auckland City Hospital

The protein Z dependent protease inhibitor (ZPI) is a human coagulation inhibitor of the clotting factors Xa and XIa. In this project ZPI was produced in the laboratory and was used to demonstrate that the inhibition of factor XIa by ZPI was significantly accelerated by the biological compound heparin. Two of three structural variants which had been initially identified in venous thrombosis patients impaired the function of ZPI, in one case to a very significant degree. In a parallel study we did not find an important difference in the incidence of potentially significant ZPI mutations or ZPI levels in such patients and controls. However when other clinical situations are elucidated where ZPI deficiency is important, then identification of these ZPI mutations which affect function will potentially be clinically very useful.

WHAT IS THE CAUSE OF COMPROMISED ACTIVITY OF THE DRUG METABOLISM ENZYME CYP2C19 IN CANCER PATIENTS?

(1110006)

Dr Nuala Helsby, A/Prof Malcolm Tingle, Prof Peter Browett
Dept of Molecular Medicine & Pathology, The University of Auckland



Dr Nuala Helsby with cancer pharmacogenomics research group including AMRF funded research technician Mike Goldthorpe

Cyclophosphamide is a drug used in the treatment of breast cancer and some blood cancers. Variability in response to this drug exists and this may be due to inherited (pharmacogenetic) differences in the ability of liver CYP enzymes to activate this drug. CYP2C19 is one enzyme that activates cyclophosphamide in the liver. We have previously demonstrated that up to one third of cancer patients have an acquired loss of this enzyme and may not be able to activate this drug. Grant support from the AMRF has given us the opportunity to expand our work and measure this loss of function in a wider range of cancer patients. We also undertook studies to investigate mechanisms for this loss of enzyme expression. We discovered that CYP2C19 is a target of gene silencing and that the gene can be reactivated by modifiers such as 5azaDC. However, this appears to be due to changes in transcription factors upstream of CYP2C19 rather than the gene itself. This is the first demonstration of possible epigenetic control of this important drug metabolising gene and may explain why some patients acquire a loss of function. We have also been able to further elucidate the complexity of cyclophosphamide metabolism and the possible confounding effect of treatment of patients with another anticancer drug, 5-FU. This work has added to our knowledge of the additional regulatory (pharmacogenomic) factors which may play a role in inter-individual differences in response to anticancer drugs.

CAN RESISTANCE TRAINING IMPROVE UPPER LIMB FUNCTION AND QUALITY OF LIFE IN ESSENTIAL TREMOR PATIENTS? (5109015)

A/Prof Justin Keogh
School of Sport & Recreation, AUT University

A/Prof Justin Keogh

AUT University with the much appreciated assistance of the Auckland Medical Research Foundation and the New Zealand Essential Tremor Support Group, have run a study investigating resistance (strength) training as a potential rehabilitation option for Essential Tremor. Participants performed resistance training for two days per week for a period of six weeks. The findings suggest that an Essential Tremor population responded positively to resistance training, with no adverse effects and significant improvements in strength and a small, but positive effect on fine manual dexterity. This preliminary study provides clear evidence that resistance training is worthy of further investigation as a therapy for improving functionality in Essential Tremor patients.

ADVANCED IMAGING IN GOUT (1109016)

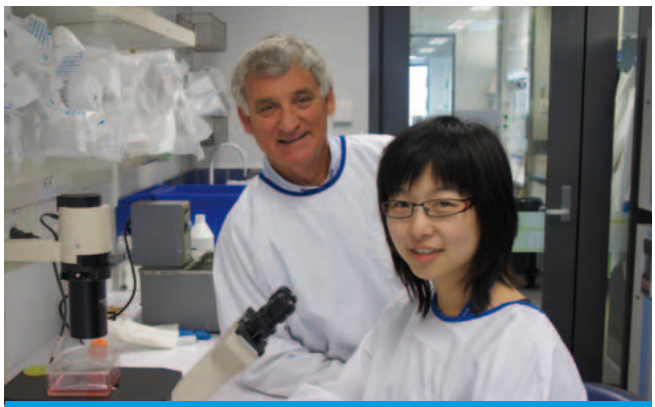
Prof Fiona McQueen, A/Prof Nicola Dalbeth, A/Prof Anthony Doyle
Dept of Molecular Medicine & Pathology, The University of Auckland

Prof Fiona McQueen

The Imaging in Gout project was set up as a comparative study of XRay, ultrasound, MRI and CT scanning. This was conducted in 40 patients with gout. The MRI scans were scored for pathology by 2 radiologists and the relationship between joint inflammation, joint damage and gouty crystal deposits (tophi) was examined. Duel Energy Computed Tomography (DECT) scans were compared with MRI scans for the assessment of tophi in a subgroup of 10 patients. Ultrasound scans have also been performed in this same subgroup and are being analysed. Major findings include that MRI is a reliable method for detecting joint damage and tophi in gout. MRI and DECT show high levels of agreement for tophi and both modalities should help monitor and manage patients with gouty arthropathy.

ELASTIN-ENRICHED SKIN GRAFTS (1109001)

A/Prof Mervyn Merrilees
Dept of Anatomy with Radiology, The University of Auckland



A/Prof Mervyn Merrilees with Ning Zuo in lab

We have investigated improving the quality of cultured skin for grafting of patients with burns and other injuries. Numerous skin substitutes are available commercially for use as grafts, but all have a major deficiency, the lack of elastic fibres that are essential for normal function. Several years ago we discovered how to stimulate formation of elastic fibres in adult tissues and we have now applied that technology to the culture of human skin for grafting. We have successfully produced small sheets of human skin, with both a dermis and an epidermis, and importantly with an increased content of elastic fibres in the dermis. The skin sheets with elastin have improved mechanical properties, but are also thin and thus difficult to manipulate surgically. Our research is now directed towards improving the robustness of our elastin-enriched grafts.

THE SYNAPTIC BASIS OF AUTISM (1111006)

Dr Johanna Montgomery, Prof Craig Garner
Dept of Physiology and Centre for Brain Research, The University of Auckland

Autism Spectrum Disorders (ASD) are characterised by impaired communication as well as by repetitive or stereotyped behaviours. Recent data suggest that ASD have a strong genetic component, however no cures or treatments have been identified. We hypothesise that the cognitive and behavioural dysfunctions in ASD are linked to changes that converge at synapses in the brain. In this research we have shown that autism mutations in the synaptic proteins Shank, Neuroligin and Neurexin result in a weakening of communication at synapses between neurons in the brain. This weakening is caused by both sides of the synapse, i.e. a decrease in the probability of chemical neurotransmitter release, and a decrease in the receptors that receive information. Our data indicate that ASD mutations target core synaptic proteins resulting in altered maturation and function of synapses.

DEVELOPMENT OF A NOVEL VACCINE FOR GROUP A STREPTOCOCCUS INFECTION (1111002)

Dr Fiona Radcliff, A/Prof Thomas Proft, Prof John Fraser
Dept of Molecular Medicine & Pathology, The University of Auckland

From left to right: A/Prof Thomas Proft, Dr Fiona Radcliff, Prof John Fraser

Streptococcus *pyogenes*, or group A streptococcus (GAS), is a human pathogenic bacterium responsible for a wide range of diseases. Despite intensive research, there is currently no safe and efficient vaccine for this pathogen. This project aimed to test a novel vaccine, comprising of a GAS virulence protein called SpnA, combined with a recently identified vaccine delivery system. Vaccination of mice with SpnA alone stimulated strong and long-lasting antibody responses capable of inactivating SpnA protein in laboratory tests. Despite this promising result, vaccinated animals proved to be as susceptible to infection with S. pyogenes as control animals, suggesting that SpnA is not a useful vaccine candidate antigen for GAS. We are grateful to the AMRF for providing the opportunity to test our vaccine candidate antigen.

METFORMIN IN GESTATIONAL DIABETES: THE OFFSPRING FOLLOW UP - 2 YEARS (81554)

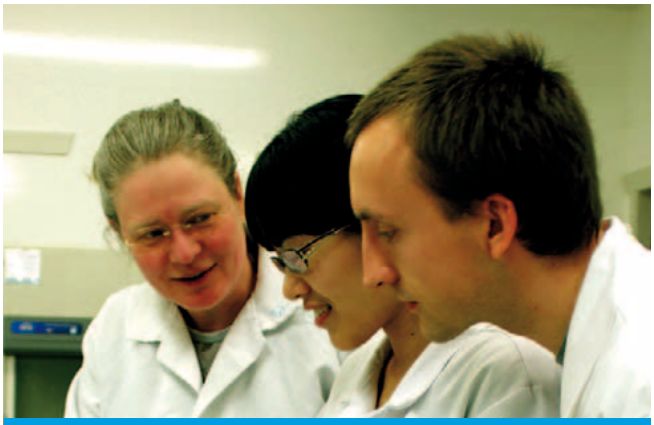
Dr Janet Rowan, Prof Elaine Rush
National Women's Health, Auckland City Hospital

From left to right: Prof Elaine Rush and Dr Janet Rowan

We have completed the follow up study of 318 two year old children whose mothers were randomized to metformin or insulin treatment for gestational diabetes during pregnancy. We have published in Diabetes Care the body composition data showing that children exposed to metformin may store their fat in a healthier pattern than children whose mothers took insulin alone. We are studying their body composition and insulin sensitivity further now the children are 9 years old with a further grant from the Auckland Medical Research Foundation. The two year old neurodevelopment analyses will be submitted for publication soon. Diet and activity assessments have shown no differences between the treatment groups.

REGULATORS IMPACTing ON BRAIN FUNCTION (4109024)

Dr Evelyn Sattlegger
Institute of Natural Sciences, Massey University, Albany



Dr Evelyn Sattegger with Michael Bolech and Su Jung Lee

The molecular basis of brain function is largely unknown, however, this understanding is essential to prevent and treat neurological diseases. In any cell, the true molecular work horses are the proteins. The protein Gcn2 is essential for several brain functions, e.g. long-term-memory formation and feeding behaviour. Gcn2 function is controlled by the brain protein IMPACT. However, the exact molecular mechanisms for this are unknown. A protein's biological activity is determined by its association with other molecules/proteins, and comprehensive protein-protein interaction databases suggest that IMPACT interacts with more proteins than the ones discovered and/or characterised thus far. As studies on neurons are rather difficult, the evolutionary conservation of the IMPACT/Gcn2-system allowed us to use baker's yeast to identify and characterise new IMPACT binding proteins, and to directly relate our findings to mammals/neurons. We successfully uncovered new IMPACT binding partners, and our findings support the idea that IMPACT regulates Gcn2 in a spatiotemporal manner. Furthermore, we discovered a link between IMPACT and cell division. This newly generated knowledge contributes to a better understanding of Gcn2 regulation, bringing us a step further along the path to understanding the link to neurological diseases and cancer.

A BIOFILM INFECTION MODEL (1110007)

Dr Simon Swift, Dr Siouxsie Wiles, Dr Marija Gizavic-Nikolaidis
Dept of Molecular Medicine & Pathology, The University of Auckland

Bacterial contamination of indwelling medical devices and catheters can progress to serious infection and result in the failure of the device. The clinical consequences of these infections can have significant effects upon patient health and recovery, requiring additional time spent in hospital and substantial increases in the cost of treatment. Materials that contain conducting polymers based upon polyaniline do not harm human and animal cells grown in the laboratory, but are anti-microbial, rapidly killing bacteria that colonise the material surface. As a step towards using conducting polymer materials in the fabrication of medical devices we have shown the effectiveness of these materials in contamination resistant implants using a mouse model. In this research we established a model for biofilm infection that uses luminescent bacteria to track the progress of the infection in mice. We used the model to test the efficacy of conducting polymer materials as a contamination resistant surface.

WHY IS KERATOCONUS MORE COMMON IN MAORI AND PACIFIC PEOPLES? DETERMINING THE GENETIC BASIS FOR FAMILIAL DISEASE (1109013)

Dr Andrea Vincent, Dr David Markie, Prof Charles McGhee
Dept of Ophthalmology, The University of Auckland

Dr Andrea Vincent (standing) with Keshni Rasanayagam (summer student)

This project aimed to characterise the genetic basis for keratoconus, a disease of the cornea more common in the Maori and Polynesian populations, resulting in poor vision and often requiring corneal transplantation. We recruited 58 family members and a genome wide scan using microarray technology suggests a causative genetic defect in 2 clear loci (regions of interest) on chromosomes 8, and 11. The Chromosome 8 region replicates a previous study and we are probing these regions to find the underlying genetic defects. In addition we screened 14 other genes. In VSX1, one novel pathogenic mutation was detected in one sporadic case, and in the gene ZNF469 changes in 18/32 individuals suggesting the changes observed predispose a “thin” cornea to become keratoconic, or are directly pathogenic.

TOWARDS ENTERAL ANTIPROTEASE THERAPY IN ACUTE PANCREATITIS (1109003)

Prof John Windsor
Dept of Surgery, The University of Auckland

Mesenteric lymph (ML) has been proposed as a possible bridge between gut dysfunction and end organ failure in critical illnesses such as acute pancreatitis. The ML toxic factors have not been fully characterised. In this project we have been: establishing new toxicity assays; characterizing lymphatic protease activity; examining the effect of anti-proteases and exploring a new class of lymph toxicity factors/biomarkers for acute pancreatitis. We have successfully established the in-vitro screening platforms for ML toxicity. The effects of anti-protease activity on ML toxicity have been complex are still the subject of ongoing studies. We have undertaken initial characterisation of a new set of bioactive factors in lymph to determine if they contribute to end organ failure.

A PROSPECTIVE STUDY OF ILEAL FREE FATTY ACID BINDING PROTEIN IN PATIENTS WITH CLINICALLY SUSPECTED NON-OCCLUSIVE MESENTERIC ISCHAEMIA (1109025)

Prof John Windsor
Dept of Surgery, The University of Auckland

Non-occlusive mesenteric ischemia (inflammation or injury to the small intestine caused by an inadequate blood flow) in critically ill patients has an unacceptably high mortality rate, in part because it is diagnosed late. Recent studies have demonstrated that ileal free fatty acid binding protein may be clinically useful in early identification of non-selected patients with both occlusive and non-occlusive mesenteric ischaemia. The aim of this study was to evaluate the utility of this biomarker in 25 critically ill patients in whom non-occlusive mesenteric ischemia was suspected. Twenty five low risk cardiac surgical patients were also studied to serve as controls. A total of 32 patients were successfully enrolled into the study in 2012 with the total number of patients in the study being 50.

NAMED FELLOWSHIPS

DOUGLAS GOODFELLOW MEDICAL RESEARCH FELLOWSHIP

ETHNICITY, BODY MASS INDEX AND PREGNANCY COMPLICATIONS (1410001)

Dr Ngaire Anderson
Dept of Obstetrics & Gynaecology, The University of Auckland

Worldwide, rates of obesity are increasing dramatically and obesity is now widely considered a global epidemic. The health consequences of obesity are widespread, including in pregnancy where obesity increases the risk of many complications. Rates of pregnancy complications have also been reported to vary by ethnicity, however adjustment for obesity is rarely undertaken. We undertook to investigate the impact of obesity and ethnicity on three important adverse pregnancy outcomes; pre-eclampsia, small infants and Caesarean section (CS) rates. Along with the known increase in risk of pre-eclampsia and CS, we were able to establish that obesity is associated with an increase in risk of small infants. Additionally, we found that rates of pre-eclampsia and CS differed by ethnicity, even after adjusting for obesity. These findings will help clinicians to appropriately identify those women who are at additional risk of adverse pregnancy outcomes, as well as provide avenues for researchers to investigate how ethnicity and obesity interact to either protect or increase risk of pregnancy complications.

RUTH SPENCER MEDICAL RESEARCH FELLOWSHIP

RANDOMISED TRIAL OF DOPPLER-OPTIMISED FLUID BALANCE IN ELECTIVE COLECTOMY (1409001)

Dr Sanket Srinivasa
Dept of Surgery, Middlemore Hospital

This work investigated how best to give intravenous fluid to patients having bowel surgery for colon cancer. Two strategies were investigated in a clinical trial and it was shown that they were equivalent. This meant that more expensive strategies using additional monitoring, as recommended in other countries, were not necessary. This work was published in the prestigious British Journal of Surgery with further publications in other, high-ranking peer reviewed medical journals.

POSTDOCTORAL FELLOWSHIPS

MILD TBI AMONG CHILDREN: DIAGNOSIS AND MANAGEMENT IN THE EMERGENCY CARE SETTING (1309001)

Dr Bridget Kool, Prof Shanthi Ameratunga, Dr Susan Wells, Dr Stuart Dalziel, Dr Michael Shepherd
Dept of Epidemiology & Biostatistics, The University of Auckland

The goal of this project is to optimise clinical practice and health care outcomes for children with mild traumatic brain injury (MTBI) presenting for care in the Emergency Department setting. Research efforts this year have focused on the analysis of the survey of 30 clinicians (from a range of settings) involved in the care of these children to identify enablers/barriers for the delivery of best practice care for MTBI. In addition, interviews conducted with 15 families of children who sustained a head injury before the age of 2 years to establish the barriers/enablers to accessing relevant services for these children have been analysed and a draft paper is being prepared for publication. An analysis of 10 years of morbidity and mortality data to establish the incidence of head injury in New Zealand was undertaken and a publication based on this analysis has been prepared.

LANGUAGE PROCESSING AFTER STROKE: OBJECTIVE EVALUATION USING EVOKED POTENTIALS (1308001)

Dr Einat Ofek
Dept of Psychology, The University of Auckland

The overall aim of this project was to improve the understanding of emotional language in people with an acquired language disorder (aphasia) after a stroke and to apply this in therapy. Forty two adults participated, including 14 people with aphasia after left hemisphere stroke, 16 age-matched controls, 10 younger controls and two people with right hemisphere stroke. Participants were interviewed and their brain potentials were measured for emotional and neutral words. Data have been processed and statistical tests conducted to determine the differences in responses between people with aphasia and control participants. Findings have been presented at eight national and international conferences, including the Aphasia NZ conference held in Rotorua in 2011. The brain responses of people with aphasia differ significantly from controls, with lower amplitudes and delayed response times for people with aphasia. Brain responses show a differential pattern for emotional and neutral words. Four people with aphasia participated in language therapy based on words chosen from their individual brain responses to emotional words. Those with non-fluent aphasia showed most benefits including significantly enhanced brain responses and gains in spoken language.

INFERRING PATHWAYS IN MELANOMA CELLS (87808)

Dr Wendy Watkins
Dept of Molecular Medicine & Pathology, The University of Auckland

Malignant melanoma is a devastating tumour with high incidence in the Auckland region. The molecular makeup of melanomas from patients is highly variable, making this type of tumour difficult to study based on patient samples alone. Therefore, we have taken a laboratory approach where we have used immortalised melanoma cells from a patient's tumour. By specifically knocking down 45 different molecular pathways in melanoma cells, then analysing the use of genes in the altered cells on a whole genome-scale,

we have been able to identify the gene networks that operate in melanoma cells. Some sets of genes are used together to drive the division of melanoma cells and are highly correlated with the prognosis of patients, therefore these genes have been proposed as a 'biomarker' for the clinical prognosis of melanoma patients to guide clinicians in the future.

DOCTORAL SCHOLARSHIPS

INFLUENCE OF CHEMICALLY ELEVATED SPERMIDINE AND SPERMINE ACETYLATION ON OBESITY AND TYPE 2 DIABETES (1208004)

Mr Mingming Li
School of Biological Sciences, The University of Auckland

The aim of this project was to investigate whether chemically elevated spermidine and spermine acetylation have beneficial effects on obesity and type-2 diabetes in an obese mouse model. We tested three polyamine catabolism modifiers, N1,N11-diethylnorspermine (DENS), aspirin and triethylenetetramine. The results showed that DENS elevated polyamine catabolism in mice through induction of spermidine and spermine acetylation, and lowered fat-mass gain over a period of 24 weeks by 22%, with amelioration of obesity and type-2 diabetes phenotypes. The other two drugs showed lesser effects. Therefore, DENS has been shown to be a promising lead compound for future drug development.

PROGENITOR CELLS IN THE THALAMOSTRIATE REGION OF THE ADULT HUMAN BRAIN (81214)

Mr Colin Mak
Dept of Anatomy with Radiology, The University of Auckland

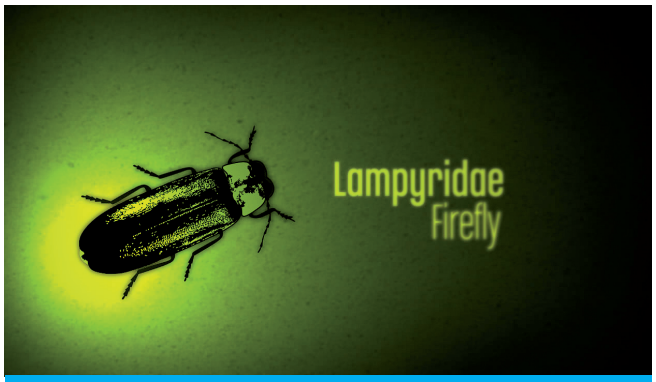
There are two main areas in the human brain where new neurons are known to be born throughout life. One of these areas is called the subventricular zone (SVZ) that gives rise to the rostral migratory stream at the front of the brain. However, for the first time, I have found a region of the SVZ further back in the brain, the thalamostriate SVZ, which contains a stem or progenitor cell population nearly 40 times larger and 3 times denser than that in other regions. These stem cells are a very good source of cells for repairing damaged brain areas in patients with neurodegenerative disease.

SIR DOUGLAS ROBB MEMORIAL FUND

ANIMATION OUTREACH PROJECT (6711004)

Dr Siouxsie Wiles
Dept of Molecular Medicine & Pathology, The University of Auckland

The aim of my application was to fund a short animation, suitable for the general public, explaining how fireflies glow and how I use that light in my research into infectious diseases. The grant-in-aid was used to pay for the services of an animator, Luke Harris, who is based in Australia. The resulting video, Meet the Lampyridae (http://youtu.be/kP_RaHo1Pmw), has had almost 4,200 views on YouTube. With additional funds from FMHS, Luke reused the firefly footage to make a second video, about fireflies and NASA (http://youtu.be/UUUytRoI-5g) which has had over 6,000 views on You Tube. In November 2012, I was awarded the New Zealand Association of Scientists Science Communicator Award, in part for the innovative animations enabled by this grant-in-aid.



Animation project "Meet the Lampyridae"

http://youtu.be/kP_RaHo1Pmw

AMRF Medical Sciences Learning Centre, University of Auckland Faculty of Medical and Health Sciences.

Opened by the Prime Minister Helen Clark in 2005, the AMRF Medical Sciences Learning Centre was funded by the AMRF to celebrate the Foundation's 50th Anniversary. The centre has won a national architecture award and houses the medical school's anatomy and pathology collections. It is used extensively by undergraduates in medicine, science and nursing from the University of Auckland and other tertiary education institutions, as well as registrars in pathology and radiology.

PUBLICATIONS

Publications

Abbott, W.G.H. Peptides in the hepatitis B virus (HBV) core gene that stimulate clinically-significant, anti-HBV CD8+ T cell immunity in patients with an inactive, HBeAg-negative chronic hepatitis B virus infection. US Patent and Trademark Office, No. 61/675,238.

Anderson, N., McCowan, L., Fyfe, E., Chan, E., Taylor, R., Stewart, A., on behalf of the SCOPE Consortium. (2012). The impact of maternal body mass index on the phenotype of pre-eclampsia: a prospective cohort study. **BJOG**, 119(5):589-595.

Anderson, N.H., Sadler, L.C., Stewart, A.W., Fyfe, E.M., McCowan, L.M. (2012). Ethnicity, body mass index and risk of pre-eclampsia in a multi-ethnic New Zealand population. **Australian & New Zealand Journal of Obstetrics & Gynaecology**, 52(6):552-558.

Anderson, N., Sadler, L., Stewart, A., McCowan, L. (2012). Maternal and pathological pregnancy characteristics in customised birth weight centiles and identification of at-risk small-for-gestational-age infants: a retrospective cohort study. **BJOG**, 119(7):848-856.

Anderson, N.H., Sadler, L.C., Stewart, A.W., Fyfe, E.M., McCowan, L.M. (2013). Independent risk factors for infants who are small for gestational age by customised birth weight centiles in a multi-ethnic New Zealand population. **Australian & New Zealand Journal of Obstetrics & Gynaecology**, 53:136-142.

Anderson, N.H., Sadler, L.C., Stewart, A.W., Fyfe, E.M., McCowan, L.M. (2013). Ethnicity and risk of Caesarean section in a term, nulliparous New Zealand obstetric cohort. **Australian & New Zealand Journal of Obstetrics & Gynaecology**, DOI: 10.1111/ajo.12036.

Ansell, J., Wouldes, T., Paynter, J., Gamble, G., Harding, J.E., for the CHYLD Study Team. (2012). Developmental outcome at 2 years is similar in late preterm and term infants at risk of hypoglycaemia. **Journal of Paediatrics and Child Health**, 48(1):18.

Arons, M.H., Thynne, C.J., Grabrucker, A.M., Li, D., Schoen, M., Cheyne, J.E., Boeckers, T.M., Montgomery, J.M., Garner, C.C. (2012). Autism-associated mutations in ProSAP2/Shank3 impair synaptic transmission and neurexin-neuroligin-mediated trans-synaptic signaling. **Journal of Neuroscience**, 32(43):14966-78.

Dalbeth, N., Pool, B., Yip, S., Cornish, J., Murphy, R. (2013). Effect of bariatric surgery on the inflammatory response to monosodium urate crystals: a prospective study. **Annals of the Rheumatic Diseases**, DOI:10.1136/annrheumdis-2013-203545.

Grey, A., Garg, S., Dray, M., Purvis, L., Horne, A., Callon, K., Gamble, G., Bolland, M., Reid, I.R., Cundy, T. (2013). Low dose fluoride in postmenopausal women: a randomized controlled trial. **The Journal of Clinical Endocrinology & Metabolism**, DOI:10.1210/jc.2012-4062.

Hurley, D., Araki, H., Tamada, Y., Dunmore, Y., Sanders, D., Humphreys, S., Affara, M., Imoto, S., Yasuda, K., Tomiyasu, Y., Tashiro, K., Savoie, C., Cho, V., Smith, S., Kuhara, S., Miyano, S., Charnock-Jones, D.S., Crampin, E., Print, C. (2012). Gene Network Inference and Visualisation Tools for Biologists: Application to New Human Transcriptome Datasets. **Nucleic Acids Research**, 40(6):2377–2398.

Kim, W., Thambyah, A., Broom, N.D. (2012). Does prior sustained compression make cartilage-on-bone more vulnerable to trauma? **Clinical Biomechanics**, 27(7):637–645.

McQueen, F.M., Doyle, A., Reeves, Q., Gamble, G., Dalbeth, N. (2013). DECT urate deposits: now you see them, now you don't. **Annals of the Rheumatic Diseases**, 72:458-459.

Nand, A.V., Swift, S., Uy, B., Kilmartin, P.A. (2012). Evaluation of antioxidant and antimicrobial properties of biocompatible low density polyethylene/polyaniline blends. **Journal of Food Engineering**, 116(2):422-429.

Ofek, E., Purdy, S.C., Fritsch, G., McCann, C., Webster, T., Miles, A., Ali, G. (2011). Neural processing of emotional words in aphasia using EEG and related therapy. **Brain Impairment**, 12(Suppl):8.

Ofek, E., Purdy, S.C., Ali, G., Webster, T., Gharahdaghi, N., McCann, C.M. (2013). Processing of emotional words after stroke: An electrophysiological study. **Clinical Neurophysiology**, DOI:10.1016/j.clinph.2013.03.005.

Rowan, J., Rush, E., Obolonkin, V., Battin, M., Wouldes, T., Hague, W. (2011). Metformin in gestational diabetes: the offspring follow up (MiG TOFU) – body composition at two years of age. **Diabetes Care**, 34:2279-2284.

Rush, E., Bristow, S., Plank, L., Rowan, J. (2012). Bioimpedance prediction of fat-free mass from dual-energy X-ray absorptiometry in a multi-ethnic group of 2-year-old children. **European Journal of Clinical Nutrition**, DOI:10.1038/ejcn.2012.182.

Sequeria, G., Keogh, J. W., Kavanagh, J. J. (2012). Can resistance training improve fine manual dexterity in Essential Tremor patients? **Archives of Physical Medicine and Rehabilitation**, 93(8):1466–1468.

Sharpe, S., Kool, B., Shepherd, M., Dalziel, S., Ameratunga, S. (2011). Mild Traumatic Brain Injury: Improving Quality of Care in the Paediatric Emergency Department Setting. **Journal of Paediatrics and Child Health**, 48(2):170-176.

Signal, M., Le Compte, A., Harris, D.L., Weston, P.J., Harding, J.E., Chase, J.G., on behalf of the CHYLD Study Group. (2012). Impact of retrospective calibration algorithms on hypoglycemia detection in newborn infants using continuous glucose monitoring. **Diabetes Technology and Therapeutics**, 14(10):883-890.

Signal, M., Le Compte, A., Harris, D.L., Weston, P.J., Harding, J.E., Chase, J.G., on behalf of the CHYLD Study Group. (2012). Using stochastic modelling to identify unusual continuous glucose monitor measurements in newborn infants. **Biomedical Engineering Online**, 11:45.

Srinivasa, S., Taylor, M.H.G., Kahokehr, A., Sammour, T., Hill, A.G. (2011). Oesophageal doppler guided fluid administration in colorectal surgery - a critical appraisal of published trials. **Acta Anaesthesiologica Scandinavica**, 55(1):4-13.

Srinivasa, S., Yu, T.C., Soop, M., Hill, A.G., Taylor, M.H.G. (2011). Perioperative care in colorectal surgery - A survey of anaesthetists. **e-SPEN**, 7(11):11-15.

Srinivasa, S., Singh, S.P., Kahokehr, A., Taylor, M.H.G., Hill, A.G. (2012). Perioperative fluid therapy in elective colectomy within an Enhanced Recovery after Surgery program. **ANZ Journal of Surgery**, 82(8):535-540.

Srinivasa, S., Hill, A.G. (2012). Perioperative fluid administration: Historical highlights and implications for practice. **Annals of Surgery**, 256(6):1113-1118.

Srinivasa, S., Taylor, M.H.G., Singh, P.P., Yu, T., Soop, M., Hill, A.G. (2013). Randomised clinical trial of goal-directed fluid therapy within an Enhanced Recovery protocol for elective colectomy. **British Journal of Surgery**, 100(1):66-74.

Srinivasa, S., Kahokehr, A., Yu, T.C., Soop, M., Hill, A.G., Taylor, M.H.G. (2013). Goal-directed fluid therapy: A survey of anaesthetists from UK, USA, Australia and New Zealand. **BMC Anesthesiology**, 13:5.

Thambyah, A., Zhang, G., Kim, W., Broom, N.D. (2012). Impact induced failure of cartilage-on-bone following creep loading: a microstructural and fracture mechanics study. **Journal of Mechanical Behaviour of Biomedical Materials**, 14:239–247.

Utter, J., Denny, S., Robinson, E., Ameratunga, S., Crengle, S. (2012). Identifying the 'red flags' for unhealthy weight control among adolescents: Findings from an item response theory analysis of a national survey. **International Journal of Behavioural Nutrition and Physical Activity**, 9:99.

Vincent, A.L., Jordan, C., Sheck, L., Niederer, R., Patel, D.V., McGhee, C.N.J. (2013). Screening the visual system homeobox 1 gene in keratoconus and posterior polymorphous dystrophy cohorts identifies a novel variant. **Molecular Vision**, 19:852-860.

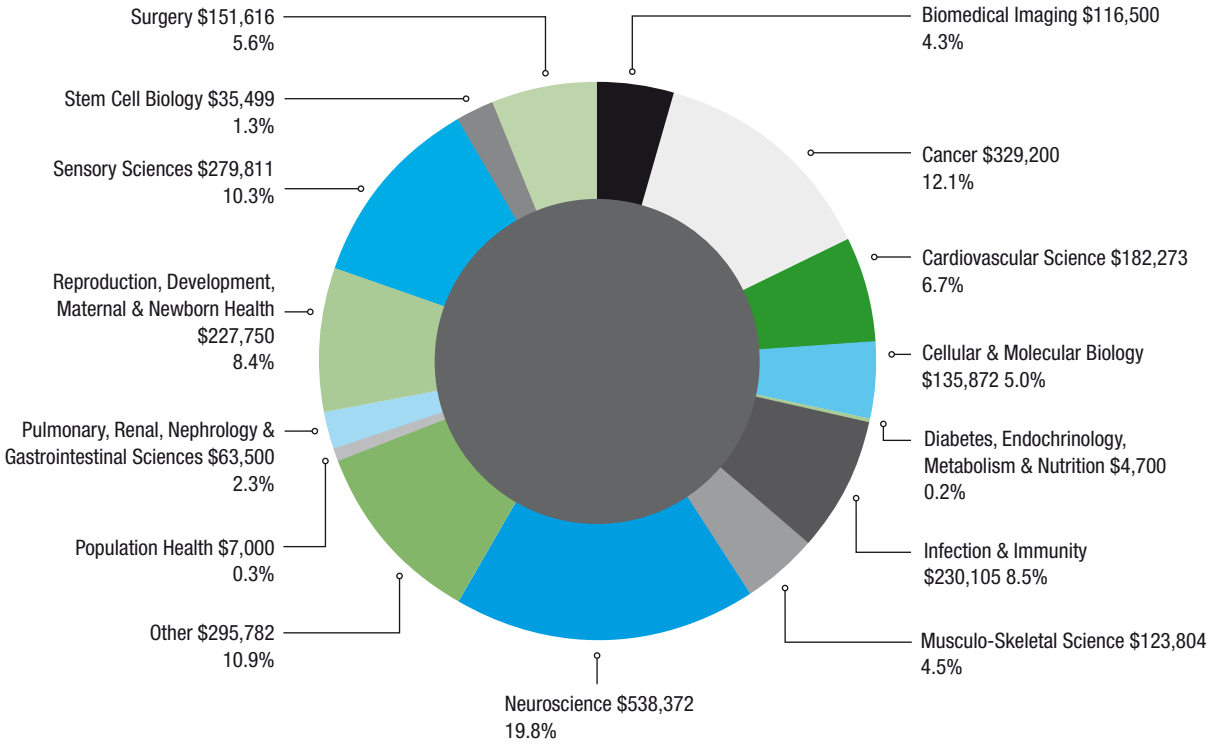
Waller, T., Lee, S.J., Sattlegger, E. (2012). Evidence that yIMPACT resides in a complex with ribosomes. **The FEBS Journal**, 279(10):1761-1776.

Wang, L., Hurley, D., Watkins, W., Araki, H., Tamada, Y., Muthukaruppan, A., Ranjard, L., Derkac, E., Imoto, S., Miyano, S., Crampin, E., Print, C. (2012). Cell cycle gene networks are associated with melanoma prognosis. **PLoS ONE**, 7(4):e34247.

Warner, B.G., Tsai, P., Rodrigo, A.G., Ofanoa, M., Gane, E.J., Munn, S.R., Abbott, W.G.H. (2011). Evidence for reduced selection pressure on the hepatitis B virus core gene in HBeAg-negative chronic hepatitis B. **Journal of General Virology**, 92:1800-1808.

Young, L.K., Birch, N.P., Browett, P.J., Coughlin, P.B., Horvath, A.J., Van de Water, N.S., Ockelford, P.A., Harper, P.L. (2012). Two missense mutations identified in venous thrombosis patients impair the inhibitory function of the protein Z dependent protease inhibitor. **Thrombosis and haemostasis**, 107(5):854-63.

FINANCIALS 2012



Financial Highlights 2012

Research Funding 2012 $2.7m
Total Research Funding Since 1955 $48m

FINANCIAL PERFORMANCE

	Note		2012 $		2011 $
Income					
Donations / Subscriptions	**1**		129,172		142,923
Investment Income			2,091,623		1,966,778
Income from Trusts	**1**		711,231		829,878
Legacies/Bequests/Specific Donations	**2**		1,971,552		1,202,215
Net Gain on realisation of investments			242,444		839,574
Net Loss on currency fluctuations			-7,195		-22,387
Total			**5,138,827**		**4,958,981**
Expenditure					
Administration expenses		323,818		333,591	
(Less Donation)	**3**	-323,818	Nil	-333,591	Nil
Research Grants 2012	**4**		2,721,784		2,963,448
Depreciation on Grant Funded Assets			6,253		Nil
Reduction in value of investments			118,595		824,009
Total			**2,846,632**		**3,787,457**
Surplus			**2,292,195**		**1,171,524**

The summary financial report above has been extracted from the full Audited Financial Statements which can be obtained by contacting the Foundation's office. Tel: 09 9231701 or Email: amrf@medicalresearch.org.nz

NOTES TO THE 2012 FINANCIAL REPORT

1. Donation Income includes Grants received from the following Trusts

The Clyde Graham Charitable Trust	NZ Guardian Trust	5,000
The William and Lois Manchester Trust		69,787
NZ Community Trust		11,920
The Ruth Spencer Estate	NZ Guardian Trust	89,000
The NH Taylor Charitable Trust	NZ Guardian Trust	9,638
Tennyson Charitable Trust	Public Trust	20,000
The NR & JH Thomson Charitable Trust	NZ Guardian Trust	15,000
Wellington Sisters Charitable Trust	Public Trust	5,000
		225,345

2. Legacies, Bequests and Specified Donations

Estate of Myrtle Callaghan	49,330
Estate of Margaret Carless	1,077,365
Estate of Donald A Gordon	148,887
Estate of Marie Mabel Hall	230,000
Estate of M P Lynsar	28,270
Estate of Elaine M Robinson	1,367
Estate of Cynthia Sparling	10,000
Estate of Christina Wishart	26,333
The MRI Education, Research & Development Trust	400,000
	1,971,552

3. Administration Expenses

The Foundation is very grateful for the donation of $323,818 from the Harry Goodfellow, Hector Goodfellow and TB & WD Goodfellow Funds to meet the full administration expenses in 2012.

4. Research Funding Approved During Year

	$
RESEARCH PROJECT GRANTS (19)	
Named & Specific Fund Research Projects (8)	748,389
- Edith C Coan	
- W & WAR Fraser Fund	
- Gastroenterology Fund	
- Sir Harcourt Caughey Fund	
- Hugh Green Diabetes & Breast Cancer Fund	
- A C Horton Fund	
- Marion Ross Memorial Fund	
- Sir Lewis Ross Fund	
General Fund Research Projects (12)	1,432,250
Including income earned and available for General Medical Research from the following Trust funds:	
- GS Blanshard Fund	
- Doug Brown Fund	
- Sir Henry Cooper Fund	
- LH Corkery Fund	
- Sir William Goodfellow Fund	
- MJ Merrilees Fund	
- Brian Jones Fund	
OTHER GRANTS	
Named Fund Postdoctoral Fellowship (1)	165,060
- Edith C Coan Research Fellowship	
Named Fund Doctoral Scholarships (1)	122,000
- John A Jarrett Trust	
General Fund – Doctoral Scholarships (2)	180,250
General Fund Travel Grants (22)	55,739
General Fund – AMRF HealtheX Emerging Research Award (1)	5,000
Named Fund Grants (3)	19,729
- Sir Douglas Robb Memorial Fund (2)	
- Sir Harcourt Caughey Fund	
Total Grants Committed 2012	**2,728,417**
Less amounts allocated but not required	-6,633
TOTAL GRANT FUNDING 2012	**2,721,784**

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

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A bequest is a gift of cash or assets (shares, property, or other assets) made through your Will. A bequest or major gift to the AMRF is an investment in the health of future generations. You can choose to leave your gift for a specific area of research or for general purposes, allowing the Foundation to determine the greatest area of need. If you are considering this option please contact us, as we are happy to assist.

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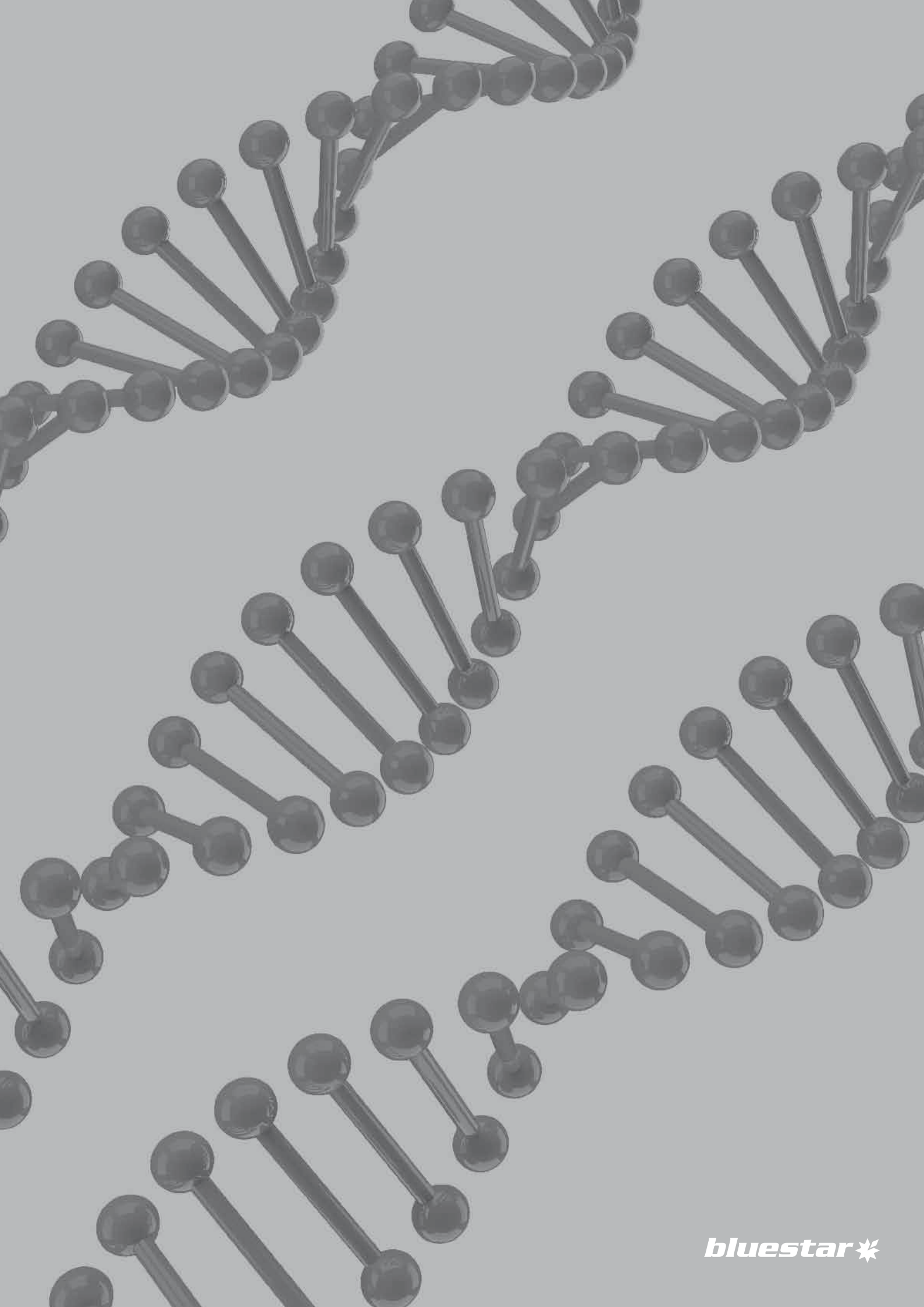
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