The Australian Society for Medical Research
ASMR Medical Research Week® June 2-10, 2011

Queensland Health & Medical Research Awards are supported by the Queensland Government

Media Alert – May 30, 2011

QUEENSLAND HEALTH AND MEDICAL RESEARCH AWARDS

The Australian Society for Medical Research is pleased to announce Finalists in the 2011 Queensland Health and Medical Research Awards

Winners: Announced Friday June 3rd, 2011

Clinical Researcher Award Winner

- **A/Prof Michael Breakspear**, **Queensland Institute of Medical Research**
  A diagnostic brain imaging protocol for recent onset psychosis based on free viewing of movie clips
  Early and accurate diagnosis of schizophrenia, a major mental illness, is key to effective intervention and reducing the overall burden of illness. This work presents early progress on a novel brain imaging test for schizophrenia which is based on the characterization of brain activity whilst subjects view clips from popular film clips. This idea is to capture complex brain activity during visual and auditory perception whilst young subjects view interesting and naturally engaging media. A diagnostic brain imaging protocol for recent onset psychosis based on free viewing of movie clips.
- **Prof Suzanne Chambers, Griffith Health Institute, Griffith University**
  Who is a cancer survivor? Antecedants, prevalence and outcomes.
  Over the past two decades the paradigm of the *cancer survivor* has come to dominate and lead not only supportive care programs in cancer but also the focus and direction of psychosocial cancer research. In the first large scale population-based assessment of *cancer survivor* identity we found almost half of colorectal cancer patients did not see themselves as a survivor; but that those who did reported more personal growth as a result of their illness experience. These results will inform the design of clinical and community support interventions for cancer patients in the future.
- **Dr Eduardo Pimenta, Endocrine Hyertension Research Centre, The University of Queensland**
  The interplay of salt and aldosterone in determining ill-effects of aldosterone excess.
  Aldosterone is a steroid hormone that contributes importantly to the maintenance of sodium and fluid balance. Aldosterone excess is a common condition (5-15% of patients with hypertension) in which autonomous aldosterone production increases blood pressure and causes target organ damage. Experimental studies have indicated that the effects of aldosterone excess are dependent upon concomitant high dietary salt intake. However, an interaction between aldosterone and dietary salt has not been studied in humans. We have demonstrated that, in patients with aldosterone excess, high-salt diet causes kidney and heart damage and is an important cause of high-blood pressure which is resistant to treatment. Strategies to substantially reduce dietary salt intake should be part of the overall treatment in patients with hypertension and aldosterone excess.

Senior Researcher Award Finalists

- **Dr Thiruma Arumugam**, **School of Biomedical Sciences, The University of Queensland**
  Novel pharmacological agents to target stroke-induced brain injury.
  In Australia, stroke is the leading cause of serious, long-term disability with more than 60,000 strokes occurring each year. Two decades of basic research targeting single stroke injury mechanisms in single cell types or single injury mechanisms in multiple cell types have failed when applied in clinical trials of human strokes. We have identified γ-secretase inhibitors as a novel and potent stroke therapy by targeting diverse pathogenic mechanisms in multiple cell types. This work investigates how γ-secretase inhibitors protect against ischaemic stroke-induced brain injury at the molecular level in multiple cell types to promote the development of γ-secretase inhibitors as a novel anti-stroke therapy.
- **Dr Kristen Radford, Mater Medical Research Institute**
  Targeting the cross-presenting dendritic cells for immunotherapy.

Dendritic cells are rare white blood cells that initiate and direct immune responses. Dendritic cell-based vaccines have been shown to improve survival in diseases such as metastatic prostate cancer, for which there are currently no effective treatments. However, as this approach relies on first extracting the dendritic cells from the patient and then reinfusing them, they are costly, labour intensive and not suitable or effective for many patients. We recently identified a rare subtype of dendritic cell in humans and showed that it is specialised at inducing anti-cancer immune responses. This now allows for the development of new vaccine strategies that target the "cancer fighting" subset of dendritic cells directly, without requiring their removal from the patient. Our goal is to now apply this finding to make dendritic cell therapy more efficacious, practical and adaptable for the treatment of a wider range of patients and malignancies.

- **Dr Susan Woods, Queensland Institute for Medical Research**
  miR-380-5p represses p53 to control cellular survival and is associated with poor outcome in MYCN-amplified neuroblastoma.
  We study a childhood cancer of the nervous system called neuroblastoma. We found that these cancers disable one of our main natural defences against cancer by over-producing a microRNA. This results in a reduction in the amount of protection against cancerous changes in that cell – leading to the growth of tumours. However when we blocked the microRNA, the cancer cells died and the tumours became much smaller. MicroRNAs originate from part of our DNA that has long been thought of as junk DNA. Much is still unknown but we know they can interfere with the functioning of genes and can control the production of proteins in the body. What is really exciting about this research is it is the first time that anyone has blocked the growth of a primary tumour by the simple, systemic delivery of a microRNA inhibitor and suggests a new therapeutic target for neuroblastoma patients.

Post-Doctoral Researcher Award

- **Dr Kerry-Ann O'Grady, Queensland Children's Medical Research Institute, University of Queensland**
  Lung health in Aboriginal and Torres Strait Islander Queenslanders.
  Acute and chronic lung diseases are major contributors to the health gap between Indigenous and non-Indigenous Australians. Despite this, there has been little work focussing on the delivery of culturally appropriate services to "close the gap." This project, for the first time, comprehensively mapped chronic lung disease burden in Indigenous Queenslanders and the services available to prevent and manage disease. It found that, overall, Indigenous Queenslanders were 2.7 times more likely to be hospitalised with chronic lung disease and 2 times more likely to die from these diseases than non-Indigenous Queenslanders. There was substantial variation in disease burden between Queensland regions. There are inadequate services to address lung health in a culturally sensitive and holistic approach. The results of this project are directly contributing to policy, service delivery and research aimed at addressing lung health in Indigenous Queenslanders.
- **Dr Kelly Anne Smith, Institute of Molecular Bioscience, The University of Queensland**
  Discovery of a novel gene in cardiac valve development.
  The heart is an essential, life-supporting organ, required to separate oxygenated and deoxygenated blood and distribute it around the body. The cardiac valves are critical for maintaining this separation. The valves develop when we are embryos and mistakes occurring during their formation result in congenital heart defects, the most common cause of infant death from a birth defect. I am using the zebrafish to understand how the heart and valves development. Zebrafish hearts develop similar to humans but zebrafish are born external to the mother and are transparent organisms so we can observe and study the heart as it forms. I have identified a zebrafish with a genetic mutation causing a valve defect. The gene responsible for this defect has never been identified previously and understanding its function may give us insight into the diagnosis and treatment of congenital heart disease.
- **Dr Michael Tallack, Institute for Molecular Biosciences, The University of Queensland**
  Exploring the control of erythropoiesis by next generation ChIP and mRNA-seq technologies.
  Healthy adults produce about 2 million red blood cells (erythrocytes) every second of their lives. These red blood cells transport oxygen from our lungs to all the tissues of the body using a protein molecule called hemoglobin. The production of red blood cells needs to be carefully controlled, too little production results in various forms of the disease anemia. The gene *KLF1* is a master controller of red blood cell production and also ensures that red blood cells are healthy and functional. Recent studies have described mutations in *KLF1* that result in a particular form of human anemia called CDA (for congenital dyserythropoietic anemia). We have investigated the different roles that *KLF1* plays to ensure healthy red blood cells are produced in adequate numbers. By utilizing recent advances in DNA technology we have described that *KLF1* regulates all aspects of red blood cells, including size, shape, survival and hemoglobin content.

Post-Doctoral Researcher Award

- **Dr Kylie Alexander,** **University of Queensland Centre for Clinical Research**
  Macrophages are novel and critical participants in bone healing.
  Bone disease and injury are national and international health and research priorities costing the Australian health system over $10 billion annually. Current treatments target bone destruction but do not restore bone that has been lost, creating an unmet therapeutic need for new bone building treatments. Macrophages are commonly known for their roles in immune response to infectious organisms. Less acknowledged are sub-groups of macrophages present in virtually all organs of the body playing ongoing roles in organ development, repair, and maintenance. We recently demonstrated that a population of macrophages is present in specialized tissues lining bones (osteomacs). Importantly, we discovered that osteomacs not only promote bone formation in normal growth but are pivotal for bone formation during bone repair. The discovery of osteomacs as novel regulators of bone formation has uncovered new and exciting avenues for the development of bone building therapies.
- **Ms Laura Bray,** **Institute of Health and Biomedical Innovation, QUT & Queensland Eye Institute**
  Fibroin-based materials support co-cultivation of human limbal epithelial and stromal cells for ocular tissue reconstruction.
  Approximately 10 million cases of blindness worldwide are due to diseases affecting the cornea. The future supply of adequate corneal tissue for transplantation is uncertain, and this problem is further compounded by a current global shortage of corneal tissue for transplantation in countries without access to tissue banking facilities. This project studies the use of limbal stem cells in conjunction with a fibrous material known as fibroin, a protein which can be readily isolated from silkworm cocoons (*Bombyx mori*). We found that limbal stem cells can produce a corneal surface transplant equivalent on fibroin-based materials. This research represents a step forward in the development of limbal tissue transplants for the treatment of severe eye injuries and common diseases such as pterygium, and also in the quest for whole transplantable ocular tissue grown from the patient's own cells, thus addressing a wider international need for transplantable eye tissue.
- **Ms Brooke Coombes,** **School of Health and Rehabilitation Services, The University of Queensland**
  Efficacy and safety of corticosteroid injections and other injections for management of tendinopathy: a systematic review of randomized controlled trials.
  Tendon problems, such as tennis elbow or Achilles tendon pain, are common afflictions of middle-aged men and women, affecting day-to-day activities, sport and work. In a comprehensive and systematic manner, this study identified and analysed 41 published reports on the use of injections in nearly 2700 patients with tendon injuries. It showed that corticosteroid injections, provide short-term pain relief but may be worse than other treatments in the long-term. However patients can be reassured that corticosteroid injection rarely causes serious harm. Other newer increasingly popular injections, such as botox or injection of a person's blood, have not been thoroughly researched. While some of these may be helpful in the long term, it appears that none offer a magic bullet for tendon pain. This study helps answer questions raised by both doctors and patients as to which injections are beneficial or harmful in treating tendon pain.
- **Ms Kate Miller,** **Queensland Children's Medical Research Institute, The University of Queensland**
  Playing away pain.
  Children accessing hospital for medical care frequently undergo painful procedures in their management of their injury or illness. With increasing numbers of children accessing hospitals and increased time and work pressures on staff, alternatives to support children undergoing medical procedures are necessary to promote both physical and emotional care and recovery. Working alongside a Brisbane technology company, a hand held distraction device was developed aimed for 3-12 year olds. The device was designed to meet the developmental (cognitive, physical and emotional) needs of children, as well as the clinical needs of staff. Using the device children could choose (1) procedural preparation stories that talked them through what to expect during their procedure, and (2) distraction stories and games that diverted their attention during the actual procedure. Using 2 clinical trials, at the Royal Children's Hospital, the impact of this device on children's pain and distress levels was compared to standard practice and off the shelf videogames. Children who accessed the purpose designed device had significantly reduced pain and distress during procedures as well as reduced treatment times. Preliminary results showed faster healing times with children with burn injuries. This has led to reduced short and longer term pain experiences for children and increased delivery and efficiency of medical procedures.
- **Ms Tracy O'Mara,** **Institute of Health and Biomedical Innovation, QUT & QIMR**
  A genome-wide association study to identify genetic markers associated with endometrial cancer grade.

Endometrial cancer (cancer of the uterus) is the most commonly diagnosed gynaecological cancer. Although the majority of cases diagnosed experience good prognosis, there are some patients who will relapse unexpectedly. Identifying genetic variation associated with prognosis could inform decision-making for disease management at diagnosis and provide avenues for the development of agents targeting aggressive disease. We have recently performed a study to identify genetic variations associated with endometrial cancer grade in Caucasian Australian and British women. Two variants were identified as having an association with higher endometrial cancer grade and will be explored in more samples for validation. These variants are distinct from those previously reported be associated with endometrial cancer risk and suggest that this research is beneficial to improve understanding of biological pathways that influence outcome for endometrial cancer patients.

- **Mr Diwaker Pattabiraman,** **Diamantina Institute, The University of Queensland**
  Requirement of MYB-CBP/p300 interaction for the development of acute myeloid leukemia
  Acute myeloid leukaemia (AML) affects the blood and bone marrow and is characterised by an DNA. Despite being one of the better-studied cancers, very few targeted therapies are used in the clinic, with chemotherapy still being mainstay. This study aims to translate basic laboratory findings into a novel targeted therapy for AML by the inhibition of c-Myb function. C-Myb is a protein essential for blood cell development. C-Myb interacts with another protein, CBP/p300, to carry out its normal function. Preliminary results show that this interaction is essential for normal cells to acquire leukemic properties. Establishing a better understanding of the mechanisms of Myb function in AML would enable development of novel targeting strategies, which could have therapeutic potential. These could potentially be used in combination with currently employed chemotherapy agents to enhance the efficacy of treatment and minimize their side effects.

Editors Note: Winners will be announced at the ASMR Medical Research Week® Dinner on Friday the 3rd of June, 2011 (Sebel and Citigate Hotel, King Georges Square)

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