

**Friday 25 October 2013**

**National Health and Medical Research Council  
2013 project grants**

**Testing if the addition of oestrogen lowering treatment to preoperative chemotherapy better reduces the size of large oestrogen receptor positive breast cancer**

**Associate Professor Prudence Francis and Professor John Forbes (UoN)**

**\$2,182,283**

Women diagnosed with large oestrogen receptor positive breast cancer are often treated with chemotherapy before surgery to reduce the size of the cancer, while treatment to lower oestrogen levels is given after surgery. This trial is studying if combining chemotherapy with oestrogen lowering treatment before surgery will better shrink the cancer which can improve the surgery options.

**Does pneumococcal vaccination protect against cardiovascular disease?**

**Professor John Attia**

**\$1,785,279**

Australian researchers have set up a novel multi-centre trial to investigate the effects of the pneumococcal vaccination in reducing heart attacks and stroke. People aged 55 to 61 from 6 sites around Australia will be invited to participate in the study. The selected participants will attend a clinic in their area and will be randomly given the pneumococcal vaccine or a placebo vaccine. Outcomes on the expected 6000 participants will be ascertained by health record linkage with government databases after 4 years.

**The Breathing for Life Trial**

**Dr Vanessa Murphy**

**\$1,647,906**

Asthma affects 12 per cent of pregnant women in Australia. These women are at increased risk of poor pregnancy outcomes, such as preterm birth and hospitalisation of the neonate. Reducing asthma attacks by providing optimal asthma management during pregnancy may lower these risks. We will test whether a

strategy which determines treatment changes based on a marker of airway inflammation, improves outcomes for maternal, neonatal and child health.

### **Improving alcohol treatment outcomes**

**Prof Robert Sanson-Fisher**

**\$1,435,804**

Patient outcomes are significantly influenced by a number of factors including the characteristics of the patient, the type of treatment provided, and the characteristics of the system in which care is delivered. This study aims to determine how these factors influence outcomes for people seeking treatment for alcohol dependence. It will provide critical information for policy makers on which to base minimum service standards.

### **Altering the microbiome to treat COPD**

**Prof Philip Hansbro**

**\$1,179,569**

Smoking leads to lung inflammation that causes emphysema - a major health problem in Australia. Emphysema progressively declines even if smoking stops and there are no treatments. Recently changes in gut microbes have been linked to inducing or protecting against inflammation in the gut and lung. Thus we may be able to control inflammation by modifying these gut microbiomes. We may be able to ingest specific microbes or use specific antibiotics or other factors as new treatments for emphysema.

### **Kidney growth in premature and low birth weight babies**

**Dr Yogavijayan Kandasamy**

**\$853,420**

The objective of this study is to identify infants who are at high risk of subsequent kidney failure. To achieve this objective, we plan to carry out comparison of kidney growth and function between Aboriginal and non-Aboriginal infants from birth until they are 2 years old. We also hope to determine if changes in the blood vessels in these infants' eyes correspond to changes in the growing kidney- we are trying to determine if the eyes are the windows to the growing kidneys.

### **Interferon epsilon for Chlamydia RTIs**

**Prof Philip Hansbro**

**\$717,616**

Chlamydia is a common cause of sexually transmitted diseases resulting in pelvic inflammatory disease, infertility and ectopic pregnancy. There are no vaccines that prevent infection or disease. We have discovered a new factor in the immune system (interferon-epsilon) that only occurs in the reproductive tract. If this factor is absent

then Chlamydia infections are more severe. We will investigate how this factor protects against infection and if we can use it as a new agent against Chlamydia STDs.

**Functional dyspepsia: Characterisation of the immunopathology and testing a novel therapeutic strategy.**

**Prof Nicholas Talley**

**\$708,148**

Dyspepsia, unexplained stomach discomfort and pain, is a common and costly problem; few effective treatments exist and the causes are unknown. We have found that the numbers of a type of immune cell, the eosinophil, are increased in the top of the small bowel in patients with dyspepsia. This study will explore the mechanisms that lead to increased eosinophils and then test the effectiveness of a treatment to suppress this overactive immune response which could rapidly change clinical practice.

**Characterising the immune function of a newly discovered CD4 T helper cell (Th22) and understanding its role in allergic inflammation**

**Prof Paul Foster**

**\$690,558**

Allergic inflammatory diseases such as asthma and allergic dermatitis are major health problems in our community that lead to poor quality of life. These diseases are induced by activation of immune cells known as T helper (Th) lymphocytes. Recently Th22 cells have been identified in patients with allergic diseases. In this study we will, for the first time, characterise these cells and determine their role in the processes that lead to chronic inflammation in asthma and allergic dermatitis.

**New way of treating respiratory infections and airway inflammatory diseases by targeting miRNA**

**Prof Paul Foster**

**\$677,562**

Among the major health issues of today is our inability to effectively treat bacterial infections and the emergence of antibiotic resistant microbes. MicroRNA are small molecules that control the levels of proteins in immune cells that fight infections. In this project we will determine if inhibiting miRNA function in the lung enhances defence against microbial invasion and is a new therapeutic approach to treat infection driven diseases of the airways such as asthma and emphysema.

### **Toll-like receptor 7 and asthma**

**Prof Joerg Mattes**

**\$673,711**

Exacerbations of asthma and wheezing illness caused by the common cold virus are a major disease burden leading to frequent hospital admissions. This project determines the role of an immune receptor sensing common cold virus in controlling the immune response. The results will lead to a better understanding of how to best treat virus-induced asthma and wheeze in the future.

### **Dual purpose contraception**

**Prof John Aitken**

**\$658,952**

This research will generate a completely novel topical contraceptive agent that becomes activated on contact with semen and will simultaneously protect the user against both unwanted fertility and sexually transmitted disease. A prototype compound has already been developed and patented. This research is aimed at the chemical optimization of this reagent, analysis of its mechanism-of-action and characterization of its anti-microbial activity against chlamydia, gonorrhoea, herpes simplex and HIV.

### **Chlamydia infection in males**

**Prof Eileen McLaughlin**

**\$630,558**

Males are a reservoir of infection and novel vaccine approaches to control Chlamydia infections in young men are needed urgently. This study will be essential for the development of interventions to control infection and will inform strategies for manipulating the immune system within the male reproductive tract that may be applied to other sexually transmitted pathogens. The studies will benefit the health and welfare of the Australian people under National Research Priority 2, promoting and maintaining good health and a healthy start to life.

### **An early indicator of renal dysfunction in Indigenous women at risk of pregnancy complications**

**Dr Kirsty Pringle**

**\$624,584**

Indigenous women are twice as likely to have low birth weight babies compared to non-Indigenous women and 2.5 times as likely to develop preeclampsia, possibly because they have a much greater incidence of chronic kidney disease, predisposing them to these pregnancy outcomes. We have found a new, sensitive marker of early stage renal dysfunction in pregnancy that could be useful for detecting early stage renal disease and which is indicative of an increased risk of adverse pregnancy outcome.

## **A novel approach to understanding Asthma: Focus on the epithelium**

**Prof Darryl Knight**

**\$606,894**

While allergies are very common, affecting ~40% of the population in Western countries, only a proportion of allergic people develop asthma, highlighting the importance of cell specific mechanisms that contribute to the disease. We will address how the structure and function of cells that line the airways, called epithelial cells contribute to asthma. We believe that in asthma, certain types of epithelial cells do not go through normal stages of development and differentiation and remain immature.

## **How resident host defence cells contribute to the development of childhood asthma and severe attacks of asthma**

**Prof Paul Foster**

**\$587,562**

Exposure to airborne particulate pollutants appears to contribute both to the development of childhood asthma and to acute severe attacks of asthma. We will investigate the mechanisms involved in childhood asthma and of asthma exacerbations. In particular, we will focus on the potentially critical role of a newly described population of host defence cells, and how these are activated as a result of injury of the lining cells of the airways.

## **Modelling schizophrenia-associated changes in mir-137 expression**

**Dr Murray Cairns**

**\$557,565**

We have identified mutation-associated changes in the expression of a non-coding microRNA gene in the cerebral cortex in schizophrenia. This gene, known as MIR137, functions by repressing hundreds of target genes and therefore has major implications for schizophrenia. The project will identify the genetic mechanism affecting the expression of MIR137, and determine the biological and behavioural implications of this change in the context of schizophrenia.

## **Spinal processing of sensory signals from the gut**

**Prof Robert Callister**

**\$536,226**

We use a model of inflammatory bowel disease (IBD) to determine how sensations from the inflamed gut are processed in the spinal cord. Over 60,000 Australians suffer from IBD and debilitating pain is a major symptom. Surprisingly, we know very little about how pain signals originating in the normal or the diseased gut are organised and processed in the central nervous system. Obtaining such information is a necessary first step before we can develop therapies to relieve gut pain.

## **Microglia as primary drivers of stress-induced changes in neuronal connectivity**

**Dr Frederick Walker**

**\$460,038**

Persistent exposure to stressful events can produce serious and lasting disturbances in cognitive function. Our research group has recently identified that microglia may play a very significant role in these disturbances. The studies to be undertaken in this proposal will provide fundamental knowledge on how microglia contribute to neuronal plasticity, and how microglia via their effects on neurons regulate complex cognitive behaviour.

## **Personally Controlled Electronic Health Records for young adults with communication disabilities: charting the course for successful child to adult health service transition.**

**Dr Bronwyn Hemsley**

**\$386,854**

Adolescents and young adults with chronic health conditions and communication disabilities struggle to communicate their health information with service providers. This causes problems in care when moving from child to adult health services. This study will investigate their use of the Personally Controlled Electronic Health Record as a means to support timely and effective information exchange to improve healthcare for these vulnerable young adults.

## **miRNA regulation of sperm maturation**

**A/Prof Brett Nixon**

**\$383,447**

Male infertility is an extremely common condition affecting 1 in 20 Australian men. One of the major reasons for this pathology is that the spermatozoa have lost their ability to recognize the egg, a function that is acquired during epididymal maturation. In this project we shall investigate the regulation of epididymal sperm maturation and thus provide new and powerful insights into the causes of male infertility, with practical implications for diagnosis and treatment of this condition.

## **Smoke-Free Recovery: an online smoking cessation program for hospital surgery patients**

**A/Prof Billie Bonevski**

**\$358,493**

Smoking causes serious post-surgery complications and may lengthen recovery time. Hospitalisation is an ideal opportunity to encourage quitting to patients who smoke. We have found high rates of smoking among trauma surgery patients, and high interest to quit, yet few reported receiving advice to quit. We have designed an

online quit support program for patients. The program is expected to help patients to quit smoking, leading to improvements in their recovery and general health.