

New South Wales

Chief Investigators

CIA Prof Philip Barter
CIB Prof David Celermajer
CIC A/Prof Leonard Kritharides
CID A/Prof Kerry Rye
CIE A/Prof Wendy Jessup

Scientific Title Atherosclerosis: Lipoproteins, cell biology and vascular physiology

Administering Institution Heart Research Institute

Recommended Budget \$9,870,727

Lay Description

The world is confronting a major new epidemic of premature heart disease that is being driven by a global increase in obesity. There are several factors that contribute to the increased risk of heart disease in overweight and obese people. One is a low blood level of the “good” HDL cholesterol that normally protects against heart disease. Another relates to a decreased ability to remove cholesterol from the walls of arteries where it builds up to cause heart disease. A third is the fact that obesity is associated with a state of chronic inflammation of the blood vessels. This inflammation not only accelerates the development of heart disease but also makes people who have cholesterol accumulated in their arteries more likely to actually have a heart attack. And a fourth is the fact that the lining of blood vessels does not function normally in overweight and obese people. This loss of normal function is a very early sign of future heart disease. These factors are closely inter-related, with the “good” HDL playing a central role in removing cholesterol from arteries, inhibiting arterial inflammation and promoting normal function and repair of the lining of blood vessels. HDL is complex, consisting of a mixture of several subpopulations of particles that vary in shape, size and composition. Furthermore, these HDL subpopulations are continually remodelled as they circulate in blood in reactions promoted by a number of blood factors that change their size and composition. A major component of the research to be conducted in this program relates to understanding how the HDL subpopulations in human blood are regulated and how they protect against heart disease. The applicants have already made major contributions to understanding the functions of the “good” HDLs, how they take cholesterol out of cells in the artery wall, how they inhibit inflammation of the arteries and how they improve the function of the artery lining. We propose to extend these studies to establish how these protective functions can be enhanced, to find out which of the HDL subpopulations are most protective, and to identify how to increase the most protective HDLs in people at risk of heart disease.

Chief Investigators**CIA** Prof Gordon Parker**CIB** Prof Philip Mitchell**CIC** Dr Gin Malhi**Scientific Title** Identifying determinants of both the origins and the progression of the depressive and bipolar (mood) disorders.**Administering Institution** University of New South Wales**Recommended Budget** \$5,883,133**Lay Description**

Currently, mood disorders are classified by severity, largely ignoring causes and leading to limited treatments. The Team will clarify how differing depressive and bipolar (mood) disorders are best modelled and pursue their differing causes, so assisting identification of specific treatments relating to their underlying causes. Our studies employ a range of sophisticated technologies, including molecular biology, brain imaging techniques, and mathematical modelling. The capacity of such research to advance the management of mood disorders address a pressing clinical need.

Chief Investigators**CIA** Prof John Simes**CIB** A/Prof Anthony Keech**CIC** A/Prof Val GebSKI**CID** Dr Martin Stockler**Scientific Title** Clinical trials advances for better health outcomes**Administering Institution** University of Sydney**Recommended Budget** \$7,560,000**Lay Description**

The NHMRC Clinical Trials Centre (CTC) aims to use clinical trials and methodological research in trials to improve health in Australia and internationally.

Its research program will initiate major new clinical trials and a comprehensive program of research into trial methods, biostatistical analysis, health outcome analysis and decision analysis. Patient preferences and decision making, particularly in cancer, will be a focus. CTC uses data from its own and other clinical trials in combined analyses to arrive at better evidence.

The NHMRC program grant will allow important research studies to be integrated with trials funded from industry and other sources and will maintain the CTC's internationally competitive research team at the cutting edge of new trial methods and systems.

Queensland

Chief Investigators

CIA Prof John Hancock

CIB Prof Robert Parton

Scientific Title Molecular and Functional Characterisation of Cell Surface Microdomains

Administering Institution University of Queensland

Recommended Budget \$5,023,833

Lay Description

This research program aims to gain a detailed understanding of the organisation of the cell surface at the molecular level. The cell surface is organised into domains with distinct functions. Visualisation of these domains, identifying their important components, and understanding how they form and function will have huge importance for therapeutic strategies aimed at combating the changes associated with cell transformation in cancer and in other human diseases such as muscular dystrophy.

Chief Investigators

CIA Prof Brian Kay

CIB Prof Scott O'Neill

Scientific Title Development of innovative approaches to manage insect transmitted diseases

Administering Institution Queensland Institute of Medical Research

Recommended Budget \$4,184,612

Lay Description

This program grant focuses on the development of new methods to control mosquito-borne diseases, including those caused by dengue, Japanese encephalitis, and chikungunya viruses. We are investigating whether the introduction of Wolbachia microorganisms into mosquitoes can be used to selectively eliminate old mosquitoes and reduce transmission of human pathogens. We will also determine whether Wolbachia

have any non-lethal affects on mosquito behaviours such as dispersal and biting activity which determine the level of contact between mosquitoes and humans.

Chief Investigators

CIA Prof David Kemp
CIB Prof Michael Good
CIC Prof Donald McManus
CID Prof Istvan Toth
CIE A/Prof Nicholas Anstey
CIF Kadaba Sriprakash
CIG Dr Denise Doolan
CIH Dr Christian Engwerda
CII Dr Alexander Loukas

Scientific Title Immunity and pathogenesis in tropical and infectious diseases:
Implications for vaccines and drug development

Administering Institution Queensland Institute of Medical Research

Recommended Budget \$14,902,357

Lay Description

Malaria, streptococcal diseases, helminthiasis and scabies are diseases of indigenous people on a massive scale, which lack vaccines. We aim to understand the pathogenesis of these diseases and develop vaccines and other treatments to combat them. Team includes senior experts on infectious diseases with long collaborative histories and younger members with impressive credentials. The work proposed also concerns inventive new ways of making such vaccines by novel chemical methods and aspects of delivery.

Tasmania

Chief Investigators

CIA Prof Simon Foote
CIB Prof Terrence Speed
CIC Dr Gordon Smyth
CID Dr Melanie Bahlo
CIE Prof Donald Chalmers
CIF Dr David Amor

Scientific Title Genetic and Bioinformatic analysis of complex human diseases

Administering Institution Menzies Research Institute

Recommended Budget \$8,134,805

Lay Description

Some human diseases are common in families; examples include prostate cancer, blood cancers, epilepsy and diabetes. Therefore, close relatives of individuals with a disease have an increased risk of being affected by this disease, implying a genetic basis. Finding the cause of these diseases is difficult, we will be developing novel approaches to the identification of genes responsible for these diseases. This is the first step towards the development of treatments for affected individuals.

Victoria

Chief Investigators

CIA Prof Leonard Harrison
CIB Prof Thomas Kay
CIC Dr Grant Morahan
CID A/Prof Andrew Lew
CIE A/Prof Philip O'Connell

Scientific Title Prevention and Cure of type 1 diabetes

Administering Institution Walter & Eliza Hall Institute

Recommended Budget \$10,473,809

Lay Description

Type 1 diabetes (T1D) is a major chronic disease affecting over 100,000 Australians. Its treatment and complications impose a significant burden on affected individuals and their families and on the health system. T1D occurs when the immune system attacks insulin-producing cells in the islet cells of the pancreas. The team has developed ways to identify at-risk people, defined immune and genetic causes of T1D and is undertaking prevention trials and Australia's first islet transplant program. Their multidisciplinary research is taking us closer to the prevention and cure of T1D.

Chief Investigators

CIA Prof Garry Jennings
CIB Prof Anthony Dart
CIC Prof Murray Esler
CID A/Prof David Kaye
CIE A/Prof Bronwyn Kingwell
CIF Dr Jaye Chin-Dusting

Scientific Title A Program of Research Addressing the Transition from Health to Advanced Cardiovascular Disease

Administering Institution Baker Heart Research Institute

Recommended Budget \$12,281,756

Lay Description

Cardiovascular disease (CVD) is the major cause of death and disability in Australia and worldwide. This burden will increase without new knowledge.

We will address knowledge gaps that delay the onset of cardiovascular disease as well as more effective prevention and control.

Our team has a strong track record of influencing clinical practice of CVD prevention, treatment and technology transfer.

For many, the first indication of a heart problem is sudden heart attack or death. By understanding mechanisms we aim to develop new tests and treatments that prevent heart attack, heart failure and other serious consequences of atherosclerosis.

Chief Investigators

CIA Prof Lois Salamonsen

CIB Prof Robert Aitken

CIC Prof John Findlay

CID Prof Robert McLachlan

CIE A/Prof David Robertson

CIF Prof Evan Simpson

Scientific Title Determinants of reproductive health: Basic and translational studies in fertility

Administering Institution Prince Henry's Institute of Medical Research

Recommended Budget \$ 11,822,329

Lay Description

Reproductive health is an issue of national and international significance yet there are considerable unmet needs in the key areas of infertility and contraception.

The health of each adult is strongly affected by very early events in development, including the effects of genetics and environment on sperm and eggs, and of the intra-uterine environment.

This program will use a combination of advanced technologies to address these issues and will translate findings to the clinic, thus improving the quality of reproductive health care and the long-term health of Australians.

Chief Investigators

CIA Prof Steven Stacker

CIB Dr Marc Achen

Scientific Title The biology and therapeutic manipulation of lymphatic vessels in human disease

Administering Institution Ludwig Institute for Cancer Research

Recommended Budget \$ 4,921,350

Lay Description

This proposal is for an established team of researchers and clinicians to explore the molecular control of the lymphatic system. This network of lymphatic vessels, located in organs throughout the body, is critical for regulation of tissue fluid and immune function. This program will explore the molecules which control the function of lymphatic vessels and their interactions with other cells in the body. It will greatly enhance our understanding of the lymphatic vessels and identify molecular targets for medicines designed to treat cancer, cardiovascular disease and lymphoedema.

Chief Investigators

CIA Prof James Whisstock

CIB Dr Philip Bird

CIC Dr Stephen Bottomley

CID Dr Ashley Buckle

CIE Dr Robert Pike

CIF Prof Alexander Smith

Scientific Title Control of proteases in infectious, degenerative and cardiovascular disease

Administering Institution Monash University

Recommended Budget \$11,009,647

Lay Description

Proteases are enzymes that control key processes in humans. The research in this program will result in major discoveries in the field of proteases and their inhibitors, with a focus on inflammatory, cardiovascular and degenerative disease. The knowledge gained from this strong foundation of fundamental research will underpin the translational outcomes necessary to combat the debilitating effects of immunological dysfunction, conformational and cardiovascular disease.