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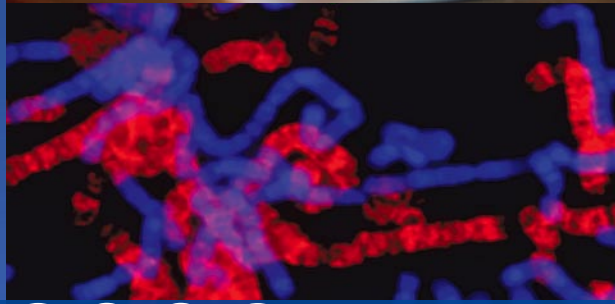
Australian Government
National Health and Medical Research Council

INVESTING IN AUSTRALIA'S HEALTH

RESEARCH • ETHICS • ADVICE • COMPLIANCE & EVALUATION



10 of the best 2006 NHMRC funded health & medical research successes

Contents

10 of the best

10 of the best celebrates success stories from 10 of Australia's leading health and medical research teams, whose work has been funded by the Australian Government, through the National Health and Medical Research Council (NHMRC).

The projects selected for inclusion were chosen by the NHMRC Final Report Review Group, chaired by Professor John Funder AO, which assessed the results of NHMRC funded research projects which concluded in 2004.

The projects showcased in *10 of the best* 2006 are representative of many more that could have been selected. All are of the highest international standard.

10 of the best is a testament to the excellence of Australian medical research.

The Commonwealth Government's Commitment to Research

Australians are rightly proud of the success of our health and medical researchers. Their success has meant less disease, better treatment, improved quality of life and a longer lifespan. Their success has also led to seven Nobel prizes for Physiology and Medicine and a per capita research output double the OECD average.

The $905 million in new health and medical research funding announced in this year's Federal Budget demonstrates the Commonwealth Government's ongoing commitment to further success.

The Government will use this funding to give NHMRC research grants a $500 million boost and to introduce a new $170 million fellowship scheme that will encourage outstanding researchers to pursue their research in Australia

The Government will also use the funding to invest $213 million into the infrastructure of Australian medical research organisations and to establish a $22 million national adult stem cell research centre.

With this ongoing support, world class Australian health and medical research will continue to contribute to longer and better lives for every Australian.

THE HONOURABLE MR TONY ABBOTT MP
Federal Minister for Health

NHMRC and the health of Australian medical research

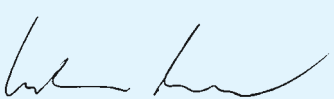
Australia boasts some of the world's best health and medical researchers, and 2006 has brought a very welcome level of recognition for them, both at home and overseas.

Barry Marshall and Robin Warren won the 2005 Nobel Prize for their work on stomach ulcers, Ian Frazer was named 2006 Australian of the Year for his ground breaking work on a cervical cancer vaccine, and David de Kretser was appointed Governor of Victoria following 40 years of research into male infertility.

These honours are fitting, deserved, and continue the Australian tradition of research excellence.

This booklet showcases another 10 of Australia's best health and medical research projects. They are an indication of the significance and quality of all NHMRC funded research, and represent the many outstanding Australian researchers who are dedicated to solving the mysteries of illness and improving the health of the population.

Finally, I would like to recognise the increasing support of health and medical research by the Australian Government, and acknowledge the work of Professor John Funder AO and Associate Professor Bronwyn Kingwell in developing this booklet which included selecting the 10 projects from hundreds of outstanding candidates.



PROFESSOR WARWICK ANDERSON
Chief Executive Officer
National Health and Medical Research Council

1

The cost of the common sore throat

Group A streptococcus bacteria cause a wide range of diseases from the common sore throat and auto immune diseases such as rheumatic fever, to the rare but life threatening toxic shock syndrome and flesh eating disease.

This comprehensive three year study found that, contrary to common perception, the streptococcal sore throat is as common now as it was 50 years ago. 13% of school age children, 5% of adults and 20% of families are affected each year, causing absence from work and school and substantial economic burden.

Serious streptococcal infections occur more commonly than meningococcal disease and have a higher death rate. Doctors treating such patients have not always been aware of new guidelines and treatments. The taking of a simple throat swab can avoid the non effective use of antibiotics, improve the chance of survival and reduce complications.

Treatments for disease have to be based on evidence, supported by research

This research will have direct economic and public health benefits and will be invaluable in determining how best to use group A streptocccal vaccines when they arrive in the next decade.

PROFESSOR JONATHAN CARAPETIS
Murdoch Childrens Research Institute
The Royal Children's Hospital, Melbourne
and The University of Melbourne

This research was funded by a NHMRC Project Grant of $386,760 over three years.

2 Exercise is key in the battle against diabetes

Type 2 diabetes in Australia has doubled over the past 20 years. It is caused by insulin resistance and associated with risk factors such as age, high blood pressure and high cholesterol. It is also strongly associated with a lack of physical activity and obesity.

More than 7% of Australian adults now have Type 2 diabetes and up to 50% of cases remain undiagnosed. Type 2 diabetes places a major burden on the health care system and can result in a decreased quality of life and a shortened life expectancy for patients.

This research showed that when blood vessels become insulin resistant, they no longer respond to insulin by increasing blood flow to provide glucose and oxygen. However insulin resistant blood vessels still respond to exercise by dilating and increasing flow rates.

This provides a logical base for putting exercise programs right up front with diet and glucose-lowering drugs in the management of Type 2 diabetes.

Health and medical research improves life expectancy and wellbeing

The research also demonstrated that insulin acts early and at very low doses on the smallest blood vessels in muscle, improving delivery of glucose, oxygen and insulin. When these tiny blood vessels fail to respond to insulin they retain their responsiveness to exercise, perhaps explaining why exercise is so beneficial in preventing the onset of insulin resistance in muscle.

These findings could ultimately lead to new therapies to prevent or treat diabetes and associated syndromes of insulin resistance such as obesity.

PROFESSOR MICHAEL CLARK
Muscle/Diabetes Research Group
University of Tasmania

This research was funded by a NHMRC Project Grant of $315,990 over three years.

3 Drugs and the mental health of our young

By 2020, the World Health Organization predicts that depression and related disorders will be the number one burden of disease in our communities.

Adolescence is a vibrant and turbulent period in which we negotiate new emotions, have increasingly complex relationships and embark on a journey of self discovery.

Many health problems such as depression and substance abuse emerge for the first time in adolescence.

To better understand the causes and consequences of these problems, this study surveyed 2,000 teenagers in 1992 to assess mental health, drug use, eating disorders, personality traits, relationships, physical and sexual health.

As these young people have grown up, their progress was followed to find out about work and study, relationships and living arrangements, and on becoming parents themselves.

Research will help ensure future generations are healthier

This internationally regarded study found a link between frequent teenage cannabis use and the later onset of mental disorders such as depression and anxiety. The research has been cited by the US office of drug control policy in their new national youth anti drug media campaign.

This study explored how a range of genetic, psychological and social influences impact on adolescent health.

It creates a unique picture of how Australian adolescents develop and will inform the most effective strategies to prevent mental health problems.

PROFESSOR GEORGE PATTON
Centre for Adolescent Health
Murdoch Childrens Research Institute, Melbourne

This research was funded by a NHMRC Project Grant of $450,939 over three years.

4 Community attitudes to colorectal cancer screening

Australia has one of the highest rates of colorectal cancer in the world. This disease is more common in older people, mainly affecting those over the age of 50. When diagnosed and treated at an early stage, there is an excellent chance of a cure.

Australia has 13,000 new cases of colorectal cancer reported per year and will soon embark on a national colorectal cancer screening program. This study looked at community attitudes to screening to ensure participation is maximised and screening is accepted by the community.

Colonoscopies have long been recommended for those with a family history of colon cancer. For the general population however, this is expensive as well as intrusive.

The study found that simplicity and ease of obtaining a stool sample at home were the key drivers for participation in screening. Perceived benefit, risk and even family history

← DR RICHARD LE LEU & PROFESSOR GRAEME YOUNG

Medical research will help prevent disease in our ageing population

were not as powerful in determining behaviour as expected. The study also found that advocacy by GPs would add credibility to the program.

These findings will increase the uptake and effectiveness of the national colorectal cancer screening program which should reduce death from colorectal cancer in Australia by up to 40%. It will also reduce the number of actual cases through detection and removal of adenomas that could develop into cancers.

PROFESSOR GRAEME YOUNG
Gastrointestinal Services
Flinders University, South Australia

This research was funded by a NHMRC Project Grant of $468,760 over three years.

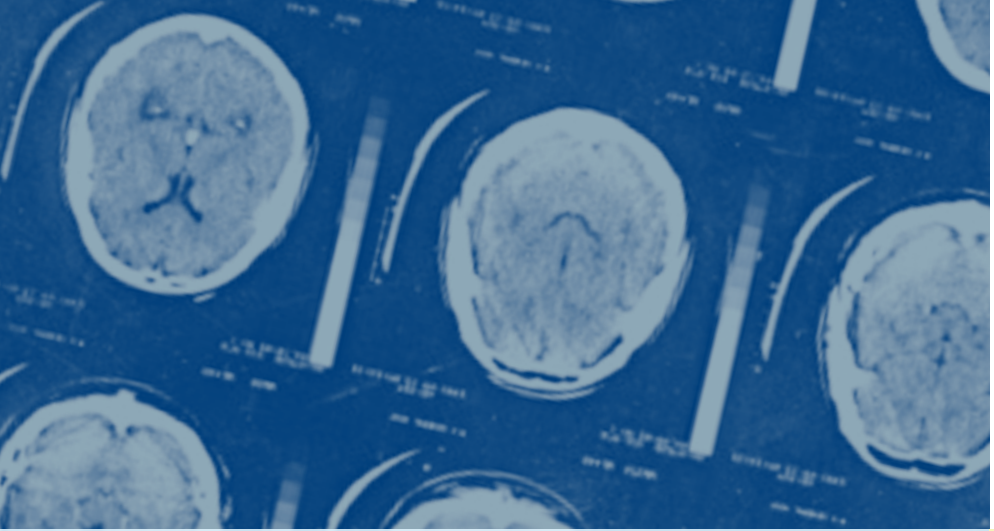
5 Supercomputer virtual brain signalling

The human brain is a complex organ, comprised of billions of individual nerve cells or neurons, with each making connections with around 10,000 other neurons.

Communication between nerves takes place through the generation of electrical pulses which cause the release of chemicals, which either stimulate or inhibit adjacent nerves to fire.

Underpinning the generation of electrical pulses is the opening and closing of small pores on the nerve surface called ion channels. When stimulated, these ion channels open, allowing charged particles to flow in and out of the cell, generating an electrical charge.

This research used a supercomputer to generate mathematical models of virtual brain ion channels. These models explained how ion channels open and close, traced the movement and number of ions crossing the channel and demonstrated how each channel discriminates between which ions are allowed to pass.



New frontiers in biomedical science are driven by Australian researchers

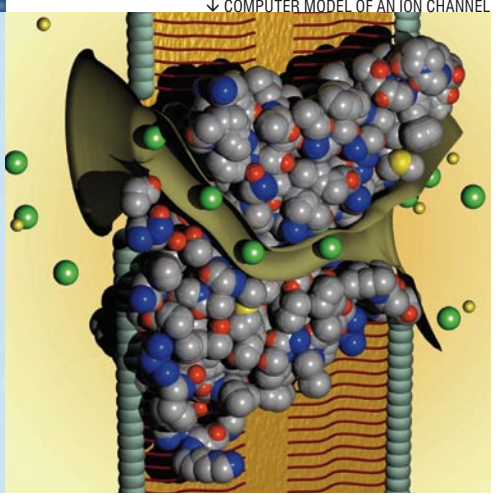
Understanding how these ion channels work will improve understanding of how the billions of cells in the brain interact and help us to identify the causes of and possibly cures for, several neurological and muscular disorders, such as epilepsy, muscular dystrophy and cystic fibrosis.

In the future the techniques of modelling ion channels using supercomputers will be used to design and test the development of pharmaceutical drugs.

DR SHIN-HO CHUNG
CNS Stability and Degeneration Group
Australian National University, Canberra

This research was funded by a NHMRC Project Grant of $677,293 over five years.

↓ COMPUTER MODEL OF AN ION CHANNEL



6

Breastfeeding decreases the chance of asthma

Asthma affects one in ten Australian adults and up to one in four children, making it the most widespread chronic health problem in Australia. There is currently no cure.

This study examined the relationship between early childhood respiratory conditions such as wheezing, allergic tendencies and asthma and early nutrition, in particular infant breastfeeding.

The study found that babies exclusively breastfed for more than four months received significant protection against developing asthma later in childhood.

Babies that were exclusively breastfed for at least six months had fewer admissions to hospital due to respiratory illness and infections.

The study also identified other benefits when babies were breastfed for at least six months, including improved verbal IQ, a measure of child development at six and eight years of age.

Health costs money, but disease costs more

Because breast milk is a rich source of fatty acids and other bioactive factors, breast milk may be essential for immune and central nervous system development.

The researchers have been actively involved in communicating the results of this study to influence health policy and to educate mothers to help decrease the physical and financial burden of childhood asthma.

DR WENDY ODDY
Telethon Institute for Child Health Research, Perth

This research was funded by a NHMRC Public Health (Australia) Fellowship of $260,018 over five years.

7

The lower the blood pressure, the better

High blood pressure is responsible for around 7 million deaths annually, making it one of the leading causes of death in the world. An estimated 600 million people worldwide have high blood pressure.

This collaborative study looked at the effects of blood pressure lowering medication on major cardiovascular diseases such as stroke and heart attack. With more than 160,000 people from 50 countries taking part, it was the largest study of its kind worldwide.

The research showed that all classes of drugs commonly used to lower blood pressure were similarly effective at reducing the risk of cardiovascular disease.

Aggressive treatment to lower blood pressure provided protection against stroke and heart attack. The study demonstrated that the lower the blood pressure, the better.

Everyone, every day benefits from health and medical research

The results from this 10 year study have already informed the development of many national and international guidelines for the management of blood pressure. Effective blood pressure control among people at high risk of stroke or heart disease has the potential to prevent many hundreds of thousands of premature deaths each year worldwide.

Evidence that older, less costly drugs are as effective as the newer ones is vital for low income countries, where most strokes and heart attacks now occur.

A/PROFESSOR BRUCE NEAL
The George Institute for International Health, Sydney

This research was funded by a NHMRC Project Grant of 166,250 over two years.

↑ WOMEN FROM INDIA TAKING PART IN THE INTERNATIONAL BLOOD PRESSURE STUDY

8 Solving the puzzle of Parkinson's

Parkinson's disease, a progressive, degenerative neurological condition that reduces control of body movements, affects more than 60,000 Australians. The cause of Parkinson's is not known and there is no cure.

People with Parkinson's disease suffer from tremors, muscle stiffness, slowness of movement, stooped posture, shuffling gait and lethargy, which intensify as the condition progresses.

These symptoms result from the progressive degeneration of a small group of nerve cells within the brain, resulting in a decrease in dopamine, a chemical necessary for normal movement control.

This research advanced our understanding of neuromelanin, a pigment molecule found in significant quantities in these vulnerable dopamine containing cells. The research team identified changes in the pigment and associated biochemical pathways which may be critical for the death of these brain cells.

The best expenditure is on prevention, not treatment

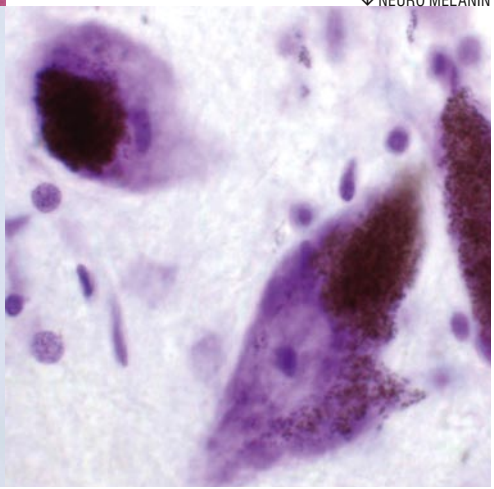
Understanding these pathways offers hope for the development of therapies to prevent the death of these brain cells, to slow or prevent the onset of Parkinson's disease.

The results of this research were also used to develop a new, more accurate method to diagnose Parkinson's disease. In the future, this test could enable patients to begin treatments to slow brain cell death, perhaps even prior to the development of symptoms.

DR KAY DOUBLE
Prince of Wales Medical Research Institute, Sydney

This research was funded by a NHMRC Career Development Award of $338,419 over five years.

↓ NEURO MELANIN



9 Preventing prostate cancer

Every year, around 10,000 Australian men are diagnosed with prostate cancer. More than 2,500 men die of the disease a year, making it the second largest cause of male cancer deaths.

This research identified a new molecule called kallikrein 4, an enzyme found in high levels in people with prostate cancer.

The finding, which has been patented, has huge commercial potential. In the future, kallikrein 4 may be used to diagnose prostate cancer, as well as to measure the progression of the disease and the effectiveness of treatments.

The kallikrein family of enzymes are also thought to play a role in metastasis, the process by which cancer spreads from the place at which it first arose to distant locations in the body. In the case of prostate cancer, kallikrein 4 is found in bone metastases.

The finding suggests this enzyme may be a suitable target for the development of new therapies designed to inhibit

Research that reduced cancer deaths by 20% would be worth $184 billion to Australians

kallikrein 4, to delay cancer progression, or prevent the bone metastasis of prostate cancer.

PROFESSOR JUDITH CLEMENTS
Leader Hormone Dependent
Cancer Research Program,
Queensland University of Technology

This research was funded by a NHMRC Project Grant of $724,544 over five years. In 2005, the research team was awarded further NHMRC funding worth more than $1 million over five years to continue this important work.

↓ PROFESSOR JUDITH CLEMENTS

10 Decreasing diabetes in remote Indigenous communities

Type 2 diabetes is a critical health problem in Indigenous communities, affecting up to one third of Indigenous Australian adults and causing high rates of avoidable complications such as infections, heart, kidney and eye disease and early death.

There is now good evidence that many of these complications may be prevented or slowed with better primary care. However, many remote communities have poor access to mainstream medical services, including appropriately trained doctors and nurses.

The research team worked closely with Indigenous health workers in the Torres Strait and Queensland to establish patient care plans, checkups and referrals, which resulted in a 40% decrease in serious diabetes complications.

The researchers then developed diabetes care guidelines and provided training and support for health care workers. As a result, more Indigenous people with diabetes were provided with appropriate care and there was

← INDIGENOUS DIABETES EDUCATOR EXPLAINING INSULIN TREATMENT TO A PATIENT IN THE TORRES STRAIT.

Every dollar invested in medical research returns five dollars in economic benefit to Australia

a decrease in the number of hospitalisations due to diabetes complications.

However, the study also found that Indigenous people with diabetes still receive insulin treatment at much lower rates than non Indigenous people with diabetes and there is a need to improve the availability and quality of healthy food in their communities.

This research provided data and a framework to further improve the quality of services and clinical outcomes for chronic disease in remote and disadvantaged communities.

PROFESSOR ROBYN MCDERMOTT
Division of Health Sciences,
University of South Australia

This research was funded by a NHMRC Strategic Research and Development Committee award of $414,000 over two years.

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