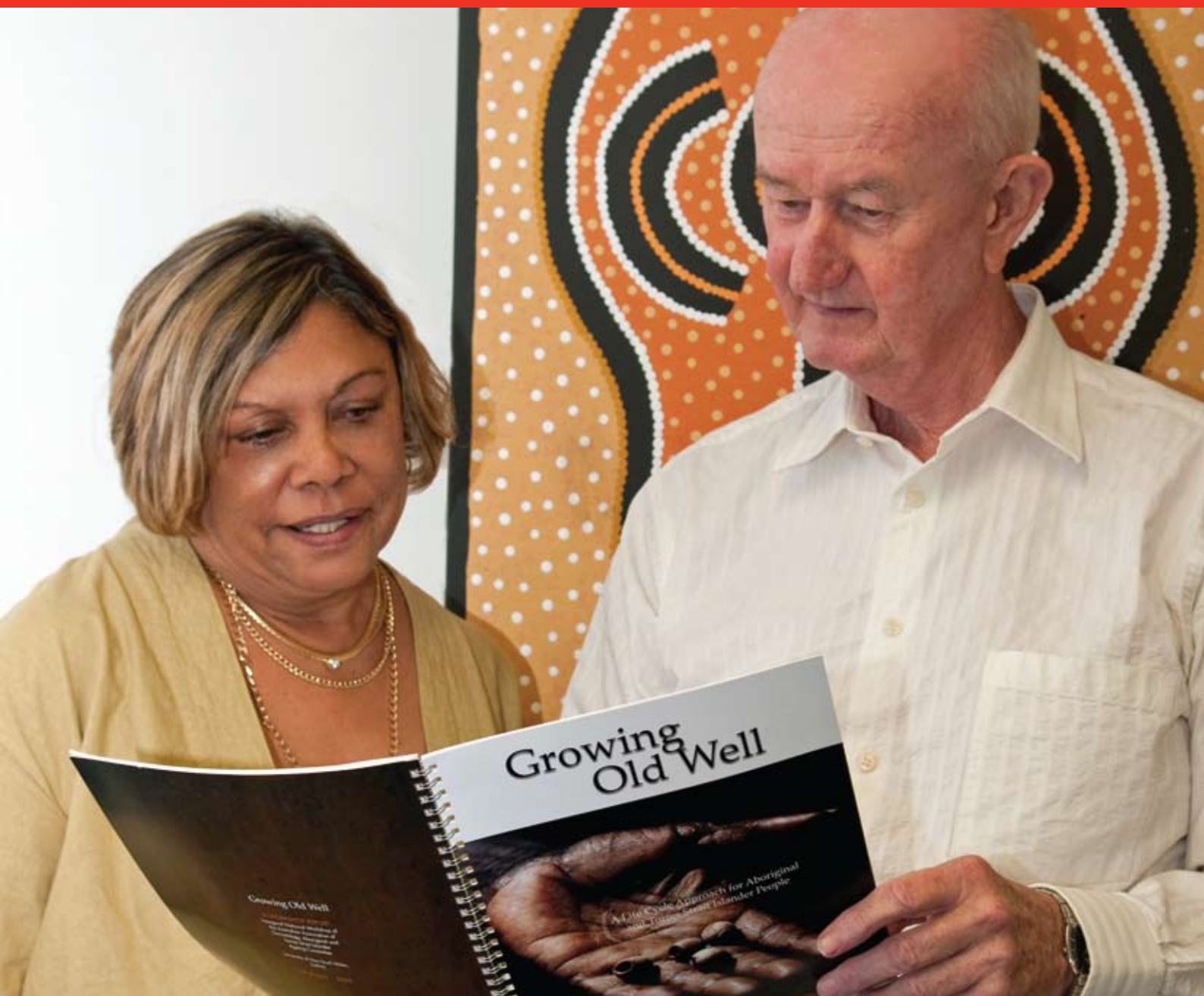




Brain *Works*



PETER SCHOFIELD

The Prince of Wales Medical Research Institute (POWMRI) is an international leader in brain and nervous system research, and endeavours to find the cause and cures for neurological diseases.

POWMRI has five areas of research: ageing and neurodegeneration, brain function and imaging, mental illness, neural injury, and sensation, movement, falls and balance.

In particular, POWMRI is recognised globally for its exceptional research in Parkinson's and Alzheimer's disease, psychiatric disorders such as schizophrenia and bipolar disorder, spinal cord injury, diseases of the nervous system such as Motor Neurone Disease, falls in the elderly, and many other fields of research.

We rely on your generosity to continue our vital research. All donations, whether large or small, are important.



I-r front row: Anna Le Masurier, Macquarie Group Foundation; Prof Cyndi Shannon Weickert; Minister Perry; Prof Denis Wakefield, UNSW
I-r back row: Prof Phil Mitchell AM, UNSW; Prof Vaughan Carr, SRI; Prof Peter Schofield, POWMRI

Cover Photograph: Professor Tony Broe AM and Aboriginal Health Worker, Colleen Cawood



The Power of Partnerships

Recently we were delighted to welcome the NSW Minister for Mental Health, Barbara Perry, to the Institute where she announced a funding boost to ensure the continuation of the Macquarie Group Foundation Chair of Schizophrenia Research. This position, held by Professor Cyndi Shannon Weickert, was originally made possible by a grant from the NSW Government and is the only professorial position of its kind in Australia.

The Institute's Schizophrenia Research Laboratory, where Professor Shannon Weickert conducts her research, is an example of a successful partnership. It is a joint initiative with the Schizophrenia Research Institute, which initially requested support from NSW Health five years ago, and then selected the University of NSW and POWMRI to host the laboratory. The Macquarie Group Foundation makes important financial contributions, along with the substantial cash contributions from each partner. With the laboratory located at the Institute, we also make significant additional contributions in providing the day to day research infrastructure.

Minister Perry praised Cyndi's incredible research, including her work in identifying a brain receptor that is faulty in people with schizophrenia and the clinical trials that are currently underway based on this information (as featured in the last issue of Brainworks). Ms Perry said the research could revolutionise the treatment for and long-term recovery of people with schizophrenia. The amazing progress that we have made in schizophrenia research is dependent on our ongoing collaborations, and the new funding will allow us to further strengthen our important partnerships.

In another example of the power of partnerships, I was one of the presenters at a federal parliamentary breakfast hosted by the Parliamentary Secretary for Health, Mark Butler. Attended by Ministers, MPs, Senators and senior parliamentary staff, the meeting heard that brain and mind disorders such as depression, stroke, anxiety, schizophrenia, Parkinson's disease and Alzheimer's disease constitute one of the fastest growing disease burdens that Australians now face.

A partnership of consumers, clinicians and scientists spoke about the proposed National Neuroscience Initiative, a coordinated, Australia-wide program targeting diseases of the brain and mind, with a focus on outcomes for patients and consumers. This initiative is strongly aligned with the Government's Health and Hospital Reform agenda, and could improve the health and prosperity of many Australians.

If supported by the Federal Government, the initiative will result in substantial improvements in scientific evidence, deliver immediate improvements in clinical practice, and allow earlier diagnosis and therapy. The outcome will be a fundamental improvement in the societal and economic burden of these devastating diseases on the Australian community.

It is working in partnership that provides these great opportunities for delivering real improvements in health.

Professor Peter R Schofield *PhD DSc*
Executive Director & Chief Executive Officer

It is working in partnership that provides great opportunities for delivering real improvements in health.

HEALTHY AGEING IN ABORIGINAL COMMUNITIES

We have a growing research team, including Aboriginal researchers, working on this complex project.

The prevalence of dementia in Aboriginal people who live in urban areas in NSW is under the research spotlight. A high rate of early onset dementia has already been identified in remote Aboriginal communities, but those closer to the city have not received the same research attention.

The Institute's *Koori Growing Old Well Study* is examining links between early-life events and mid-life health status in Aboriginal people and their ability to reach a healthy old age in the same way as the non-Aboriginal community.

"This study represents one of the most important challenges for health equity in Australia," says Study Director Professor Tony Broe. "Overall, we would like this research to lead to a reduction in the life expectancy gap between Aboriginal and non-Aboriginal Australians and in the current high rates of chronic disease experienced by many Aboriginal communities.

"From a personal point of view, this represents a distillation of my 40 years of research in building a better understanding of the socio-biological and neuro-biological processes associated with healthy ageing, brain ageing and longevity," he says.



In designing the research, Professor Broe says that one of their aims is to ensure Aboriginal representation and involvement in the research processes.

"We have a growing research team, including local Aboriginal researchers, working on this complex project. We have also spent time solidifying partnerships with participating Aboriginal communities and their representative organisations in metropolitan Sydney and northern NSW," Professor Broe says.

Researchers are currently recruiting approximately 600 Aboriginal people aged 60 and over across NSW. Professor Broe says there has been genuine interest in dementia and ageing in the Aboriginal communities they are working with.

"There is a real need to improve care for older Aboriginal people as well as to ensure that they actually reach old age," says Professor Broe.



Dr Americo Migliaccio with the high-speed rotator he designed to underpin his VOR research

THE BODY'S BALANCING ACT

As a child, you probably had fun spinning around and around to make yourself dizzy.

But it's no fun for the one million Australians who will experience balance-related problems at some stage in their lives. When the fragile balance organs in the inner ear are damaged by injury, disease or degeneration due to ageing, juggling work and family, and even living independently, can become a major problem.

"Often simple tasks requiring head movements will result in severe nausea and dizziness," says the Institute's Dr Americo Migliaccio who heads a team investigating a crucial component of the human balance system, the vestibulo-ocular reflex, or VOR. The VOR is a reflex eye movement that stabilises images on the retina during rotations of the head.

"For example, when the head rotates with a certain speed and direction, the eyes should rotate with the same speed but in the opposite direction," says Dr Migliaccio. "It's the balance organs, one in each inner ear, that sense this motion and produce counter-rotations of the eyes to compensate for these unplanned head movements."

Investigators are looking for ways to help restore this important eye movement reflex in people who have sustained damage to their balance organs. They use a state-of-the-art rotator and high-speed video system to measure binocular, three dimensional 3D, VOR eye movements. The equipment was originally designed by Dr Migliaccio during his seven years at Johns Hopkins University in the USA.

This research is aimed at identifying treatments to reduce the suffering of those affected by major balance disorders.

RESEARCH TIGHTENS SEATBELT LAWS

Every child... every trip

As a direct result of seven years of research by Assoc Professor Lynne Bilston and her child injury research team, new child restraint laws were introduced in NSW and other states on 1 March 2010.

The new legislation requires all children up to the age of seven years to use an appropriate child restraint or booster seat when travelling in cars. Children will also need to sit in the rear seat until they are seven.

"Our research into injuries in car crashes showed that children correctly using the right restraint for their size were substantially less likely to sustain serious or fatal injuries in crashes," said Assoc Professor Bilston.

"Our team has been investigating how well children fit into different restraint types. This research ensured that simple, age-based criteria would be the best way of framing the new laws," she said.



Prof Lynne Bilston in the Institute's Injury Prevention Research Centre

New child restraint laws – the minimum safety requirements:

Birth to 6 months

Must travel in a rear facing child restraint.

6 months to 4 years

Must travel in either a rear facing child restraint OR a forward facing child restraint with an in-built harness. If a car has two or more rows of seats, then children under four years must not travel in the front seat.

4 years to 7 years

Must travel in a forward facing child restraint with an in-built harness OR a booster seat. May not travel in the front seat unless all rear seats are being used by children under seven years.



New insights in cancer treatment

Nerve damage is a common side effect of many cancer treatments and can cause irreversible, long-term damage, says PhD student Susanna Park.

"Nerve damage limits the amount of treatment that patients can receive," she says. "The mechanisms underlying this nerve damage are not understood and there are currently no established treatments or preventative strategies."

Park says this is increasingly becoming a problem in cancer treatment, especially for patients with completely cured disease who have an excellent prognosis but are given treatments as a preventative measure.

"The treatment potentially leaves these patients with life-long neurological symptoms including pain, numbness, weakness and difficulty walking," she says.

Park is working with Professor Matthew Kiernan, Dr Cindy Lin and Dr Arun Krishnan to identify ways of predicting a person's susceptibility to nerve damage.

Using new nerve testing protocols developed at the Institute, the researchers have undertaken over 1000 studies and identified patients most at-risk of developing severe 'neurotoxic' symptoms following treatment for a range of cancers, particularly breast and bowel cancer.

Cancer specialists will use this information when deciding what treatment to offer individual patients. The new techniques developed by the team are now being adapted for use in an international clinical trial and have been published in the academic journals *Brain* and *Journal of Clinical Oncology*.

PhD student, Susanna Park tests a patient for nerve damage



COPPER IN PARKINSON'S DISEASE

How and why selective brain cell death leads to the symptoms of Parkinson's disease (PD) is unknown, but changes in levels of metals within the brain are widely believed to play a significant role, says Assoc Professor Kay Double.

Assoc Professor Double and her researchers have been collaborating with Dr Sylvain Bohic at the European Synchrotron Radiation Facility in Grenoble, France, and have found that brain regions vulnerable in PD have reduced levels of copper.

"Copper is important for the normal function of several key brain proteins," she says. "Decreased brain copper causes cell damage and death in other brain disorders. Therefore it is feasible that reduced brain copper may contribute to cell damage in the brain in PD."

The next step, says Assoc Professor Double, is to determine whether the transport of brain copper is altered in patients with PD, and what effect reduced copper has on their brain cell health. Assoc Professor Double's work is supported by a Seed Grant from Parkinson's NSW.

PD researchers (l-r) Veronica Smoothy, Katherine Scarpin and Assoc Prof Kay Double



Fay Bernstein will be 94 on 3 April this year and, to celebrate, she's taking a cruise to Honolulu and Tahiti. This spirited lady doesn't just take life as it comes, but meets it head on!

Fay recently visited the Falls and Balance Research Group to take part in a study investigating whether a 'fear factor' increases the risk of falls in older people.

"When we look at the association between fear of falling and balance, we often see that they are closely related," says researcher Dr Kim Delbaere.

"Many older people are very conscious of the potentially devastating consequences of falling over, such as breaking a hip or losing their independence and report to be afraid of falling," she says.

In her most recent study, Dr Delbaere found that about one third of participants had a fear of falling that did not match their actual ability to

DON'T WORRY, BE HAPPY

Fay Bernstein and researcher, Dr Kim Delbaere

balance – in other words, they had an excessive, unrealistic fear of falling.

Many of these people reported having falls in which they injured themselves or had multiple falls, despite their low actual risk of falling. They also had higher levels of depressive symptoms, and often adopted a cautious gait in hazardous situations by walking slower and taking smaller steps, which actually decreases walking stability.

On the other hand, those people who had the same risk of falling but felt less fear than the overly cautious people reported falling less often.

"Our study showed that these people were protected from falling through a positive outlook on life, and maintained physical activity and community participation," says Delbaere.

These results indicate that being overly cautious could increase the risk of suffering a fall, says Delbaere. Therefore, it's important to maintain an active and healthy lifestyle in old age, she says – just like Fay Bernstein!

WHAT IS PSP?



Dr Emma Schofield

The first symptoms that people with a brain condition called 'PSP' usually notice is that they have difficulty balancing and walking, says Institute researcher Dr Emma Schofield. They begin to fall a lot, and may also start having difficulty thinking and managing everyday tasks.

While this means that sometimes PSP is mistaken for Parkinson's disease, the reality of PSP is very different – at present, it has no treatment and life expectancy is only about 6 to 7 years after the first appearance of symptoms.

It's this bleak reality that has been driving researchers at the Institute to understand what's happening in the brains of people with PSP. "If we want to find a treatment, we need to know what's actually causing the problems on a cellular level," says Dr Schofield.

PSP stands for Progressive Supranuclear Palsy. "It's progressive because it's a disease that continues to get worse," says Dr Schofield. The 'supranuclear palsy' refers to one of the main symptoms of the disease, the inability of the brain to control eye movement.

PSP usually affects people over the age of 65. In these people,

a protein called 'tau' starts behaving abnormally in the brain.

"It forms something like a hairball inside the neurons," says Dr Schofield.

Research at the Institute has been focusing on finding the regions of the brain that are affected by these 'hairballs', and how this relates to symptoms of PSP. What they've found so far is the 'hairballs' appear in many different parts of the brain including the cortex, which controls 'higher' functions, and that this is an important part of the disease process.

The hope is that their results will help inform drug research, possibly into a drug that can move the protein out of the cell, which might halt or even reverse symptoms.

Another area of research is finding ways of diagnosing PSP earlier by finding objective measures of early brain changes.

"Our real problem is that we're diagnosing people quite late in the disease, so our ability to really decipher what's going on in terms of the brain is hard," says Dr Schofield. If we can diagnose people earlier, then there is potentially more that we can do for them, she says.



Bridge Players Are Using It

During the first week of May, over 3000 players across Australia will keep their mind active by playing Bridge while raising funds for Alzheimer's and dementia research.

From Palmerston in the Northern Territory to the Melbourne Bridge Cricket Club in Victoria, clubs around Australia are participating in The Bridge for Brain Research Challenge.

Keith McDonald, President of the Australian Bridge Federation (ABF) has been a long time supporter of the Challenge.

"The ABF is delighted with the support from bridge clubs for the research into Alzheimer's disease. These are difficult financial times but it is in difficult times that we need to counter the challenge. I hope that 2010 will be a record in terms of participation, and funds raised."

Some of Australia's best known business names have stepped up to provide prizes for the Challenge including Captain Cook Cruises, BridgeClimb, Bridge Shop, Leading Edge Telecoms in Northmead and Penguin Books.

Contact Suzy Randjelovic on 1300 888 019 for further information.

Bridge players take part in the 2009 Challenge

JAMES' GIFT

When 12 year old James Pacino's grandmother, Marianne Bleasel, died after a long illness and donated her brain to the Brain Bank at the Institute, James decided he would donate something important of his too.

With the help of his parents, he withdrew all 130 dollars from his savings account, and made a donation to the Institute in honour of his grandmother.

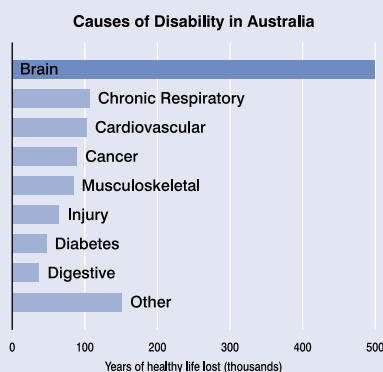
James' generous donation will help researchers discover the cause of dementia, and find a way to prevent and even cure the disease – a gesture his grandmother would surely be proud of.

James with his Grandma



We need your help!

More than ever before, Australians are facing the anguish of caring for family members living with diseases that affect their mind and their mobility. The solutions will only be found through medical research.



In any one year, over 3 million Australians struggle with major brain disorders. This poses the largest economic, health and social capital burden to Australia. Currently there are no known cures.

The Institute's Foundation has been established to fund the research undertaken at the Prince of Wales Medical Research Institute.

By financially supporting the Foundation, you will provide researchers with a critical resource for moving closer to discoveries that will lead to cures. Monetary and in-kind donations are essential, and multi-year commitments that empower researchers to pursue their passion for cures.

You can help by making donations to:

- Where best needed
- Specific disease research projects
- Fellowships and Scholarships to support internationally-recognised researchers
- Leading edge equipment to ensure scientists remain at the forefront of global research
- Seed funding to grow the work of innovative young researchers

YOUR SUPPORT IS NEEDED

There are many ways you can help our scientists in their quest to combat disease and reduce the tragic human toll in Australia and around the world. We can help you make the best-informed decisions about giving.

Please contact: **Stephanie Grove** on 02 9399 1270 or **The Foundation** on 02 9399 1122

Yes! I want to help fund medical research

You can make a tax-deductible donation by:

- **Mail:** complete your details below and send your gift to **POWMRI, PO Box 82, St Pauls NSW 2031**
- **Phone:** 1300 888 019
- **Fax:** 02 9399 1082
- **Online:** www.powmri.edu.au

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Please send me information about leaving a bequest in my Will

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