

BRAINwaves



The Newsletter of the Brain Foundation Winter 2007



FROM THE PRESIDENT – Professor Philip Thompson

As the financial year draws to a close, I am pleased to report there have been a number of changes to the structure of the Brain Foundation and I welcome those of you who have only been on the mailing list of the

subsidiary company in Victoria to now being readers of the National "Brainwaves" for the first time.

The most significant change has been that the operations in Victoria have been refocused upon our main and very important work in clinical neuroscience research and Brain Foundation Victoria will now direct attention to raising funds to support research. The information, carer and respite programs formerly delivered through our Victorian Office are now under the auspices of a new, independent company called Brainlink. It has taken over our former premises at Blackburn and the office of Brain Foundation Victoria is now located in the Department of Psychology and Psychiatry at Monash

University. If you have any questions or would like further information please call 1300 886 660.

These changes will now enable a truly national emphasis for our research programmes. Our national scientific committee looks for proposals that will facilitate early diagnosis of neurological diseases so that treatments will be more effective and of course the ultimate goal is to not only delay and minimise neurological disability but prevent the onset of such diseases. Applications are now being called for the 2007 Grants and details are available in the research segment of our website.

There are examples of the advances made by research in this newsletter. These are very encouraging and reinforce the value of your generous donations to the Brain Foundation. I do hope that as many of you who can will contribute to our "end-of-tax year" appeal.

Philip Thompson
President, Brain Foundation

Fundraising and Sponsorship

Each year the Brain Foundation is amazed at the generosity of our individual and corporate sponsors whose support has ranged from the first christening donation, engagement party donation, sponsored sporting events, Bequests, workplace donations and fun work day events to raise awareness about the Brain Foundation, and its aims to find cures via research into debilitating neurological diseases. For more information please see the website at www.brainaustralia.org.au.

The efforts of every person who donates to the Brain Foundation are greatly appreciated irrespective of the amount. A separate form has been included for that purpose and it already has your name and address pre-printed for your convenience. A self-addressed envelope is also included to easily complete a donation.

For those working, one of the most cost effective ways to donate is by taking advantage of pre-tax giving. That is, by

arranging for the pay office to deduct an amount each pay day, you will be immediately credited with the applicable tax deduction. That means you do not have to worry about extra paperwork at the end of the financial year. Another way to help us by contributing smaller amounts regularly is to have a regular bank account transfer or to do the same by means of a credit card. Please call the office if you have any questions about how these methods can be implemented.

For those of you who wish to help us in the very long term, there is a new bequest handbook. Copies may be printed off the website or we will be happy to forward one to you if you contact the head office.

Research Grant Applications

The Brain Foundation is currently inviting applications for clinical neurological projects. This year the Board has decided that Applications can be submitted via email and



will be categorised into 1 of 10 fields of research. Applicants will be competing on a national scale and their proposals will be adjudicated by the Brain Foundation's National Scientific Committee. The closing date for applications will be the 30th of June. Further information can be obtained from the research section of our website at: www.brainaustralia.org.au

Headache and Migraine

It has often been stated that there is very little funding available for research into migraine and chronic headache. The challenge to us at the Brain Foundation through Headache Australia has been to build a database of those who are unfortunately afflicted with these conditions. If we do not have direct representation of large numbers then we are not in a strong position to raise funds from corporations or government for much-needed research. While very large numbers visit our website every month they remain anonymous unless they choose to leave their details with us and most do not. Therefore, a national campaign will be launched later this year to attract those who suffer migraines and chronic headaches to register with Headache Australia.

This edition of Brainwaves includes a form for those of our readers who unfortunately suffer chronic headache and migraine. We would be grateful if you would kindly complete the database form. Once in the database, you will receive the latest information and have the opportunity to participate in research if you choose to do so. It is hoped that this will be the first step forward in the quest to break the cycle of the feeling of hopelessness that can affect sufferers.

State Activities.

The next highlight for those in **New South Wales** will be the Christmas Fair at Tamworth Racecourse on Saturday the 17th of November. There will again be a full range of wares from flea market to upmarket and a wide variety of foods and entertainment for all ages throughout the day. If Tamworth is accessible to you, this will be a great opportunity to finalise your Christmas gift shopping, especially if you are looking for something quite unique. Proceeds from this event will benefit neurological research.

The **Brain Foundation Victoria** has undergone a major restructure since the last Brainwaves. The government sponsored programmes for Acquired Brain Injury victims

and carers for those with other neurological disorders have been assigned to a new company Brainlink that is independent of the Brain Foundation. All the staff formerly involved with the delivery of those services have transferred to the new company. As a result, your contributions will now go directly into research projects.

Brain Foundation (SA) teamed with the University of Adelaide to conduct "Professor Bob Hill's Haircut for Charity" during Brain Awareness Week in March. All proceeds were generously donated to the **Brain Foundation (SA)** and the target of \$10,000 was easily exceeded.



"I always knew it, the ponytail, would go one day – this seems like a good excuse to do it." Professor Hill said.

Pictured: Dr Simon Koblar Neurologist, Ms Lisa Taplin, Exec Director Brain Foundation SA, Mr Tim Noonan Journalist ABC Radio, Mr Luke Rosenzweig. And of course Professor Robert Hill, Executive Dean of Faculty of Science University of Adelaide.

The Executive Dean of the Faculty of Sciences at the University of Adelaide, Professor Bob Hill, had a ponytail for almost all of his time since his undergraduate days. He agreed to have it removed to raise funds for the **Brain Foundation (SA)**, supporting our research into brain disorders, diseases and injury.

The official hair cut took place during Brain Awareness Week on March 16. The successful event was hosted by



ABC radio journalist, Mr Tim Noonan at the University of Adelaide. **Brain Foundation (SA)**'s Executive Director, Ms Lisa Taplin, invited a previous Brain Foundation scholarship recipient and University of Adelaide science graduate, Luke Rosenzweig to speak about his ongoing recovery from a brain injury sustained in a motor vehicle accident.

Brain Foundation (SA) would like to thank Professor Hill for his kind gesture in raising funds for the Foundation's research, The University of Adelaide for their support and Luke Rosenzweig for sharing his story. Further thanks are extended to the many generous donors who supported this event. Their crests and logos are grouped below.



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Grow with us

The Sir Charles Bright Scholarship Trust was established in 1983. It was designed to provide financial scholarships to people with disabilities who are undertaking post secondary education within South Australia, at either university, TAFE

or other recognised educational institutions. Each year the **Brain Foundation (SA)** funds two scholarships to assist two students with a brain injury.

This year the **Brain Foundation (SA)** Scholarships were presented by the Hon. Paul Caica MP Minister for Employment, Training and Further Education at the Arts Centre, Adelaide. The recipients were Miss Centaine Kaesler-Smith and Miss Adel Stephens. Miss Centaine Kaesler-Smith is 19 years of age and suffers from Asberger's Syndrome. Centaine will be undertaking a Bachelor of Applied Science in Animal Sciences at the Roseworthy campus of the University of Adelaide.

Miss Adel Stephens is 19 years old and also suffers from Asberger's Syndrome. Adel will be undertaking a Bachelor of Science in Laboratory Medicine at the University of Adelaide.



Adel Stephens with the Honourable Paul Caica MP Minister for Employment, Training and Education

We are currently conducting our Autumn lottery which will be drawn on 19 June 2007 with total prize money of \$58,000.00. The proceeds of this lottery will assist us in funding further grants for research into neurological diseases, disorders and injury, providing tertiary scholarships and raising awareness of brain related diseases and disorders.

In August, our second lottery for the calendar year will commence with total prize money of \$62,000.00. Tickets are \$40.00 each and are limited to 9000. Supporters who would like to purchase a ticket please telephone **08 8223 3758**.

The Brain Foundation has had a busy quarter in **Tasmania** with a number of community and media



activities ensuring valuable recognition for the organisation. Promoting the Healthy Brain message has been a focus for the organisation with a new programme being developed to deliver to business and community groups. The programme was successfully offered as a course under the State's Adult Education framework and consideration is now being made to offer it on an ongoing basis. The programme provides a fantastic opportunity to raise awareness of the work the Brain Foundation undertakes and provides a welcome opportunity to talk directly to people.

The focus on promoting the organisation's role in providing information and advice on headaches and migraines has also been addressed by developing a programme titled, "Taking control of it controlling you". With an emphasis on chronic condition management, the workshops have been developed to empower participants – all of whom suffer regular headaches – to better understand and manage their headaches. Results of the program so far have been interesting; despite the fact that participants had been 'working closely' with their GPs in finding solutions to managing their headaches, the majority had not considered using headache diaries or trigger charts. The conclusion being that there is much work to be done in terms of spreading the Headache Australia message.

RESEARCH GRANT PROGRESS REPORTS

Recently the Brain Foundation awarded research grants into a number of Neurological studies, including Parkinson's Disease, Stroke, Schizophrenia, Migraine and Tumour. We are delighted to announce feedback on just some of the ongoing projects.

TWO PROJECTS CONDUCTED BY:

Chief Investigator

Professor Marcus Stoodley,
Prince of Wales Medical Research Institute,

Co-investigator

Dr Jian Tu.

PROJECT 1

VASCULAR TARGETING ENHANCEMENT OF RADIOSURGERY FOR BRAIN BLOOD VESSEL ABNORMALITIES (AVMS)

We are investigating methods of improving the efficacy of radiation treatment for brain arteriovenous malformations. These malformations cause strokes in children and young adults.

Radiation produces gradual occlusion of the abnormal vessels, preventing haemorrhage and stroke. Our previous work focused on understanding the molecular and cellular processes involved in the response to radiation. Building on this work, we are now trialling methods of altering these processes to facilitate vessel occlusion. Our initial attempts using molecules targeting the cells lining the blood vessels have proved very successful, with a significant increase in occlusion compared with radiation alone. Our current work continues to refine these techniques.

Project 2

2004 RESEARCH PROJECT TITLE: CEREBROSPINAL FLUID FLOW IN POST- TRAUMATIC SYRINGOMYELIA

Spinal cord cysts form in patients with spinal cord injury and in patients with certain types of congenital brain or spine abnormalities. These cysts cause spinal cord damage, but the origin of the fluid in the cysts remains largely unknown. One theory is that fluid leaks out of blood vessels around the cysts. Our current work is aimed at determining whether such fluid leakage contributes to cyst formation or enlargement. We have found that there is a breakdown in the lining of the blood vessels around cysts, but that this does not seem to cause an increase in the flow of fluid. We are currently completing this study in post-traumatic syringes and are about to commence investigating the blood vessels around cysts in other types of syringomyelia.

PROJECT:

NERVE DYSFUNCTION IN KIDNEY FAILURE

Chief Investigator

Matthew Kiernan PhD FRACP, Associate Professor in
Neurology, Prince of Wales Medical Research Institute &
Prince of Wales Clinical School University of New South
Wales

End Stage Kidney Disease (ESKD), occurring in studies investigating the mechanisms of nerve dysfunction in kidney failure as part of the Brain Foundation grant have



been completed. Neuropathy is a common complication of endstage kidney disease among the majority of patients undergoing dialysis. At present renal transplantation remains the only known cure for this neuropathy. Nerve excitability studies have suggested that hyperkalemia underlies the development of neuropathy and researchers have argued against dysfunction of the axonal Na^+/K^+ pump in the development of this condition. Excess potassium (K^+) fits the profile of the neurotoxin responsible for uraemic neuropathy better than middle molecules, parathyroid hormone or any other organic substance that has been previously linked to the development of uraemic neuropathy. Recent findings from nerve excitability studies in ESKD patients suggest that maintenance of serum K^+ within normal limits between periods of dialysis, rather than simple avoidance of hyperkalemia, is likely to reduce the incidence and severity of uraemic neuropathy. These findings were the subject of a public awareness campaign run by Kidney Health Australia.

To date, studies have been published in *Brain*, in addition to *Journal of Neurology*, *Neurosurgery* and *Psychiatry* and *Clinical Neurophysiology*. Dr Arun Krishnan has completed his PhD on the topic and was selected for the 2004 Golseth Award of the American Association of Electrodiagnostic Medicine for these studies, the first Australian to be chosen for this prestigious award. He also recently co-authored an invited review summarising these findings for the journal *Muscle & Nerve*. The support of funding by the Brain Foundation to enable these studies is gratefully acknowledged.



PROJECT:

DEVELOPMENT OF BIONIC EYE DEVICES

Research team

Dr Vivek Chowdhury, Professor Minas Coroneo and Professor Morley at the Department of Ophthalmology, Prince of Wales Hospital.

The Australian Bionic Eye Foundation is based at the Prince of Wales Hospital in Sydney Australia. It conducts basic and clinical research into the development of visual prostheses or bionic eye devices that aim to restore very basic visual sensations to patients who have developed severe visual disability or blindness for certain eye diseases. These devices work by the surgical placement of small electrodes over the outer surface of the globe of the eye, or on the surface of the visual area of the brain. Electrical stimulation of either eye or brain tissue with these electrodes elicits the perception of small spots of light in the patients visual field which are called "phosphenes". By stimulating the perception of multiple "phosphenes" or spots of light, the aim is to develop a very basic visual representation of objects to the patient. The patient wears a body mounted camera, such as on a pair of glasses, and the images acquired from the camera are processed by a small "pocket" computer that is worn by the patient. The computer then translates the image to an electrical stimulus that is transmitted to the electrodes, and this causes the patient to see shapes consisting of a matrix of small spots of light.

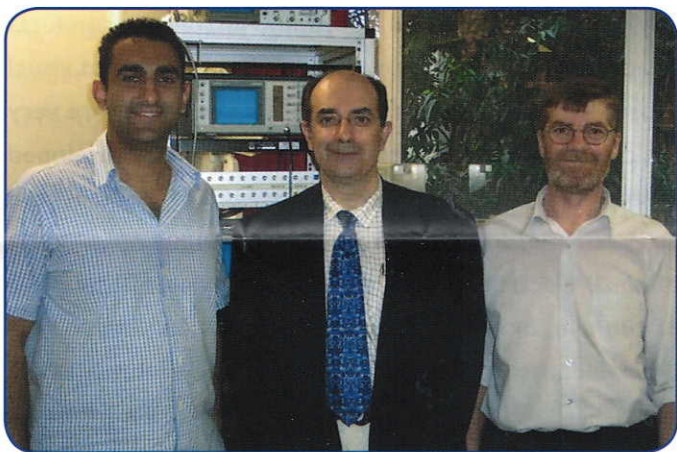
Professor John Morley's laboratory at the University of New South Wales has performed a lot of the pre-clinical experiments that validated the effectiveness of these devices.

In 2006, the Foundation began its Clinical Research Programme with a trial of electrical stimulation of the eye in patients with severe blindness from retinitis pigmentosa. In this disease there is a loss of the "photoreceptors" in the eye which convert light to "neural" activity. In order to implant the device, surgery needs to be performed to place electrodes on the outer surface of the eye – the "sclera".

A pilot trial was initiated to assess visual sensations, and to evaluate whether the type of electrical stimulation produced

by the device would be effective in patients. The trial will allow researchers to develop specialised electrodes for this purpose and to determine that patients with severe retinal degeneration have some remaining cells in the retina which can be activated electrically.

Clinical trials are continuing. It is hoped that functional devices could be ready in the next two to three years.



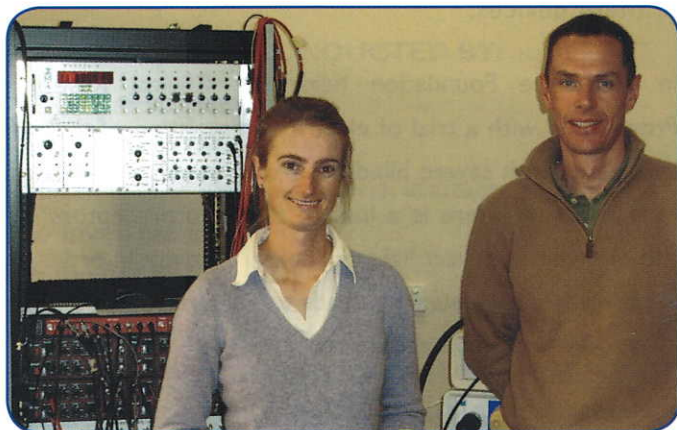
Research Team: Left, Dr Chowdhury, Professor Coroneo, Professor Morley.

PROJECT: IDENTIFICATION OF EARLY MARKERS FOR PARKINSON'S DISEASE

Chief Investigator

Dr Gabrielle Todd, School of Molecular and Biomedical Science, The University of Adelaide

Approximately 80,000 Australians suffer from Parkinson's disease, the second most common neurodegenerative disease in Australia. It is a major cause of loss of mobility and independent living in the community.



Dr Gabrielle Todd shown with Dr Michael Ridding

Our research focuses on two important brain structures involved in the initiation and execution of willed movements, the basal ganglia and motor cortex.

The aim of our research is to identify multiple markers of altered basal ganglia and motor cortex function in order to improve our ability to identify predisposition to disease of the basal ganglia (eg. Parkinson's disease). Our project will assess structural abnormalities of the basal ganglia with the use of ultrasound. We will then correlate the structural abnormalities with measures of motor cortex excitability using transcranial magnetic brain stimulation.

This project will provide valuable information to assist the development of one or both of these techniques as simple, quick, non-invasive and objective methods to identify motor dysfunction at an early stage. Early identification of diseases that affect the basal ganglia is crucial for timely implementation of novel therapeutic strategies aimed at arresting or delaying the onset of movement dysfunction.

PROJECT: THE MOLECULAR BASIS OF NEUROPATHOLOGY IN LYSOSOMAL STORAGE DISORDERS

Chief Investigator

Dr Emma Parkinson-Lawrence, Genetic Medicine, Womens and Children's Hospital, Adelaide.



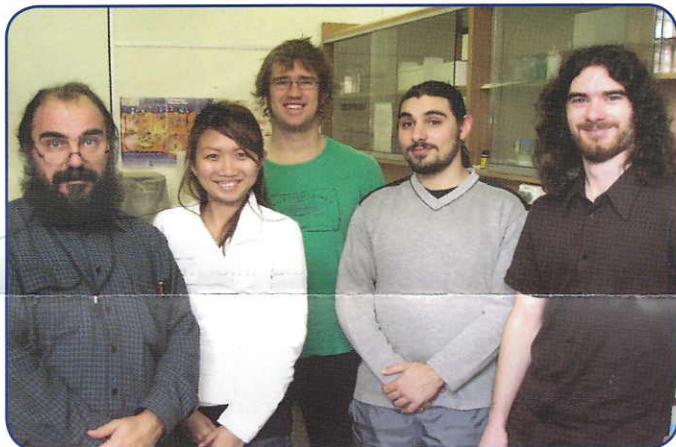
Dr Emma
Parkinson-Lawrence

Lysosomal Storage Disorders (LSD), are a group of genetic diseases caused by an inactive or deficient protein that normally breaks down waste products within a cell. As a result, waste products accumulate, becoming toxic to the cell, leading to the onset of devastating disease, mostly in children. Approximately two-thirds of LSD patients suffer from brain dysfunction but the basis of this is not understood. Specialised cellular compartments called endosomes and lysosomes have a fundamental role in the function of neurons, a subset of cells found within the brain. In this study we are trying to determine if the accumulation of waste products alters the movement and function of endosomes and lysosomes within neurons, and whether this contributes to the onset of brain dysfunction.

PROJECT: ALDEHYDE ADDUCT-TRAPPING AGENTS AS POTENTIAL ANTI-ALZHEIMER'S THERAPIES

Chief Investigator

Dr Ian Musgrave, Discipline of Pharmacology, School of Medical Sciences, University of Adelaide.



Pictured: Dr Ian Musgrave and Honours students.

One of the key features of Alzheimer's disease is the accumulation of clumps of insoluble protein in the brain. The clumps of protein are thought to be at least partly responsible for the death of nerves in the areas of the brain that control memory. Some of this cell death is due to the proteins being toxic themselves, and part due to these proteins ability to generate highly reactive derivatives of oxygen, so-called "oxidative stress". The effect is not dissimilar to pouring bleach on nerve cells. In the Autumn 2006 newsletter we reported that we had found a compound that could rescue nerve cells after they have been exposed to oxidative stress, suggesting they could reverse some pre-existing damage in clinical models. Also we had found that oxidative stress products can accelerate the formation of abnormal proteins of the sort that are responsible for Alzheimer's disease.

Our major finding of interest to the Brain Foundation is that our lead compound can not only reduce the toxic effects of oxidative stress on cells, but it can also prevent the formation of the abnormal protein aggregates in the test tube. This exciting information suggests that our compound may be able to combat the disease process itself, as well as reduce the damage produced by the disease process. We are currently working with Professor John Carver (Chemistry) to understand how this compound prevents protein

aggregation, and to determine its effect on cells exposed to the toxic proteins. We are also working with Dr. Michael Lardelli (Genetics) to develop a suitable animal model for screening this compound. This work will be presented at the 2007 International Brain Research Organisation meeting.

We have also begun investigation of the abnormal proteins role in brain inflammation.

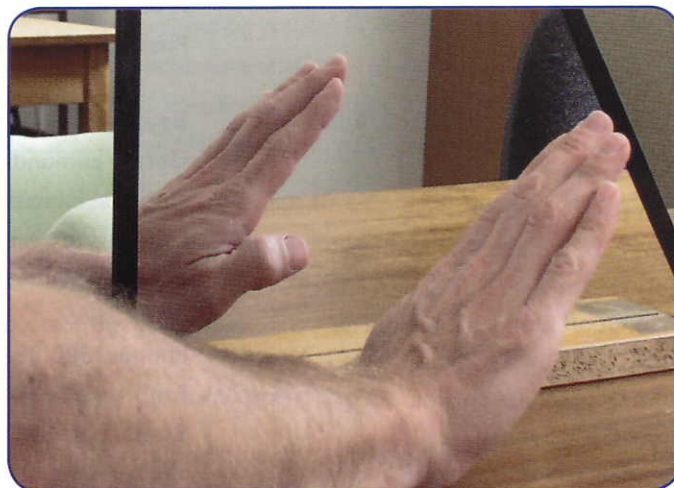
PROJECT: THE EFFECT OF COMBINED BILATERAL THERAPY AND MIRROR-VIEWING ON NEUROPLASTICITY AND MOTOR FUNCTION ON POST-STROKE HEMIPARESIS.

Chief Investigator

Dr M I Garry, University of Tasmania's School of Psychology.

The Human Motor Control Laboratory in the University of Tasmania's School of Psychology has begun research into a novel approach to help treat stroke-induced hemiparesis. Previous research had shown that the brain's response to movement is different when visual perception of the arm is altered using a mirror.

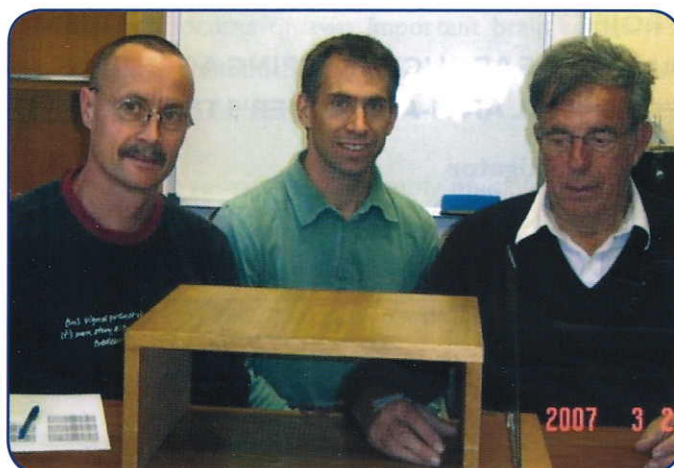
The project is investigating whether bilateral therapy, a therapeutic approach which involves both the affected and unaffected arms, can improve function of the affected arm after a stroke. In our study, a mirror is positioned between the participant's arms that reflects the unaffected arm. The affected arm is positioned (unseen) behind the mirror and the reflection of the unaffected arm is observed. When the participant moves their unaffected arm, the reflection



gives an illusion that the affected arm is moving normally. Our interest is whether seeing this 'illusory' movement can enhance the benefits of bilateral therapy.

The generous funding from the Brain Foundation has allowed us to hire Mr. Wayne Dicker, himself a stroke survivor, as a research assistant on the project. His roles include liaising with local rehabilitation units and hospitals to identify potential candidates, organising participant transportation to and from the University of Tasmania's Human Motor Control Laboratory, and conducting the therapy sessions.

The results of the research will be presented at a conference in Darwin in July 2007.



Pictured from left: Mr Wayne Dicker, Dr Mike Garry and Mr Colin Drake.

IN MEMORIAM

The President, Directors and Staff pass on their condolences and gratefully acknowledge gifts in memory of the following since the last Brainwaves Newsletter.

Ami Olian
Brian Appleford
Peter Raymond Davies
Barry Pattinson
and Elsie Dowd.

Peter Robertson
Brian Francis Crichton
Narm (Harry) Panjer
Carol Lawn

Also, the following groups made donations in memory of a staff member and colleague:

CBA Charity Social Committee
The Federal Publishing Company Magazine Group
John Willoughby and Staff at Forest NSW,
Northern Region

We continue to revere the memory of those for whom gifts have already been made and especially those who kindly made bequests to the Brain Foundation. If you are kind enough to consider a bequest to the Brain Foundation, please contact us for a special bequest brochure that shows the format necessary to ensure that your wishes are carried out. Alternatively, a copy of the brochure is available in the bequest section of our Website.

Personalised In Memoriam forms are also available should a donation to the Brain Foundation be an additional or preferred tribute for your loved ones (at funeral services). Please contact us to facilitate such arrangements.

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