THINK ABOUT IT

ANNUAL REPORT 2009
IMPROVING LIFE THROUGH BRAIN RESEARCH
1 IN 7 AUSTRALIANS EXPERIENCE A MAJOR BRAIN DISORDER EVERY YEAR
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In August we broke the soil at the Austin, and this was celebrated with the Premier of Victoria, Federal and State Ministers and a number of dignitaries.

EMERGING NEUROSCIENCE FACILITIES IN PARKVILLE AND THE AUSTIN

From an external observer’s perspective the greatest impact of the FNI amalgamation has been our participation in the Melbourne Neuroscience Project. FNI are partners with The University of Melbourne, Mental Health Research Institute and Austin Health in the building of the two dedicated neuroscience facilities at Parkville and at the Austin Hospital.

In August 2009 we broke the soil at the Austin, and this was celebrated with the Premier of Victoria, Federal and State Ministers and a number of dignitaries. In a short six months, the Austin project has risen two storeys out of the ground.

The Parkville project is now four storeys above Royal Parade in Parkville with a multi-level car park completed beneath the complex. This imposing building on the grounds of The University of Melbourne certainly heralds a new collaborative approach to neuroscience in Australia.

The construction of these facilities means that we have provided an important stimulus to the local economy during the difficult period of the Global Financial Crisis.

BOARD MATTERS

During the year we have been very sorry to lose the services of Mr Martyn Myer AO, Dr Alan Finkel AM and Mr John Wylie AM.

Martyn Myer was President of the Howard Florey Institute and joined the FNI Board on its formation. Martyn was for many years the driving force of the ‘Project Committee’, the committee charged with bringing the Parkville and Austin projects to completion. Martyn dedicated many years of service to HFI and FNI and has been a significant donor to both: we will miss his many skills and leadership.

John Wylie also joined the FNI Board after being a Director of the Howard Florey Institute where he took on the role of Honorary Treasurer. John carried on this role for FNI, where his extensive business experience and foresight have been of the greatest value.

Alan Finkel brought significant scientific expertise to the Board, and particularly in the area of neuroscience. Alan’s role as Chancellor of Monash University provided FNI with insight into the operation of the university sector. He and his wife still have a strong connection to FNI through the ‘Alan & Elizabeth Finkel Award for Neuroscience’, which assists post-graduate students to top-up existing scholarships.

We have been very fortunate to have some outstanding Directors join the Board. Mr Craig Drummond formerly with Goldman Sachs and presently Chief Executive Officer & Country Head of Bank of America Merrill Lynch Australia, and Mr Mark Jones, a Partner and member of the executive team for the Advisory Services Division of KPMG, joined the Board in June and May 2009 respectively.

In October Professor Richard Lukins, formerly Vice Chancellor of Monash University and Professor Andrea Hull formerly Director and CEO of the Victorian College of the Arts, joined the Board.

We thank all those who have contributed over the years and look forward to working together with the new Directors.

FNI’s science continues to thrive. Our researchers have been very successful in their research grant applications and awards, and I would like to thank them and all the staff for their enormous contribution over the past year. 2010 will see FNI move into the second half of its amalgamation process. Much still needs to be done but solid ground work has already been laid, and I am confident that we will move forward with vigour and resourcefulness.
The Science Vision Workshop in October was the forum where the FNI science leadership group set our direction for the forthcoming five years in the areas of research, people and collaboration. We were also fortunate to complete our capital fundraising campaign with a grant of $39.8 million from the Federal Government’s Health and Hospitals Fund (HHF). This grant was the final piece of our $205+ million building project, and allowed us to award the contracts for the two buildings at very competitive prices. To raise this amount in such a short time frame was a massive achievement, and we are delighted to see the Federal and State Governments strongly supportive of neuroscience in Australia.

Despite the effects of the global financial crisis, philanthropic contributions continued to be strong this year, and supported the work of our scientific teams in many different ways. FNI is indeed fortunate to be able to partner with a number of trusts and foundations which are committed to our mission and research achievements, and to receive support from so many individuals who share our commitment to finding better treatments and a cure for brain disease.

PLANNING FOR THE FUTURE

Our Science Vision Workshop in October was the forum where the FNI science leadership group set our direction for the forthcoming five years in the areas of research, people and collaboration. The group wished to reinforce existing core areas of scientific strength, and to expand into new areas of research we see as important in the future. We looked at the number and skill sets of our scientists to identify the professionals we need to recruit, and retain. Finally, we scoped the parties with whom FNI could work together to further brain and mind research.

The new areas we identified include translational research, computational neuroscience, stem cells and the genetics of neurological disease. The expansion and development of our facilities to support this will include new state-of-the-art equipment in imaging and microscopy, and this will provide unique opportunities for collaboration with existing and new scientific teams. During 2010, we will undertake workshops to promote collaborative initiatives which will exploit the synergies made possible by our scientific direction, and take advantage of our advancements in scientific technology. To continue our upward scientific trajectory, we are also beginning to recruit new scientific teams who will be able to take advantage of the opportunities we can offer for innovative research.

Essential to our future expansion is the education and mentoring of talented students and young researchers at FNI. With over 70 honours and post graduate students FNI has a vibrant and enthusiastic group of young scientists. The post doctoral researchers at FNI are the institutes’ developing breed of bright stars and I thank them and the students for their fine work. Both groups have been ably represented in 2009 by the Student Of Florey Neuroscience Institutes (SOFI) organisation and Florey Post Doctoral Association (FPDA) respectively.

EXECUTIVE SUPPORT AND BOARD

During the year we have been very sorry to lose the services of Mr Martyn Myer AO, Dr Alan Finkel AM and Mr John Wylie AM from the Board. I want to personally thank them for contributing their valuable time and expertise over the years, and I look forward to working together with the new Directors.

I have been extremely fortunate in having a dedicated Executive as mentioned earlier. Each has contributed significantly to the amalgamation process and level of scientific achievement. As we move into the second half of our amalgamation process, I am also deeply grateful for the hard work and commitment of our administrative teams. They raise vital funds to support our scientific research, they make sure the books are balanced and we are meeting our compliance requirements, and they communicate our achievements to the wider community and the world.

Finally, I would like to thank all of FNIs supporters over the past 12 months. This has been a period of unparalleled change and development, both in terms of the organisation’s structure and the construction of our exciting new facilities. Without your ongoing financial and in-kind support these projects would not have been possible.
The last two and a half years have not been easy for anyone. Good planning and management are a necessity, but ultimately it is staff effort and the extra yard they go that makes the difference.

Collaboration in Delivery
Collaboration in science is a core strength which leads to discovery. We have seen an increasing focus upon collaboration in the management of shared scientific platforms because our new buildings will be occupied by staff from FNI, The University of Melbourne and the Mental Health Research Institute (MHRI). The challenge is not only in how shared scientific platforms will be delivered, but how the delivery model will be applied across the scientific platforms housed in retained premises. This is a complex issue, and we have been working through its many ramifications.

A Director’s Co-ordination Forum, established in 2008, has turned its attention to this issue in order to facilitate decision making. The Forum has three core members: Director FNI, Director MHRI and a representative nominated by the University of Melbourne.
Mr Charles Allen was born and educated in England. His working career was in the oil and gas industry, initially as an exploration geophysicist with Shell in various parts of the world, and later in production and general management.

He was posted to Australia in 1979 as Executive Director of Woodside Petroleum Ltd and Chairman of the North West Shelf LNG project, the largest undertaking by a non-government organisation in Australia at that time.

He became Managing Director of Woodside in 1982 and retired in 1996 when the project was complete. He was appointed AO in 1990.

He has been a Director and Chairman of CSIRO, National Australia Bank and Air Liquide Australia. He has also been a Director of Metals Manufactures, Amcor and AGL.

Mr Craig Drummond is Chief Executive Officer and Country Head of Bank of America Merrill Lynch Australia, and brings with him more than 20 years of banking experience.

Prior to this, Mr Drummond was Executive Chairman and Co-Chief Executive Officer at Goldman Sachs where he repositioned the company to a top three participant in each of its major market segments. In 2007 Mr Drummond was appointed Deputy Chairman of the Australian Financial Markets Association, and retains strong working relationships with major regulators.

Mr Drummond is a fully accredited member of the Securities & Derivatives Industry Association, a Senior Fellow of FINSIA and is a Chartered Accountant. He is a Director of Scotch College, the Australian Davos Connection and Australian Financial Markets Association (AFMA).

Professor Geoffrey Donnan was previously Director of the National Stroke Research Institute and Professor of Neurology, University of Melbourne, Austin Hospital campus.

His research interest is clinical stroke management and he was co-founder of the Australian Stroke Trials Network.

He is immediate Past-President of the World Stroke Organisation. He received the American Stroke Association William Feinberg Award for Excellence in Clinical Stroke Research in 2007 and the 2008 Béthémén Griffiths Research Foundation Medal for outstanding contributions to research in stroke.

Professor Andrea Hull has had a distinguished career in CEO and executive roles, and also as a non-executive Board member in government and not-for-profit organisations.

She has been a Director at the Australia Council, the CEO of the WA Ministry for the Arts and the Director and CEO of the Victorian College of the Arts. She is an Emeritus Professor at the University of Melbourne, and sits on the Boards of the National Museum of Australia, the National Gallery of Victoria, and the Breast Cancer Network of Australia.

She was a founding Board member of the WA Health Promotion Foundation, a Trustee of the Victorian Arts Centre and a part time Commissioner of the Commonwealth Tertiary Education Commission.

Professor Hull has undertaken numerous international and national assignments, and served on many international, federal and state bodies to advance the integration of economic, social and cultural agendas.
Professor Graeme Jackson is the founding Director of the Brain Research Institute and a Neurologist at the Austin Hospital. He is internationally recognised for his work in new MR technologies, particularly in the field of epilepsy.

He is a Professorial Fellow of the Department of Medicine and Adjunct Professor in the Department of Radiology, The University of Melbourne; an Honorary Neurologist at the Royal Children’s Hospital in Melbourne and a Board member of Neurosciences Victoria.

Professor Jackson recently won a highly prestigious 2008 NHMRC Excellence Award.

Mark Jones is a Partner in KPMG’s Advisory Services practice, with national responsibility for corporate governance and internal risk management. He has previously provided external audit, internal audit, and accounting and advisory services to clients.

He is a member of the Australian executive team for the Advisory Services practice, with responsibility for internal risk management.

Mr Jones is a Fellow of both the Institute of Chartered Accountants in England and Wales and the Institute of Chartered Accountants in Australia, and a member of both CPA Australia and the Australian Institute of Company Directors.

Professor Graeme Jackson
BBSc, MBBS, FRACP, FRANZCR
(Chief Scientific Director)

Mr Mark Jones
BA (Sheff), MBA (MBS), FRIC, FAAA
(from alternate to permanent Director from May 2009)

Richard Larkins is an Emeritus Professor at Monash University, where he was Vice-Chancellor and President from 2003 to 2009.

From 1998 to 2003 he was Dean of the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne, and the James Stewart Professor of Medicine of the University of Melbourne at the Royal Melbourne Hospital from 1984 to 1997.

He has also held a number of senior academic and clinical positions at the Royal Melbourne Hospital and at the Austin, Repatriation Medical Centre, with clinical and research interests in diabetes, endocrinology and general medicine.

Professor Larkins’ past positions include Chair of Universities Australia, Chair of the National Health and Medical Research Council of Australia, President of the Royal Australasian College of Physicians, President of the Endocrine Society of Australia.

Mr Robert Trenberth began his professional career as a structural engineer and now serves as Chairman and Director in a number of companies and not-for-profit organisations.

His corporate business career includes consulting with McKinsey & Company, followed by senior executive appointments with Carlton and United Breweries Ltd and McPherson’s Ltd.

In 1991 Mr Trenberth was appointed Deputy Secretary of the Federal Department of Industry Science and Technology, returning to the private sector in 1996 as a non-executive director.

His current company appointments include Chairman of Riviera Properties Ltd and of Upstream Print Solutions and Director of the CRC for Polymers.

Mr Robert Trenberth
BEng (Melb), MA (Waterloo, Canada), MBA (Harvard), FICD
Mr Allan Myers is a Queen’s Counsel and has practised as a barrister, principally in Victoria, although his professional work has led to appearances in all jurisdictions within Australia. He has lectured in law at universities in Melbourne, England and Canada, published legal articles in Australia and elsewhere, and regularly presented papers at legal, business and educational conventions. He is currently the President of the Council of Trustees of the National Gallery of Victoria.

Dr Brendan Murphy was appointed Chief Executive Officer of Austin Health in January 2005. Prior to this appointment he was Chief Medical Officer and Medical Program Director at St. Vincent’s Health, Melbourne, and Professor/Director of Nephrology at St Vincent’s from 1992-2005. Dr Murphy was previously a Board Member of the Royal Victorian Eye and Ear Hospital, a Director of the Kidney Health Australia and President of the Australian and New Zealand Society of Nephrology. He is currently a member of the Board of Health Workforce Australia, Chair of the Victorian Health Department Management Innovation Council and a Professorial Fellow with the title of Professor at Melbourne University.

Professor Peter Rathjen is currently the Deputy Vice-Chancellor (Research) at the University of Melbourne. Prior to this appointment he was Director of Science at the University of Adelaide from 2006 – 2008. He was previously Chair of Biochemistry at the University of Adelaide in 1995, foundation Head of the Department of Molecular Biosciences in 2000, and in 2002 was appointed Executive Dean of the Faculty of Sciences. In 2005 he received the inaugural Premier’s Award for Scientific Excellence (Research Leadership) in South Australia. Professor Rathjen was a founding member of the ARC Special Research Centre for the Molecular Genetics of Development, and the Australian Stem Cell Centre (ASSC).

Dr Alan Finkel was the founder and CEO of Axon Instruments, an ASX-listed, US biotech company. He was also a co-founder of the ASX-listed company Optiscan Imaging and served as a Director until 2002. After Axon was acquired in 2004, Dr Finkel co-founded and currently serves as Chairman of Luna Media, the publisher of Cosmos Magazine and G Magazine.

Dr Finkel is Chairman of the Child Abuse Prevention Research Australia Centre, a Governor of the Clunies Ross Foundation, and Chairman of the Australian Course in Advanced Neuroscience. He is also the Chancellor of Monash University.

Mr Harrison Young became the Chairman of the FNI Foundation Council in 2009. He retired in 2007 as Chairman of Morgan Stanley Australia and is now Chairman of Better Place Australia Pty Ltd, a Director of the Commonwealth Bank of Australia, Deputy Chairman of the Asia Society AustralAsia Centre and of AsiaLink, and a Director of the Financial Services Volunteer Corps in New York.

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2009 SAW THE OUTER CONCRETE STRUCTURE OF THE PARKVILLE AND AUSTIN BUILDINGS COMPLETED – THE BUILDINGS ARE A BOLD STATEMENT OF THE EMERGING NEUROSCIENCE REVOLUTION IN MELBOURNE
Dr Robin McAllen is a NHMRC Principal Research Fellow. He trained in Physiology in London and Birmingham and in Medicine at Birmingham (UK) before moving to the Florey in 1988.

He is a neurophysiologist with an interest in the central nervous regulation of cardiovascular and autonomic functions, and has published extensively of this topic. More recently he has collaborated with FNI colleagues in neuromaging experiments that aim to translate lessons learned from animal studies to the human brain.

He currently serves on the editorial board of the American Journal of Physiology, is a section editor for Clinical and Experimental Pharmacology and Physiology and is a member of the Faculty of 1000.

Associate Professor Brodtmann is a Senior Post-doctoral Research Fellow, as well as holding joint appointments as a neurologist at Austin Health and Box Hill Hospital.

Her research focuses on novel uses of fMRI in patients with cerebrovascular disease, correlating BOLD signal changes with perfusion data and clinical parameters. Other interests are in the neural basis of neglect, and the diagnosis of focal onset dementias.

She is a current recipient of a NHMRC Training Research Fellowship, and was recently appointed as the National Brain School Co-ordinator, overseeing post-graduate education for neurology trainees.

Associate Professor Ross Bathgate is a NHMRC Senior Research Fellow and an Honorary Principal Research Fellow in the Department of Biochemistry and Molecular Biology at The University of Melbourne.

His work focuses on the relaxin family of peptides and their G-protein coupled receptors. He has published over 165 papers including numerous invited reviews on relaxin peptides and their receptors, with a total of over 2500 career citations.

His work has attracted substantial funding from the NHMRC and other Australian funding bodies as well as pharmaceutical companies.

Associate Professor Leonid Churilov is Adjunct Associate Professor at the Department of Mathematics and Statistics, The University of Melbourne. He is an internationally recognized expert in using statistical, data, and knowledge modeling for decision support in clinical and health care delivery systems, with specific focus on stroke and neurology care.

He won a 2000 Victoria Fellowship for his contribution to the area of interactive decision modelling for Victorian Health Care, and an award from the Japanese Operational Research Society for research on iso-resource grouping in acute health care in Australia.

Professor Egan is NHMRC Principal Research Fellow at FNI and Head of the Neuroimaging and Neuroinformatics Group which includes the animal MR imaging and spectroscopy facility.

He is also Associate Director of the Centre for Neuroscience, University of Melbourne and Deputy Director of the NCRIS National Imaging Facility. He has developed in vivo MR imaging and analysis methods using high resolution structural MRI to study cortical lamination patterns, as well as innovative MRI acquisition and analysis techniques for the detection of iron pathologies related to neurodegenerative diseases.

He has received substantial national and international recognition for his research, and is currently associate editor of Human Brain Mapping and a member of the editorial board of Neuroimage.
Professor Horne is Deputy Director of Florey Neuroscience Institutes, Consultant Neurologist at St Vincent’s Hospital, Fitzroy, and Conjoint Professor, Centre for Neurosciences at the University of Melbourne. He is a member of The Australian Society for Neurosciences, The Australian Association of Neurologists, The Royal Australasian College of Physicians and The American Society for Neurosciences.

Associate Professor Howells began his career investigating the biochemical and genetic basis of dopamine and serotonin deficits in children. He went on to describe a new population of dopaminergic neurons, demonstrated that BDNF depletion can cause parkinsonism and that Parkinson’s disease patients are deficient in BDNF. His other research interest is in stroke: his studies of neuroprotection in stroke have led to improved modelling of stroke in animals, the development of new methods of imaging, and development of systematic review and analysis as tools for rigorously evaluating basic science literature. The latter have led three leading stroke journals to publish guidelines for Good Laboratory Practice.

Trevor Kilpatrick leads the MS Division at FNI and is a neurologist and Head of the MS Unit at the Royal Melbourne Hospital, in addition to being Director of the Centre for Neuroscience at The University of Melbourne. His research interests include the neurobiology of multiple sclerosis, neural precursor cell biology and the study of genetic and environmental factors that contribute to MS as well as the translation of basic research discoveries to the clinic.

Professor Graeme Jackson is the founding Director of the Brain Research Institute and a Neurologist at the Austin Hospital. He receives international recognition for his work in new MRI technologies, particularly in the field of epilepsy. He is a Professorial Fellow of the Department of Medicine and Adjunct Professor in the Department of Radiology, University of Melbourne; an Honorary Neurologist at the Royal Children’s Hospital in Melbourne and a Board member of Neurosciences Victoria. Professor Jackson recently won a highly prestigious 2008 NHMRC Excellence Award.

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Professor Tan is NH&MRC Senior Principal Research Fellow, and Adjunct Professor at The University of Melbourne Centre for Neuroscience, and University of Queensland Brain Institute. He is interested in understanding how the brain is assembled during development, and what mechanisms protect brain cells from death following brain injury such as trauma and stroke.

Current major areas of investigation are centred around the development and characterisation of genetically engineered mice models for the study of human familial epilepsy. He works closely with industry and has several patents for his discoveries.

In addition to his many roles within the Florey Neuroscience Institutes and the University of Melbourne, he serves on the editorial board of the Journal Neurobiology of Disease and the Investigators Workshop Committee for the American Epilepsy Society.

Professor Richard Macdonell is Director of Neurology at Austin Health and an Honorary Professorial Fellow at FNI.

He trained in Neurology and Clinical Neurophysiology at Austin Health, Massachusetts General and the London Hospitals and has been in charge of the Neurophysiology and Neuroimmunology services at Austin Health since 1991.

His research interests include multiple sclerosis, peripheral nerve and muscle disorders and using transcranial magnetic stimulation to study the pathophysiology of epilepsy.

Professor Lawrence is a Professorial Research Fellow within the Behavioural Neuroscience division at FNI, and head of the Addiction Neuroscience laboratory. His primary research interest is in the development of robust animal models of drug-seeking, drug-taking and drug-induced neural adaptation. In addition, his group use these models to define new potential therapeutic targets for drug and alcohol abuse disorders.

He has published over 150 original articles and reviews. Andrew Lawrence is currently Senior Editor of The British Journal of Pharmacology and also sits on the editorial boards of Neurochemical Research & Addiction Biology.

In 2009, Professor Lawrence was awarded the Australian Neuroscience Society medalion for services to the society. In his spare time, Andrew is a keen cyclist and a surf life guard.

Professor Lawrence is the leader of two successful research programs that advance the study of brain and behaviour. She is one of a small number of international researchers with expertise both in cognitive neuroscience and music research, and the only specialist music neuropsychologist in Australia.
ADDICTION
Chronic alcohol and drug use can lead to a cycle of addiction which has serious implications for our society and the families and friends of the drug affected person. FNIS Addiction group is investigating how alcohol and drugs change the brain's structure, chemistry and function.

RESEARCH HIGHLIGHTS
The Addiction group, headed by Professor Andrew Lawrence, is examining the neural pathways implicated in drug-seeking behaviour. To achieve this they are using genetic approaches in combination with animal models of drug-seeking and relapse. This latter aspect is of critical importance, as the defining feature of addiction is the chronic and relapsing nature of the disorder.

AREAS OF RESEARCH
- ADDICTION
- SCHIZOPHRENIA
- HUNTINGTON’S DISEASE
- RETT SYNDROME
- WILLIAMS SYNDROME

SCHIZOPHRENIA, RETT SYNDROME AND WILLIAMS SYNDROME
Many brain disorders, including schizophrenia, mental retardation and autism, involve abnormal development and function of the brain. In a condition like schizophrenia, the experience of loss of contact with reality for sufferers can be intolerable, and also devastating for family and friends.

The Neural Plasticity group, headed by Associate Professor Anthony Hannan, is interested in the mechanisms whereby the genes underlying maturation of the brain in conditions like schizophrenia, Rett syndrome (an autistic spectrum disorder) and Williams syndrome (another disorder of brain development) are regulated by interaction with the environment.

RESEARCH HIGHLIGHTS
The group is studying the effects of environmental stimulation delays disease onset and progression in a model of HD. Building on this research, Associate Professor Anthony Hannan’s group is currently identifying molecular targets for ‘environomics’: novel drugs which would mimic or enhance the beneficial effects of environmental stimulation.

HUNTINGTON’S DISEASE
Huntington’s disease (HD) is an inherited single-gene abnormality that causes neurons in the brain to become dysfunctional and eventually die. The condition involves cognitive deficits (culminating in dementia), psychiatric symptoms (e.g. depression) and movement disorders (e.g. chorea). HD is one of an increasing number of fatal brain diseases known to be caused by expanding DNA (a ‘genetic stutter’) in the disease genes.

RESEARCH HIGHLIGHTS
Previous work done in collaboration with colleagues at Oxford University demonstrated that environmental stimulation delays disease onset and progression in a model of HD. Building on this research, Associate Professor Anthony Hannan’s group is currently identifying molecular targets for ‘environomics’: novel drugs which would mimic or enhance the beneficial effects of environmental stimulation.

MODELS OF NEURO-DEGENERATIVE DISEASE
Disorders such as Parkinson’s disease, Huntington’s disease and Alzheimer’s disease are characterized by the progressive death of brain cells. The death of neurons results in a significant burden of psychological, cognitive and motor disability. The Molecular Neurobiology diseases group headed by Associate Professor John D’Orsog aims to exploit the tools of genetic engineering to understand this spectrum of neurodegenerative diseases.

RESEARCH HIGHLIGHTS
The group has generated a number of animal models relevant to neurodegenerative diseases. These animals are important in understanding how the adult brain responds to focal injury of specific cell populations. The models will also provide information on the precise function of discrete brain cell populations. The surprising findings are that dystonia, a condition characterized by involuntary twirling of the body or limbs, results not from disease of the basal ganglia (a discrete population of cells within the brain) but from damage to cortical brain structures. Other aspects of neurodegenerative disease such as disturbances of gait and orofacial function do indeed reside in the basal ganglia. Our model of focal death of basal ganglia cells had a classic gait disturbance typically seen in Parkinsonian syndromes. The models are also providing insight into the anatomical seat for anxiety.
RESEARCH HIGHLIGHTS

We have conducted studies to track the movement and destinations of cortical interneurons. This class of neurons comprises only 20% of the cortex, yet their inhibitory activity is essential to prevent excessive firing, and to coordinate the firing of projection neurons. Using video-imaging and mathematical modeling, we have uncovered the rules of interneuron migration taking into account their branching activity and growth cone positions. We have performed experiments to understand how much Reelin (a protein that helps regulate processes of neuronal migration and positioning in the developing brain) is required for ensuring that a 6-layered cortex is constructed. Using mouse chimeras, we have been able to create mice with different ‘Reelin-strengths’. We found that Reelin activity is dose-dependent, and that aberrant Reelin concentrations result in the formation of a 12-layered cortex.

We have continued to study the genetic regulators of cortical development. Building on our previous discovery of Rnd genes, we have now discovered that RPS14 is a negative regulator of Neurogenin, a master regulator of cortical neurons.

CLINICAL TRIALS

Acute stroke therapy is still a major focus of our research. EPITHET, a Phase II trial using brain imaging, has recently been completed and published in the prestigious journal, Lancet Neurology. New evidence from the EPITHET trial has revealed that extending the time window in using clot dissolving drugs from 3 to 6 hours is safe, feasible and biologically plausible. A new trial (EXTEND) to further test this hypothesis will start in 2009 (see also Stroke division).

The Clinical Trials division, led by Professor Geoffrey Donnan, oversees about 30 trials being conducted at any one time. These include investigator initiated studies as well as those initiated by commercial partners.

In the area of stroke prevention, ARCH is an investigator-driven trial on patients who are likely to suffer a stroke as a result of thickening of the wall of the aorta, the main blood vessel that carries blood from the heart to the body. Patients are randomised to receive either a novel or the more traditional blood thinning therapy. This will be completed during 2010.
Since establishment of the division in June 2008 there have been many exciting developments, particularly with Dr Amy Brodtmann joining the team as Co-head. The division collaborates with a large number of national and international research bodies, and we have a vibrant graduate research program investigating disorders of the brain arising from epilepsy, stroke, dementia and autism. Our goals remain to understand the cognitive and behavioural manifestations of these conditions, to shed light on neurobiological mechanisms, and to identify factors affecting improved patient outcomes.

We continue our basic research into the mechanisms underlying sound perception and how these map onto the higher cortical functions of language and music and interact more broadly with cognitive systems underpinning decision making, spatial processing, mathematics, memory and our emotions. The links between our research endeavours have continued to strengthen to form an integrated set of related research themes.

RESEARCH HIGHLIGHTS

In expanding our profile, the division has supported the development of a new Social Neuroscience and Neuroeconomic (SNN) research hub to examine leading-edge research issues in social, affective and cognitive neuroscience informed by the theory and practice of economics and commerce. This research hub brings inter-disciplinary research expertise to extend FNI’s presence in the burgeoning fields of applied neuroscience.

Other highlights include the award of substantial funding from the National Health & Medical Research Council (NHMRC) for our research investigating the genetic basis of autism spectrum disorders. Recently, we have also received funding from the Academy of the Social Sciences in Australia (ASSA) to support a significant new international research collaboration investigating the use of music to facilitate language recovery after stroke. In addition to providing insights into the optimisation of language rehabilitation strategies, this project will directly contribute to our knowledge of the organisation of higher cortical functions and their interactions. Part of this research is being undertaken at the International Laboratory of Brain, Music and Sound Research (BRAMS), which is a multi-university consortium jointly affiliated to McGill University and the University of Montréal, Canada. It houses state-of-the-art facilities dedicated to the study of brain organisation and the cognitive processes supporting music behaviour, and provides new and exciting graduate and postdoctoral exchange opportunities between Australia and Canada for junior researchers at FNI.

Neurobiological models of sound
- pitch processing

Neurocognitive basis of language & music
- functional neuroanatomy of discourse & singing
- the basis of expertise

Neurocognitive models of memory
- recent & autobiographical memory

The attentional network & neglect
- representational neglect

The broader autism phenotype (BAP)
- objective behavioural & neurobiological markers
- emotional expression & empathy

Social Neuroscience & Neuroeconomics
- decision making in individual & social contexts
- predicting economic market & consumer behaviour

Predicting health outcomes
- epilepsy, acquired brain injury

Diagnosis & treatment of focal onset dementias
- establishment of registry
- empathy, theory of mind & executive function

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Diagnosis & treatment of focal onset dementias
- establishment of registry
- empathy, theory of mind & executive function
Epilepsy is the most common serious neurological disorder of children, and one of the major neurological conditions affecting the general population. Up to 10% of people will seize at some time in their life. As one of the world leading centres for epilepsy research, FNI’s Epilepsy division specialises in imaging and molecular neurobiology in both humans and animal models. It is integrated with other leading researchers as a core part of the internationally recognised NHMRC Epilepsy program led by Professor Samuel Berkovic, AM.

The epilepsy division has almost 50 full time staff and more than 20 students and honorary fellows. It has four of nine Chief Investigator’s in the recently announced $16.45M epilepsy program grant renewal. At FNI Austin campus, researchers have been undertaking high impact research using Magnetic Resonance Imaging (MRI) for more than 15 years to understand the structural and functional basis of human epilepsy. The FNI Parkville team have revealed many of the fundamental neurological mechanisms by which genetic abnormalities give rise to epilepsy. Together with our colleagues at the University of Melbourne and across Australia, we are working towards finding a cure for epilepsy.

Epilepsy Imaging

Through the use of advanced MRI methods, major advances continue to be achieved in understanding epilepsy. These advances are rapidly translated to improved patient care through Victorian Epilepsy Centres’ comprehensive epilepsy programs, like at the Austin Hospital in Heidelberg where the FNI imaging team is an integral part of the investigation and treatment of epilepsy in patients. Three of the core scientific aims of our research are:

- To characterise structural and functional effects of genes involved in human epilepsy.
- To develop advanced MRI techniques able to detect subtle structural and functional brain abnormalities not previously possible through human imaging methods.
- To identify abnormal brain networks by defining structural network abnormalities and functional networks in the resting state and during EEG-defined events.

Human Brain Structure and Function

In order to better understand the effect of epilepsy on cognition, we are using advanced neuroimaging techniques to map the functional effect of epilepsy in several cognitive domains. One of the key questions when considering brain surgery to remove an epileptic focus is: will this damage the normal functioning of the patient? To answer this question, one needs a good understanding of how normal brain function is organised, and how this may be perturbed in a person with epilepsy. We have mapped disease-related changes in brain regions responsible for language, memory and music (singing), and we are also examining changes in these domains post-surgery.

We have discovered that language lateralization (a measure obtained from functional MRI indicating the degree to which a particular side of the brain dominates one’s language function) correlates with verbal memory performance in children with focal epilepsy. Our findings indicate that unusually lateralised language is advantageous for verbal memory performance, presumably as a result of transfer of verbal memory.

Our findings also reveal that verbal memory performance provides a better indication of language lateralisation than handedness, side of epilepsy or side of lesion. In a study of children with Rolandic epilepsy, a condition thought to be benign, we have discovered subtle deficits in both domains of language function, and have localised these to anterior brain regions.

Little is known about specific brain networks involved in musical ability and how these may be perturbed by epilepsy, but this information is crucial when treating patients who are musicians. In the process of mapping brain areas responsible for singing in healthy individuals, we have discovered that expert singers appear to use less brain areas responsible for singing in healthy individuals, we have discovered that expert singers appear to use less brain areas than non-expert singers.

Our research includes methodological development in addition to application of advanced neuroimaging methods to map brain changes in epilepsy.

We recently developed a new method for detecting atypical lateralisation of language function with fMRI that is more reliable and objective than current techniques. We have explored how accurate one needs to be when identifying subtle epileptiform activity in EEG when analysing simultaneously acquired EEG and fMRI, and have determined and published guidelines for this analysis.

In structural imaging, we have established and validated methods that remove the requirement for group morphometry studies to have all imaging performed on one scanner at a single site. Our multi-site analysis methods open up the possibility of detecting more subtle changes by studying larger populations than would otherwise be practical.

We have also developed a method that permits automated quantitative detection of subtle changes between groups of routine clinical Tesla-weighted MRI scans. Such scans are usually only qualitatively assessed on an individual basis by a radiologist, but our method opens new possibilities for studying the neuro anatomical changes present in patient populations. Finally, we have systematically evaluated automated methods for identifying the boundaries of the hippocampus, and found these methods remain inferior when compared to manual segmentation by an expert. The hippocampus is a critically important deep brain structure that is affected in many epilepsy patients, and identifying volume loss in this structure, even if subtle, has important consequences for patient management.

For more than ten years we have been studying the electrical features that are associated with different types of epilepsy, and have found that symptoms relate to the brain networks activated. This is a major advance in trying to understand the basis of epilepsy and what treatment is appropriate for each form of epilepsy.

A project funded by The National Institutes of Health, ‘Long-term outcomes in childhood-onset epilepsy’ is an ongoing prospective cohort of 613 children recruited when first diagnosed with epilepsy. FNI’s role in the project is to apply advanced image analysis techniques to structural MRI scans acquired from a large subset of the original group. These methods provide insight into the links between brain structure and social, educational, and health-related outcomes in patients with childhood-onset epilepsy.

Ion Channels and Disease

Genetics plays a major role in epilepsy. In particular, subtle changes in the properties of mutated ion channel proteins have been identified as the cause of many cases of human epilepsy. Through the use of advanced electrophysiological and biophysical tools, the group’s efforts are focussed on exposing the fundamental physiological changes that predispose to epilepsy and to reveal novel methods and approaches for diagnosis and therapy.

The Ion Channels and Disease group, led by Associate Professor Steven Petrou and Dr Christopher Reid, made two major advances in 2009:

- Using mouse models harbouring human genetic mutations, they revealed the fundamental changes in discrete parts of individual nerves that are the probable cause of the increase in brain excitability seen in epilepsy.
- They then went on to develop a novel mouse model of Dravet Syndrome (a debilitating human infant epilepsy) that reveals fundamental neurophysiological changes responsible for the seizures and movement disorders seen in patients.

Neurobiology of Epilepsy

The goal of the Neurobiology of Epilepsy group is to use an integrative, systems level approach to reveal the neural mechanisms that cause epilepsy. Genetic engineering, secure threshold analysis, EEG analysis, quantitative morphology, physiology and computation are combined in a diverse and multi-disciplinary group to achieve this goal.

The Neurobiology of Epilepsy group, led by Associate Professor Steven Petrou and Dr Christopher Reid, made two major advances in 2009:

- Using computational methods, they went on to provide theoretical evidence that small changes in ion channel function can cause network level changes consistent with the development of epilepsy.
OVERVIEW
The Genomic Disorders Research Centre (GDRC) was formed to lead the world in genetic research focusing on mutation and its effects on human well-being. It was the first and remains the only Centre to focus on gene mutation, its cause, documentation, collection and consequences. The Centre coordinates numerous national and international activities such as courses, workshops, and the high profile genetics journal Human Mutation. GDRC also hosts the office of the Human Genome Variation Society.

PURPOSE
The Human Variome Project (HVP), developed by the GDRC, is the global community effort to collect, curate and make accessible information on all genetic variations affecting human health. The project has evolved and matured to become a partnership of countries and organisations working to create the systems necessary to fulfill this task. The GDRC hosts the International Coordinating Office of the Human Variome Project; this develops global standards systems and collaborators for gene variation data collection, specifically those causing inherited diseases. One of its major initiatives is the HVP Neurogenetics Consortium which is working towards the collection of genetic data implicated in many neurological disorders.

ACHIEVEMENTS
AUSTRALIAN NODE – HUMAN VARIOME PROJECT
During 2009 the GDRC was granted funding from the Federal Government NeAT grant scheme to develop software and systems for the HVP Australian Node. This will enable gene variation data to be collected from Australian laboratories, allowing enhanced diagnostic abilities for Australian clinicians treating patients with inherited cancers and other debilitating disorders. This is intended to form a model for the establishment of data collections elsewhere.

2009 – 2010 MEETINGS
In 2009 we held the 10th International Mutation Detection Symposium, Cyprus, and two HVP Fora on Standards and Nomenclature, Vienna and a Neurogenetics forum in Hawaii which initiated a consortium to collect gene variation data on neurological disease along with two Human Genome Variation Society meetings.

We also are organising the third Human Variome Project meeting to be held on 10–14 May 2010 at the UNESCO Headquarters, Paris and the Australasian Mutation Detection meeting to be held in Tasmania, August, 2010, among others.

PHD STUDENT STUDY
Tim Smith has embarked on a PhD project to examine the role of the database curator in the construction, maintenance and operation of genetic variation databases. These databases provide vital information to clinicians and diagnostic specialists on the frequency, clinical effect and genetic consequences of numerous variations in our genetic makeup, and are frequently used as clinical tools for the management and treatment of patients. However, despite their importance and frequent use, data management and preservation strategies have never been fully explored in this particular field. This project attempts to define a standard methodology for the curation of these vital resources.
AREAS OF RESEARCH

- NEUROIMAGING
- MRI DEVELOPMENT
- NEUROINFORMATICS

NEUROIMAGING AND MRI DEVELOPMENT

The MRI Development group has a long-standing interest in translational research, linking the development of MRI techniques to important clinical and neuroscientific applications. The group, led by Professor Alan Connelly, is internationally recognised as a leader in the measurement of cerebral haemodynamics and white matter fibre tracking (the visualisation of how the brain is inter-connected via a network of white matter fibre tracts).

In particular, the group has devised a novel solution to fibre tracking throughout the brain known as Constrained Spherical Deconvolution (CSD), and has developed a software package (MRtrix) to apply this method. The technology has been made freely available to the neuroimaging research community and has been downloaded more than 1000 times since its release, indicating the significant international impact of CSD as a method and the MRtrix software package as an image processing tool.

The group is investigating a range of neurological and neuroscientific problems primarily in the areas of epilepsy and stroke. The MRI development and application work forms a core part of a current $12m NHMRC Epilepsy Program grant, and of the 2009 application to renew this program (aimed to start in 2011).

Many of the major advances in understanding the basis of the epilepsies have arisen from the ability to image the whole brain and detect underlying pathology with ever-increasing sophistication. The methodology that the group is developing allows the study of families with well-characterised genetic syndromes, thereby enabling the identification and understanding of the effects on the brain of genetic mutations related to epilepsy.

The group is also part of a $4m CSIRO Flagship Collaboration Fund grant in stroke. This work is aimed at extending the time after symptom onset during which treatment by thrombolysis (to dissolve blood clots) might be used to prevent more extensive brain damage.

NEUROIMAGING AND NEURO-INFORMATICS

Neuroimaging is an extraordinarily important neuroscience discipline, and is unique in being able to provide direct in vivo measurements of the human brain. This is of crucial importance in research into the causes of brain and mind diseases.

Under the leadership of Professor Gary Egan, the Neuroimaging and Neuroinformatics group utilises MRI in four major neuroscience research areas, including:

1. Assessment of the structural and functional integrity of neural pathways in neurological disorders such as Multiple Sclerosis, Huntington’s disease and Friedreich’s ataxia.
2. Investigation of brain function including the neural base of thirst, pain and cough in normal human subjects.
3. Development of advanced neuroimaging methodologies to enable novel in vivo measurements, such as quantification of iron metabolism in neurodegenerative diseases, and
4. Implementation of neuroimaging informatics and data management systems for high throughput analyses, and the federation of imaging databases from the National Imaging Facility.

RESEARCH HIGHLIGHTS

Novel MRI techniques are being used to quantify axonal and myelin pathology in patients with multiple sclerosis (MS), thereby demonstrating that after unilateral optic neuritis, MRI structural and diffusion measures of the optic nerve can predict visual dysfunction in MS patients.

Diffusion tensor MR imaging is being used to investigate striatal pathology in Huntington’s disease and demonstrated microstructural changes in HD patients that correlated with the patients’ cognitive status.

Ultra-high field MRI images are used to measure brain iron uptake for possible use as an imaging biomarker for the investigation of neurodegenerative diseases such as Huntington’s and Parkinson’s disease.

The division also collaborates in ultra-high field MRI research at the Neuroscience Research Institute, Korea. This project is being funded by an ARC Linkage International project entitled ‘e-Research in the Neurosciences: building collaborations in Asia’.

Finally, the Neuroimaging group led submissions to the Federal and Victorian State Governments from a consortium of universities and institutes to fund the establishment of an ultra-high field MR and advanced PET imaging facility in Melbourne.
Multiple Sclerosis (MS) is the most common neurodegenerative disease of young adults in our community, unfortunately striking people who are otherwise in the prime of their life. The MS division, led by Professor Trevor Kilpatrick, aims to make fundamental discoveries that will improve our capacity to treat and ultimately prevent this debilitating disease.

**NOVEL THERAPIES**

Dr Holly Cate and her PhD student, Jennifer Sabo, have established that a family of molecules known as BMPs are critically important in regulating how the nervous system regenerates in response to demyelination (cellular layers stripped from the nerve sheath). BMP signalling induces an increase in precursor cells in the brain of mice with demyelinating disease, but inhibition of this signalling is required for these cells to mature into oligodendrocytes, the cells responsible for inducing repair and remyelination. This work provides important and novel perspectives on how regeneration can be enhanced in multiple sclerosis.

Dr Simon Murray and co-workers within the division published data in the Journal of Neuroscience to indicate that an important signalling molecule known as BDNF influences the ability of neurons to modulate their own myelination by the cells that ensheath them. The BDNF molecules signal via two receptors, one of which promotes myelination and the other which inhibits it. It is probable that the relative expression profile of these receptors is important in regulating how the nervous system is myelinated within both the peripheral nerves and the brain. Dr Murray and his collaborators are now exploring ways in which BDNF signalling might be promoted for therapeutic benefit. It has recently been appreciated that resident immune cells within the brain known as microglia have an important role to play in MS. Vilija Jokubaitis, working with Associate Professor Helmut Butzkueven and Professor Trevor Kilpatrick, has discovered that the protein disabled-2 (Dab2) is expressed by microglia during demyelinating disease and that depletion of Dab2 in mice diminishes disease severity. In ongoing research, we are now assessing the mechanism by which Dab2 increases microglial-mediated tissue damage. This research ultimately aims to identify potential ways of modulating microglia in order to reduce brain damage (in particular axonal injury) in MS.

**NOVEL MEASURES OF DISEASE ACTIVITY**

Most MS disability is thought to be caused by nerve cell and, in particular, axonal process injury within and surrounding inflammatory demyelinating lesions. Although this pathological process is not currently directly targeted by protective therapies, such potential drugs are, in fact, in advanced pre-clinical development. Unfortunately, the lack of a reliable and validated biomarker of axonal injury is preventing the clinical testing of these therapies.

We have been attempting to identify a suite of markers that can be used to test the efficacy of novel neuroprotective agents that we and others believe could be useful treatments for MS. At present there is no way to accurately quantify the degree of nervous system damage in clinical studies. To address this need, we have undertaken two complementary approaches, the first involving neurons and the second developing a blood-based biomarker.

**RESEARCH HIGHLIGHTS**

**EXPLORING THE CAUSE OF MS**

The group’s genetics work has received wide scientific and media attention in 2009. As principal members of the ANZgene consortium, we published data in Nature Genetics that reported two novel genetic associations for MS. The first region encompasses a number of genes, a prime candidate of which is a molecule responsible for the conversion of inactive Vitamin D to its active form. The second developing a blood-based complementary approaches, the need, we have undertaken two therapies for MS. At present there is no way to accurately quantify the degree of nervous system damage in clinical studies. To address this need, we have undertaken two complementary approaches, the first involving neurons and the second developing a blood-based biomarker.

**Figure 1:** Around 15% of patients with relapsing remitting MS (RRMS) have detectable levels of pNF-H in their blood, whereas this is not found in healthy controls. Only a few patients with primary progressive MS (PPMS) have been included to date.
AREAS OF RESEARCH
- PARKINSON’S DISEASE
- MOTOR NEURON DISEASE
- NEUROPHARMACOLOGY
- STEROID NEUROBIOLOGY
- STEM CELL THERAPIES

PARKINSON’S DISEASE
Parkinson’s Disease (PD) affects around 80,000 people in Australia. PD is a progressive and degenerative condition that impairs the control of movement. On average, 25 Australians are diagnosed every day, and one in seven of those will be under 50 years of age. Patients in the advanced stages depend on 24-hour care from loved ones or professionals. Symptoms result from the progressive degeneration of nerve cells, including those that make dopamine, a chemical messenger necessary for smooth, controlled movements.

RESEARCH HIGHLIGHTS
The PD research group, led by Professor Malcolm Horne, has found that a key protein that accumulates in brain cells of people with PD is also at high level in the blood in people with PD. This protein (called α-synuclein) is made by blood cells, and so the team is actively investigating whether blood cells can be used as model of how α-synuclein damages and destroys brain cells. The levels of α-synuclein is a measure of risk of PD, and they are also using this to study how genetic variations in PD subjects influence α-synuclein levels. The team has developed mice that accumulate α-synuclein in the brain and are using cell cultures to gain a better understanding of how α-synuclein damages cells, and why its secretion is associated with increased cell death. They have also found novel ways of converting cells in the adult brain into becoming dopamine cells, as a new therapy for PD.

MOTOR NEURON DISEASE
Motor Neuron Disease (MND) is a debilitating disease striking 400 Australians each year. MND often begins with weakness of the muscles in the hands or feet and eventually leads to generalised paralysis, including an inability to speak or swallow. The MND research group led by Professor Malcolm Horne, Professor Philip Beart and Dr Brad Turner is investigating the events that lead to MND with a view to creating ways to block the disease’s progression.

RESEARCH HIGHLIGHTS
The group has identified the temporal sequence of key events leading to the death of the affected cells. They have found that stress of the compartment that makes proteins (the Endoplasmic Reticulum or ER) is a key step. One molecule in the ER in particular seems very important; known as Protein Disulphide Isomerase (PDI), this molecule is elevated in all forms of MND. One component of this defence mechanism is a transporter that controls the levels of the brain’s positive chemical response. The group identified a remarkable capacity of astrocytes to maintain the activity of this transporter when under severe stress, but continued stress forces astrocytes to actually contribute to the toxic environment. These events comprise part of the brain’s inflammatory response, and recent insights into the genes involved offer possibilities to minimize neuronal injury and promote regeneration.

NEUROPHARMACOLOGY
Astrocytes are the most abundant non-neuronal cells in the brain, and they possess remarkable capacities to modulate neuron-to-neuron signalling, to nourish and to protect neurons, and to contribute to their death in neurodegenerative conditions.

RESEARCH HIGHLIGHTS
The neuropharmacology group, led by Professor Philip Beart, has found that under conditions which mirror perinatal and stroke injury, a number of events are triggered within astrocytes that act to preserve neuronal function when there is a lack of oxygen to the brain. One component of this defence mechanism is a transporter that affords considerable protection, and this molecule in cell models of the disease seems very important; known as Protein Disulphide Isomerase (PDI), this molecule is elevated in all forms of the disease. Augmenting this mechanism is a transporter that makes proteins (the Endoplasmic Reticulum or ER) is a key step. One molecule in the ER in particular seems very important; known as Protein Disulphide Isomerase (PDI), this molecule is elevated in all forms of the disease. One component of this defence mechanism is a transporter that affords considerable protection, and they are now examining the possibility that small molecules mimicking PDI could be used as a therapy. They have also found high levels of PDI in the spinal cord of people with MND, suggesting that it could be used to monitor the effect of therapies. As well, they have found that processes which remove PDI and other key molecules associated with MND are disrupted in this disease, providing clues to causes and therapy for this condition.

STEROID NEUROBIOLOGY
Everyday experience tells us that sex hormones influence behaviour, but how well do we understand the mechanism? To demonstrate the effects of sex hormones on brain functions and behaviour, we are studying a knockout mouse model which is completely estrogen-deficient, including the brain.

RESEARCH HIGHLIGHTS
The steroid neurobiology group, led by Dr Wah-Chin Boon, has demonstrated that in the complete absence of estrogens, the pyramidal neurons in the mouse female frontal cortex die, even when there is no external assault such as neurotoxin treatment. By one year of age, female knockout mice have 33% less cortical neurons than mice that make estrogen normally (the wild-type mouse). This process begins some time during the mouse’s adult life and demonstrates that estrogens protect nerve cells from normal physiological stress. Curiously, male knockouts do not suffer the same fate. We are currently investigating the mechanisms underpinning the vulnerability of female neurons in the absence of estrogen.

STEROID NEUROBIOLOGY
Replacing damaged or injured neurons by transplanted stem cells is an exciting prospect for a future therapy. Stem cells can divide, and are thus a potentially limitless source of new cells. They can also be instructed to become a particular cell type, such as a dopamine neuron (the degenerating cells in PD). We aim to use these two capabilities to produce cells that can partially restore function after disease or trauma.

RESEARCH HIGHLIGHTS
The Stem Cell Research team, led by Dr Clare Parish, is developing new strategies to improve cell transplantation in neurodegenerative disease models, including PD, MND and HD. In this context, they are examining both rodent and human neural stem cells and embryonic stem cells. They are also focussing on understanding the events that result in the maturation of selected neurons during early development. Replicating these events in stem cells will be critical in ensuring that appropriate neurons and neural connections are made upon eventual transplantation into the diseased brain.
NEUROPEPTIDES

AREAS OF RESEARCH

• NEUROPEPTIDES IN HEALTH AND DISEASE

The Neuropeptides division has two main areas of research:

• Broad-ranging studies on the relaxin family of peptides/hormones and their receptors focussed on determining the role of the peptides in cardiac physiology, tissue fibrosis, and brain and behaviour, and developing therapeutics based on these peptides to treat numerous diseases;

• Studies of the role of the enzyme insulin-regulated aminopeptidase (IRAP) in normal brain physiology, and particularly in relation to cognitive disease.

RESEARCH HIGHLIGHTS

A study of the neuronal roles of IRAP has opened the way for the development of new strategies for the treatment of memory disorders. We have discovered a series of small molecule IRAP inhibitors with memory-enhancing properties in animals that have exciting potential for alleviating memory deficits in a range of patient groups. The group’s long-standing research focus on relaxins and their receptors continued in 2009, with significant advances in understanding the structure and biological activity of relaxin peptide analogues, the potential use of relaxin to treat fibrosis, and receptor function and signalling. Studies of the brain relaxin peptide relaxin-3 have uncovered important roles in the regulation of circadian activity and of spatial and emotional memory. This research has continued to receive support from Johnson & Johnson Pharmaceutical Research and Development LLC (San Diego, USA).

A highly significant milestone was reached in 2009 with the acquisition by Novartis of our commercial partner, Corthera Inc. San Mateo, CA (formerly known as BAS Medical), following the successful completion of a Phase II clinical trial of relaxin in acute heart failure. This is the culmination of many years of research by FNI scientists in investigating the biological role of the relaxin peptide family, and is underpinned by a strong portfolio of international patents. The clinical trial demonstrated strong, unequivocal improvement in heart function. A Phase III clinical trial in acute decompensated heart failure commenced in late 2009, and the US Food and Drug Administration (FDA) has granted ‘Fast Track’ designation to relaxin – this expedites the review of new drugs intended to treat serious or life-threatening conditions that can potentially address unmet medical needs.

Statistics and Informatics division provides research and teaching expertise in the study design, protocol development, data collection and statistical analysis aspects of research projects. An important source of that expertise is our methodological research that promotes the use of high-standard, rigorous quantitative methods to facilitate effective evidence generation, accumulation, and re-use in basic and clinical neurosciences.

RESEARCH HIGHLIGHTS

• Statistics and Informatics division during 2009 provided statistical and data management support to a number of large international clinical trials including AVERAnd EXTEND. In collaboration with Neuroscience Trials Australia, the division also provided statistical support for SCIPA, a unique, multi-disciplinary, multi-centre research program which aims to promote neurological recovery, maintain health and wellness, and optimize independence following spinal cord injury.

• In the area of Medical Informatics, the division led a research project that successfully applied multiple-criteria decision analysis to choose the most appropriate computer software for imaging the ischaemic penumbra in acute stroke patients.

• Novel application of case-based reasoning paradigms has secured the success of the study of factors influencing specialists’ decisions to mobilize patients after treatment with rtPA agent.

• In the area of health services research and in collaboration with CSIRO Mathematics and IS Division and The University of Melbourne, the division has built a process model of rtPA delivery to acute ischaemic stroke patients in emergency departments. Effective decision support models for fast and appropriate rtPA delivery means more saved lives and less disability because this crucially important treatment can only be administered within a relatively short time window.

• We further extended this work as a part of our on-going collaboration with Swinburne University of Technology, with the aim to create a simulation model for a complete Stroke Chain of Survival and Recovery. A decision support tool that allows simulation of various complex scenarios resulting from the interactions between pre-hospital, acute, and rehabilitation stroke care processes will provide necessary insights into better delivery of stroke care.
47 STROKE

AREAS OF RESEARCH

• BASIC SCIENCES
• IMAGING AND ULTRASOUND
• PUBLIC HEALTH AND EPIDEMIOLOGY
• REHABILITATION AND RECOVERY
• AVERT – EARLY INTERVENTION

BASIC SCIENCES

Basic Sciences focuses on neuroprotection and neuroregeneration after stroke, with particular emphasis on drug treatments.

RESEARCH HIGHLIGHTS

Basic Sciences, led by Dr David Howells, has recently re-analysed data in what appeared to be effective animal studies of neuroprotective agents, which went on to fail in further clinical trials. The research revealed that some of the apparently positive effects were the result of poor experiment design. This has led to a set of guidelines that now ensure that the design of experiments is consistent and rigorous, and therefore avoids the waste of valuable resources.

The current preferred stroke therapy is thrombolysis (clot dissolving) which can only be done within the first 3–6 hours of a stroke, and carries the risk of bleeding. Biological markers that could help determine the exact time the stroke occurred and markers that identify patients at risk of bleeding are being identified, making this therapy safer and more accessible to patients.

Another area of interest is the ability of the brain to repair itself. Experiments are being conducted to determine to what extent and over what time period the brain can grow new connections, or use other parts to perform the same function.

IMAGING AND ULTRASOUND

Research led by Professor Geoffrey Dorman and Associate Professor Brian Chambers is developing methods to obtain a view into the brain and blood vessels before and after stroke. This involves state-of-the-art technology such as positron emission tomography (PET), magnetic resonance imaging (MRI) and ultrasound.

RESEARCH HIGHLIGHTS

The ischaemic (oxygen-starved) penumbra is brain tissue which, while damaged, continues to live after the onset of the stroke process. In collaboration with colleagues at the Royal Melbourne and Austin Hospitals, our research group was able to show that using MRI to identify patients with potentially viable brain tissue after stroke onset may be clinically useful. A Phase II study, led by Professors Stephen Davis and Geoffrey Dorman and published in the journal Lancet Neurology, showed that selection of patients using this approach for therapy with the clot dissolving agent tPA could be safely extended out to 6 hours after stroke. They are now leading a Phase III trial to apply this same principle up to 9 hours post stroke.

The use of PET with a novel agent linked to brain changes seen in Alzheimer’s disease provides an image of chemical changes associated with dementia in patients with recent onset of stroke. Interesting links between vascular dementia, stroke and Alzheimer’s disease may be part unravelled by this technique.

The clinical significance of a newly appreciated ultrasound sign referred to as ‘small vessel knock’ is currently being investigated. FNII is collaborating with CompuMedics DWL and Dr Paul Syme in Edinburgh to determine whether ‘knock’ is useful in the diagnosis of stroke.

Finally, Dr Udommongkol, in collaboration with CSIRO and a group in Leicester UK, has created a bench-top, scaled-up model of a vessel branch which allows modelling of blood flow. This will enable the study of ultrasound signals under different conditions such as those occurring in the brain during a stroke.

PUBLIC HEALTH AND EPIDEMIOLOGY

Research led by Dr Dominique Cadilhac in Public Health and Associate Professor Helen Dewey in Epidemiology centres around understanding the costs and burden of stroke on the community.

RESEARCH HIGHLIGHTS

In 2009, five major projects focused on the assessment of the quality of care for stroke patients in public hospitals. Partners included the Australian Commission of Safety and Quality in Health Care, the National Stroke Foundation, State Government of Victoria, New South Wales Health, Austin Health and St Olav’s Hospital in Trondheim, Norway.

The impact of stroke on patients has been under investigation over the last 12 years through a major epidemiological study (NEMESIS). More than 1,600 patients have had their health tracked for 10 years after suffering stroke. The most recent information collected from NEMESIS estimates lifetime costs for all cases of first ischaemic and haemorrhagic stroke at approximately $2 billion per annum. This data will be useful for planning health service requirements to meet the needs of our ageing society.

Research continues into the health and economic benefits of reducing risk factors for stroke and cardiovascular disease in the community. Expertise developed at FNII underpins many of the disease prevention and health services audit programs led by the National Stroke Foundation.

NEURO-REHABILITATION AND RECOVERY

Neurorehabilitation and Recovery research, led by Professor Leanne Carey, focuses on the scientific foundations of rehabilitation.

Three complementary streams of research investigate:

• Mechanisms of recovery after stroke, using brain imaging techniques
• New rehabilitation approaches, using clinical trials
• The relationships between loss of sensations and movement after a stroke, and functionality

RESEARCH HIGHLIGHTS

In 2009, major projects focused on the assessment of the quality of care for stroke patients in public hospitals. Partners included the Australian Commission of Safety and Quality in Health Care, the National Stroke Foundation, State Government of Victoria, New South Wales Health, Austin Health and St Olav’s Hospital in Trondheim, Norway.

Studies were conducted during the period of early recovery, following training, and after 12 months. Findings to date indicate differences in regions of the brain that were activated in stroke survivors with sensory loss relative to healthy controls, as well as identifying specific brain regions that were associated with better touch sensation and recovery. These findings suggest that optimal recovery may require different rehabilitative strategies to target specific brain regions.

SENS’ (Study of the Effectiveness of Neurorehabilitation on Sensation), is a randomised control clinical trial of a novel approach to rehabilitate loss of sensation and hand function after stroke. We found that sensations (such as ability to feel everyday textures and objects through touch) and hand function improved when patients underwent the specific sensory retraining program. This approach to rehabilitation aims to improve lost abilities rather than focus on compensation alone. The findings of these two projects may be used to improve rehabilitation, and predict who may benefit most from specific rehabilitation programs.

Other project highlights are:

• The National Institute of Health (NIH) Toolbox. We developed tools to assess sensation and tested these in children, adults, older individuals and stroke survivors.
• The James S Macdonell collaborative project, Cognitive Neuroscience Principles for Rehabilitation, will develop a test on translation of core principles from cognitive neuroscience to clinical practice.
• Investigation of the relationship between sensation, thinking abilities and mood on quality of life and return to participation after stroke. We found that mild cognitive impairment impacts on activity participation in an Australian cohort after stroke.

AVERT – EARLY INTERVENTION

Research led by Associate Professor Julie Bernhardt is focussed on the development, testing and implementation of early physical activity/exercise–based interventions for people with stroke, and on understanding how these interventions affect muscle, bone, mood and thinking.

RESEARCH HIGHLIGHTS

AVERT is the largest clinical trial of stroke rehabilitation in the world. It is an international, multi-centre study testing whether commencing frequent out of bed activity within 24 hours of stroke onset reduces death and disability compared with current stroke care. A cost-effectiveness study sits beside the trial, involving approximately 450 physiotherapy and nursing clinical leaders and other acute stroke clinicians. Funding was secured from Singapore, Malaysia and Northern Ireland to expand the study to these countries. The study is expected to be completed in 2012.

In 2009, the first Physical Activity Forum was held at FNII, bringing together researchers with an interest in the use of exercise to promote health and well being in able–loded and disabled populations. New collaborative projects examining cardiovascular fitness changes early following stroke are planned.

Since 2002 we have regularly measured the physical activity of people early after stroke using a range of tools. This year, collaborative projects with the Karolinska Hospital (Sweden) and St Olav’s Hospital (Norway) were completed, and activity data from a further 200 patients were added to our database.
SYSTEMS NEUROPHYSIOLOGY

AREAS OF RESEARCH

- **Brain Regulation of Body Temperature**
- **Sympathetic Nerves in Heart Failure**
- **Physiological Changes in Epilepsy**

Associate Professor Robin Macdonell heads the Systems Neurophysiology group at Parkville, which researches brain function in health and disease. A particular focus is on how the brain controls basic bodily functions such as blood pressure, body temperature, body fluids and breathing. Professor Richard Macdonell heads the clinical arm at the Austin Hospital which researches the physiological changes underlying epilepsy.

**Brain Regulation of Body Temperature**

The brain regulates body temperature, keeping it within a narrow range. The consequences of failure can be life-threatening; elderly people with impaired temperature regulation frequently die of heat stroke during heat waves. The master temperature controller region in the brain is the pre-optic area which adjusts the balance between heat generation and heat loss from the body, using nerve connections to regulate skin blood flow and sweating, and heat generation by specialized fat deposits (brown fat). If the body temperature falls too low, it initiates shivering. These mechanisms set body temperature, but not always to an identical level. Our temperature is adjusted to about 1 degree lower at night, for example, and upwards by one or two degrees if we are sick and run a fever. In fever, a chemical signal, prostaglandin E2, acts on cells in the pre-optic area to cause this upward shift in body temperature. This year we have made significant progress in understanding how this happens.

Cells in the pre-optic area combine the information on brain temperature with signals from skin temperature, and compute the correct adjustments for the body’s heat balance. Against all previous expectations, we found that the pre-optic area contains at least two distinct sub-regions that control blood flow to the skin, and hence heat loss. The nerve cells in one (called RMPO) respond to the fever mediator prostaglandin E2, but those in the other (called CLPO) do not. These findings are helping us to pinpoint the actual nerve cells performing thermo-regulatory functions, although these have not yet been definitively identified.

We do know that nerve cells in the pre-optic region take account not only of brain temperature but also of skin temperature. This combined information allows them to anticipate thermal challenges rather than simply reacting to them. Signals from warm or cool skin can trigger the pre-optic area to initiate compensatory changes before there is any change in deep body temperature.

**Sympathetic Nerves in Heart Failure**

Heart failure is a serious condition with a high mortality rate. It affects 300,000 Australians in any year. Current treatments can improve symptoms and delay the course of the disease, but they cannot cure it.

Australians researchers made the important discovery some years ago that in patients with heart failure, the nerves that stimulate the heart to beat harder and faster (cardiac sympathetic nerves) are activated to a much greater extent than sympathetic nerves to other parts of the body. This overactivity exacerbates the disease process and can trigger sudden death. The brain is known to drive these sympathetic nerves; thus, our aim is to understand why they are overactive in heart failure, and why that overactivity is worse in the cardiac sympathetic nerves than in the nerves to other organs.

This year, we have identified the brain pathways that tell the pre-optic area when the skin is warm: a localized group of neurons in the dorsal sub-region of the parabrachial nucleus in the midbrain relay this information from the skin to the pre-optic area. It is already known that a neighbouring group of parabrachial cells relay information from cold skin to the pre-optic area. This is critical information which, with other findings, will help us track the complete nerve pathways controlling skin blood flow to regulate body temperature.

**Physiological Changes in Epilepsy**

Based on animal models, it has been known for some time that hyper-excitability of neurons in the cerebral cortex of the brain is a prime cause of epilepsy. Until recently, it has not been possible to investigate this in humans because of an inability to study cortical excitability non-invasively. Using a technique known as Transcranial Magnetic Stimulation (TMS), it is now possible to stimulate the brain (in particular the motor cortex) to determine whether these cortical neurons are more excitable in patients who suffer from epilepsy compared with normal controls.

We have recently discovered that both nerves become overactive in heart failure compared with the normal state, but the cardiac sympathetic nerve increases its activity by a much greater percentage than the renal nerve. This fits with clinical observations made by indirect measurements on humans. The major reason for this is that cardiac sympathetic nerves have a very low level of activity in the normal state, but have the capacity to increase their activity by a much greater percentage than when they are driven hard by the brain (as occurs transiently in exercise but all the time in heart failure). It appears that this unrelenting overactivity is what does the damage.

We are currently investigating the brain mechanisms behind it.

We have extended this work to investigate the mechanism by which anti-convulsant drugs reduce seizures. Using TMS, we have shown that cortical excitability returns to a normal level in patients whose epilepsy is well controlled. Conversely, patients whose seizures are not controlled by their medication continue to show cortical hyperexcitability. Changes in the response to TMS appear to reflect the pharmacological action of these drugs in patients, and suggest that one of the mechanisms by which anti-convulsants act is by changing cortical excitability. In addition, using longitudinal studies, we have been able to show that measuring cortical excitability after a first seizure is predictive of the risk of subsequent seizures.

Our findings may be translated in clinical use for the diagnosis and management of epilepsy. They have contributed to knowledge about the patho-physiological mechanisms of epilepsy and could be utilised in the assessment of new pharmacological agents to treat epilepsy.
Florey Neuroscience Institutes has continued to work closely with all scientists and clinicians within the group to identify intellectual capital and, where appropriate, to protect and develop these assets for the benefit of our people and the wider community.

During 2009, the recommendations of an Institute-wide review of FNI’s commercial management processes were implemented, resulting in the allocation of additional resources into the business development group. Dr Karin Sitte (FNI Austin) and Ms Julie Anne Quinn (FNI Parkville) are spending considerable time and effort on new initiatives across the range of business development opportunities within FNI. Exciting developments during 2009 include:

- The successful completion of Phase II clinical trials for relaxin and the commencement of a multi-centre Phase III.
- The successful award of a Victorian Science Agenda Investment Fund grant for a stroke telemedicine initiative in rural Victoria.
- The granting of two new patent families in the USA.

FNI has a range of research programs at various stages of pre-clinical development, and two are currently with the Medical Research Commercialisation Fund for active investment.

FNI has been privileged to have had the involvement of Dr Geoff Brooke from GBS Ventures as a member of the Institute’s commercialisation committee for many years. Geoff has now retired from that committee and we extend our sincere appreciation to him for his time and effort. Similarly, we were fortunate to have our committee, chaired during 2008 and 2009 by Dr Alan Finkel, who has recently taken up a challenging and exciting new opportunity in the commercial sector that has caused his resignation. We also extend our thanks to Alan for his generous contributions.
YEAR ENDING DECEMBER 2009

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Mr Gary Gray

BOARD RESIGNATIONS YEAR ENDING DECEMBER 2009
Dr Alan Finkel (15 October 2009)
Mr Martyn Myer (21 May 2009)
Mr John Wylie (21 May 2009)

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Professor Richard Larkins
Mr Robert Trenberth
STATEMENT OF COMPREHENSIVE INCOME FOR THE YEAR 1 JANUARY TO 31 DECEMBER 2009

INCOME STATEMENT

Revenue from Ordinary Activities 97,268,500*
Salaries and Employee Benefits - (19,803)
Raw Materials and Consumables - (3,648)
Conferences and Collaborations - (969)
Building Maintenance - (791)
Research Support Services - (1,392)
General Administration - (1,043)
Other Expenses From Ordinary Activities - (233)
Distribution of Grant Funds - (301)
TOTAL - (28,180)
Net Operating Surplus/(Deficit) before Depreciation 97, (1,330)
Depreciation (4) (2,654)
Net Operating Surplus/(Deficit) after Depreciation 93 (3,984)
Revenue Contributed for Future Building Costs 15,878 22,283
Expenses related to Future Building Costs (750) (750)
NET SURPLUS FOR THE YEAR 15,221 17,549

ACTUAL % OF TOTAL

Government & Statutory Bodies (67.9%) 18,230 67.9
Other Peer Review Funding (9.1%) 2,445 9.1
Miscellaneous Income (6.9%) 1,855 6.9
Private Donors & Foundations (6.7%) 1,790 6.7
Commercial Collaborations (6.1%) 1,649 6.1
Investment Income (3.3%) 881 3.3
TOTAL 26,850 100

BALANCE SHEET AS 31 DECEMBER 2009

Current Assets
Cash and Cash Equivalents* 53,210 79,608
Trade and Other Receivables 4,642 5,786
Available for Sale Financial Assets - 10,465
Prepayments 79 281
Total Current Assets 57,931 96,140

Non-Current Assets
Property Plant and Equipment 96 6,980
Assets Under Construction 28,935 28,935
Investments in Associates - -
Total Non-Current Assets 29,031 35,915
TOTAL ASSETS 86,962 132,055

Current Liabilities
Trade and Other Payables 3,470 2,202
Provisions - 3,592
Other - Unearned Revenue - 92
Total Current Liabilities 3,470 5,886

Non-Current Liabilities
Provisions - 591
Total Non-Current Liabilities - 591
TOTAL LIABILITIES 3,470 6,477

NET ASSETS 83,492 125,578

Funds
Retained Surplus 83,492 98,828
Unrealised Investment Reserve - 556
Merger/Reorganisation Reserve - 26,194
TOTAL FUNDS 83,492 125,578

* Includes funding from the Victorian Government’s Operational Infrastructure Support Grant.
The members of the FNI Fundraising and Marketing Group worked hard during 2009 with the aim of reducing the anticipated impact of the Global Financial Crisis (GFC) on the FNI fundraising results. Nevertheless, total funds raised were markedly down on the previous year.

During the year general fundraising revenue, excluding capital fundraising, totalled $1,826,358 from 826 organisations, individuals and families.

CAPITAL FUNDRAISING

At the end of 2008 there was a shortfall of approx. $40 million in our quest to raise $205+ million to support the establishment of FNI and the expansion of its world-renowned neuroscientists.

In January 2009 work was completed on a submission to the Federal Government through its Health and Hospitals Fund Infrastructure Grant Program to secure the balance of funds needed to complete this vital project. The submission was successful and in May 2009, during the Federal Budget announcement, FNI was advised that the $39.8 million was to be granted.

Pledge payments to the capital project have continued to flow in during the year.

TRUSTS AND FOUNDATIONS

Despite the GFC mentioned above, philanthropic Trusts and Foundations have continued to be a significant source of funding for FNI with a total of $1,082,777 received this year. Funding support of this nature is crucial to the achievement of our Mission of improving life through brain research.

It enables the purchase of essential items of laboratory equipment, provides seed funding for new projects, and supports young scientists in furthering their careers. We are greatly appreciative of such contributions.

STROKE ANNUAL SCIENTIFIC MEETING

The Stroke Annual Scientific Meeting was again held in 2009 with the support of Boehringer Ingelheim Pty Ltd, Novartis Pharmaceuticals Australia, Sanofi Aventis, Servier Laboratories Pty Ltd and National Health & Medical Research Council. We greatly appreciate and acknowledge their generous support.

In January 2009 work was completed on a submission to the Federal Government through its Health and Hospitals Fund Infrastructure Grant Program to secure the balance of funds needed to complete this vital project. The submission was successful and in May 2009, during the Federal Budget announcement, FNI was advised that the $39.8 million was to be granted.

Pledge payments to the capital project have continued to flow in during the year.

COMMUNICATING WITH OUR SUPPORTERS

Early in 2009 the team engaged in a branding workshop. We examined FNI’s existing and possible future communications channels that required a distinguishable single theme. Our supporter newsletter was redesigned and re-launched as Brain Matter(s) and the Annual Report followed in the same visual style.

A suite of bequest materials were developed under the banner of ‘Think about it’ and all of our supporter materials used the FNI mission statement of ‘Improving life through brain research’ to succinctly describe the Institutes’ core business.

A temporary FNI website was established midyear at www.fni.edu.au, which explains the amalgamation process, describes our scientific work and provides a common link to the websites of the three amalgamating organisations until a dedicated FNI website is developed in 2010.

Our public speaker program was put on hold and reviewed with the aim of relaunching it in 2010 under the Brain Matter(s) theme.

COMMUNITY FUNDRAISING

A number of external groups and people arrange their own fundraising activities on behalf of FNI and we are most appreciative of their support.

During 2009 FNI was the grateful recipient of $20,000 from Henrietta Mapes and her Perspectives on Parkinson’s fundraising group. Takako Machida Subocz has continued with her beautiful floral paintings and held an exhibition and sale in Japan which delivered just over $5,000 to FNI.

2009 KENNETH MYER LECTURE

The 13th Annual Kenneth Myer Lecture was delivered on Thursday 10 December 2009 by Professor Fred (Rusty) Gage from the Salk Institute for Biological Studies, La Jolla, California. Professor Gage has a special interest in Brain Regeneration and how the brain can re-grown and repair itself. The audience was enthralled as he gave a fascinating insight into the development of the cell, our basic building block. Then, as he discussed the discovery that stem cells can be grown from skin cells and transplanted to aid brain development, function and repair, his excitement was truly infectious. The annual Kenneth Myer Lecture is an important part of our community engagement program that provides opportunities for our many supporters to learn more about the mysteries of the brain from world renowned neuroscientists.

MEDIA AND PROMOTION

Promotion of FNI continued throughout 2009 with some highly interesting media stories on a range of issues about brain disorders and diseases. Highlights include a full page article in The Australian Financial Review (AFR) about how dehydration can affect people as they get older through the mind tricking them that they have quenched their thirst when in reality they are still dehydrated.

Another full page article in the AFR discussed the potential that being overly sympathetic to a loved one’s plight may actually make them feel worse rather than better.

These are only two of approximately 250 news stories generated by FNI through the year on a variety of brain and mind health matters.

OUR SUPPORTERS

In thanking our supporters, we would be remiss if we did not make very special mention of the enormous contributions made to support our work, on a continuous basis, by the Ian Potter Foundation and the Myer Foundation and Family. Their support over many years for Howard Florey Institute, and latterly for Florey Neuroscience Institutes, has been important to ensuring our progress towards overcoming neurological disease.

Florey Neuroscience Institutes is indebted to the many individuals and organisations that have provided financial and gift-in-kind support during 2009. Each gift is greatly valued for it enables our scientists to move closer to their goal of achieving a healthier future for all Australians.
WE SINCERELY THANK ALL OUR SUPPORTERS, INCLUDING THOSE WHO WISH TO REMAIN ANONYMOUS - YOUR GENEROUS CONTRIBUTIONS WILL HELP FUTURE GENERATIONS.
Florey Neuroscience Institutes is a public company limited by guarantee under the Corporations Act 2001.
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