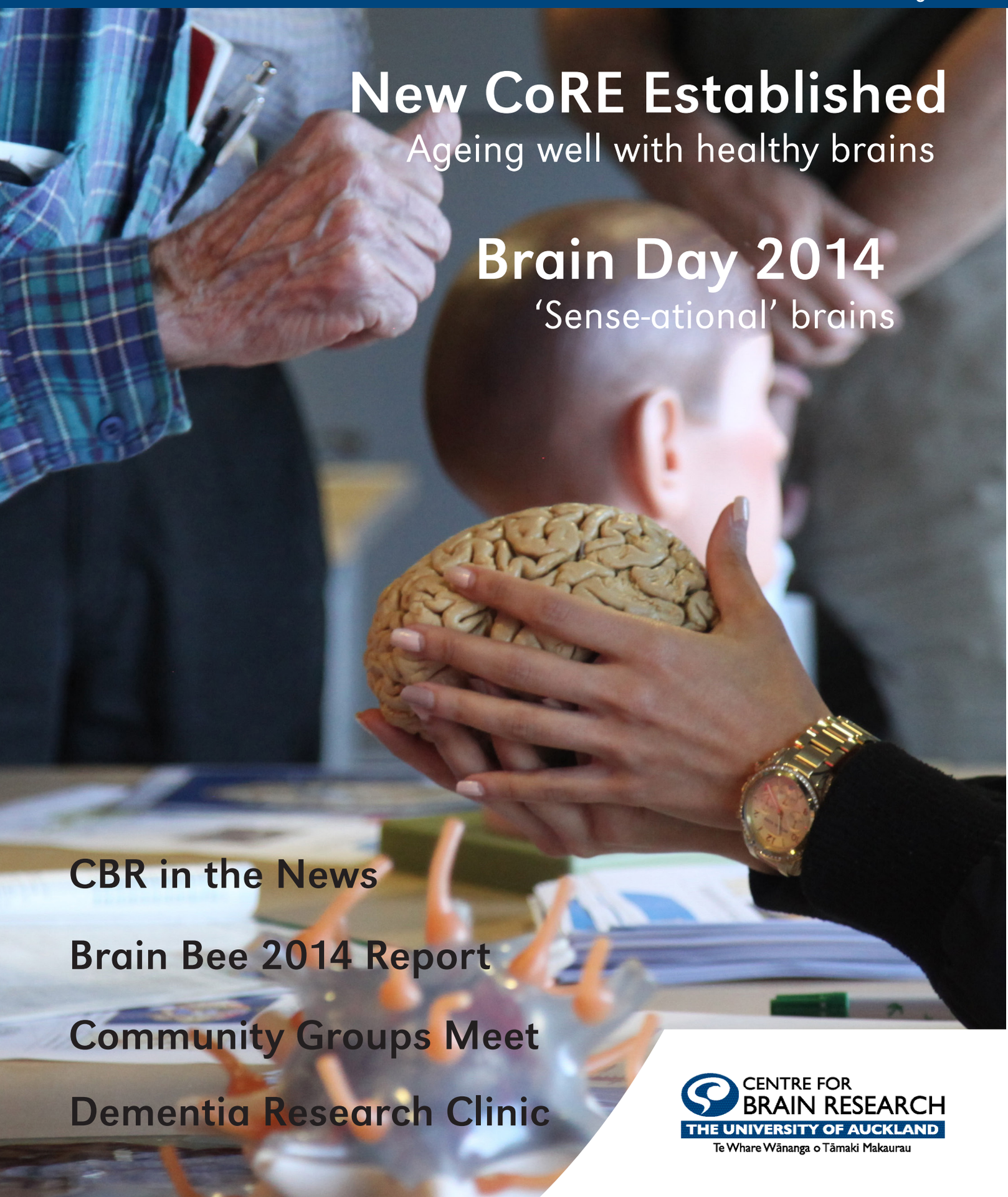
Connections

November 2014 - Issue Eight



New CoRE Established

Ageing well with healthy brains

Brain Day 2014

'Sense-ational' brains

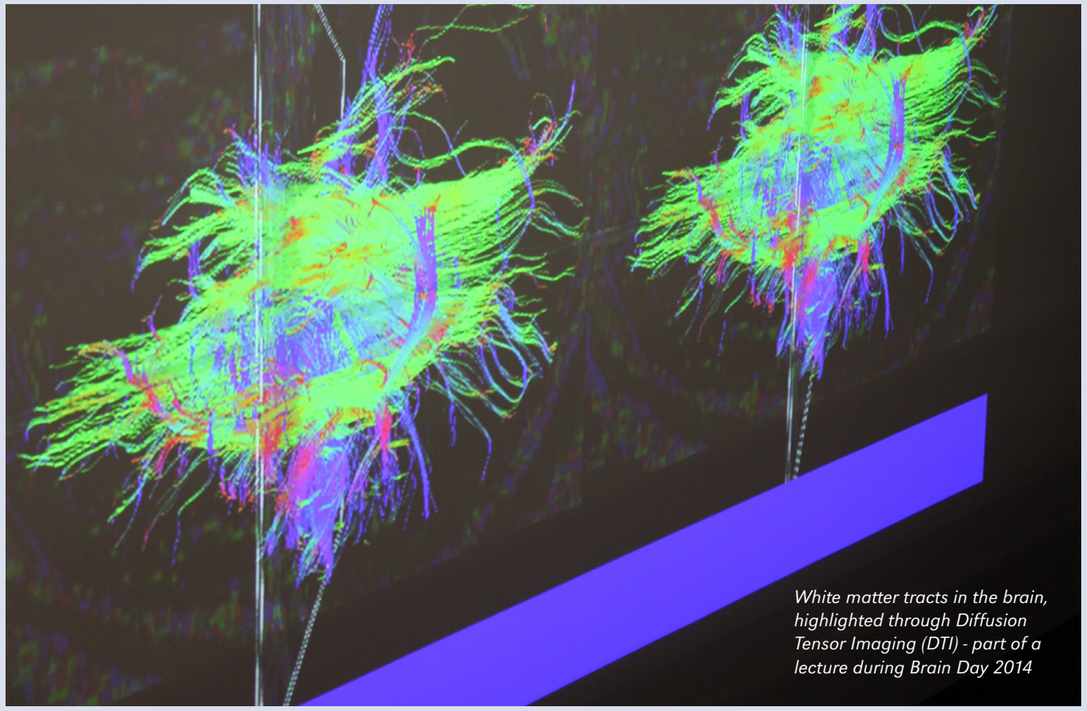
CBR in the News

Brain Bee 2014 Report

Community Groups Meet

Dementia Research Clinic

CENTRE FOR BRAIN RESEARCH
THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau



White matter tracts in the brain, highlighted through Diffusion Tensor Imaging (DTI) - part of a lecture during Brain Day 2014

In this issue

Contents

Photography by Dean Carruthers, Kirsty Harkness, Sara Reid, Erin Lee, Billy Choy, Sara Bonner and Roger Brown.

Cover Image: Erin Lee

Brain Day 2014 - pg 4

CBR and partners from Otago, AUT and Canterbury awarded CoRE - pg 6

Connections - The Centre for Brain Research magazine

October 2014 Issue Eight

The Centre for Brain Research is a unique partnership between scientists, doctors and the community. Established in 2009, cross-faculty research teams carry out world-class neuroscience research, alongside clinical collaborations with leading neurologists, neurosurgeons and physicians in the Auckland region.

Editorial contact details

Connections is published by the Centre for Brain Research (CBR). Previous issues of Connections are available from the CBR. They can also be accessed as PDFs at:

www.cbr.auckland.ac.nz

Edited and designed by Sara Reid.
Content by Sara Reid and Suzi Phillips.

Centre for Brain Research
The University of Auckland
Private Bag 92019
Auckland, New Zealand

Tel: 09 923 1913
Email: cbr@auckland.ac.nz

Letter from the Director

2014 has been a milestone year for the Centre for Brain Research where we have seen some of our most exciting dreams and visions, to promote collaborative research between neuroscientists, clinicians and the community, come to reality in both the Auckland region and nationally.

In this, our fifth year since launching the CBR in November 2009, we can look back with pride on our achievements. We are beginning to make an impact with success stories I couldn't have imagined in my wildest dreams.

First, early in the year we received critical support of $300,000 from the Alzheimer's New Zealand Charitable Trust and $210,000 from the Angus Trust to establish a Dementia Research Clinic where clinicians and scientists would combine forces to trial novel treatments for Alzheimer's patients in the very early stages of the disease in order to slow the onset and progression of the disease. The vision was that the development of an Auckland Clinic would be the catalyst to forming a national network of research of clinics with our colleagues in the Brain Health Research Centre at Otago University, Canterbury University and other New Zealand Universities.

Most notably, this was followed by an announcement by the Tertiary Education Commission in May that one of the six national Centres of Research Excellence (CoRE) was jointly awarded to the Centre for Brain Research and the Brain Health Research Centre, University of Otago, as co-hosts in partnership with colleagues at AUT University and the University of Canterbury. The CoRE, known as "Brain Research New Zealand – Rangahau Roro Aotearoa" is focused on promoting collaborative research among the partner organisations in order to develop enhanced clinical and community care for the ageing brain. The most exciting aspect of the CoRE is that it is promoting national research collaborations across New Zealand with the overarching vision of enhancing lifelong brain health for all New Zealanders. The CoRE was awarded $29.8 million over 5 years (2215-2020) and over $2 million has been awarded for 2015 for collaborative research projects across the participating institutions to enhance our national effort. The overall aim is to produce a better quality of life for the rapidly increasing number of people with ageing related brain disorders. This is a national milestone and a huge achievement towards a common mission and vision for the future of all New Zealanders.

We are also making considerable progress on other fronts of collaborative brain research. In September 2013 we launched the Chair of Neurosurgery campaign to establish an Academic Unit of Neurosurgery in partnership with the Neurological Foundation of New Zealand between the CBR and the ADHB.

The Directors of the Centre for Brain Research L-R: Professor Peter Thorne, Deputy-Director Science; Professor Richard Faull, Director; Professor Alan Barber, Deputy-Director Clinical; Professor Ian Kirk, Associate Director

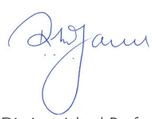
Fundraising continues, and with over $4 million raised we are confident of reaching our $8 million target. We have secured naming rights for two of the neurosurgical theatres and will be using those to give appropriate recognition to major donors to the Campaign. We are extremely excited about appointing a top class academic neurosurgeon with the ability to have a lasting impact on neurosurgery and research collaborations between the top class neurosurgeons in the Auckland Hospitals and the leading neuroscientists in the Centre for Brain Research.

We have also been very fortunate to receive a Strategic Research Initiative Award of $750,000 over 5 years (2014-2019) from the University of Auckland for salary support for CBR administrative staff which the Faculty of Medical and Health Sciences has provided in the past. This support from the University is absolutely critical for our very existence and the day-to-day operation of the CBR.

Despite the generous support from the University, we continue to rely heavily on philanthropic support to develop and expand new research initiatives. We have received over $1 million in the last year from the Coker Charitable Trust, Freemasons Roskill Foundation, Cuthbertson Family Trust, Dame Jenny Gibbs, Matthew Oswin Trust, Sir Thomas and Lady Duncan Trust, Neuro Research Foundation, Campus Link Foundation Alzheimer's NZ Charitable Trust, and the Angus Trust. We are so grateful to have our CBR Ambassadors – Dame Jenny Gibbs, Dame Rosie Horton and David Mace - who work tirelessly to provide support for our ongoing development and expansion of our research efforts. To date, over the last 5 years our philanthropic support has exceeded $10 million; that is very humbling and makes us even more determined in our research efforts.

Most important of all is the dedication and support of our world class neuroscientists and clinicians. They have raised over $5 million from competitive granting agencies in the last year (up by 25% on the previous calendar year), and as detailed elsewhere, many have won awards and recognition. I would especially like to congratulate the staff who were promoted to associate professor this year (Johanna Montgomery, Kathy Mountjoy, Cathy Stinear, Ben Thompson and Srdjan Vlajkovic) in recognition of their outstanding research achievements.

Finally I would like to thank all our very dedicated CBR professional staff, and the graduate students and postdoctoral research fellows – the leaders of tomorrow – for their willingness to embrace the ethos of the Centre for Brain Research and who play a vital role in our community outreach programmes. Thank you all for your dedication and striving to ensure that the Centre for Brain Research serves the people.



Distinguished Professor
Richard Faull

Your Sense-ational Brain...

...was the theme of the eighth annual Brain Day in Auckland, held this year on 29 March, and featuring a range of local and international speakers with a shared passion for our most intriguing organ.

This year's Brain Day was once again supported by the Neurological Foundation of New Zealand. We thank them for their endorsement of this important community outreach.

Minute by minute our five sense bring us information about our world and allow us to enjoy the pleasures of our environment - hearing a bird sing, feeling the arms of a loved one around you, seeing the magnificent night sky, tasting a delicious ripe nectarine, or the smell of freshly mown grass. Brain Day 2014 took attendees on a journey into how our sense-ational brains operate.

The day's organiser, Associate Professor Cathy Stinear, says that the theme allowed for talks on a wide range of topics, providing yet another fascinating window into what the brain can (and can't) do, and how these perceptive processes often tell us more about what's going on inside the brain than out!

'It's so rewarding to see our own enthusiasm for the brain is reflected in the wider community - Brain Day is the perfect example of this.'

Associate Professor Cathy Stinear

It has been said that the eyes are the window to the soul, but on Brain Day they were the window to the brain, with three of the six lectures giving considerable focus to the topic of seeing.

Our first ever international speaker to appear at Brain Day, Professor Rob Shepherd of the Bionics Institute in Melbourne, spoke about bionic organs to help those with senory loss to regain a sense of the world around them, with particular attention to the ultimate goal of a bionic eye, and the many challenges on the pathway to this goal.

Associate Professor Paul Corballis addresses attendees at Auckland Brain Day 2014.

CBR member Associate Professor Paul Corballis, from the Department of Psychology, followed with a fascinating exploration of the interactions between 'sensing' and 'perceiving', in a presentation liberally strewn with quotations from notable philosphers, demonstrating that this is a topic which has exercised many of humanity's finest minds over the course of our history.

Dr Corballis began his lecture by pointing out that we can sense only those aspects of the world for which we have receptors - meaning that our information about the world around us is necessarily incomplete. Additionally, the information is *ambiguous* in and of itself. It requires processing, and that is where perception comes in. Perception is by nature a constructive process - that is, it pulls together information considered salient and disregards other information, to produce a coherent narrative of the world surrounding us.

Of course, complex processes such as these can be disrupted, even in those whose brains and sensory organs are working exactly as expected. Dr Corballis presented a series of examples of visual illusions - scenarios constructed to trick the brain's perceptual process into misperceiving the information it receives - and explained how they come about.

Earlier in the day, Associate Professor Ben Thompson, a CBR member and optometrist, spoke about his research in the field of Amblyopia (otherwise known as lazy eye).

Hands-on ctivities for children to encourage an interest in science and the brain were a hit with younger attendees, as these pictures show!

Amblyopia is a neurodevelopmental vision disorder in which leads to blurred vision and perception of distorted images. It is an ideal field of study for a brain scientist, because the problems which cause amblyopia are not due to the eye, they are due to the brain.

Dr Thompson noted that amblyopia can be successfully treated in children, but those who are not diagnosed until adulthood are not usually able to be treated. Both scenarios reveal interesting facts about the brain. The efficacy of treatment in children is thought to be due to the greater 'plasticity' of their still-developing brains, meaning the brain responds to environmental change (in this case, putting an eye patch over the 'good' eye) by changing itself. On the other hand, adults with amblyopia generally experience monocular vision - the brain 'turns off' the flow of information coming from the 'bad' eye in order to make sense of the visual world.

There are several approaches to treating amblyopia which may be used in conjunction with traditional patching, and Dr Thompson detailed these, noting that combination therapy does tend to produce better results than patching alone. In particular, he and his team have produced a tetris-style video game which forces the eyes to work together - the screen cannot be seen properly with only one eye. An amazing effect seen in early trials was that some adult participants experienced a return to stereoscopic vision - something previously not thought possible!

The tradition of discussion panels to complement lecture topics, featuring two or three researchers with an interest in the field, was continued this year. Areas covered included the relationship between the five senses and an individual's sense of 'equilibrium', or balance, and techniques for maintaining it.

Members of the CBR's CeleBRation Choir sing a selection from their repertoire at lunchtime sing-along during Brain Day 2014.

Another discussion centred on sensory disturbance following neural injury, and featured, in addition to 'experts', the CatWalk Trust's Sally Wenley, who lost the use of her legs after an accident at the age of 17. For many of the attendees, says Brain Day organiser Cathy Stinear, it was clear that Sally was the real expert, having years of first-hand experience to discuss.

The CBR's CeleBRation Choir features many individuals who struggle to speak as a result of stroke or aphasias, but who are able to sing without difficulty. A group of them once again attended Brain Day to give a demonstration of their remarkable abilities. The choir was led by music therapists Alison Talmage and Shari Ludlam, who provided accompaniment, and performed a range of familiar tunes, and their own signature song, 'We all love CeleBRation Choir'.

Sensing the world through different pathways

Have you ever wondered what it would be like to have heightened senses? We all know, of course, that many animals perceive significantly more than we do - everyone has heard tell of male moths smelling the pheromones of a female of their species over a distance of a mile or so, and we humans make use of just such a heightened ability in dogs by employing them as mobile drug and contraband detectors in our airports. In the same way, we can use our knowledge of animals' heightened senses of smell, hearing, and sight to create deterrent devices, such as cat repellent granules or mothballs, or plug-in devices which emit ultra-sonic sound to eliminate rodents in the house. But what about entirely different ways of sensing the world? How can we even begin to understand these? Professor Michael Walker from the University's School of Biological Sciences, spends his time trying to do just that, and he shared with his audience the evidence for a magnetic sense, which has long been theorised to be the means by which homing pigeons perform their amazing feats. Professor Walker showed slides of experimental situations he had created in his laboratory with trout and stingray, in which they too showed behaviour which was consistent with an ability to sense magnetic fields.

Pigeon photograph © 2013 Photo by rosalee3 Creative Commons 2.0 http://flickr.com/photos/rosalee333/

Stingray photograph © 1992 Photo by Barry Peters Creative Commons 2.0 http://flickr.com/photos/barrypeters/

CBR and Partners to Establish Centre of Research Excellence

Researchers from The Centre for Brain Research are teaming up with colleagues from the University of Otago, AUT University, and the University of Canterbury to form a multi-centre initiative: Brain Research New Zealand - Rangahau Roro Aotearoa, which will focus on the ageing brain and age-related neurological disorders.

The ageing brain will be the focus of the new Centre for Research Excellence funding co-hosted at the Centre for Brain Research.

The new CoRE is to be co-hosted by the University of Auckland and the University of Otago under the leadership of co-directors Distinguished Professor Richard Faull (Auckland) and Professor Wickliffe Abraham (Otago).

The CoRE forms a national partnership between the Centre for Brain Research at the University of Auckland, the Brain Health Research Centre at the University of Otago, and researchers at AUT University and the NZ Brain Research Institute in Christchurch.

This collaboration will harness the strength of the nation's world-leading scientific and clinical expertise in the ageing brain.

What is a CoRE?

CoREs (Centres of Research Excellence) are inter-institutional research networks, with researchers working together on commonly agreed work programmes. CoREs make a contribution to New Zealand's development, and link to user groups. They also build research capacity and capabilities through the establishment of post-graduate programmes and the training of new researchers.

The CoREs Fund was established in 2001 to encourage the development of excellent tertiary education-based research that is collaborative, strategically focused and creates significant knowledge transfer activities. Funding from the CoREs Fund is determined through a fully contestable process and is allocated and monitored through a funding arrangement with the Tertiary Education Commission.

Source: Tertiary Education Commission.

Photograph courtesy of North and South Magazine

Professors Richard Faull and Cliff Abraham, co-directors of Brain Research New Zealand - Rangahau Roro Aotearoa

A key focus of the new CoRE, to be known as 'Brain Research New Zealand - Rangahau Roro Aotearoa' is to unlock the secrets of the ageing brain and develop new therapies and better clinical and community care to enhance lifelong brain health for all New Zealanders.

Professors Faull and Abraham say "Like all developed nations, New Zealand has an ageing population and a rapidly increasing number of people with ageing-related brain disorders like stroke along with Alzheimer's, Parkinson's and Huntington's diseases."

"By 2036 one in four New Zealanders aged over 65 will be affected by an ageing-related brain disorder. These disorders can result in profound and long-term impairment and place huge physical and emotional strains on individuals, family, and whanau."

"New Zealand's ageing population means that in only twenty years, one in four of those over 65 will be affected by an ageing-related brain disorder. The time to address this is now."

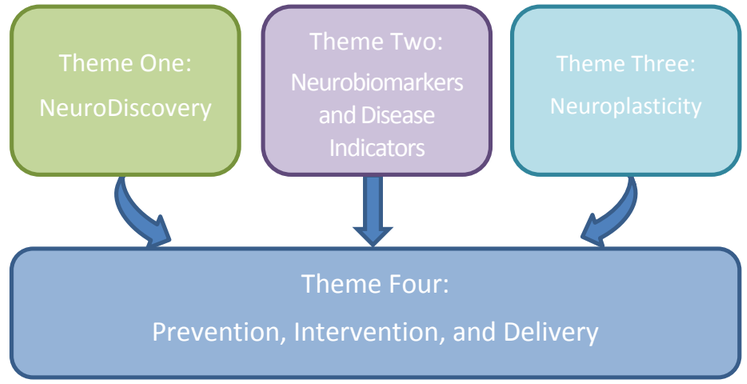
Professor Richard Faull

"The vision of this CoRE is to enable people to age well with a healthy brain and to delay the onset of these aging-related brain disorders. Developing a truly national, collaborative response to this issue is of critical importance" say Professors Faull and Abraham. "Direct costs associated with these disorders are estimated to be more than $1 billion per year and are rising by more than 5 per cent per year."

"The mission of Brain Research New Zealand is for our scientists, clinicians and the community to work together to unlock the secrets of the ageing brain so that we can develop new therapies and better clinical and community care to enhance lifelong brain health."

Story by Suzi Phillips.

Imagine if you were able take a simple test, in middle age perhaps, which could predict whether or not you would develop Alzheimer's disease later in life - which might even tell you whether it would be early or late-onset? Now imagine there is another simple test you can take, which gives you a detailed prescription, based on your individual characteristics, of the steps you can take to maximise your symptom-free years, and optimise your ability to prepare to meet this thing head-on. Furthermore, the test can tell your clinicians what kind of treatment they should be giving you, and when to start offering it. Sound far-fetched? Well, it's not too far-fetched to work toward, and an integrated approach is crucial, so the CoRE research is arranged around four themes, which feed into one another.



Theme 1 - Neurodiscovery: Ageing related brain disorders severely reduce the quality of life for a large number of New Zealanders, affecting sensation, movement, and cognition. Neurodiscovery involves research into the development of drug therapies, and cellular and genetic techniques to reduce or reverse the decline associated with ageing-related neurological disease. Researchers will investigate the molecular, cellular, and signalling mechanisms within the brain which change with age, using both animal models and human tissue. This research will identify potential targets for new therapies and allow for monitoring of the effects of those therapies. Neurodiscovery will also build on the exciting revelation that the brain continues to produce new cells throughout its life (neurogenesis), and seek to increase understanding of this phenomenon in order to harness its potential to promote healing and repair in the normal and diseased ageing brain.

Theme 2 - Neurobiomarkers and disease indicators: A biomarker is a substance or characteristic which can lead to the identification of a particular pathological process or disease. Researchers working on this theme will utilise human tissue, health informatics, genetics and data from wide-rangeing and ongoing studies of the population's health and development to discover and validate new biomarkers for ageing-related neurological diseases, and contrast these with those of normal ageing processes. Gathering this information will also allow tracking of biomarker progression with age and the passing of time, and the identification of important risk factors associated with particular neurological disorders. It will provide crucial information about key time points for intervention in disease progression, and a means of monitoring the impact of these interventions. Finally, access to the combined data resources of the partner institutions means that information about these biomarkers can be linked with clinical observations and functional outcomes, using bioinformatics and observations from longitudinal and cross-sectional studies, to compare experience and outcomes of normal ageing with that of specific neurological disorders.

Theme 3 - Neuroplasticity: The brain has a tremendous ability to modify its structure and function in response to changes in internal and external environments. Researchers working on this theme will capitalise on this knowledge, seeking to expand our understanding of neuroplasticity and identify targets for therapy development by understanding the molecular and functional changes that occur during synaptic plasticity, and in response to ageing and neurological disorders. Using this information in conjunction with evidence deriving from research into Theme1 will allow the advancement of therapeutic strategies that harness and optimise plasticity, to promote brain health and stabilise or improve memory function. It will also give impetus to the development and prototyping of rehabilitative tools aimed at mitigating ageing-related changes of function and connectivity, or promoting recovery in patients with actue and chronic ageing-related neurological disorders.

Theme 4 - Prevention, intervention, and delivery: To realise the benefits of our increased knowledge of ageing-related neurological disorders, an outreach and effector arm of the CoRE is essential. The nationwide nature of the CoRE will greatly enhance interactions between the community, researchers and clinicians already in place. These interactions will serve to inform the implementation of preventive measures and early interventions to reduce or reverse functional neurological decline with age and associated neurological disorders. In addition, a national network of assessment clinics with information and data exchange co-ordinated by a Dementia Research Clinic will be established.

The research clinic will focus on the amelioration of early cognitive change in dementia and other neurodegenerative disorders, and will recruit and assess study participants from throughout New Zealand. It will test the clinical efficacy of therapeutic strategies identified by research in themes that appear promising with regard to dementia and stroke-specific lifestyle and the prevention, minimisation, or reversal of brain dysfunction in those with neurological disorders. Another important function of
Theme 4 will be to translate evidence to action. We will encourage implementation of effective interventions in the community and health system by promoting dementia and stroke awareness, and engaging with community groups to provide expertise and to understand community identified needs. Prevention and recognition of cognitive decline and stroke will be a particular target, and should enable improved quality of life for people with dementia and stroke and their carers. Identifying and overcoming barriers to accessing services and programmes for preventing and managing ageing-related neurological decline will be a particular focus, including holistic services and interventions to address the needs of all population groups, with particular regard to Maori and Pacific people.

Dementia Research Clinic

Philanthropic support gets the first multidisciplinary research clinic up and running.

Members of the Alzheimer's Research Charitable Trust, from left, Mr Michael Keyse, Mr John Brandts-Giesen, and Mrs Wendy Fleming, meet with Associate Professor Lynette Tippett and CBR Directors Professors Richard Faull and Peter Thorne.

Treatment options to help slow the onset and progression of Alzheimer's disease and other dementias will be trialled at New Zealand's first Dementia Research Clinic, in Auckland later this year.

The Clinic will operate within the Brain Recovery Clinic at the University of Auckland's Centre for Brain Research (CBR) in Grafton. Development of the Auckland Dementia Research Clinic was made possible this year with two major new philanthropic donations to the CBR. "We have had extremely generous donations from the Alzheimer's New Zealand Charitable Trust ($300,000) and the Angus Trust ($210,000 over 3 years)," says CBR Director Professor Richard Faull from the University of Auckland.

"This funding is to establish the research clinic at the CBR, where systems and research programmes will be trialled to guide the shape of future clinics in other main centres," he says. "We have long held a vision of a network of research clinics in major centres around the country to support the research into the prevention and treatment of Alzheimer's disease and other dementias."

"We are thrilled that these Trusts share this vision and with their wonderful support will truly help us to make the dream come true."

The Dementia Research Clinic will be the first in the national research clinic network to be established under the auspices of the new Brain Research New Zealand (BRNZ)'s Centre of Research Excellence (CoRE).

The CoRE was awarded jointly to the Universities of Auckland and Otago and is co-directed by Professors Cliff Abraham and Richard Faull. Future Dementia Research Clinics are planned for Christchurch, Dunedin and Wellington.

"These clinics will investigate and trial novel treatments for Alzheimer's patients in the very early stages of the disease," say CoRE Directors, Cliff Abraham and Richard Faull. "The purpose is to trial different treatment options on well characterised clinical populations, which could slow down the onset and/or progression of the disease.

Clinic patients (and care-givers) will provide a well-characterised cohort who will be offered the opportunity to participate in a range of studies emerging from the participating CoRE research partners – the CBR, the Brain Health Research Centre at the University of Otago, the University of Canterbury, the NZ Brain Research Institute, and the Auckland University of Technology.

The balance of the funding to operate the Clinics will come from the CoRE funding allocated to the project, and this funding, together with additional philanthropic donations, will enable the Clinics to operate well into the future.

Both Directors are confident that more funding will become available in future years to enable the vital work of the CoRE clinics to continue well into the future.

Individuals with mild cognitive impairment and in the earliest stages of Alzheimer's Disease interested in taking part in the research trials will be referred from specialists and DHB Memory Clinics.

They will undergo detailed multidisciplinary evaluations to characterise the patient's neurological and psychological condition, their general health and lifestyle, along with brain imaging using MRI, and blood samples for research analysis and biomarker identification and monitoring.

"By looking at novel methods to delay the development and progression of Alzheimer's disease this network of national dementia research clinics has the potential to change the future of Alzheimer's disease in New Zealand."

"We know that diet, exercise, cognitive stimulation, social interactions, environment and occupational therapy all have the potential to contribute to delaying the onset of Alzheimer's and other dementias," they say.

"If we are able to delay the onset by two years, that would see the prevalence of Alzheimer's drop by 20 percent. If we can delay Alzheimer's onset by five years it would reduce the prevalence by 50 per cent."

At present, there are about 50,000 New Zealanders suffering from dementia with the numbers predicted to increase to about 150,000 people by 2050.

"We have no magic cure for Alzheimer's but we believe that packaging new treatments and innovative care has the potential to delay the onset and progression," say Professors Faull and Abraham.

Co-director of the Auckland Dementia Research Clinic, Associate Professor Lynette Tippett from the School of Psychology, says the Clinic will provide individuals and families with the chance to be part of this research drive to make a real difference in our knowledge about the underlying causes, treatment, management and prevention of Alzheimer's disease and related dementias.

"From the first day that people attend the clinic they will already be active participants in research," she says. "The Clinic will also be collecting information and listening to the experiences and needs of care-givers and family members.

"People who attend with early onset signs of dementia will be invited to participate in a range of preliminary clinical trials, developed as part of the research programme," she says. "These may include testing novel drugs, nutritional supplements, and cognitive, social and physical interventions that are designed to prevent, delay or ameliorate Alzheimer's disease and other related dementias."

"We are fortunate in Auckland to have the involvement of some highly experienced medical specialists in dementia helping to develop and establish the Clinic."

The other Co-director of the Auckland Clinic is geriatrician Dr Phil Wood, and the Clinic will also employ a full-time neuropsychologist, and a part-time psychiatrist and neurologist, as well as a research nurse. The Auckland Clinic is expected to be open initially to participants one day per week.

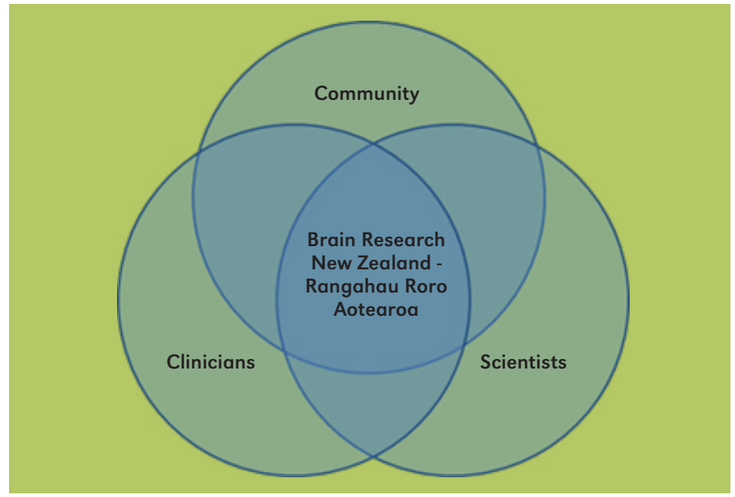
The Research Clinics are not intended to be an alternative to the health service and will not be taking over the care of patients with dementia from the DHBs, says Dr Tippett.

Story by Suzi Phillips

Making a difference today, for tomorrow

The Centre for Brain Research's founding goals include the training of scientists and clinicians, development of new therapies, novel approaches to clinical care, and an on-going dialogue with our community, enabling both parties to develop new understandings. As such, we are well placed to host the first Dementia Research Clinic, which will be followed by others in Christchurch and Dunedin, taking a multidisciplinary approach to evaluating people with memory difficulties or early symptoms of dementia.

The cohort of individuals attending the clinic will be followed longitudinally; their clinical assessment information, neuroimaging and blood samples the focus of many scientists in the CBR, as they search for elusive biomarkers of Alzheimer's Disease and other dementias. Clinic visitors will also have the opportunity to take part in studies testing potential therapies that may slow down or halt disease progression.



Co-directors of the clinic are Associate Professor Lynette Tippett, School of Psychology, and geriatrician Dr Phil Wood. Lynette is enthusiastic about the potential of the clinics, and keen to spread the word. "Much of the clinics' work will be focussed on Mild Cognitive Impairment, or MCI, a stage that for some people precedes the development of a dementia. We desperately need to gather data on MCI – what is happening in the really early stages – which individuals go on to develop the early stages of dementia, and which ones do not? Can we find ways to keep everyone from progressing? Gathering comprehensive information is vital to answering these questions, and the clinic approach, where several clinicians are able to pool their findings, ensures the highest quality of characterisation of individuals, which is essential to research of this sort."

What might a visitor to the clinic expect? Research nurse Karen Smith, who will co-ordinate the running of the clinics, says it's important for anyone interested in being involved to visit their doctor first, to get a referral to the clinic. This referral will give some prior information as to the sort of evaluation that is most relevant for them. Karen will meet with clinic visitors on arrival, explain what is to follow, as well as take baseline observations such as blood pressure readings. They will then meet with one of the specialists, either Dr Kiri Brickell, (a neurologist with specialist interests that include early onset and familial dementia), or Dr Phil Wood (a geriatrician with long-standing interest in Alzheimer's disease), or Dr Gary Cheung, (a psychiatrist specialising in old age psychiatry and early dementia), for a detailed clinical assessment. Most people who attend the clinic will have the opportunity for an assessment with neuropsychologist Dr Christina Ilse, a clinician with many years experience working with individuals with MCI or dementia. Depending on their particular set of circumstances, many clinic visitors will also have an MRI scan, with neuroradiologist Dr Gerard Deib. Whenever possible partners or spouses will also be part of the clinic process. A report of the findings obtained during the visit, along with any recommendations (if appropriate) are shared with clinic visitors', then forwarded to GPs or other specialist providers.Everyone who attends the clinic will be kept up to date with additional research opportunities available for them.

Focus on Community Groups

A report from the CBR's first-ever community groups feedback day.

With our fifth anniversary just around the corner, the CBR is continuing to break new ground and try out fresh ideas. The latest one - brainchild of Professor Suzanne Purdy, newly appointed head of CBR's Community Relations Committee, was to gather the community information groups and support organisations, who normally all come together once a year to exhibit at Brain Day, and invite them to give feedback, both on Brain Day itself and on how we are doing generally, from their various perspectives.

Representatives from twenty-eight community organisations attended, along with several key CBR staff, including Deputy Director Professor Peter Thorne. The feedback from previous Brain Days included much that was positive, along with plenty of suggestions for ways to give Brain Day a wider appeal or make it work better for community and support organisations. Some of the most common suggestions included allocating more room, and more prominent space, for the community expo, promoting this part of the day more heavily in advertising leading up to the day, and structuring the programme on the day so that there was 'in-between' time with respect to lectures and workshops, thus encouraging attendees to browse the community expo area.

Above: Professor Suzanne Purdy thanks attendees for their suggestions. Below: representatives from the Hope Foundation, Stroke Foundation, Sparx, Epilepsy Dogs Assist Association, Blind Foundation and NZ Essential Tremor support Group.

Several attendees were keen to see attempts to make Brain Day more attractive to a younger clientele, and suggested thinking carefully about themes which might be interesting to this cohort, advertising to or through schools leading up to the day, and making use of social media to promote Brain Week. Another suggestion around advertising for the future was to include a listing of all the community organisations who would be present, rather than simply advertising a 'Community Expo', as in past Brain Days.

Some contributors felt that it would be good to have the day less focused on lectures as the primary means of gaining information, while others thought that lectures should continue to be emphasised, as they acted as a 'drawcard', bringing the crowds in. It was felt that the workshops and/or panel discusssions which accompany the lectures were valuable because they offered the opportunity for those attending to ask questions of people working or living at the 'coalface' of neurological disorders.

"I'm delighted by the attendance we had, and awed by how engaged these people are, how much of themselves they put into what they do."

Professor Suzanne Purdy

The day also provided an opportunity for community groups to communicate with each other, not just CBR staff, and this bore fruit also, with the suggestion that support groups be arranged in a manner consistent with what they are supporting on future Brain Days, so that anyone manning a stand will know where to direct enquiries which are best answered by another group. There was also enthusiasm for the idea of communication between community groups prior to Brain Day so that co-ordinated promotion to their constituencies could take place.

Some attendees also spoke of the difficulties they faced getting recognition of less well-known neurological conditions, from both the public and the clinical world. Neurologists may be less likely to specialise in an uncommon condition, it was felt, or to view some conditions as 'not serious', in comparison to other conditions they dealt with daily. The CBR's unique position at the interface between community, academia, and the clinical world was seen as potentially offering a way to solve these issues.

Others felt that it would be good for the CBR to provide lay-language summaries of relevant research by staff to any community groups whose constituents might be interested. This was seen as an important service scientists can perform, as often the people most interested in the results of current neurological research - those living with a neurological condition - can't understand or even access it.

Another theme was the need to integrate results of scientific studies with those of sociological studies and policy data, in order to actually effect change for sufferers and their families, particularly in those areas where research shows that early intervention and/or preventative measures have a significant impact, but where multi-intervention treatments might be stigmatised as a waste of resources.

Professor Purdy says she was very pleased with the level of engagement on the day, and is keen to ensure CBR provides other opportunities to 'continue the conversation'.

Tinnitus Research Conference

Worldwide network of researchers gathers in Auckland to focus on the problem of tinnitus and approaches to its treatment.

The eighth annual Tinnitus Research Initiative conference was hosted by the University of Auckland at the Viaduct Events Centre, from 10-13 March this year. CBR member and audiologist Dr Grant Searchfield was the conference organiser.

Tinnitus, which is defined as the perception of sound within the human ear when no external sound is present, may affect as much as 20 per cent of the population at any time. Despite it being common and often disabling, researchers largely ignored it for many years, but recently there has been an upsurge of interest from both researchers and clinicians.

The Tinnitus Research Initiative, which was formed in 2006, seeks to take advantage of this, and to apply innovation and collaboration to increase understanding of tinnitus and to find effective treatments.

More than 200 researchers from 20 countries attended this year's conference, and agreed that there may never be a single cure for tinnitus, but instead a range of treatments for different types of tinnitus will be needed.

Exciting possibilities for future research directions were presented by leading experts in bioengineering, neuroscience, psychology and pain research, discussing how developments in their fields might be applied to understanding tinnitus and generating new treatments.

Presentations took place on the new findings in the neuro-imaging of tinnitus; understanding how the brain and ear work to create the sounds; new drug research; mindfulness meditation; and treatments using hearing aids, sound, and brain stimulation.

Much of the research indicated that the auditory system does not behave in isolation. Instead, regions of the brain involved in emotion, reaction and connections with regions of the brain and body not thought of as being involved in hearing, contribute to tinnitus.

"The Tinnitus Research Initiative brings researchers and clinicians from many disciplines from all around the world together to focus on a single health problem."

Dr Grant Searchfield.

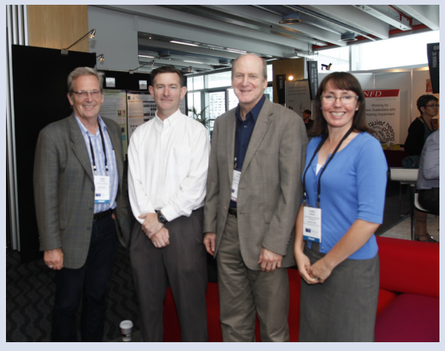
Several researchers from the Centre for Brain Research, who make up a multidisciplinary research team to tackle the complexity of tinnitus, presented at the conference.

Researchers from audiology, pharmacy, medicine, vision and sports and exercise science have combined their very different perspectives to cast new light on tinnitus. They have developed computer based training programs to change attention to tinnitus, and are examining how drugs might improve treatment effects.

Notable overseas speakers included Professor Susan Shore from the University of Michigan, presenting on work from her laboratory demonstrating the strong interconnection between the auditory and somatosensory (touch) systems that can contribute to tinnitus being experienced differently with neck or jaw manipulation.

Other research demonstrated that attention systems in the brain might help tinnitus pop out from normal sounds. Dr Alain Londero from Paris-Quest University described how utilising virtual reality could change how people thought about tinnitus.

The possibilities of the drug MDMA (Ecstasy) as a means to change how people think about their tinnitus were also discussed by Dr Rick Doblin and Amy Emerson of the Multidisciplinary Association for Psychedelic Studies (MAPS).



Above: CBR members presenting at the conference. From left: Professor Peter Thorne, Dr Grant Searchfield, Professor Cliff Abraham (Brain Health Research Centre, University of Otago), and Associate Professor Cathy Stinear.

Above Left: Professor Cliff Abraham addresses attendees on 'Metaplasticity: Brake or accelerator for plasticity?'

Left: A selection of cochlear implants on display at the conference.

Research Funding News

Several young researchers are awarded scholarships and emerging researcher grants, while founding staff have their ongoing efforts endorsed via new project grants and feasiblity studies.

Epilepsy study begins

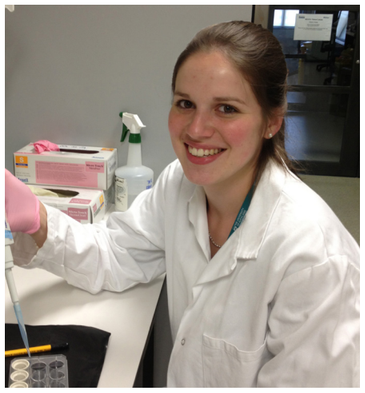
CBR clinical associate and neurologist Dr Peter Bergin has received $670,000 from the Health Research Council of New Zealand for an incidence study of status epilepticus in the greater Auckland region. Status epilepticus occurs when seizures do not stop spontaneously; it is the most severe form of epilepsy. We need to determine why people in New Zealand develop status epilepticus, and which treatments work best, so that we can reduce its frequency, and the morbidity and mortality associated with it. Dr Bergin's team will track the incidence and causes of status epilepticus throughout the Greater Auckland region. Over a one year period, they will identify all patients over the age of four weeks who present to Auckland, Middlemore, North Shore and Waitakere hospitals with seizures that continue for ten minutes or more. Information will be collected regarding the type, cause, duration, treatment, and outcome for each episode of status epilepticus. Blood samples will be tested for the presence of anti-neuronal antibodies. Patients will be followed for two years, so that the long-term global outcome and associated health costs can be determined.

Customising rehabilitation

Stroke is the leading cause of adult disability worldwide. Stroke affects the way some neurotransmitters operate in the brain, and this has implications for how plasticity (adaptation) and recovery of function occur after stroke, but this varies from one individual to the next. CBR Principal Investigator Professor Winston Byblow has been awarded $1,200,000 by the Health Research Council of New Zealand to research individualised approaches to neuromodulation for motor recovery after stroke. The objective of this study is to identify factors that predict how best to apply non-invasive brain stimulation to modulate neurotransmitter activity and facilitate motor recovery in the initial days and weeks after stroke. To fulfil this objective, advanced neuroimaging and neurophysiological assessments will be undertaken in order to establish links between inhibitory neurotransmitter function, effects of brain stimulation on recovery, and patient outcomes. This project will increase understanding of the molecular, cellular and neurophysiological mechanisms of recovery of motor function in human patients after stroke, and reduce inequalities in stroke outcomes for people who are more likely to suffer stroke earlier and live with disability longer.

Reprogramming cells

CBR student Amy McCaughey-Chapman has been given a boost to her goal of developing her research interests in somatic cell reprogramming and effective drug development for neurodegenerative diseases with a W & B Miller PhD Scholarship from the Neurological Foundation of New Zealand. Parkinson's disease (PD) is a movement disorder caused by the death of dopamine cells in the brain. Scientists globally have investigated the transplantation of dopamine-producing cells into PD patients' brains.



Amy (pictured above) will progress an exciting research area in Associate Professor Bronwen Connor's human brain stem cell laboratory, with a focus on a Parkinson's disease model. This lab recently made worldwide news headlines with ground-breaking research that demonstrated the ability to generate immature dopamine neurons directly from adult human skin; a strategy called direct reprogramming. This process has the potential to generate dopamine cells from the patient's own skin for brain cell replacement. Ms McCaughey-Chapman's project aims to optimise the transplantation of directly reprogrammed dopaminergic neurons using a model of PD with future therapeutic applications in mind.

Plasticity and Huntington's

There is evidence to suggest Huntington's disease (HD), a progressive neurodegenerative disease that results in deterioration of movement, personality, thinking and eventually death, has at least twice as high an incidence in Māori than non-Māori. CBR member Dr Melanie Cheung has been working in partnership with a large Taranaki Maori Huntington's disease whanau, who, after six years of building relationships, are eager to begin developing treatments in co-operation with her. Currently the most promising brain disease treatments harness neuroplasticity, the brain's powerful ability to change and adapt itself. Dr Cheung has been awarded $1,200,000 by the Health Research Council of New Zealand to conduct research bringing together Taranaki Māori Whanau, HD scientists and clinicians from Centre for Brain Research and Brain Plasticity Institute (San Francisco) to develop computer-based brain exercises that augment neuroplasticity in the brains of people with Huntington's disease to ultimately slow the course of the disease. The methodology will include Kaupapa Māori approaches to brain imaging, neuropsychology and clinical care. Melanie discusses her current work in more detail on page 15.

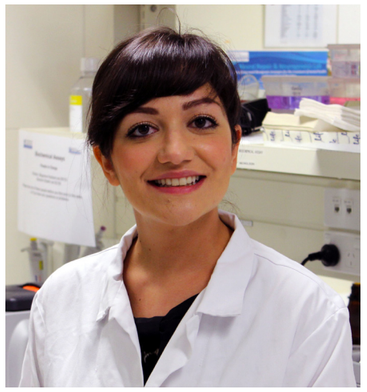
Causes of amblyopia

A childhood cataract can cause the brain to process information from the eyes incorrectly, resulting in a loss of vision that persists after the cataract is removed. This loss of vision is known as deprivation amblyopia (lazy eye). CBR member Dr Ben Thompson has developed a project titled 'Understanding and treating deprivation amblyopia, which has been funded by the Neurological Foundation of New Zealand. The research aims to determine the changes within the brain that cause deprivation amblyopia, and to test a new treatment which may improve vision in children with this problem. If this treatment is effective, the principle on which it is based may be relevant to a range of neurological conditions in which healthy brain cells have been deprived of input.

Rejuvenilising for recovery

Injury to one hemisphere of the adult brain often results in more profound deficits than similar injury suffered by children. The reasons for this are controversial, but may be related to the ability of young brains to undergo a restructuring process (plasticity). Animal research has shown that 'rejuvenilising' the adult brain via the application of an enzyme appears to lead to a recovery of sensorimotor function. CBR member Professor Martin Wild has received $150,000 from the Neurological Foundation to undertake a project aiming to determine whether and when re-juvenilising the adult brain following a unilateral brain injury enhances sensorimotor recovery. This study also seeks to understand the mechanisms that promote functional recovery in the brain.

A cell model for Huntington's Disease



Mandana Ghodratipour (pictured above) is fascinated by the topic of cell reprogramming (the process of transforming a particular cell type into a different cell type), and its applications for the study of Huntington's disease (HD). Her work in this area has led to her receiving the Neurological Foundation of New Zealand's inaugural Gillespie Postgraduate Scholar award, which will fund her continuing study with Associate Professor Bronwen Connor for a period of three years. HD is a genetic neurological disorder characterised by progressive loss of specific brain cells with devastating neurological consequences. The molecular mechanisms that drive cell death in HD are poorly understood, and as a consequence current therapies only alleviate some clinical symptoms and no cure is available. Mandana's project aims to establish a new platform for studying HD by reprogramming skin cells obtained from HD patients directly into the brain cells that are lost in the disease. This cell model of HD will provide a critical disease-specific tool for understanding the disorder at a molecular and cellular level. The long-term aim is to use the model to develop treatments for those living with HD.

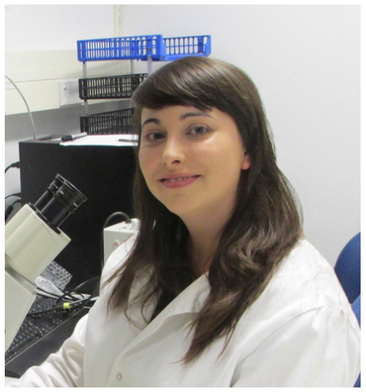
Bacterial infection and the foetal brain

Premature babies have a high risk of neurodevelopmental disability and there is no effective treatment for this once it has happened. Although multiple factors are involved, disability is closely linked to infection and inflammation around the time of birth. To better understand this process, CBR member Professor Alistair Gunn has devised a study which will first test, in preterm foetal sheep, whether exposure to a clinically silent dose of a key part of bacterial cell walls for just 5 days results in impaired growth of the branches (dendrites) that connect brain cells together, and so reduce the growth and function of the brain. He and his team will then test whether blocking one of the key inflammatory pathways in the brain can help restore normal maturation of brain cells and brain activity, and determine the window of opportunity for such treatment. This new knowledge will provide valuable insight into how cognitive deficits develop in preterm infants, and provide a new way of protecting normal brain development. Professor Gunn received $1,200,000 from the Health Research Council of New Zealand to carry out this research.

Combined approaches to treat tinnitus

Tinnitus (ear and head noise) is a highly prevalent condition affecting an estimated 15% of the population. Severe tinnitus can result in disruption of work, social activities and sleep; and lead to anxiety and depression. There is a pressing need for effective therapies to help solve this common problem. In the last decade there have been tremendous advances in our understanding of the mechanisms underlying tinnitus, but effective treatments for tinnitus remain elusive despite these advances in knowledge. CBR members Dr Grant Searchfield, Dr Giriraj Singh Shekhawat, Associate Professor Cathy Stinear and Professor Ian Kirk have teamed up with Professor Dirk De Ridder from the University of Otago to take a closer look at the issue. Tinnitus can be temporarily reduced or eliminated by sound stimulation and non-invasive brain stimulation, but only in some people, some of the time. Tinnitus is complex; studies of brain activity indicate auditory, memory, attention and emotional parts of the brain work together to create tinnitus. These studies have led to a "Neurophysiological network" model of tinnitus. Recently an "Adaptation Level Theory" model of hearing has explained how memory, attention and emotion might contribute to tinnitus magnitude. The Auckland Medical Research Foundation has granted $85,000 for proposed research which will examine how the two models of tinnitus interrelate. It will involve measuring brain activity (by EEG) and tinnitus loudness before, during, and after sound stimulation and non-invasive stimulation of different brain areas. The study should identify new targets and means for treating tinnitus.

Receptor function in mental illness



Centre for Brain Research postdoctoral fellow Dr Natasha Grimsey (pictured above) has been awarded an emerging researcher's grant by the Health Research Council of New Zealand to investigate a possible mechanism behind mental illnesses such as depression, bipolar disorder and schizophrenia, which affect around 16% of New Zealanders and are difficult to diagnose and treat effectively. Continued research is required to better understand these disorders and develop new medicines. Individuals with small alterations in their DNA, called polymorphisms, can produce different versions of the same protein which might work differently. A few specific versions of Cannabinoid Receptor 2 (CB2), one of the proteins that mediates the effects of cannabis, are more common in patients suffering from mental illness than in the general population. These may play a role in disease cause or progression.

Natasha plans to look at what is different about the function of these versions of CB2 at a cellular level. This research will include studying cells donated by patients with schizophrenia. The information generated is expected to provide insight into the causes of mental illness and may assist with designing new therapies.

Natasha has also been awarded an Edith C Coan Research Fellowship and a Kelliher Trust Emerging Researcher Award, which provides funding for the purchase of equipment to aid her research efforts. The two awards have a combined value of $225,000, to further her research in this exciting arena. Both awards are administered through the Auckland Medical Research Foundation.

Research Funding News

More grants are featured, and Dr Melanie Cheung talks about the exiting research that, besides inspiring her every day, has led to a Fulbright Fellowship and a position with the Brain Plasticity Institute in San Fransisco.

Pre-term ischaemic injury

CBR student Tania Fowke has a particular interest in the developmental and cognitive impairments which occur following preterm brain injury and potential treatments for these deficits, and has been awarded a Neurological Foundation W & B Miller Postgraduate Scholarship to investigate the role of hylauronan and perineuronal nets in preterm brain injury. Despite increased survival of preterm babies with improved hospital care, they exhibit high rates of learning/memory problems in later life. Evidence suggests these deficits are partly caused by impaired growth of neuronal cell branches resulting from low blood flow to the brain (ischaemia). However, the precise manner in which ischaemia affects neuronal development is not known. There is evidence that neurons produce specialised structures called perineuronal nets (PNNs), which are important for neuronal development. Tania's research will determine whether preterm ischaemia causes disruption to these structures, and the mechanisms by which this may alter neuronal growth and function. This will assist future understanding of the causes of cognitive deficits affecting preterm infants.

TCDS and stroke recovery

Stroke is a significant cause of adult disability. The ability to live independently after stroke depends on the recovery of motor function, so research to investigate methods to augment recovery are crucial. CBR member Associate Professor Cathy Stinear has been awarded $150,000 by the Health Research Council of New Zealand for a feasibility study to examine whether transcranial direct current stimulation (tDCS) can increase the rate and extent of motor recovery after stroke. tDCS is a safe, painless and non-invasive way to increase the activity of the stroke side of the brain. Previous studies have shown that applying tDCS during physiotherapy can enhance the benefits of therapy. However, little is known about its effects with patients at the sub-acute stage. This feasibility study will evaluate patient and therapist acceptance of tDCS, and estimate effect size and recruitment rate. If feasible, tDCS will be integrated with rehabilitation after stroke in a future multi-centre, double-blind, randomised controlled trial. This research has the potential to improve the recovery of motor function and independence for the approximately 6,000 New Zealanders who experience stroke each year.

New HD receptor identified

Huntington's disease (HD) is a devastating genetic neurological disorder which results in the death of specific cells in a part of the brain called the caudate nucleus. Very close by lie the lateral ventricles, whose subventricular lining produces new brain cells. Thus there is potential for these new cells to be directed to replace the damaged cells in the caudate nucleus of those living with HD. Professor Louise Nicholson has recently identified a new receptor in human HD brains, which may be involved in this process and the aim of this project is to see if these findings are able to be replicated in an animal model of HD. This animal model could then be used for functional studies leading to identification of intervention strategies for using the brain's own mechanisms to halt the progression of this devastating disease.

White matter cell regeneration after injury

The white matter regions of the brain are important for transferring signals between different brain structures. For rapid movement of these brain signals, cells in the white matter called oligodendrocytes produce an insulating material called myelin. In babies born prematurely, oligodendrocytes show a particular vulnerability to injury resulting from low brain blood flow, leading to loss of myelin and cerebral palsy, a devastating lifelong movement disorder for which there is no cure. Therefore, there is a need for new therapies. CBR member Dr Justin Dean says "In humans, although oligodendrocytes are easily killed, we now know that they rapidly grow back. Strikingly, for unknown reasons these new oligodendrocytes fail to properly mature, and do not produce myelin, in areas of injury." New evidence has come to light that a molecule called hyaluronan is highly up-regulated in preterm white matter injury, and that this excess of hyaluronan may be the cause of failure of oligodendrocytes to produce myelin. Justin has been awarded a grant of $115,000 from the Auckland Medical Research Foundation to examine how hyaluronan triggers myelin deficits in the preterm brain. This new information will further understanding of the causes of cerebral palsy in preterm infants, and determine whether blocking hyaluronan is a potential treatment strategy in this large group of children.

Dr Melanie Cheung's journey toward a Fulbright Fellowship started several years ago, after a friend lent her a book. It was a New York Times bestseller, called "The brain that changes itself", and it featured a chapter on Professor Mike Merzenich's brain training work with dyslexic and autistic children. Melanie was was captivated by the idea of brain training and wondered if this brain plasticity research could have therapeutic applications in her own area of research - Huntington's disease.

Fast forward to 2013, and Melanie approached Professor Merzenich with her idea. He was very enthusiastic about working together to develop a brain plasticity based training programme for people with Huntington's. In October last year Melanie spent a month at Professor Merzenich's Brain Plasticity Institute, getting to know the research and the team. She recalls, "It was a whole new area of neuroscience for me and a very steep learning curve. I learnt a lot about brain plasticity and my colleagues at Brain Plasticity Institute, Posit Science learnt a lot about HD."

Melanie started her Fulbright fellowship at the institute in San Fransisco in May 2014 and has been working intensively on programme development since then. She says, "We know for certain that there is no-one else in the world doing research that is even remotely similar to this in the field of Huntington's disease therapeutics. As a result, we have some extraordinary people working with us because they are curious about our outcomes."

The team are currently recruiting for their study and will begin collecting data early next year. Preliminary results are expected in September 2015, and data from the final set of measurements at the end of 2016. However, Melanie says that since previous studies have shown that brain plasticity-based training effects can last for over 10 years, she hopes to continue to track the progress of participants and develop newer, better versions of the training programmes.

The brain plasticty training programme will be delivered via a web-based platform, which Melanie believes is an area with great potential for future research. She points out that using the internet also means the research team can monitor participants' progress in real time, for such measures as amount of time they are training, how they are doing in specific areas, how they are improving. In turn the team will be able to use this data to encourage and motivate participants to continue with their training.

Another asset to the programme is that Posit Science (which produces the brain training programmes) has a huge team of computer engineers and an excellent customer services team, meaning an online programme was hands-down the best option. When asked about whether navigating computer systems might be extra-challenging for some of her participants, Melanie says, "It is our responsibility to design programmes that are intuitive and easy to use. We are constantly being asked to give feedback to the Posit Science computer engineers about the new exercises we design together. We also try to think about how neurologically impaired people might respond to and be taxed by our exercises. I have really enjoyed this aspect of the research."

The flexibility and adaptability of the programme platform also gives Melanie the opportunity to ensure that her Huntington's Brain Training tool utilises a Kaupapa Māori approach which prioritises Māori values and processes, and requires involvement and ownership by Māori at all stages of the research process, rather than simply as participants in a prefabricated paradigm. Melanie believes hers is the only research group in New Zealand working on developing culturally-responsive scientific and clinical practices in this area.

Finally, Melanie, recommends brain training to anyone! "To understand what our participants have to do, I have been undertaking general brain plasticity-based training. I am really feeling the benefits! My attention, working memory and auditory perception have improved. I am relying on lists and reminders less and less, because I can remember things myself!"

Dr Melanie Cheung (left) enjoying a catch-up with colleagues from the Brain Plasticity Institute, San Fransisco, where she is undertaking a Fulbright Fellowship.

Early Alzheimer's and the olfactory system

Alzheimer's disease (AD) causes severe memory loss and progressive dementia that directly affects 48,000 people in New Zealand, and has a significant impact on the lives of a further 300,000 people, who are their friends and loved ones. What causes this devastating disease is currently unknown in most instances, with only approximately 10-15% of cases having an obvious genetic susceptibility. In brains affected by AD there is major cell death in the temporal and frontal lobes; however, 8-10 years before this is evident the olfactory system (the smell centre) has already suffered significant cell death. To overcome the problem of major cell loss in AD, CBR Director Professor Richard Faull and colleague Dr Maurice Curtis have posited that it will be important to intervene early before this cascade of loss has begun. To date the major studies of AD have focussed on end stage disease and not the initial brain changes, but they have secured funding of $115,000 from the Auckland Medical Research Foundation to begin a project that aims to study the human olfactory system (where the disease begins), in the hope of determining what cell types are affected the most and to compare these with cells in the textbook regions where damage occurs in AD. This will identify the earliest changes that occur in AD , with the hope that future treatments might be helpful before depletion of brain cells has occurred in the brain.

Predicting motor recovery after stroke

Stroke is a leading cause of disability and currently affects more than 45,000 New Zealanders. Recovering hand and arm function is essential for regaining independence in activities of daily living, and being able to return to work and family roles. The rate of recovery is greatest within the first three months after stroke, but little is known about the longer-term recovery trajectory. Associate Professor Cathy Stinear's project HARTS: Hand and Arm Recovery Trajectory after Stroke, funded by the Neurological Foundation of New Zealand, aims to be the first to characterise recovery of hand and arm movement in patients from the time of stroke until two years post-stroke. Cathy's project will determine if the level of impairment at three months post-stroke can predict whether recovery long-term will reflect a virtuous circle of improvement or a vicious circle of deterioration. This knowledge can then be used to decide whether an individual patient has further potential to benefit from therapy two years or more post-stroke.

Talking works

A club founded around public speaking, for people with aphasia? It may seem a little counterintuitive – but it works.

Speech-language therapist Celia Moore was inspired to start a 'Gavel Club' in Auckland last year, following a visit to Toronto's Aphasia Institute. She says, "Of all the amazing programmes I saw there, the Gavel Club really sang out to me. Public speaking is demanding for most people but is particularly challenging for people with aphasia. It was inspiring to see the members arise to this challenge to improve their communication skills. I was so inspired by this Gavel Club, the only one of its kind in the world, that when I moved to NZ in January 2012, I wanted to create one."

Celia approached Professor Suzanne Purdy, and Philippa Friary from the University of Auckland Speech Language Therapy Department with her idea. They immediately embraced it, and lent their support, expertise, and enthusiasm in the creation of an 8-week Pilot Program. Gavel Clubs are affiliated with Toastmasters International, and are for people who can't participate fully in Toastmasters for various reasons. Therefore it was important to link up with a local Toastmasters club. Celia contacted her local Toastmasters Club, who put her in touch with Claire Read. Claire also gave invaluable assistance in the development of materials for the pilot programme, and has since co-facilitated the meetings with Celia.

Celia and her colleagues recruited 10 members for the pilot program, which was simple as she was volunteering with the CBR Choir and with Aphasia NZ so had met a number of people with aphasia. A measure of the success of the venture is that two years later, all of the original members are still coming. Over the last year, 4 new members have joined, making it 14 members strong. Another measure of success is seen in the data collected around improvements in speech.

Following the conclusion of the pilot, the members voted to officially form a Gavel Club and named themselves 'More Than Words Gavel Club for People with Aphasia'. A few months later, the Centre for Brain Research became officially involved and the club was renamed the CBR More Than Words Gavel Club for People with Aphasia. Members join to improve their self-confidence and to refine their public speaking abilities. This is done in a safe and mutually encouraging environment.

During the meetings, members are greatly supported by Master of Speech Language Therapy Practice students. They provide supportive communication techniques to those who require a bit of extra help speaking. Two dedicated speech language therapy Masters Students recently completed a 10 week-practicum with the Gavel Club, and this year, the club has also acquired 5 volunteers to provide one-on-one communication support, and to help with set up and clean up and data collection. Two of these volunteers are speech language therapists. All of this amounts to a tremendous vote of confidence in this value of the club to both its members and the wider communities in which they live.

According to Celia, members have been enthusiastic about participating in research, as they would like to see other Gavel Clubs established for people with aphasia. Questionnaire results indicate a significant improvement in members' self-reported confidence in communicating over their time in the Gavel Club. Current research activities include language analysis of members' recorded speeches to investigate improvements in language complexity, and interviews with members to determine their perceptions of Gavel Club.

The AM Toastmasters have provided invaluable guidance and mentorship to the Gavel Club members in terms of how to run meetings properly and have provided advice on giving impromptu and prepared speeches, Celia says. Their members regularly attend the Gavel Club meetings to provide mentorship.

The AM Toastmasters have provided financial support by paying club fees and providing trophies for the end of year celebration. Trophies are given for Gavellier of the Year, Most Improved Member and Speech of the Year. The Gavel Club is grateful for the support they receive from the Tavistock Trust for Aphasia and, of course, the CBR.

Story by Sara Reid and Celia Moore.

The Gavel Club meets weekly during term time and new members are welcome.

Meetings are held on Fridays from 10.00 am to 12.00 pm, at the School of Population Health, contact Celia for details: celiamoo@gmail.com

Members' Impressions:

"Delivering a speech gives you a tremendous sense of achievement"

"It is perfect for improving your speech and boosting your self-confidence"

"Even if you have severe aphasia, Gavel Club can help"

"I have gone from 'I'll see' to 'I can!'"

Pioneering technology

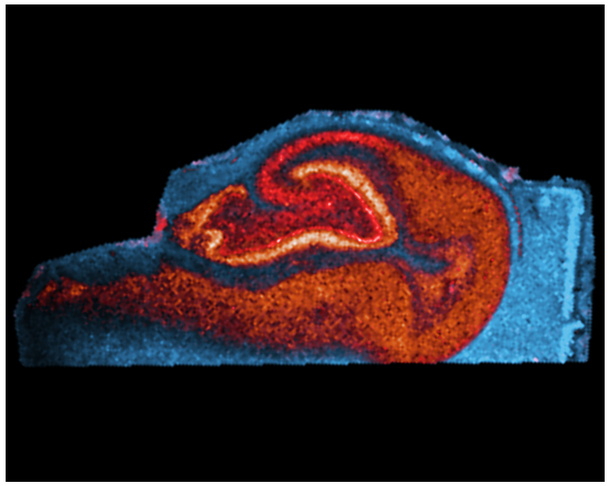
A brief profile of the work of three CBR researchers and the fascinating techniques they are utilising.

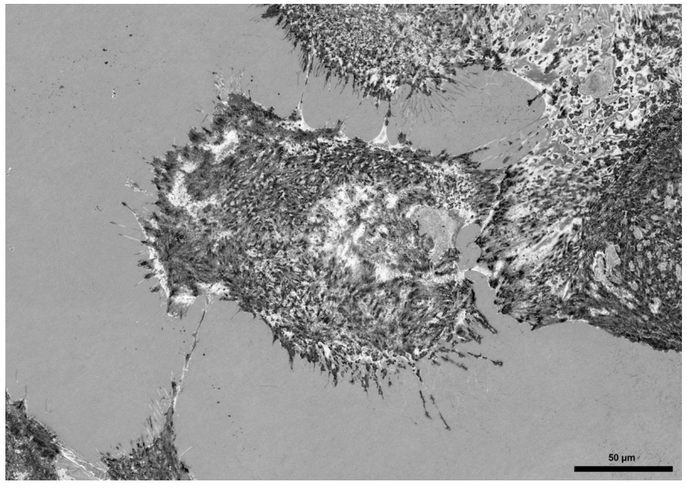
Lipids in the adult human hippocampus

The amazing image at right shows the hippocampus of an adult human brain, an important region involved in memory formation and recall. The hippocampus is so named because its shape remineded early anatomists of a seahorse. (Hippocampus is the Latin name for the species). The seahorse here is quite easily visible as a pale area, lying on its back, with its beak protruding and tail curling around upward at the other end.

The image was acquired by CBR member Lakshini Mendis, and Dr Gus Grey, from the Department of Anatomy, using a technique known as Matrix-Assisted Laser Desorption/Ionisation (MALDI) imaging, which allows researchers to visualise the individual distributions of any biomolecule in the acquired mass spectrum. The technique is relatively new at the University of Auckland, and Lakshini's is the first research to utilise it for studying human tissue.

The image shows an overlay of the distribution of three different types of lipids (fats) in the hippocampus. This technique is useful for comprehensively identifying molecular changes that occur in disease, in a region of interest, using only a small tissue sample.





A neural cell making multiple new connections

It may not look like a big deal, but it is! The image at left shows a human astrocyte, a type of brain cell, growing on a petri dish at 60x magnification.

The visualisation technique used, Interference Reflection Contrast Microscopy, is frequently used for studying cell adhesion, and here it darkly shades the cells' regions that are strongly attached to the Petri dish.

Small projections only a few micrometres wide extend from the central astrocyte, connecting the cell to its neighbours. In the brain, these connections form a network that allows astrocytes to communicate with each other and with neurons and other cells.

The image was captured by Brad Raos, a CBR PhD student and member of the Auckland Bioengineering Institute, and colleagues Dr Scott Graham and Dr Charles Unsworth.

Optogenetic research comes to the Centre for Brain Research

Optogenetics is an exciting new and powerful technique that is opening up the field of neuroscience, allowing new avenues of research to be explored. The technique utilises light-sensitive proteins called opsins that, when activated by light, lead to cell depolarisation and an increase in individual brain cell activity. Expression of opsins can be targeted to specific cell types in the brain using advances in the 'genetic toolbox'. Together, optogenetics combines light and genetics to enable the precise dissection of neural pathways. Previously this sort of investigation was hampered by the non-specific action of electrical stimulation methods, or lack of temporal precision of pharmacological approaches.

Dr Peter Freestone and Professor Janusz Lipski have established optogenetic techniques in the Centre for Brain Research, and after a period of further optimisation, they will apply the techniques to gain a better understanding of basal ganglia circuitry. The basal ganglia is a complicated network of brain cells that underlies many functions including learning, reward and control of voluntary movements, and in diseases like Parkinson's and Huntington's, becomes imbalanced leading to motor symptoms. Optogenetics provides the perfect toolset to address the complex interconnectivity of the basal ganglia.

Shortly, they will begin applying optogenetics to freely moving animals in order to monitor behavioural changes in response to stimulating important brain structures involved in locomotion. Looking beyond the research lab, optogenetics could one day be applied in the clinic, and used as a treatment for diseases like Parkinson's, epilepsy and many psychiatric disorders.

PhD Day 2014

PhD students from across the Centre organised their own symposium to encourage interaction and look at the challenges and opportunities particular to the PhD process.

The day is completely student-led, and one of this year's committee members, Katharina Limbach, who is studying for a PhD with Associate Professor Paul Corballis in the School of Psychology, provided a report on the day's activities.

"Overall, PhD day was a great success this year and the participants gave us very encouraging feedback. The 'vibe' during the day was really positive and students seemed to enjoy themselves, talking to each other and engaging in discussions about both research and careers in and outside of academia. Informally we have heard students talking about collaborations within the CBR which they had not considered before, which I think is one of the best outcomes! Students were all really enthusiastic, and I felt like they were having lots of interactions especially outside their usual 'lab groups'."

"We included a non-academic careers panel as we strived to make the day distinct from last year's and to take into account previous feedback. Students last year asked for a panel on alternative careers options. It was well received and I think we will ask attendees for feedback regarding doing it again in the future."

"We also held a "CBR Superstar" showcase because we both wanted to give students a chance to present their success, but also reveal some of the things that go on 'behind the curtain', and give the opportunity for them to be discussed. Things such as the struggles and tangents encountered on the way to the publication or handing-in of the PhD thesis. This also had to do with feedback from last year, where students asked us to also cover the not-so-bright sides of doing your PhD. The showcase was our attempt to be both motivating (there is an end), but also reassuring, acknowledging that we all struggle at times and probably even with similar issues."

"We asked Alice Lagas, Bradley Pattern, Joan Leung, Nasim Mehrabi and Samantha Murray to present for this section. They all gave us some insight about their projects and talked about their challenges along the way. I found it a really interesting session, as you can get the impression it is all straight-forward and it is only you struggling when you look at the polished end result, but this isn't true."

"We organised a debate to finish up the day on a lighthearted note. The moot for the debate was 'Nonhuman animals are the best tool we have for understanding the brain'. The debate was very informal and fun to listen to. We had Associate Professor Ian Kirk and Professor Mike Corballis to argue against the moot and Professor Alistair Gunn and Dr Fabiana Kubke to argue for it. There was a lot of hilarity - I heard that the build-up to the debate included clips from the movie 'Fight Club' being sent back and forth in emails. The speakers started by giving opening statements and then there was time for rebuttal. The debate was very refreshing because of the high quality of the speakers. Professor Mike Corballis especially is such an eloquent speaker - his opening statement included a definition of tool and he then went on (tongue in cheek) to ask how you would use an nonhuman animal as a tool - could you use a crocodile to open a skull for brain study? Or maybe freeze a parrot to pick it open? Other panelists also prepared interesting openings, but importantly, they raised some interesting points about neuroscientific research in general."

Katharina Limbach

Screening for strength

Two CBR researchers are now the proud caretakers of New Zealand's first and only TEER (Trans-endothelial electric resistance) screening machine. The machine was purchased with a grant from the New Zealand Lottery Health Board, and will vastly increase capacity to generate much needed brain endothelial cell-lines possessing the structural, immunological and functional properties which are observed in live models.

Drs Scott Graham (left), and Simon O'Carroll stand in front of the new ECIS z-Θ screening machine.

Endothelial cells form the inner lining of blood and lymphatic vessels. The brain is one of the most highly vascularised organs in the human body (it contains many blood vessels). There is currently a great deal of interest in blood-brain barrier (BBB) research. The blood-brain barrier is a semipermeable membrane that separates circulating blood from the extracellular fluid in the central nervous system. One major area of interest relates to drug delivery across this barrier, and another is associated with reducing damage to blood vessels during inflammation, neuroinflammation or neurodegeneration. The blood-brain barrier achieves its strength from a family of proteins expressed by the endothelial (lining) cells. This family of molecules is expressed at much higher levels in the central nervous system than elsewhere in the body. In this research project the team aim to generate multiple new human brain endothelial cell lines with high blood-brain barrier strength for advancing BBB integrity research. They will approach this by isolating brain endothelial cultures from human brain tissue, where endothelial cells will be purified and then screened for those possessing high-barrier strength. The new machine detailed above will help with this process, and operates by using ECIS (Electric Cell substrate Impedance Sensing) It is particularly suited to looking at barrier membrane permeability, as ECIS measurements of impedance at frequencies below 5kHz are very sensitive to changes in the barrier function of these cell types.

The researchers aim, with the development of these cell lines, to generate a valuable future resource of strategic importance in advancing biomedical and clinical research associated with neuroinflammation research involving the blood-brain barrier.

CBR in the news

This year, our scientists have made themselves heard - in print, on the airwaves, and even on TV!

A new way of learning


Associate Professor Karen Waldie, Head of the CBR's Fucntional Neuroimaging Research Group, has found herself in the headlines a few times this year - and it's all about learning, or perhaps learning how to learn.

Inevitably, some people find themselves left behind in the education system, and in the past they may simply have been labelled as 'slow', and become disillusioned with school and learning in general. Some, however, have been unwilling to accept this label, either for themselves or others, and have theorised that a different approach to learning might be the key.

Several such alternative education programmes exist, and one, called the Arrowsmith programme, is already being trialled at a school in South Auckland. Philanthropist Anne Gaze, whose Campus Link programme is dedicated to offering additional assistance to students studying toward NCEA, was instrumental in bringing the Arrowsmith programme to New Zealand, and while she is happy with the results it offers, it is very expensive, which placed limits on broadening its scope.

The next logical step seemed to be to explore other options which might prove useful, at lower cost, or even to customise a programme for use in the New Zealand context. To this end, the Campus Link Foundation has funded two post-doctoral fellowships to undertake a thorough evaluation of a selection of alternative learning programmes, and to develop a system which can be used in New Zealand schools. The goal of the research, says Karen, is to come up with something that offers advantages to all students, not just those with learning challenges.

The evaluation study which Karen is leading was covered in October's North and South magazine, and also featured on TVNZ's 'Sunday' programme, which followed the struggles and successes of a severely dyslexic student.

Stem cells - hope and hype


Image courtesy of NEXT magazine

Associate Professor Bronwen Connor featured in a recent issue of the New Zealand Listener, which covered one man's decision to pay for stem cell treatment for his injured knee, after feeling he had exhausted other options.

The article went on to discuss the proliferation of clinics dedicated to stem cell medicine, despite fairly minimal evidence of efficacy in many areas of application.

Dr Connor, whose team discovered a new way of 'reprogramming' cells two years ago, turning skin cells into brain stem cells in a process known as direct reprogramming, is obviously a believer in the potential of stem cells, but she is uncomfortable with the treatments that clinics are beginning to offer, as their treatments are unproven. She says human clinical trials are still some way off, although in the meantime the ability to grow and transform stem cells shows considerable promise as an arena for testing drugs under development on human cells, which may give a more reliable indicator of eventual performance than traditional animal testing.

Rehabilitation revisited


Stroke scientist Associate Professor Cathy Stinear, of the School of Medicine and Centre for Brain Research, featured prominently on TV One's 'Sunday' programme which aired on the 20th July.

The programme followed a stroke survivor who worked daily with Mike Ansari, a personal trainer with no formal rehabilitation education, sixteen years after a stroke left her with significant impairment on the left side of her body.

The progress the patient experienced under Mr Ansari's self-devised treatment was surprising not just for the rapidity with which change was seen, but because there has been a general consensus that there is a critical 'window' for rehabilitation after a stroke, after which additional recovery becomes increasingly unlikely.

Dr Stinear spoke with presenter Peter Williams about the brain's plasticity, and the boost which imagination, motivation, and confidence building can give to physical rehabilitation efforts.

New Dean of Science

The Centre for Brain Research, as a cross-faculty institution, has from its inception had an important relationship with the Faculty of Science. We welcome their new Dean, Professor John Hosking, who took up his position in June of this year, and congratulate former Dean Professor Grant Guildford, who is now Vice-Chancellor of Victoria University.

Brain Bee returns to CBR

The Centre for Brain Research once again hosts a fun-filled day of rapid-fire neuroscience quizzing.

Massey High School student Nicholas Kondal was the winner of the 2014 New Zealand – Australia North Island Brain Bee Challenge this week, and his efforts helped Massey High School to finish among the leaders in the Brain Bee Challenge Teams competition.

Nicholas was a clear winner of the neuroscience-based competition while it required four tie-breakers to determine second and third places.

The Brain Bee attracted 170 secondary school students from throughout the North Island and was held at the University of Auckland's Faculty of Medical and Health Sciences in Grafton, and was hosted by the Centre for Brain Research.

Following on from his win in the North Island leg of the Brain Bee Challenge, Nicholas will compete at the Australia - New Zealand Brain Bee Challenge where he will meet the winner from each Australian state as well as the South Island Brain Bee Challenge winner in the Australasian final, which will be held as part of a large international neuroscience conference at Perth in April 2015.

Mt Roskill Grammar School took first place in the very competitive teams' section of the North Island Brain Bee Challenge, heading off Westlake Girls High School in second spot with Nicholas Kondal and his team from Massey High School emerging in third place.

The Challenge tested the students on many aspects of the human brain from intelligence, memory, emotions, stress, ageing and sleep, to diseases such as Parkinson's, Alzheimer's, stroke and addiction.

As well as taking part in the quiz component of the Brain Bee challenge, the students and their teachers were given the opportunity to tour the facilities at the Centre for Brain Research and to conduct a range of hands-on experiments. They also had the chance to meet researchers and graduate students and to find out more about the role and importance of medical research and brain research in particular.

The organiser of the Brain Bee Challenge, Dr Maurice Curtis, says, "The annual Brain Bee Challenge is a great opportunity for us to show students and their teachers that there are exciting careers in science and medicine."

"We can encourage these bright, academically inclined students to think about the opportunities here," he says. "Neuroscience is an important aspect of science, so it is vital that we have an understanding of the impact that brain diseases have on the health of New Zealanders."

Above: Individual winner Nicholas Kondal checks out his trophy. R: Quizmaster Dr Jessie Jacobsen addresses finalists at the front of the auditorium. Below: The winning team from Mt Roskill Grammar.

Prizes and promotions

Staff and students from the CBR receive recognition for their achievements.

Centre for Brain Research students shine

Every year, the Faculty of Medical and Health Sciences at the University of Auckland holds an expo of student research, at which students have the opportunity to either make an oral presentation to an audience, or to present a poster, about which they speak for a few minutes. Both of these approaches are useful preparation for attending academic conferences. This year, CBR students swept the prize pool in the poster category, taking out all the placings! Shown above with their certificates are (from extreme left), Helen Murray (runner-up), Angela Wu (winner), and Yukti Vyas (third), with the other category winners.

Angela, who is supervised by Associate Professor Debbie Young, presented her work regarding a particular category of antibodies which interact with glutamate receptors. These receptors play a vital role in synaptic plasticity (the ability of synapses to adapt to environmental alterations), but under some conditions they may be overstimulated, with negative results. It is possible to prevent this overstimulation with an immunisation which produces glutamate antibodies. Angela's research sought to understand the cellular mechanisms by which these antibodies exercise their therapeutic effect.

Helen Murray, who studies in Dr Maurice Curtis' laboratory, presented a poster detailing her quest for the optimum post-mortem tissue processing method for human hippocampal cells in studies of plasticity in Alzheimer's disease. For this very specific use, Helen looked back in time to a technique that is a hundred and forty years old, known as Golgi staining, after the inventor of the procedure. The method involves infusing sections of tissue with silver nitrate, which then reacts with other chemicals in neural cells. This technique is unique as it only stains around 5% of neurons in the tissue it is applied to. As the brain contains millions of cells that overlap and intertwine, this property allows researchers to clearly define the structure of individual neurons, which may then be viewed under a microscope in phenomenal detail. Helen experimented with modifications to the traditional method of staining, and investigated their efficacy using fresh and chemically prepared tissue, both before and after freezing. Her results showed that the best results are obtained by using tissue which has not been previously frozen, but which has been subject to a short period of chemical treatment (fixing).

Yukti, whose supervisor is Associate Professor Johanna Montgomery, is researching synaptic alterations in Autism spectrum disorder-associated Shank2 mutations. Autism spectrum disorders (ASDs) are neurodevelopmental disorders characterised by deficits in social interaction and communication, and repetitive behaviours. ASDs are largely genetic disorders, and many of the mutations associated with them are involved in 'encoding' proteins in synapses with an excitatory function. The research presented by Yukti showed that Shank2 mutations in ASD caused significant disruption of pre and post-synaptic activity and synapse density. These deficits may have adverse implications for synaptic function and overall cellular equilibrium.

Promotions

Five CBR members have had their excellence recognised with a promotion to Associate Professor this year.

Associate Professor Johanna Montgomery (pictured above) is head of the Synaptic Function research group, which utilises electrophysiological, molecular biology and imaging techniques to investigate the function of specific synaptic proteins, and how changes in synapse function or strength could manifest into network changes and disease.

Associate Professor Kathy Mountjoy is is head of the Molecular Neuroendocrinology research group, which investigates the activity of a peptide produced primarily in the pituitary gland and the hypothalamus within the brain, and its effects on other parts of the body.

Associate Professor Srdjan Vlajkovic is head of the Auditory Neurobiology laboratory, which is concerned with a particular signalling pathway of the inner ear, and investigating the activity of enzymes which may reflect an adaptive response of cochlear tissues during noise exposure.

Associate Professor Cathy Stinear operates the Clinical Neuroscience Laboratory, which focuses on the study of brain plasticity and recovery in humans with neurological disorders, particularly stroke. The laboratory works closely with physicians, allied health therapists and nursing staff at Auckland City Hospital.

Associate Professor Ben Thompson runs the Visual Neuroscience group, which looks at visual perception and neural plasticity, with a view to developing new, clinically-applicable treatments for visual developmental disorders such as amblyopia.

Congratulations to these staff on this important step in their career pathways.

Introducing

In this feature we introduce new members of the Centre for Brain Research.

Karen Smith, Research Nurse

Tell us about your work at the Centre for Brain Research

As a Clinical Research Nurse I am responsible for the coordination of the Brain Research Clinic. This involves inviting patients to enrol onto our Brain Research Register; inviting eligible patients to attend our specialist clinics where they will undergo a full assessment, and offering them an opportunity to participate in stroke or dementia research.

What interests you about being part of the CBR?

I have a career-long passion for brain research, with my particular area of interest being dementia. I became aware of brain research developments in Auckland shortly after arriving in New Zealand in 2007 when I attended the National Brain Day event at Auckland University. I was totally blown away by this, especially after attending a seminar presented by Professor Richard Faull. He may not recall but I accosted him in the café afterwards and begged him for a job! I was told there were no jobs available at that time. Needless to say, I had no research experience at that time, either but longed to be part of this amazing team.

What has been your career journey to bring you to this point?

I began my working life as a Care Assistant in a retirement home for older people at the age of 19 years. Prior to that I had been a volunteer in another facility where I experienced working with people with dementia for the very first time, although I did not really know what dementia was back then. However, as someone with an interest in social science and social history, I was keen to learn more about the journey that these residents had embarked on and what made them who they were. I continued working as a Care Assistant for a number of years before eventually working as a manager of a sheltered housing complex (similar to a retirement village) and then as a manager of a residential care home for older people.

In 2001 I made the decision to embark on a career in Mental Health Nursing. Upon completing my studies I worked as a Registered Nurse in a long-stay ward for people with dementia and complex needs. I have also worked in a dementia day hospital.

Since arriving in New Zealand in 2007 I have worked in various in-patient services for older people with mental health problems, including dementia. After being "rejected" by Professor Faull I returned to the UK in 2009 where I was given an opportunity to work for the national Dementias and Neurodegenerative Research Network (DeNDRoN) as a Research Nurse. This has undoubtedly been the highlight of my career...until now!

Which living person would you most like to meet, and why? What would you say to them?

Right now it would have to be Malala Yousafzai. She has shown tremendous courage after her attack by the Taliban. She is an inspiration to everyone seeking what I deem should be a basic human right – the right of every child to be able to access formal education.

I would thank her for being the truly inspirational figure that she is – and for choosing to live and study in Birmingham, England! Goodness knows us Brummies need something to be proud of!

Dr Christina Ilse, Neuropsychologist

Tell us about your work at the Centre for Brain Research.

I'm a Neuropsychologist for the Dementia Research Clinic. My work involves providing in-depth assessments of memory and thinking abilities to assist with diagnosis of age-related memory problems for older adults concerned about their memory. At the clinic, we hope to collect information on a wide range of characteristics, and to follow our participants longitudinally.

What has been your career journey to bring you to this point?

I have worked in Older Adult Mental Health for the past 10 years, both as a Clinical Psychologist providing therapy for anxiety and depression, and as a Neuropsychologist, providing neuropsychological assessments for older adults with memory problems to assist with diagnosis. I've also worked as a Neuropsychologist for the past 8 years, for people with traumatic brain injury. This involves detailed assessments of cognitive functioning post-injury, and the provision of rehabilitation recommendations.

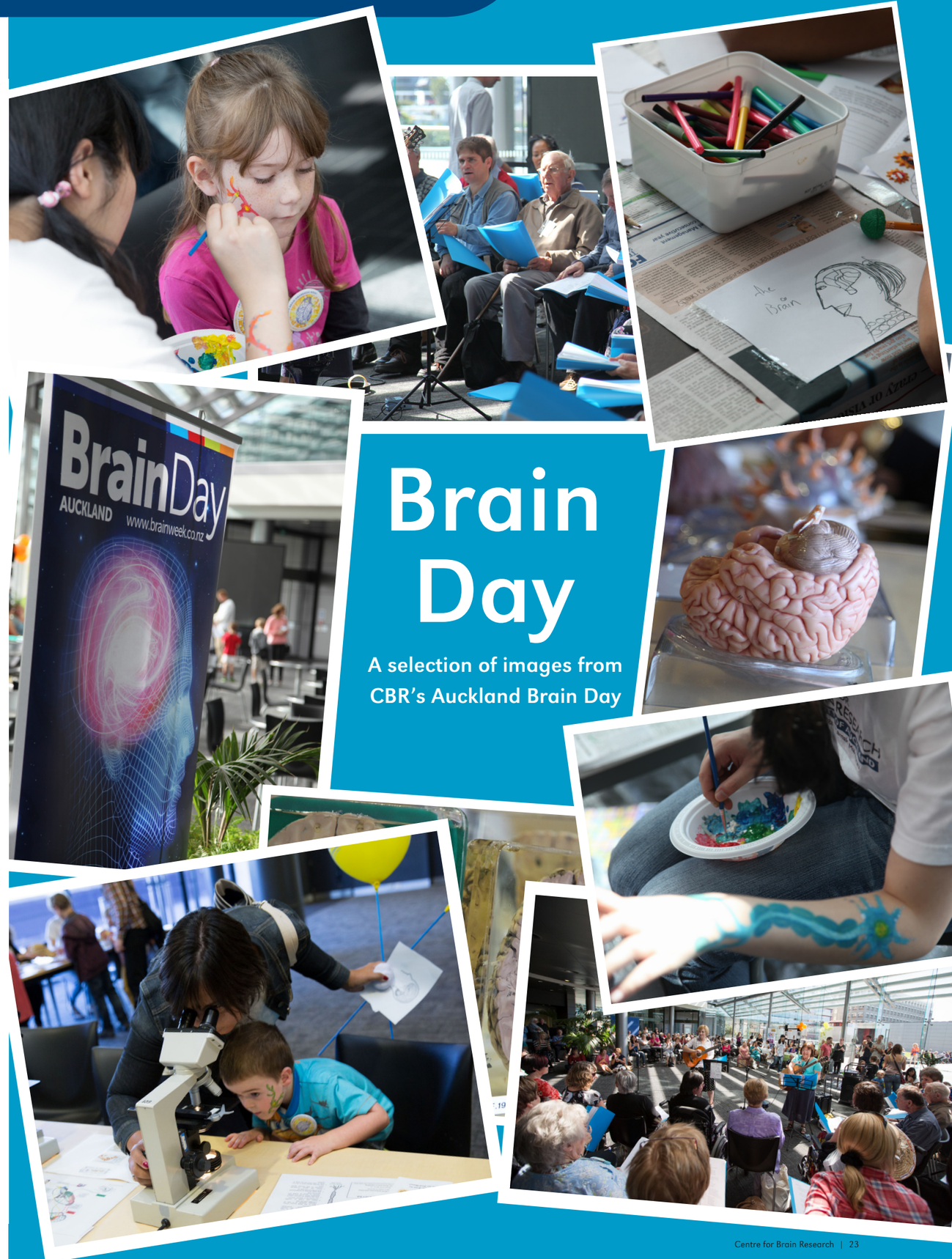
What interests you about being part of the CBR?

It's great to be part of a team researching the area (age-related memory decline) in which I have worked clinically for so long. To have the chance to work towards an intervention for this condition is just excellent.

Which living person would you most like to meet, and why? What would you say to them?

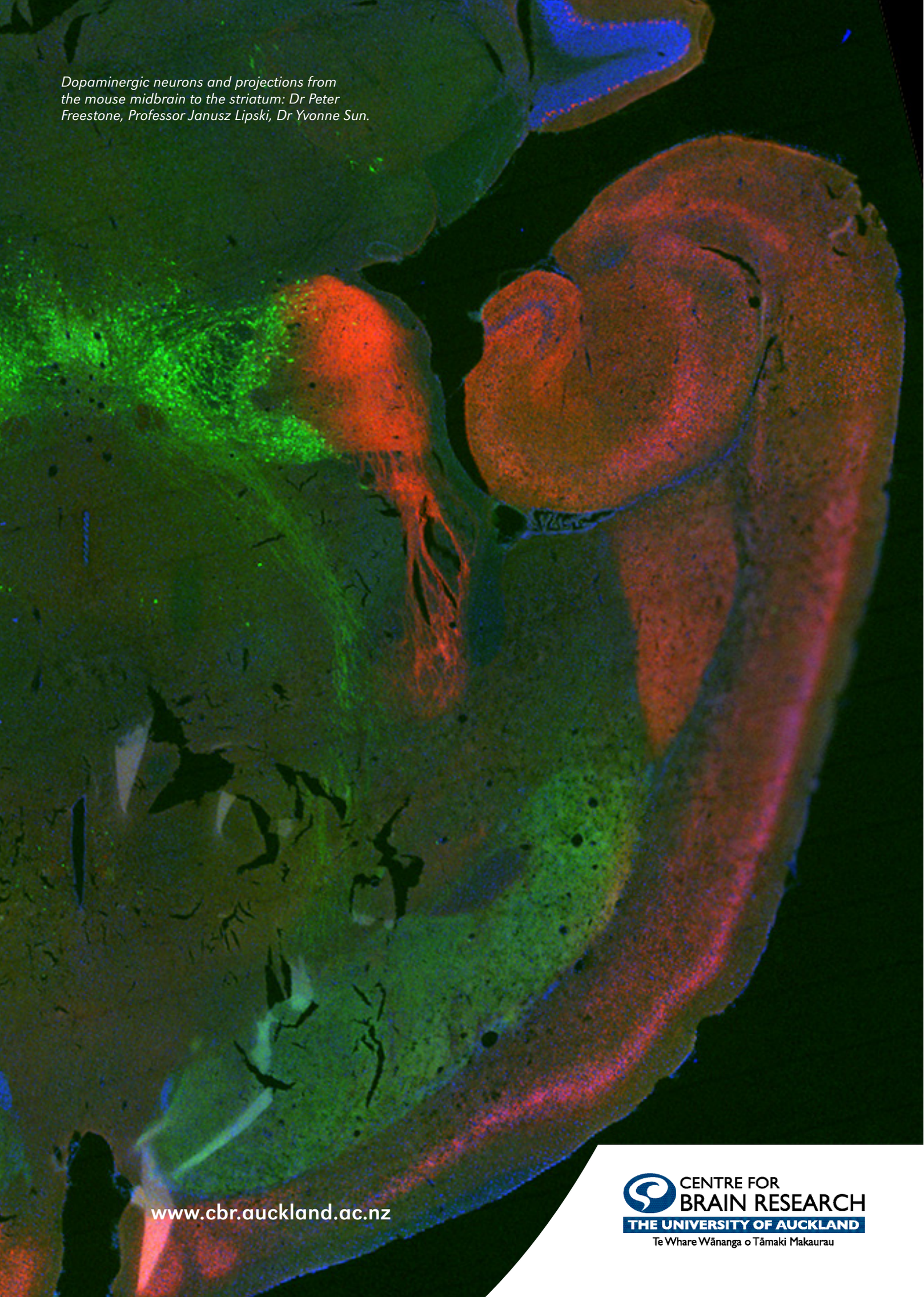
This is a really tricky question. In terms of a living person, I would love to meet JK Rowling because I find itamazing that she was able to create such a detailed, intricate wizard world, and to communicate her story in a way that the whole world loved. So clever. She's not directly relevant to neuropsychology however!

To that end, I would have oved to meet H.M., who was the first (and last) person to undergo a bilateral medial temporal lobectomy for the treatment of epilepsy, which left him with severe anterograde amnesia. This revolutionized our understanding of how memory is organized in the human brain. He died in 2008.



Brain Day

A selection of images from CBR's Auckland Brain Day



Dopaminergic neurons and projections from the mouse midbrain to the striatum: Dr Peter Freestone, Professor Janusz Lipski, Dr Yvonne Sun.

www.cbr.auckland.ac.nz

CENTRE FOR BRAIN RESEARCH
THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau