University of Otago
Te Whare Wānanga o Otāgo
New Zealand
Sapere Aude

# Brain Health Research Centre

# TRANSMISSIONS

March 2013
www.otago.ac.nz/bhrc

## Welcome to 2013

2013 is lining up as an exciting year for the Brain Health Reseach Centre. First, we warmly welcome the new Neurological Foundation Professor of Neurosurgery, Dirk de Ridder. It is exciting to think about the research possibilities that have been opened by having both Dirk and Reuben Johnson as joint academic-clinical appointments.

We also warmly welcome our new communications specialists Irene Mosley and Alexis Poppelbaum. You may recognise Irene from the Chair in Neurosurgery campaign, and we are excited to have her on board with us, along with Alexis, to raise awareness of the high quality neurological research at the Centre, and its importance for improvements in brain health and quality of life.

This year, our publicity focus will be on Alzheimer's disease. Alzheimer's is undoubtedly one of the major health issues facing society today and it happens to be one of the key research areas in the Centre. Please contact us if you would like to help us with this research, either through financial donation or encouraging a friend or relative who has Alzheimer's to become a participant in our research programme.

Cliff Abraham, Director

## Head start for young researchers at the BHRC

We are very pleased to announce the University of Otago has received a donation to establish an endowment fund that will provide an annual scholarship for a PhD student, or Postdoctoral Fellow, undertaking neurological research. The scholarship, commencing in 2014, will be known as the Helen Rosa Thacker Scholarship in Neurological Research, and will be awarded by the BHRC.

In February 2005, Helen suffered a brain aneurysm and underwent neurosurgery at Christchurch Hospital. At the time, it was discovered she had a second aneurysm on the other side of her brain. As it was too dangerous to operate on both sides of the brain at the same time, she underwent further surgery in October 2005. Helen was fortunate and made a remarkable recovery. She is very grateful to her surgical team, led by Dr Martin MacFarlane and Dr Vaughan Laurenson.

Helen maintains that positivity, keeping active, and leading a healthy lifestyle has been key to her recovery. She has always had a keen interest in research, realising that if it wasn't for medical research and the specialist surgical teams, titanium clips, plates and screws in her head, she may not be with us today.

Helen hopes the scholarship will give an opportunity for further research so other people may reap the benefits by enjoying a greater quality of life. She looks forward to meeting the students who will be awarded the scholarship and learning about the research they are undertaking.

The BHRC would like to extend its gratitude to Helen for her generosity. There will be a call for applications towards the end of the year.

*Helen Thacker with Professor Cliff Abraham*

science for a healthy brain

# BHRC 2013 focus disease: Alzheimer's

Funded by the Health Research Council, a large team of researchers at the BHRC are focusing on identifying biomarker genes or proteins in the blood that are diagnostic of Alzheimer's disease-related changes in the brain. At the same time, the team is also looking for new therapeutic strategies to attack the disease.

Alzheimer's disease is becoming more prominent due to our ageing population, yet only 60% of cases are diagnosed or documented. In 2011, the total financial cost of dementia in New Zealand was estimated at over $950 million.

It is predicted that by 2050, nearly 150,000 New Zealanders will have dementia, which is more than triple the current amount. The majority of people with dementia receive a diagnosis late in the course of their disease, resulting in a 'treatment gap' where they have missed the opportunity to delay irreversible symptoms.

For the blood test project, our researchers are seeking local Dunedin volunteers for the study who have been diagnosed with Alzheimer's disease. Participation in the study involves giving a small blood sample, and travel to the university can be provided if required. If you or someone you know is interested in participating in this study, please contact our administrator Jane at (03) 479 4066 for further information.

The second stage of the project will involve testing the new panel of biomarkers on a set of blood samples stored from a previous study of cognitively healthy elderly people. The aim of this is to determine whether the blood test can predict, from the stored samples, which of those healthy people went on to develop Alzheimer's disease.

The ability to identify Alzheimer's at its earliest stages will become especially important if effective drug therapies can be identified. It is hoped that the second part of the research programme, namely harnessing the power of protective molecules already found in the brain, will generate important leads toward finding such therapies.

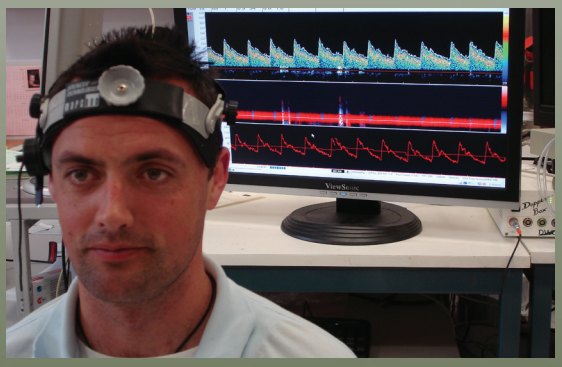
# Regular excercise key for young adult cognitive heatlh

Mounting evidence indicates that regular aerobic exercise can combat a multitude of age-related cognitive deficits. A new study by Dr Liana Machado and Hayley Guiney from the Department of Psychology, suggests that this is also the case for young adults.

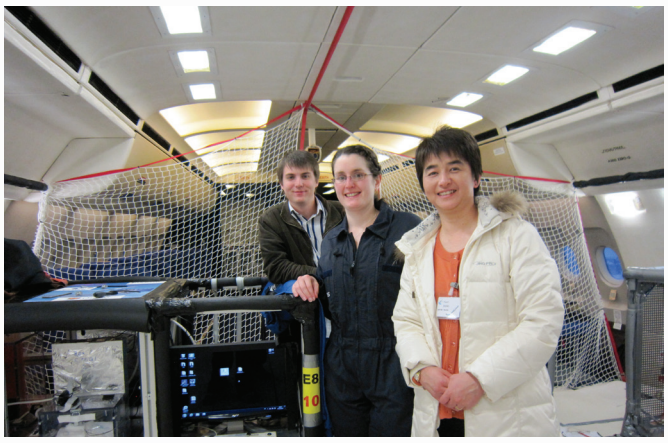
Liana had noticed over the years that university students were becoming less fit, and she wondered whether there was a link between exercise levels, blood flow to the brain, and cognition.

Along with collaborators Dr Sam Lucas and Associate Professor Jim Cotter, Liana and Hayley embarked on a study to measure a group of 18-30 year olds' aerobic fitness and self-reported exercise, cognitive ability, and how their blood flow to the brain responded to changing $CO^2$ levels.

A significant link was made between the frequency of exercise and the superior cognitive control over reflexive responses. Liana and Hayley were suprised at the sensitivity to engagement in physical activity in an already high-functioning population. The study suggests that frequency, as opposed to intensity of exercise, may be crucial to cognitive health. Liana is also interested in studying how diet influences cognitive health and cerebrovascular function.



# Neuroscience experiments under Zero G



*Left to right: Research Fellows Phillip Aitken and Lucy Stiles with Dr Yiwen Zheng.*

In December last year, researchers from the Department of Pharmacology and Toxicology were invited to participate in the European Space Agency's Parabolic Flight Campaign in Bordeaux, France.

The Vestibular and Auditory Research Group, led by Professor Paul Smith, Associate Professor Cynthia Darlington and Dr Yiwen Zheng, conducted experiments on a modified Airbus A300 along with 13 other research teams. The aim of their experiments was to test the effects of gravitational changes on the ability of the brain to produce new neurons, as part of their on-going vestibular research programme.

The microgravity (zero g) was achieved by flying the aircraft on a parabolic path, which creates about 20 seconds of 1.8 g during both climbing and descending and about 25 seconds of zero g at the apex of the parabola. This was repeated 31 times. The team is waiting for the samples to be shipped from France to collate its findings.

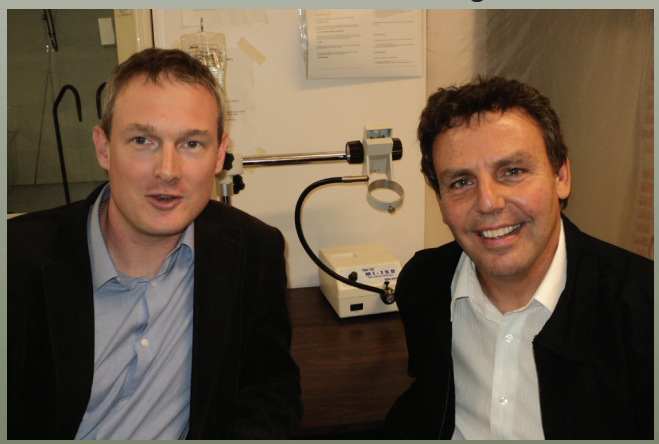
# Senior Lecturer in Neurosurgery: Reuben Johnson

The Brain Health Research Centre is pleased to welcome Otago University's new Senior Lecturer in Neurosurgery, Reuben Johnson to the team. Rueben is looking forward to collaborating with BHRC researchers and having the opportunity to work both in clinical neurosurgery for the DHB and at the research centre. Mr Johnson makes up part of the team of the new Chair in Neurosurgery project which was so widely and generously supported by the community during 2012.

Working alongside the newly established Neurological Foundation Chair in Neurosurgery, Professor Dirk De Ridder and Clinical Neurosurgeon Ahmad Taha, Mr Johnson will help provide a strong academic presence for neurosurgery in Dunedin as part of the South Island Neurosurgical Service. Before arriving in Dunedin, Mr Johnson completed a fellowship in minimally invasive spinal surgery and scoliosis surgery in Italy, and a further fellowship in endoscopic pituitary surgery. His neurosurgical interests include neuro-oncology, functional neurosurgery, and minimally invasive spinal surgery.

After initially studying medicine in Glasgow, Scotland, Johnson went to London to begin his surgical training, working with world-renowned British surgeon Professor Harold Ellis. Johnson then moved to Oxford to complete a doctorate in neurogenetics where he was involved in a project examining how genes control the development of the brain and how this can be altered in disease. At Oxford, he also met his Kiwi wife, Willow, a Rhodes Scholar. "I was fascinated by the brain and I loved studying anatomy," Johnson says. Throughout his career, Johnson has received a number of fellowships and scholarships and has worked as a neurosurgery registrar at John Radcliffe Hospital in Oxford, a lecturer in neuroanatomy at Oxford, and as a neurosurgery fellow at Royal Melbourne Hospital.

Associate Professor John Reynolds welcomes Rueben as a colleague and is excited by the prospects in future research that both Reuben and Dirk De Ridder bring to the South with them. "It will take time for our new team members to develop new research projects. We are just so fortunate to be welcoming researchers of this calibre to Dunedin. We look forward to working with them."



*Left to right: Mr Reuben Johnson and John Reynolds in one of our laboratories.*

# Brain Day 16th March 2013

As part of Brain Awareness Week, Brain Day Dunedin is brought to you by the Neurological Foundation of New Zealand and the Brain Health Research Centre.

The free public event will include three public lectures by brain researchers, medical brain models and other displays, and information from neurological groups such as The Stroke Foundation of New Zealand, and the Otago Multiple Sclerosis Society. Be sure to visit the BHRC stand at the event for your chance to have an EEG reading from your brain, and to view our brain displays and slides.

**When:** Saturday 16th March 2013, 10am – 3pm

**Where:** St David Lecture Theatre, University of Otago, Corner of St David and Castle Streets, Dunedin.

**Key Speakers and Seminars**

**10:00am** Professor Paul Smith
*Tinnitus: what's the buzz?*

**11:15am** Alzheimer's Otago
*Caring for the carer*

**12:00pm** Dr Gwyn Lewis
*The potential effects of brain stimulation for chronic pain*

**1:15pm** Otago MS Society
*Living with MS*

**2:00pm** Professor Warren Tate
*Proteins on the brain: Alzheimer's disease under the microscope*

# With thanks to our supporters

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# Supporting the BHRC in 2013

There are various ways that you can support our research:

## Speaking engagements

We value our contacts with the community. If you would like a scientist to visit or present to your community group, please contact Alexis on (03) 479 4150 or bhrc-comm@psy.otago.ac.nz

## Do you know someone over the age of 55 diagnosed with Alzheimer's?

A team of BHRC researchers are working on a research study that aims to discover whether biomarkers in blood samples can predict Alzheimer's disease. Participation in the study involves providing a blood sample and completing a short memory test. Transportation to and from the University of Otago can be provided if required. For more information, please contact Jane on (03) 479 4066 or bhrc-admin@psy.otago.ac.nz

## Donating to the BHRC

Our team of researchers is committed to undertaking internationally excellent research to develop new treatments for neurological disorders. With your support, we can significantly enhance our research and ability to discover new treatments for brain diseases. Donations to the BHRC are administered through The University of Otago Foundation Trust, a registered NZ charity. Donations made by NZ resident taxpayers can recieve a tax rebate of up to 33.3%

For online donations, please visit:
www.givealittle.co.nz/org/BHRcentre

Cheques, made payable to The University of Otago Foundation Trust - BHRC, can be sent to:

The Brain Health Research Centre
University of Otago, Deptartment of Psychology
PO Box 56
Dunedin 9054

For further ways you can make a donation, please contact Alexis on (03) 479 4150.