

RESEARCH EXPERTISE



2008

## Letter from the Pro-Vice-Chancellor



Internationally recognised research excellence is at the core of the activities of the Division of Health Sciences at the University of Otago. The importance of research is reflected in our Mission Statement, which says that the Division will promote health and health care through basic and applied research and academic and professional leadership.

Our Division is research intensive, with a strong culture of undertaking internationally recognised research. Breakthroughs in biomedical sciences, clinical and public policy research underpin advances in medicine and health-care provision. Examples of the tangible benefits for New Zealand from our research can be seen in the areas of healthy housing, mental health, inequalities research, oral health, delivery of pharmaceutical agents, monitoring of medication use, rehabilitation, screening programmes for stomach cancer; preventive and/or treatment measures for obesity, diabetes, cardiovascular disease, asthma and childhood eczema. Strong interactions with the biotechnology industry both locally and internationally mean Otago's Health Sciences researchers are contributing to the advancement of knowledge in medical science for New Zealand and the world.

As a result of these research activities, University of Otago Health Sciences students are taught by academics and clinicians who are at the forefront of new knowledge. Research students can expect to be trained by individuals who are themselves passionate researchers, and to have access to the latest knowledge, equipment and technologies.

The Division has three campuses with extensive research facilities and abilities. These campuses are in Christchurch, Dunedin and Wellington, and each campus has a large number of prestigious research groups. Examples are the Cancer Genetics Laboratory, the Centre for Neuroendocrinology, the Christchurch Cardioendocrine Research Group, the Virus Research Unit, the Sir John Walsh Institute for Oral Health, the Injury Prevention Unit, the Centre for Sustainable Cities and the Webster Centre for Infectious Diseases.

In 2008 the Division attracted over \$63M of external funding and produced over 1200 scientific publications. In 2009 we are continuing to build on our research success.

I hope you enjoy this brief overview of some of the areas of research activity in the Division of Health Sciences.

A handwritten signature in blue ink that reads "Don Robertson". The signature is fluid and cursive.

**Don Robertson**

PRO-VICE-CHANCELLOR HEALTH SCIENCES

2008

## Outstanding Health Sciences Researchers

### Professor Mark Richards

Director, Christchurch Cardioendocrine Research Group

World-leading cardiovascular researcher Professor Mark Richards is the 2008 recipient of the University of Otago's highest research honour, the Distinguished Research Medal.

Professor Richards leads the internationally renowned Christchurch Cardioendocrine Research Group (CCERG) and has done so since its inception in 1996.

One of his notable achievements is his research into the role of cardiac hormones in the development of heart failure. Professor Richards and the CCERG have developed sophisticated blood tests based on their discoveries about these hormones. These tests are being used internationally in diagnosing heart failure and in assessing how intensively patients need to be treated, and with what drugs.

He has also built on this research to show that a particular gene variant is a marker for greater risk of death after a heart attack.

During 2008 Professor Richards was successful in securing Health Research Council (HRC) funding for a new programme entitled "Neurohumoral and genetic prediction and protection in heart disease". His project "Urcortin2 in decompensated heart failure" also received HRC funding in 2008.

Professor Richards is also the recipient of the Royal Society of New Zealand's 2008 Sir Charles Hercus Medal for excellence in biomedical and health sciences.

### Dr Mik Black

Department of Biochemistry

Dr Mik Black was awarded a University of Otago 2008 Early Career Award for Distinction in Research.

Dr Black is a senior lecturer in the Department of Biochemistry. His research involves developing novel mathematical methods for the analysis of data from genomics experiments. He works closely with members of Otago's Cancer Genetics Laboratory, and is currently involved in external collaborations with the University of Auckland, and the Genome Institute of Singapore. Each of these collaborations is in the field of applied bioinformatics.

Along with his own research, Dr Black is also a key member of an Otago-led group which has been awarded \$42m to establish a nationally co-ordinated genomics infrastructure. He is also involved in e-research activities, specifically using KAREN for collaborative genomics research.



2008

## Outstanding Health Sciences Researchers

### Dr Alex McLellan

Department of Microbiology and Immunology

Dr Alex McLellan was awarded a University of Otago 2008 Early Career Award for Distinction in Research.

A senior lecturer in the Department of Microbiology and Immunology, Dr McLellan leads a research group studying the interaction of pathogens and cancer with the body's immune system.

His recent paper in the highly ranked *Journal of Immunology* defines new mechanisms for primary immune cell activation, and explains how limited antigenic challenge at the start of infections is amplified to boost immune responses.

Dr McLellan has recently received a grant from the Marsden Fund to further his research in this area. The aim of this project is to better understand the fundamental mechanisms of the immune response, ultimately aiding the development of new ways to intervene in diseases that involve the immune system, such as cancer, infections and transplant rejection.

Dr McLellan is the Director of the Otago Flow Cytometry Facility and has built working collaborations with several groups, including researchers in Switzerland, Austria and Germany.

His research has resulted in 37 peer-reviewed papers in high-impact journals and he has contributed to several book chapters.

### Dr Lisa Whitehead

Centre for Postgraduate Nursing  
University of Otago, Christchurch

Dr Lisa Whitehead was awarded University of Otago 2008 Early Career Award for Distinction in Research.

A senior lecturer within the Centre for Postgraduate Nursing, Dr Whitehead has a wide range of research interests including the assessment and management of fatigue in chronic illness; long-term condition management; and mixed methods and computer-mediated research.

In addition to developing and maintaining her own research profile, she has also established three research groups at the Centre: Health Status and Health Outcomes over the Life Course; Service Delivery and Health; and Management and Long-term conditions.

Dr Whitehead was nominated by the nursing departments of New Zealand universities to be Deputy Director of the TEC-funded 'Strategy to Advance Research', responsible for distributing \$2.7m worth of funding to build capacity in nursing and allied health research in New Zealand.



## Selected Research Profiles

### Professor Greg Cook Department of Microbiology

Professor Greg Cook is a bacterial physiologist who studies the role of membrane proteins in the adaptation of microorganisms to environmental extremes. His primary focus has been on the membrane-bound  $F_1F_0$  ATP synthase, a nano-sized rotary engine embedded within the membranes of mitochondria, chloroplasts, or bacteria. A major theme in this research is aimed at understanding how the ATP synthase has been adapted to function under diverse environmental conditions. Professor Cook's research on ATP synthase has formed an essential platform for future studies on this enzyme in *Mycobacterium tuberculosis* as a new drug target to combat tuberculosis, and as a potential target to control green house gas production by rumen methanogens.

Professor Cook is a co-principal investigator on an International Cooperative Research Project (ICORP) funded by Japanese Science and Technology that will study the regulation of ATP synthase in the bacterial cell. Dr Cook was recently named the 8th Sir William Dunn Scholar to conduct studies on the ATP synthase at the MRC Dunn Human Nutrition Unit, Cambridge in 2009 and is currently funded by the Marsden Fund, Health Research Council, Lottery Health and ICORP.



### Associate Professor Mary Cullinan Faculty of Dentistry

Associate Professor Mary Cullinan is a specialist periodontist actively involved in a number of longitudinal clinical studies looking at, on the one hand, the contribution of microbiological, genetic and environmental factors to risk for periodontal disease, and on the other, health promotion and the impact of oral disease on systemic health.

This has led to an interest in understanding the mechanisms involved and a range of current projects include using a metagenomic approach to carry out a large-scale species survey of the total oral microbiota, expected to be in excess of 500 microbial species, to catalogue and compare the diversity of microbial populations in health and disease from childhood to old age. Other projects are looking at human gene expression pathways in oral wound healing and the potential use of the peripheral blood and salivary transcriptomes as diagnostic biomarkers for identifying patient susceptibility to periodontitis.



### Professor Stephen Duffull School of Pharmacy

Professor Stephen Duffull holds the Chair in Clinical Pharmacy and is Associate Dean of Postgraduate Professional Programmes in the School of Pharmacy.

Professor Duffull instigated the Modelling & Simulation Laboratory which is actively involved in pharmacometrics, the quantitative design, analysis and inference from pharmacological studies, particularly those involving pharmacokinetics and pharmacodynamics (PKPD). He has also been involved in the development and release of four software products including optimising design of clinical studies and individualising doses of medicines for patients

His research currently involves collaborative studies into supportive treatments for malaria, developing systems models of coagulation to help individualise dosing of anticoagulants, dose selection in obese patients and the theory of optimal design. His research is supported by industry funding, NH&MRC grant and UORG.



## Selected Research at University of Otago Health Sciences

Non-Communicable Diseases		
Area	Detail	Leading Researchers
<b>Cancer Research</b>		
Cancer Genetics	Genetic changes with neoplasia, apoptosis, tumour suppression, p53 protein, Wilms' Tumour; genomic imprinting, stomach, colorectal, renal, prostate cancer; leukaemia, diagnostic markers for cancer; chromosome structure	Antony Braithwaite, Mike Eccles, Tony Reeve, Brett Delahunt, Ian Morison, Han Seung-Yoon, John Carter; Parry Guilford, Christine Morris, Bridget Robinson, Julia Horsfield, Bostjan Humar
Role of Antioxidants	Biological chemistry of free radicals, redox regulation of cell signalling, apoptosis, antioxidants and chemoprevention	Christine Winterbourn, Tony Kettle, Mark Hampton, Margreet Visser
<b>Cardiovascular Disease</b>		
Cardioendocrinology	Endocrinology, physiology, cardiology, biochemistry, neurohumoral factors, regulation of blood pressure, salt/water balance, heart failure	Gary Nicholls, Mark Richards, Tim Yandle, Vicky Cameron, Miriam Rademaker, Richard Troughton, Chris Charles, Chris Pemberton
Vascular Biology	Vascular connective tissue biology, genetics, atherosclerosis, varicose veins, venous ulcers, surgical audit	Russell Scott, Andre van Rij, Rob Walker; Greg Jones, Sally McCormick, Ivan Sammut, Ged Wilkins, Ming Zhang
Cardiac Health and Disease	Risk factors for cardiac disease, advanced methods of diagnosis, clinical pharmacology, therapy for ischemia, regulation of cerebral blood flow, hypoxia	Peter George, Carl Burgess, Stewart Mann, Phil Ainslie, John Elliott, Ivan Sammut
<b>Diabetes/Obesity and Renal Disease</b>		
Metabolism and Endocrinology	Obesity, insulin resistance, hormone disturbance in adolescence, metabolism of lipoproteins, energy homeostatic mechanisms	Dave Grattan, Mike Lean, Jim Mann, Russell Scott, Barry Taylor, Patrick Manning, Greg Anderson, Mary Thompson, Wayne Sutherland, Chris Florkowski
Nutrition; Bone Health	Effects of exercise, diet, intervention studies	Jim Mann, Mike Lean, Ailsa Goulding, Rachael Taylor
Neuropathy and Vascular Damage	Detection and treatment of blood vessel damage	Russell Scott, Zoltan Endre
Paediatrics	Type I diabetes, obesity	Barry Taylor, Brian Darlow
Clinical Care	New treatments, obesity management, diet-control, HRT, inhaled insulin, lifestyle interventions	Patrick Manning, Russell Scott, Richard Stubbs, Helen Lunt, Bev Lawton, Kirsten Coppell, Rachael Taylor
Renal Health and Disease	Risk factors for renal failure, effects of lithium, renal amyloidosis, renal dysphagia, ion channels	Rob Walker, Zoltan Endre, Kevin Pringle, Stephen Brennan, Mike Eccles, Grant Butt, Fiona McDonald
<b>Respiratory Disease</b>		
Asthma	Exhaled NO, beta agonists environmental triggers	Robin Taylor, Julian Crane, Rob Siebers, Carl Burgess
COPD	Airway inflammation, paediatric respiratory problems	Philip Pattermore, Mike Epton
<b>Autoimmune Disease</b>		
Autoimmune	Genetics of diabetes type I, arthritis, gout, inflammatory bowel disease	Tony Merriman, John Highton, Paul Hessian, Frank Frizelle, Will Taylor, Andrew Harrison, Richard Geary, Rebecca Roberts, Michael Schultz, Lisa Stamp
<b>Biological Systems &amp; Technologies</b>		
Area	Detail	Leading Researchers
Advanced Biological Technologies	Genomics, proteomics, gene expression and sequencing methodologies, structural biology, protein crystallography, bioinformatics, genetics, microarray technology, statistical computing	Greg Cook, Steve Duffull, Mike Eccles, Neil Gemmell, David Green, Kurt Krause, Ian Morison, Tony Reeve, Clive Ronson, Stephen Robertson, Warren Tate, Mike Legge, Iain Lamont, John Cutfield, Catherine Day, Peter Dearden, Sally McCormick, Russel Poulter, Mik Black, Liz Ledgerwood, Chris Brown
Reproductive and Developmental Biology	Pre-implantation development, fertility, IVF, male reproductive biology, congenital malformation in humans, insect development, mammalian genomics	Neil Gemmell, Dave Grattan, Helen Nicholson, David Green, Stephen Robertson, John Hutton, Mike Legge, John Evans, Peter Dearden
Pharmacology	Neuropharmacology and neurotoxicology, cardiovascular signalling, cardioprotection, drug resistance and drug metabolism, inflammation and wound healing, pharmacovigilance, pharmacogenetics, vestibular pharmacology, clinical impact of genetic variability, personalised medicine	Evan Begg, Carl Burgess, George Lees, Paul Smith, Murray Barclay, Cynthia Darlington, Martin Kennedy, Steve Kerr, David Reith, Rhonda Rosengren, Ivan Sammut, Yiwen Zheng, Greg Giles
Drug Formulation and Delivery	Biocompatible formulations, bioactivity, chemical and physical stability neural networks, controlled release	Ian Tucker, Thomas Rades, Steve Duffull, Sarah Hook, Ivan Sammut, Paul Fawcett
Plant Health and Disease	Rhizobia, plant flowering, photosynthesis	Clive Ronson, Julian Eaton-Rye, Richard MacKnight, John Sullivan
Biomaterials	Tissue engineering, forensic dentistry, micro-mechanical properties of materials	Jules Kieser, Mike Swain, Tony Poole
Bioethics	Ethics of research and new technologies, war crimes, reproductive technologies	Don Evans, Grant Gillett, Jing Bao-Nie, Lynley Anderson, George Dias
Biostatistics	Design and analysis of clinical trials, Bayesian methods	Steve Duffull, Richard Edwards, Peter Herbison, Shelia Williams, Chris Frampton, Elizabeth Wells, Neil Pickering, Gareth Jones

## Selected Research at University of Otago Health Sciences

Communicable Diseases		
Area	Detail	Leading Researchers
Vaccine Development	Anti Tb, H Pylori and ORF virus vaccines vs animal diseases, directing vaccines to mucosal surfaces, anti-cancer vaccines, viral particles for vaccine delivery	Frank Griffin, Ian Tucker, Thomas Rades, Andrew Mercer, Philip Bagshaw, Margaret Baird, Sarah Young, Sarah Hook, Marilyn Hibma, Alex McLellan, Vernon Ward
Microbiology and Microbial Molecular Genetics	Probiotics, antibiotic resistance, Candida, HIV, iron uptake, mycobacteria, biofilms, virology, gingivitis, biosensors, fermentation, biofuels	Richard Cannon, Steve Chambers, Greg Cook, Robert Love, Andy Mercer, David Murdoch, Greg Seymour, Chris Sissons, John Tagg, Gerald Tannock, Warren Tate, Mary Cullinan, Iain Lamont, Vernon Ward
Vaccines and Viruses in Cancer	Viruses as risk factors for breast cancer; immunity to HPV, anti-cancer vaccines	Justin Roake, Margaret Baird, Marilyn Hibma, Sarah Young
Epidemiology of Infectious Diseases	Meningococcal disease, HIV, climate change and disease, oral health, systemic disease from oral infection, Tb and PCV in Africa	Philippa Howden-Chapman, Philip Hill, Charlotte Paul, Greg Seymour, Murray Thomson, Michael Baker, Nigel Dickson, Nick Wilson
Public Health		
Area	Detail	Leading Researchers
Cancer Control	Cancer prevention, epidemiology and screening, sun protection, tobacco control, multidisciplinary patient care, regulation of angiogenesis, and metastasis, pharmacology, clinical trials, cytogenetics, and child cancer care	David Skegg, Charlotte Paul, Peter Crampton, Tony Blakely, Frank Frizelle, Brian Cox, Rob McGee, Shelia Williams, Christine Morris, Bridget Robinson, Tony Reeder, John Dockerty
Suicide; Youth Mental Health; Addiction; Drug/ Substance Abuse	Longitudinal studies, epidemiology, suicide prevention, cognitive psychology, risk factors for intentional injury, alcohol and drug abuse, smoking in Māori, adolescents, and during pregnancy, anti-smoking campaigns, tobacco industry behaviour, health promotion	Richie Poulton, Pete Ellis, David Fergusson, Annette Beautrais, Marie Crowe, Rob McGee, Douglas Sellman, John Horwood, Sunny Collings, Shyamala Nada-Raja
Social and Economic Determinants of Health	Housing and health research, social inequalities in health, interventions to reduce disparities, mental health, international health	Julian Crane, Philip Hill, Philippa Howden-Chapman, Tony Blakely, Sunny Collings, Louise Signal
Longitudinal Studies	Two cohorts of 1000 people have been studied from their births in the 1970s. All aspects of their health and well-being have been recorded	Richie Poulton, David Fergusson, Murray Thomson, Bob Hancox, John Horwood, Jo Baxter
Oral Public Health	Paediatric dental health, dental health of older people, epidemiology of oral disease	Murray Thomson, Bernadette Drummond
Paediatrics	Neonatology, complications of prematurity, immunisation strategies, sleep disorders, SIDS	Brian Darlow, Don Robertson, Barry Taylor, Thorsten Stanley, Dawn Elder, Barbara Galland
Injury Prevention and Rehabilitation; Recreational Injury; Occupational Health	Injury prevention policy and practice, transportation injuries, occupational musculoskeletal and respiratory diseases, stroke, epidemiological surveillance, psychological care and rehabilitation, aviation medicine, head injury	John Langley, David Baxter, John Campbell, Tim Anderson, David Chalmers, Colin Cryer, Clare Robertson, Richard Jones, Hilda Firth, Rob Griffiths, David McBride, Dorothy Begg, Sarah Dean, Leigh Hale, Steve Milosavljevic, Haxby Abbott
Health Services	Primary health care funding and organisation, rural health, clinical practice guidelines, health sector restructuring, waiting lists, health promotion, health economics, pharmacy practice	Peter Crampton, Tony Dowell, Pauline Norris, Jim Reid, Les Toop, Robin Gauld, Richard Edwards, Des O'Dea, Pauline Barnett, Derelie Mangin, Rob Weir, Philip Hider, Louise Signal, Rick Audas
Mental Health, Neuroscience, and Neurological Disorders		
Area	Detail	Leading Researchers
Depression, Mood Disorders and Psychiatric Illness	Psychiatric genetics, neurobiology, neuroendocrinology, bi-polar disorder, personality disorders, psychopharmacology, psychotherapy	Paul Glue, Peter Joyce, Roger Mulder, Pete Ellis, Suzanne Luty, Richard Porter, Sunny Collings, Janice McKenzie, Caroline Bell, Paul Edgar
Neuroendocrinology	Neural regulation of fertility, gonadal steroids, adaptations of the maternal brain, dopamine neurons, prolactin, leptin and reproduction, GnRH neurons, vasopressin neurons	Allan Herbison, Dave Grattan, Brian Hyland, Greg Anderson, Colin Brown, István Abrahám, Ruth Empson, Christine Jasoni
Neurodegenerative and Balance Disorders	Parkinson's disease, cellular action of dopamine, anti-parkinsonian drug therapies, motor control pathways, sensory-motor and cognitive function, Alzheimer's disease, recovery from vestibular damage, ADHD	Tim Anderson, Jeff Wickens, Warren Tate, Cliff Abraham, Ian McLennan, Paul Smith, Richard Jones, Brian Hyland, Cynthia Darlington, Richard Sainsbury
Memory and Learning	The molecular mechanisms of information storage, synaptic transmission, gene expression in memory formation and learning, dopamine and learning	Warren Tate, Cliff Abraham, Jeff Wickens, Joanne Williams, Ping Liu, John Reynolds
Primary Care and Service Delivery	Behavioural science, nursing, provision of care. See also <i>Mental Health</i> section under <i>Public Health</i>	Oliver Davidson, Tony Dowell, Pauline Barnett, Pete Ellis, Sunny Collings, Marie Crowe
Rangahau Hauora Māori Research		
Area	Detail	Leading Researchers
Māori Health	Mental health, social inequalities in health, sexual health, women's health, attitudes to new technologies, heart disease, inherited cancers	John Broughton, Jo Baxter, Paul Edgar, Bridget Robson, Paul Robertson, Suzanne Pitama, Bev Lawton, Don Evans, Julian Crane, Parry Guilford, Mike King
Diabetes	Anti-psychotic drugs and type II diabetes	Jim Mann, Paul Edgar, Kirsten Coppell
Miscellaneous		
Area	Detail	Leading Researchers
Anatomy	Clinical anatomy, human anthropology, liver disorders, orthopaedics	Lisa Matisoo-Smith, Mark Stringer, Jean-Claude Theis, Ming Zhang

## Selected Research Profiles

### Associate Professor Martin Kennedy

Director of the Carney Centre for Pharmacogenomics  
Department of Pathology, University of Otago, Christchurch

Associate Professor Martin Kennedy leads the Gene Structure and Function Laboratory and is the Director of the Carney Centre for Pharmacogenomics. The group is working on a range of projects that explore how genes influence the onset, progression and treatment of disease.

His team has a long-standing research interest in genetic influences on personality. In research for which Associate Professor Kennedy has recently received a grant from the Marsden fund, his research team will identify novel structural variants of three important genes involved in brain function, then determine the extent, frequency and functional effects of these variants.

This research will allow Associate Professor Kennedy to determine whether these novel variants are associated with heritable components of personality and mental disorders such as depression and addiction.



### Dr Liz Ledgerwood Department of Biochemistry

A senior research fellow in the Department of Biochemistry, Dr Liz Ledgerwood's research interests lie in cell signalling pathways and mechanisms.

She has been awarded a grant from the Marsden fund to further her research into a New Zealand family which has the first reported mutation in the protein, cytochrome c.

Cytochrome c has two important roles in the body, in the production of energy and in the control of cell death. Dr Ledgerwood and her team discovered that in this family the energy-producing function of cytochrome c is normal, but the mutant protein is better at triggering cell death than the normal protein. This work was published in *Nature Genetics* in 2008.

Dr Ledgerwood's research will use this unique mutation to discover where and when cytochrome c triggered cell death is important during development, in adult life and in disease states. She will also determine how the change in the mutant protein makes the protein better at causing cell death.

With these two approaches her research will contribute to international efforts to block or enhance apoptosis to treat diseases characterised by either too little (e.g. cancer) or too much (e.g. Alzheimer's disease) cell death.



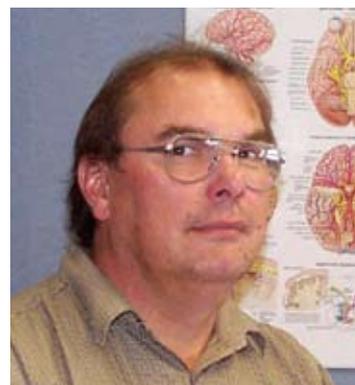
### Dr Stephan Milosavljevic School of Physiotherapy

Dr Milosavljevic has a special interest in occupational biomechanics, ergonomics and injury prevention in the rural workplace. His long-term research plan is to develop a rural research team with a focus on ergonomics, biomechanics, identification of injury risk, and prevention of injury.

With extensive contacts within the rural community of Otago he is a prime facilitator for recruitment, development and design of our rural research programmes.

Dr Milosavljevic has been collaborating with researchers at the spine occupational biomechanics laboratory at the University of Waterloo in Ontario, Canada on cumulative spinal loading. Other collaborations involve colleagues at the University of Umea in Sweden looking at All Terrain Vehicle risk factors, as well as the Injury Prevention Research Unit and the Department of Preventive and Social Medicine at the University of Otago to look at ergonomic interventions within the NZ rural sector.

Specifically, Dr Milosavljevic conducts research into clinical management of low back pain, occupational cumulative spinal loading, whole body vibration, injury coping strategies of rural workers, spinal kinematics, and alternative wool harvesting technologies.



## Selected Research Profiles

### Dr John Reynolds

Department of Anatomy and Structural Biology

After being awarded a University of Otago Tertiary Teaching Excellence Award, Dr John Reynolds went on to be awarded national honours in the 2008 Tertiary Teaching Excellence Awards.

Dr Reynolds' research interests include reward-related learning and memory mechanisms of the basal ganglia in the mammalian brain.

He has successfully published in the prestigious scientific journal *Nature*, with a paper that demonstrated the activation of dopamine cells by rewards not only promotes the learning of behaviour, but also strengthens the synaptic connections in the striatum involved in bringing about the behaviour.

In 2008, a team co-led by Dr Reynolds, gained \$1.1m over three years from the Foundation for Research Science and Technology for its research into diagnosis of disease and delivery of brain chemicals. The vision is to develop technology that delivers bioactive chemicals to the brain in a manner that lessens side effects. This approach aims to provide optimised treatment for particular disorders of the central nervous system, such as Parkinson's disease.



### Bridget Robson

Director, Te Rōpū Rangahau Hauora a Eru Pōmare

Bridget Robson (Ngāti Raukawa) is the director of Te Rōpū Rangahau Hauora a Eru Pōmare (the Eru Pōmare Māori Health Research Centre) in the University of Otago, Wellington. The Centre was established in 1992 to conduct research by and for Māori, and to train Māori in a variety of research methods.

Her research interests include the social and economic determinants of health, access to and quality of health care for Māori, and the impact of racism and colonialism on Māori health and disparities. Monitoring Māori health and inequalities is a particular focus of her work and she was a co-editor of *Hauora: Māori Standards of Health IV* (see [www.hauora.maori.nz](http://www.hauora.maori.nz)). She is also interested in how kaupapa Māori research meets epidemiology.

She is currently involved in projects on disparities in health care for ischaemic heart disease, pregnancy and childbirth, cervical cancer, colon cancer, uterine cancer, breast screening, and oral health. The Mauri Tangata project, in partnership with Ngāti Kahungunu Iwi Inc, is a unique cohort study looking at the long-term health effects of factory closures, funded by the HRC.



### Professor Robin Taylor

Director, Otago Respiratory Research Group  
Dunedin School of Medicine

World leaders in asthma research, the Otago Respiratory Research Group led by Professor Robin Taylor, has prompted the medical world to review its traditional asthma care.

Professor Taylor and his team has extended the understanding of airways disease in many different areas, including identifying that not all asthmatics suffer from the same type of inflammation and not all will respond to commonly used inhaled steroid treatment.

This research has been assisted by the loan of an 'electronic nose' from collaborators at the Cleveland Clinic, Ohio, which is able to record information about a patient's breath and what is happening in the lungs.

His latest research indicates that obesity can worsen the impact of asthma and may also increase its severity. Professor Taylor's research establishes a direct link between obesity and the development of a phenomenon known as "dynamic hyperinflation".

These findings point to fundamental differences in the way that obese individuals might experience shortness of breath if they have asthma.





### The Flow Cytometry (FACS) Facility

FACS instruments are used to analyse or separate out individual cell types from complex biological systems, such as human white blood cells from tissue, tumour cells or a single species of bacteria from complex communities.

The Flow Cytometry (FACS) Facility provides the University of Otago with fluorescent cell analysis and sorting, magnetic bead separation and fluorescent protein detection technology. The facility is situated in two locations on the campus. Two analysers and the fluorescent and magnetic bead based cell sorters, are housed within the *Department of Microbiology and Immunology*. The other analyser is housed within the *Wellcome Institute*. In addition the facility offers a Bioplex machine that allows researchers to simultaneously analyse multiple analytes, such as cytokines, within biological samples.

Since its purchase in 2004, the FACS-Aria cell sorter has allowed researchers to analyse the biology of systems at the single cell level, thus providing insights into complicated biological systems. The instrument is a high speed sorter and among the best available in the world. It has proven itself to be extremely reliable in providing high-purity sorts for a variety of applications.

The Flow Cytometry (FACS) Facility is led by Dr Alex McLellan, an Otago 2008 Early Career Research Award recipient.



### Research Support

Health Sciences has a Divisional Research Committee, consisting of the Associate Deans of Research from each School plus other representatives.

This committee is chaired by the Division's Associate Dean for Research, Professor Warren Tate. The Division also employs Dr Michele Coleman as its Research and Development Manager.

The University of Otago Research and Enterprise Office deals with research funding and assists researchers in gaining money from the application/ proposal stage right through to contracting and reporting stages. Five Research Advisors and two Enterprise Managers are employed specifically to help Health Sciences researchers develop new funding proposals.

For further information on any aspect of research in the Division please contact:

Email: [michele.coleman@otago.ac.nz](mailto:michele.coleman@otago.ac.nz)

### Career Opportunities in Health Sciences at Otago

The Division of Health Sciences at the University of Otago offers a vibrant, well-resourced research environment. You can work alongside New Zealand's top basic biomedical, clinical and public health researchers. We have a research-intensive School of Pharmacy, an internationally renowned research-led School of Dentistry and a new centre for Physiotherapy Research.

Below are links that will tell you about postgraduate opportunities, postdoctoral fellowships as well as academic positions.

Postgraduate Opportunities:

[www.otago.ac.nz/healthsciences/research/postgraduate](http://www.otago.ac.nz/healthsciences/research/postgraduate)

Postdoctoral Fellowships:

<http://healthsci.otago.ac.nz/research/postdoc.html>

Academic positions:

[www.otago.ac.nz/vacancies/index.html](http://www.otago.ac.nz/vacancies/index.html)

The Division of Health Sciences has campuses not only in Dunedin, but also in Christchurch and Wellington, and all three campuses have very well-established research reputations which offer employment and postgraduate opportunities.

Our campuses in Christchurch and Wellington host large medical schools that are undertaking a range of excellent research, from basic right through to translational and applied and each have world-leading research groups.

As well as the University, Dunedin offers an excellent quality of life and easy access to Otago's rich and diverse environment.

## RESEARCH ENQUIRIES

Dr Michele Coleman  
Research and Development Manager  
Division of Health Sciences  
Tel: +64 3 479 3076  
Email: [michele.coleman@otago.ac.nz](mailto:michele.coleman@otago.ac.nz)

