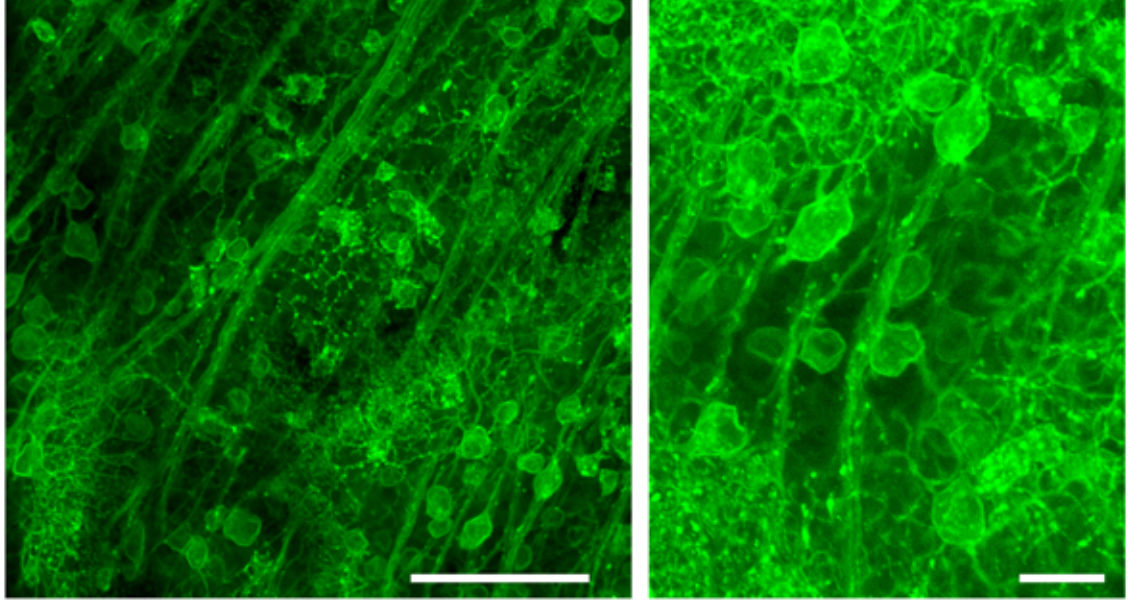
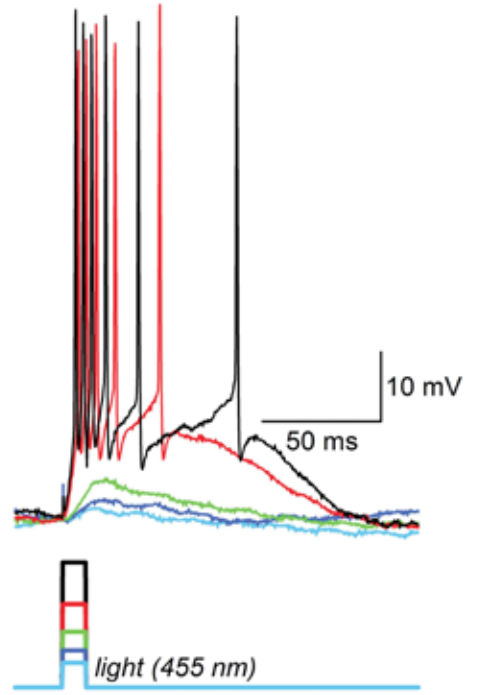
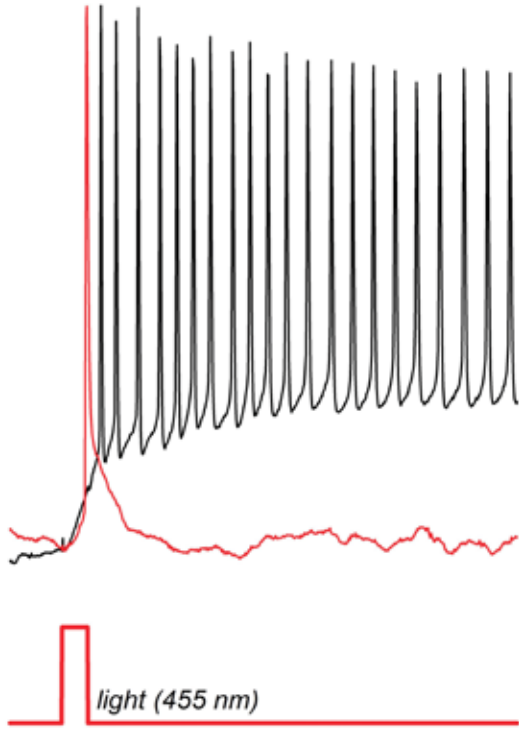


Morphology and light-responses of *YFP-Channelrhodopsin* Retinal Ganglion Cells



— Rods and cones + Channelrhodopsin
— Channelrhodopsin



Editor: Professor Emeritus Brian J. Morris

Production Assistants: David Lawrey

Photography for group photo: Clive Jeffery

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Cover illustration: Data from Dr Dario Protti's Laboratory.

Upper panel shows retinal ganglion cells expressing yellow fluorescent protein and channelrhodopsin (a subfamily of retinylidene proteins [rhodopsins] that function as light-gated ion channels). Scale bars left 100µm, right 25µm (Image taken by Dr Sammy Lee).

Lower panel illustrates the responses of retinal ganglion cells to stimulation with light. Left traces show responses of ganglion cells to stimulation of rods, cones and channelrhodopsin (black) and channelrhodopsin only (red) after blocking inputs from rods and cones. Right traces show channelrhodopsin responses to different light intensities. Low intensities evoke subthreshold responses and higher intensities trigger action potentials. (Recordings by Andrea Yong).



THE UNIVERSITY OF
SYDNEY

Discipline of Physiology

School of Medical Sciences

The University of Sydney

2014 & 2015 Biennial Report

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TOTAL RESEARCH INCOME & OUTPUT

Journals of Publication	140
Grant Funding Totals	146

HEAD OF PHYSIOLOGY REPORT 2014 & 2015

The Discipline of Physiology is part of the School of Medical Sciences (SoMS). Other disciplines in the School are Anatomy & Histology, Pathology, Pharmacology and Biomedical Sciences. As well as a large cohort of research students undertaking honours projects and post-graduate research, Physiology has major responsibilities for coursework teaching in the Faculties of Science, Pharmacy, Dentistry and Medicine.

Staff matters:

Several Research Fellows joined Physiology in 2014, including Prof David James, in the Charles Perkins Centre, and Profs Tom Becker, Bernard Balleine and Assoc Prof Jim Lagopoulos at the Brain and Mind Research Centre. Dr Susannah Parker, who holds an RG Menzies Research Development Fellowship from the NHMRC, was appointed as a Senior Lecturer in Physiology. Dr Daniel Johnstone, an NHMRC Early Career Fellow, was promoted to Lecturer level B in January, 2015, while Drs Margot Day, Steve Assinder and Matthew Naylor were promoted to Associate Professor from that date. In 2015, Drs Tara Brennan-Speranza and Andrew Hoy were promoted to Senior Lecturer, Dr Cathy Leamey to Associate Professor and A/Prof Simon Carlile to full Professor, effective January, 2016. Dr Cathy Leamey was awarded a Thompson Fellowship in 2014. Former Associate Professor Arthur Everitt passed away on 30 Jan 2014 at age 90. After his retirement in 1983, Arthur maintained a close association with Physiology. He graduated with a BSc with First Class Honours and University Medal in 1953 and was made a Teaching Fellow, then temporary Lecturer in 1955, Lecturer in 1960 and Associate Professor from 1972. In 2008 he received the Distinguished Achievement Award from the American Aging Association.

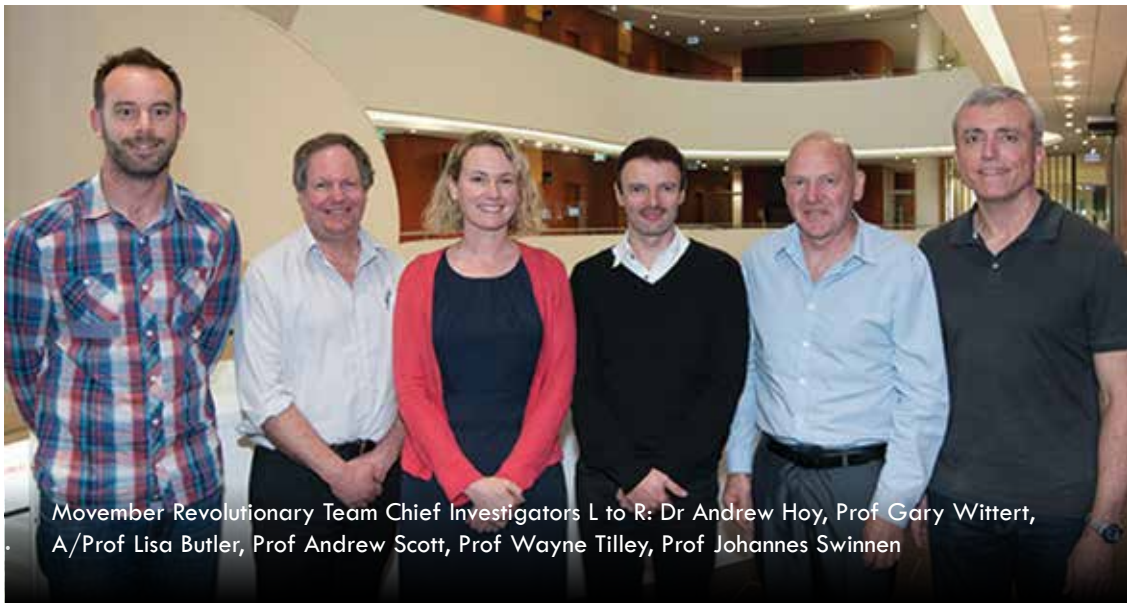
Professor of Cardiovascular Physiology, David Allen, retired in 2015 and was awarded the title of Professor Emeritus. Like most of our retirees, David continues to provide valuable input to teaching and other activities of Physiology, the School of Medical Sciences and the Bosch Institute. Physiology sadly farewelled Drs Dane King and Isabel Arnaiz, who resigned at the end of 2015. Dr King accepted a continuing appointment at Macquarie University and is still a frequent visitor, in part due to contributions to joint pedagogic research projects. In 2015, a party was held in honour of our beloved John Dodson, who retired. John's title was Senior Network and Systems Administrator, a description that does not even come close to covering John's contributions to Physiology, the School and the Faculty over more than 30 years. In November 2015, Dr Tara Brennan-Speranza joined the continuing academic staff. Dr Melissa Cameron accepted an offer of a fixed term lectureship commencing in January, 2016. Also in November 2015, Mr Paul McInerney became the new Senior Network and Systems Administrator for the School of Medical Sciences. Professor Peter Thorn, from the University of Queensland, accepted an offer of a Level E position in 2015 and commenced in December of that year.

Research

Total research income increased from \$3.54 million in 2014 to \$5.12 million in 2015, despite the poor funding climate. The increase reflected more funding from NHMRC, ARC and from other sources, such as Foundations. Staff in Physiology published 71 peer reviewed journal articles in 2013 with an average impact factor of 3.7. This (increased) to 84 publications, in journals with an average impact factor of 3.7, in 2014, and 94 publications, in journals with an average impact factor of 4.0, in 2015. Over the past five years 40% of all journal publications from Physiology have been in the top 10% of journals (impact factor >3.8), a highly commendable outcome.

Several staff members were honoured with awards for research in 2014-15. Professor Emeritus Brian Morris received the prestigious Irvine Page-Alva Bradley Lifetime Achievement Award for 2014 at the American Heart Association Council for High Blood Pressure Research annual scientific meeting in San Francisco held in September of that year. The Council noted that this important honour is bestowed only on outstanding cardiovascular investigators and leaders. In July 2015, Professor John Hearn was conferred Doctor of Science (Honoris causa) by University College, Dublin. The citation





Movember Revolutionary Team Chief Investigators L to R: Dr Andrew Hoy, Prof Gary Wittert, A/Prof Lisa Butler, Prof Andrew Scott, Prof Wayne Tilley, Prof Johannes Swinnen

noted his research and teaching in fertility, stem cell science, international policy in regenerative medicine, and in higher education reform, as well as his leadership in international universities. Dr Daniel Johnstone received a prestigious Young Tall Poppy Science Award at a ceremony held at the Museum of Applied Arts and Science in Sydney in October, 2015. The Young Tall Poppy program, run by the Australian Institute of Policy and Science, aims to promote awareness and recognition of Australia's outstanding intellectual achievers and to encourage younger generations to follow in their footsteps through undertaking further study and careers in the sciences. The award assesses both "excellence in research achievement in the sciences" and "excellence and passion in communication and community engagement to promote understanding and engagement in science".

Research Fellow, Dr Andrew Hoy, who was part of an Adelaide based consortium awarded \$3.25M over 3 years from the Movember Foundation and the Prostate Cancer Foundation of Australia to study the role of lipids in prostate cancer, moved his group into the newly opened Charles Perkins Centre. Our new Professor, Peter Thorn, also established his group in this remarkably well-equipped Centre.

Research student numbers increased substantially in 2014–15. Numbers of honours students rose from an average of 17 in the previous three years, to an average of 30 in 2014–15, while post-graduate research student numbers rose from an average of 41 in the previous three years, to 56 over the period of this report.



Professor Emeritus Brian Morris receiving the prestigious Irvine Page-Alva Bradley Lifetime Achievement Award for 2014 from the American Heart Association Council for High Blood Pressure Research



Winners of the Colin Dunlop Prize over the years

Service

Physiology academics serve on a surprisingly large number of committees within the University and in the scientific and general community. A/Prof William Phillips was Chair of the School Teaching Committee during this period, while Dr Meloni Muir represented the School at the Faculty of Science Teaching Committee. Professor Jonathan Stone served as Director, and Professor Mason as Deputy Director, of the Bosch Institute for Medical Research, the research arm of the School of Medical Sciences. During 2013–15, A/Prof Bill Phillips continued to serve as a member of the University Biosafety Committee, while Dr McAllan was a member of the University Animal Ethics Committee till the end of 2015, and Dr Stephen Assinder was Chair of a University Human Research Ethics Committees in 2014–15. As well as his other roles, Professor David Cook has been a Deputy Dean of the Faculty of Medicine since 2010, was Academic Director of the Charles Perkins Centre, Camperdown in 2013–14 and of the Charles Perkins Centre, Westmead, from 2015.

Acknowledgements

Our activities would not be possible without a great deal of support from our dedicated general staff. Although general maintenance of our computers was taken over by University ICT services in 2010–2011, John Dodson and Dane King provided the specialized support required for research programming and equipment to the end of 2015. Lali Jacob manages to navigate impenetrable university finance and other systems as Physiology Manager while Louise Harrison continues to be an excellent student liaison officer and staff manager, and is ably seconded by Kris Harrison. Finance and related services were supported by the unbelievably efficient Silvana Hourcade, and by David Lawrey, who undertakes academic work in Fine Arts in his other life. Our classrooms, practical classes, equipment and occupational safety are organized by Adel Mitry, a veterinarian by training, and by the very helpful Hala Bishay, with the general oversight of Dr Haydn Allbutt. Vincent Cheung continues to build and maintain our much-needed electronic devices. We all appreciate being part of the Bosch Institute, and make great use of its many facilities. Physiology, is part of the School of Medical Sciences, and is very grateful for the continuing supportive leadership of our Associate Dean, Professor Chris Murphy.

Rebecca S Mason

Physiology Staff List as of early 2015

Professor

Maxwell Richard Bennett, AO BE MSc PhD *Melb* DSc FAA. Appointed 1983

David Ian Cook, BSc(Med) MD BS MSc, FRACP FAA. University of Sydney Medical Foundation Fellow. Appointed 1998

Rebecca S Mason, MB BS PhD. Appointed 2007

David Grant Allen, BSc MB BS PhD *Lond*, FAA. Appointed 1989

Simon Carlile, BSc PhD

John Patrick Hearn, MSc *Dublin* PhD ANU. Appointed 2004

Jonathan Stone, BSc(Med) PhD DSc FAA. Appointed 2007

Paul R Martin, BSc PhD, Professor of Experimental Ophthalmology, Save Sight Institute. Appointed 2010

Philip Poronnik, Bsc PhD, Grad Cert HE. Appointed Dec 2012

Thomas Becker, PhD *Columbia*

Associate Professor

Stephen J Assinder, BSc *East Anglia* MSc *Bristol* PhD *Bristol*

Margot L Day, BSc PhD

Anuwat Dinudom, BSc *Prince of Songkla* MS *Mahidol* PhD

Ulrike Grünert

Jim Lagopoulos, PhD *Johann Wolfgang Goethe (Frankfurt)*

Matthew J Naylor, BSc *UWS* PhD *UNSW*

William D Phillips, BSc PhD

Senior Lecturer

Tara Brennan-Speranza, PhD

Stuart T Fraser, BSc *Monash* PhD *Hong Kong* (Sesqui Lecturer)

Andrew J Hoy BSc MSc *Wollongong* PhD *UNSW*

Catherine A Leamey, BSc PhD

Bronwyn M McAllan, BSc *Macq* MSc *Adel* PhD *UNE*

Michael B Morris, PhD (Sesqui Senior Lecturer)

Meloni M Muir, BSc *Purdue* PhD *McG*

Susanna Park BSc, BPsych *ANU* PhD *UNSW*

Dario A Protti, PhD *BAires*

Lecturer

Haydn N Allbutt, BSc *Melb* PhD

Isabel Arnaiz, PhD

Sharon M Herkes, BSc PhD *UQ*

Jin Huang

Dane King, BSc

Atomu Sawatari, PhD *UCSD*

Visiting Scholar

Arie Moran

Moreno Marino

Senior Research Fellow

Laurence Macia

Silke Rinkwitz

Il Ha Lee, PhD *Seoul*

Postdoctoral Fellow

Daniel Johnstone, BBiomedSc PhD *Newcastle*

Hayley Stannard

Postdoctoral Research Associate

Serena Becchi

Laura Bradfield

Spencer Chen

Chin Chieng

Calvin Eiber

Elham Hosseini-Beheshti

Genevra Hart

Sammy CS Lee, BMedSc(Hons) PhD *Melb*

Beatrice Leung

Alexander (Sander) Pietersen

Sivaraman Purushothuman, BSc BSc(Psych) *ANU*

Research Fellow

Mark Rybchyn, BSc(Adv) PhD

Research Associate

Craig R Campbell, BSc *Qld* PhD

Auvro Mridha

Research Officer

Pauline Aubel

Heather Kelly, AB *Vassar* PostBac *Penn* MA *Arizona*

Suja Mohammed

Thomas Owens, BSc PhD *Manchester (UK)*

Sarah Zhao

Research Assistant

Rola Bazzi

Angus Begg

Christoph Hammans

Rania Masri

Elysia Neist BMedSc *Newcastle*

Joshua Richards

Sandra Bermeo Serrato

Eliot Smolyanski

Sharon Spana

Hannah Timmins

Discipline Manager

Lali J Jacob, BAEcon MBA

Manager, Physiology Technical & Teaching

Adel Mitry, BVSc Cairo ACC STC

Senior Network and Systems Administrator

Paul McInerney

Senior Technical Officer

Sean Hatton

Student Liaison Officer

Louise Harrison, BT CSU BED UNSW

Administrative Officer

Lucinda Guy, GradCertBusMan Deakin

Kris Harrison

Silvana Hourcade

David Lawrey, BVA

Technical Officer

Hala Bishay, BVSc Cairo AssocDip STC

Vincent HW Cheung, HND HK Polytechnic CEI Part 2 UK

Arzu Demir

Will Dobbie

Monique Fasavalu

Professor Emeritus

William (Liam) Burke, BSc PhD Lond

Roger Alan Loftus Dampney, PhD DSc. Appointed 1997

Brian James Morris, BSc Adel PhD Monash DSc FAHA. Appointed 1999

Anne E Sefton, AO BSc(Med) MB BS PhD DSc

Honorary Professor

Hamish Coates

Jens Coorssen

Charles Mackay

Geoffrey Manley, PhD

Paul M Pilowsky MB BS PhD

Allan Snyders, DSc London PhD Univ College London MS Harvard SM MIT

Peter Tregloan

Bernard E Tuch

Honorary Associate Professor

Ann Goodchild, BSc PhD

John F Cossey, BTC STC

David F Davey, BSc MScMed PhD McGill

Joseph FY Hoh, BSc(Med) MB BS PhD ANU DSc

John J Carmody, MB BS MD Qld

Honorary Senior Lecturer

Annick Anselin, BA Macq MSc PhD

Kaye Brock

Miriam I Frommer, BSc PhD Lond

Honorary Senior Research Fellow

Yue-Kun Ju, MD Xian PhD ANU

Honorary Associate

Rick Ballan, BA City Art Institute DipJazz Sydney Conservatorium of Music (pre-integration USyd)

Clare Gordon-Thomson

John WA Dodson, HNC Lond MIET I Eng

M Andrea Markus, BSc PhD Mainz (Germany) – located at Univ of Gottingen, Germany

Francine Z Marques, BSc MGenetMolBiol Fed do Rio Grande do Sul (Brazil) – located at Univ of Ballarat PhD

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Yu (Eric) Wang, PhD Newcastle

Honorary Research Assistant

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Mohammad Al-Drees, BSc

Veronica Antas

Seher Balaban

Joanne Ban

Amol M Bhandare

Vanitha Bhoopalan

Badwi Bob Boumelhem

Bobbi Boumelhem

Alice Brandli, BSc Melb

Kurt Brigden, BSc

Martin Burgess

Thomas Burton

Luke Carroll

Chanukya Colonne, BSc

Sarah Dalati, BSc

Manori De Silva

Jessica Dudley

Alison Ferguson, BMed PharmBiotech UniSA BSc UNSW

Quanqing (Helen) Gao

Charmaine Green, BSc

Holly Johnson

Komal Kapoor

Dylan Kilpatrick

PhD student continued

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Seungjae Kim
Melanie Laird
Johann Leung, Beng
Gavin Lin, BSc
Sam Liu, BSc
Bianca McCarthy
Charith Nandasena, BSc
Suzanna Pilgrim
Nicola Pitt, BSc
Narayan Sankaran
Tanya Saraogi
Rachel Shparberg, BSc
Selina Solomon, *MEng Imperial College London*
Nicola Stark
Wannit (Anna) Tongkao-on, BSc
Tamara Treleaven
Vicki Velonas, BSc
Anthony Wakulicz
Courtney Wright
Ashley Yang
Jia Hao Yeo
Radu Zamfirescu, *BSc Bucharest*
Natalie Zeater

MMed student

Eric Jung Yong Song, *MB BS*

MPhil student

Tianchen Feng
Sarah Hawes
Kevin Lee
Abdurrahman Mubayyid
Shilpa Nagarajan
Tim Nguyen
Harrison Shtein
Salini Sreedharan
Jonathan Suriya
Archunan Visvanathan

MSc student

Mohammed Bahrami
Hannah Glover
Lisa Huis in t'Vald

BMedSc(Hons) student & BSc(Hons) student

Kyle Alderman
Marcus Andersson
Justin Barford
Kevin Bragg
Aneesha Chawla
Daniel Choe
Myfanwy Cohen
Jarron Dodds
Varshika Ganeshan
Jeremy Han
Yeon Jae Kim
Zohra Kakall
Kirsty Mckenzie
Suba Nasir-Ahmad
Angela Nova
Thara Pannadewi
Roxanne Parungao
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Andra Rucoi
Tamara Simpson
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Nicole Tamer
Fiona Tout
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Ashleigh Chandra
Syed Haider
Miriam Span

Professors



Maxwell Bennett



David Cook



Rebecca Mason



David Allen



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Lecturers



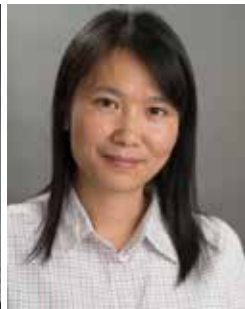
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Atomu Sawatari

Snr Res Fellow



Il-Ha Lee

Postdoc Fellow



Daniel Johnstone

Postdoctoral Research Associates



Elham Hosseini-Beheshti

Research Fellow



Sivaraman Purushothuman

Research Fellow



Mark Rybchyn

Res Associate



Craig Campbell

Research Officers



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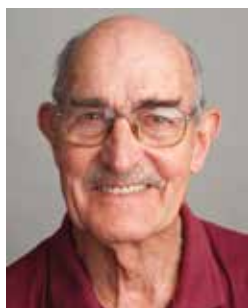


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Brian Morris



Paul M Pilowsky



Bernard E Tuch

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Honorary A/Prof



Joseph Hoh

Honorary Snr Lect



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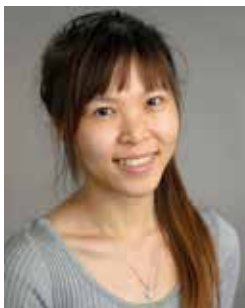
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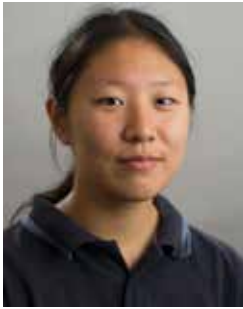
Alison Ferguson



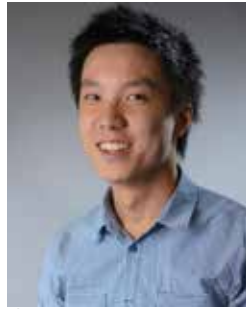
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Dylan Kilpatrick



Ji Yeon Kim



Gavin Lin



Sam Liu



Bianca McCarthy



Narayan Sankaran



Rachel Shparberg



Selina Solomon



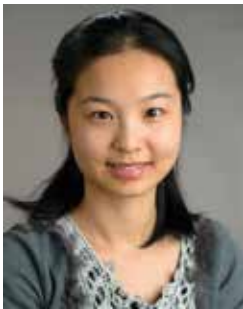
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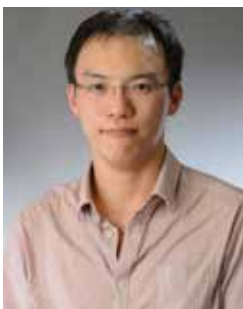


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Eric Song

MPhil students



Sarah Hawes



Kevin Lee

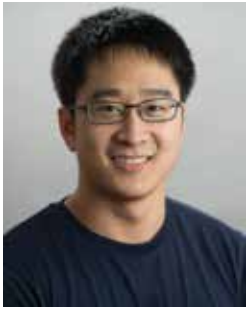


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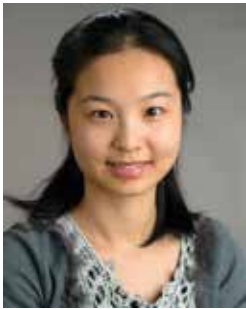
Aneesha Chawla



Varshika Ganeshan



Jeremy Han



Chelsea Pilgrim



Andra Rucoi



Tamara Simpson



Nicholas Skladnev



Charles Yates



Syed Haider

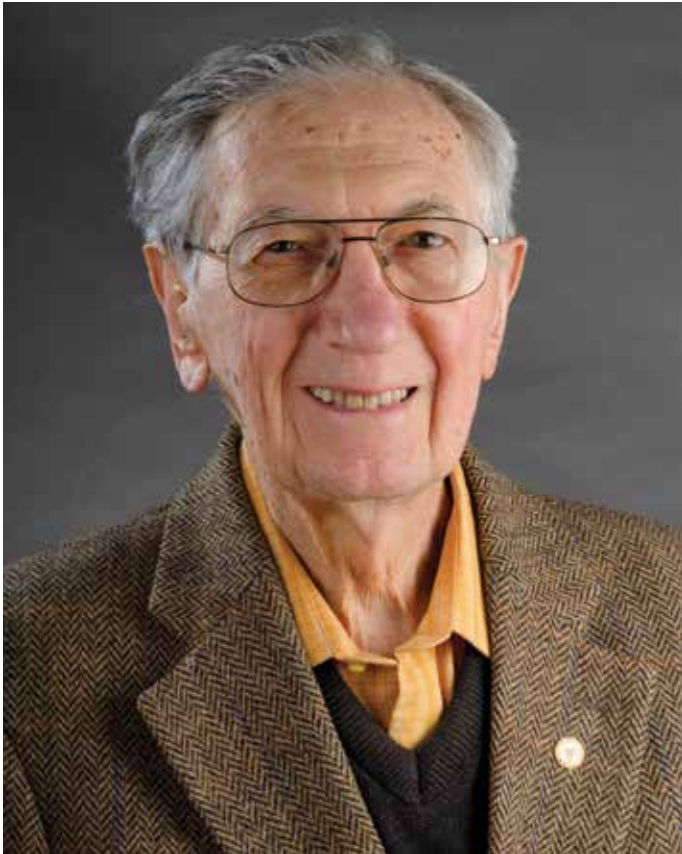


Back Row: Sam Liu, Thomas Burton, Dylan Kilpatrick, Gavin Lin, Lali Jacob, Hala Bishay, Abdurrahman Mubayyid, Elham Hosseini-Beheshti, Bobby Boumelhem, Alison Ferguson, Abrar Rahman.

Middle Row: Andrew Hoy, Louise Harrison, Craig Campbell, John Dodson, Jaimie Polson, Adel Mistry, Paul McInerney, Kurt Brigden, Vincent Cheung, Brian Morris, Courtney Wright, Dane King, Jin Huang, Harry Shtein, Narayan Sankaran, Seher Balaban, Shilpa Nagarajan, Jie Liu, Miriam Frommer.

Front Row: Haydn Allbutt, David Allen, Max Bennett, Liam Burke, Roger Dampney, Margot Day, Stuart Fraser, John Hearn, Daniel Johnstone, Cathy Leamy, Rebecca Mason, Paul Martin, Sharon Herkes, Michael Morris, Bill Phillips, Atomu Sawatari, Matt Naylor, Tara Brennan-Speranza, Jonathan Stone.

Vale Professor Arthur Everitt, 1924 to 2014



Arthur Everitt passed away peacefully on 29 Dec 2014 at the age of 90. After his retirement in 1983 Arthur maintained a close association with Physiology. He graduated BSc with First Class Honours and University Medal in 1953 and was made a Teaching Fellow in Physiology, then temporary Lecturer in 1955, Lecturer in 1960 and Associate Professor from 1972. In 2008 he received the Distinguished Achievement award from the American Aging Association. Arthur was best known for his research on caloric restriction as a means of lifespan extension in rats. Arthur remained active in ageing research long after he “retired”, presenting papers on ageing at conferences and publishing articles on ageing into his late eighties,

On 5 July 1962 Geoffrey Hughes and Arthur Everitt established the Gerontological Society of New South Wales, which became the Australian Association of Gerontology (AAG) in 1964. Arthur wrote in the AAG Newsletters from the very first issue, maintained his support for the association which he helped to found, and attended the 2013 National Conference the year before he died.

Arthur Everitt was gentle of manner and speech. He was dedicated to and motivated by his passion for sound scientific research. Not blinkered by his own findings, he remained open to and interested in the findings of others across the whole field of multidisciplinary ageing. He was kind and welcoming to new researchers, ready to share his knowledge and always interested in new perspectives. At conferences and seminars, Arthur was always keenly observant and perceptive in his comments, supportive and measured in his critique of others’ opinions, and generous in his encouragement of young starters. He regularly visited several staff members in Physiology and in other disciplines on campus until early in 2014. For everyone who knew him Arthur Everitt was a model of graceful ageing.

Arthur is survived by his wife Joyce, son Michael, daughter Sue and five loved grand children. His funeral was held Monday 5 January 2015 at 11 am at the Woronora Cemetery in Sutherland.

Brian Morris and David Le Couteur

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International Physiology and Research Networks Unit, <i>John P Hearn</i>	58
Lipid Metabolism Laboratory, <i>Andrew J Hoy</i>	60
Developmental Neurobiology Laboratory, <i>Catherine A Leamey</i>	65
Vision Research Laboratory, <i>Paul R Martin</i>	67
Vitamin D, Bone and Skin Laboratory, <i>Rebecca S Mason</i>	72
Environmental Physiology Laboratory, <i>Bronwyn M. McAllan</i>	76
Basic & Clinical Genomics Laboratory, <i>Brian J Morris</i>	78
Embryonic Stem Cell Laboratory, <i>Michael B Morris</i>	95
Research and Teaching Report, <i>Meloni M Muir</i>	99
Developmental & Cancer Biology Laboratory, <i>Matthew J Naylor</i>	102
Clinical Neurophysiology, <i>Susanna B Park</i>	106
Molecular Neuroscience & Synaptic Biology Laboratory, <i>William D Phillips</i>	110
High Blood Pressure Research Group, <i>Paul M Pilowsky</i>	114
Laboratory Of Molecular Membrane Physiology, <i>Philip Poronnik</i>	121
Vision Laboratory, <i>Dario A Protti</i>	124
Systems Neuroscience Laboratory, <i>Atomu Sawatari</i>	128
Laboratory of Retinal and Cerebral Neurobiology, <i>Jonathan Stone & Daniel M Johnstone</i>	131
Diabetes And Stem Cells, <i>Bernard E Tuch</i>	135

LABORATORY OF MOTOR AND SENSORY SYSTEMS

HAYDN N ALLBUTT

Laboratory Personnel 2014–2015

Haydn Allbutt	Lecturer	2007–
Abdurrahman Mubayyid	MPhil student	2012–
Courtney Wright	PhD student	2012–
Madeline Noonan	BSc(Hons) student	2014
Total effective full-time personnel	2014: 4	2015: 1

Lab Overview

Research in this Laboratory focuses on elucidating cellular mechanisms that initiate Parkinson's disease.

Research Activities

During 2014 and 2015 we have continued investigating the role of environmental amyloid proteins as possible initiating triggers for the α -synuclein pathology associated with Parkinson's disease.

The environmental amyloid proteins we have been investigating include, κ -casein which we initially extracted from low fat milk ourselves but then switched to the commercially available protein. We also continued to test raw fungal homogenate from various fungal species and have now tested 15 or so different species of fungi. We also tested the fungal amyloid protein hydrophobin extracted from two of the fungal species.

In addition to environmental sources of amyloid protein we examined other compounds reported to affect either amyloidogenesis of amyloid proteins or compounds reported to be associated with a reduced risk of developing PD to see if they have anti-amyloidogenic activity. The aim for us as a lab is to screen compounds that may protect against the alpha-synuclein pathologies underlying Parkinson's disease.

The potentially anti-amyloidogenic compounds we have tested include nicotine and raw tobacco extract, since smoking has been associated with a decreased risk of Parkinson's disease, several types of tea (black, green, white and decaffeinated), kombucha tea (a type of fermented black tea) coffee, as well as caffeine, since coffee and tea drinking has been associated with a reduced risk of Parkinson's disease. We have also tried beer, vodka, hops and ethanol, since the flavonoids in beer and some spirits have been reported to have neuroprotective properties.

Examples of the data we have been getting from these experiments are shown in the Figures below.

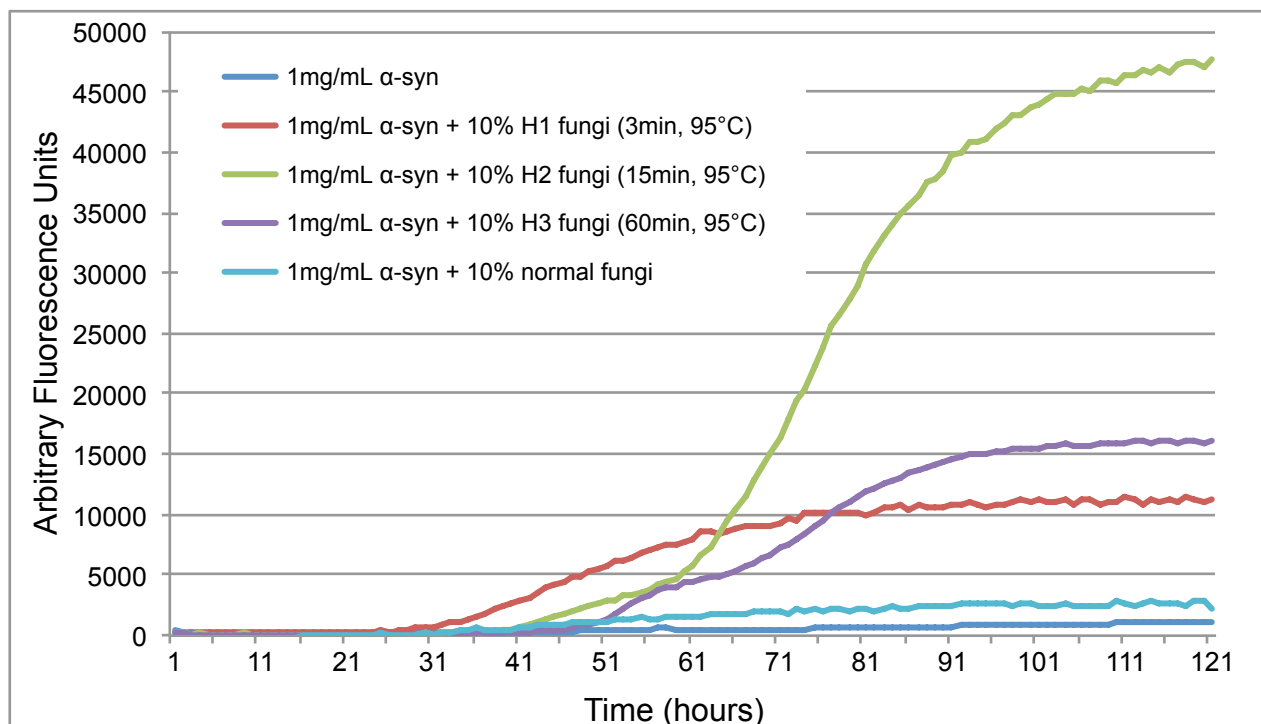


Figure 1. This graph was the first important result we obtained in 2014, demonstrating not only that raw fungal homogenate exacerbated α -synuclein aggregation compared to α -synuclein alone, but also that heating the fungal homogenate greatly exacerbated its amyloidogenic properties by as much as 21-fold over the effect of non-heated raw fungal homogenate. The result was important since it demonstrated what we had postulated, namely that there is a strong degree of cross reactivity between different amyloid proteins, meaning that amyloid proteins of one type can induce different types of amyloid proteins to aggregate. This suggested that exposure to an environmental source of amyloid protein such as that found in many filamentous fungi may represent a possible initiating trigger for Parkinson's disease. The aggregation of the α -synuclein was monitored in a 96 well plate at 37°C by measuring increase in fluorescence of the dye thioflavin T using a fluorescence plate reader. Thioflavin T becomes more fluorescent in the presence of aggregated amyloid proteins since aggregated amyloid proteins develop β -sheet motifs. The increase in fluorescence is shown on the Y-axis in arbitrary fluorescence units. Typically what is seen over the course of a week is that α -synuclein will begin to aggregate by about 46 hours and after just over a week the level of fluorescence will plateau to a maximum. The Figure shows the effect of raw fungal homogenate as well as raw fungal homogenate that had been heated to 95°C for different periods. Since heating greatly exacerbated the amyloidogenicity of the raw fungal homogenate, the scale of the Y-axis in the Figure makes it difficult to see the effect of just raw fungal homogenate by itself. To show this more clearly, α -synuclein by itself, and α -synuclein with 10% vol/vol raw fungal homogenate is shown in Figure 2 below.

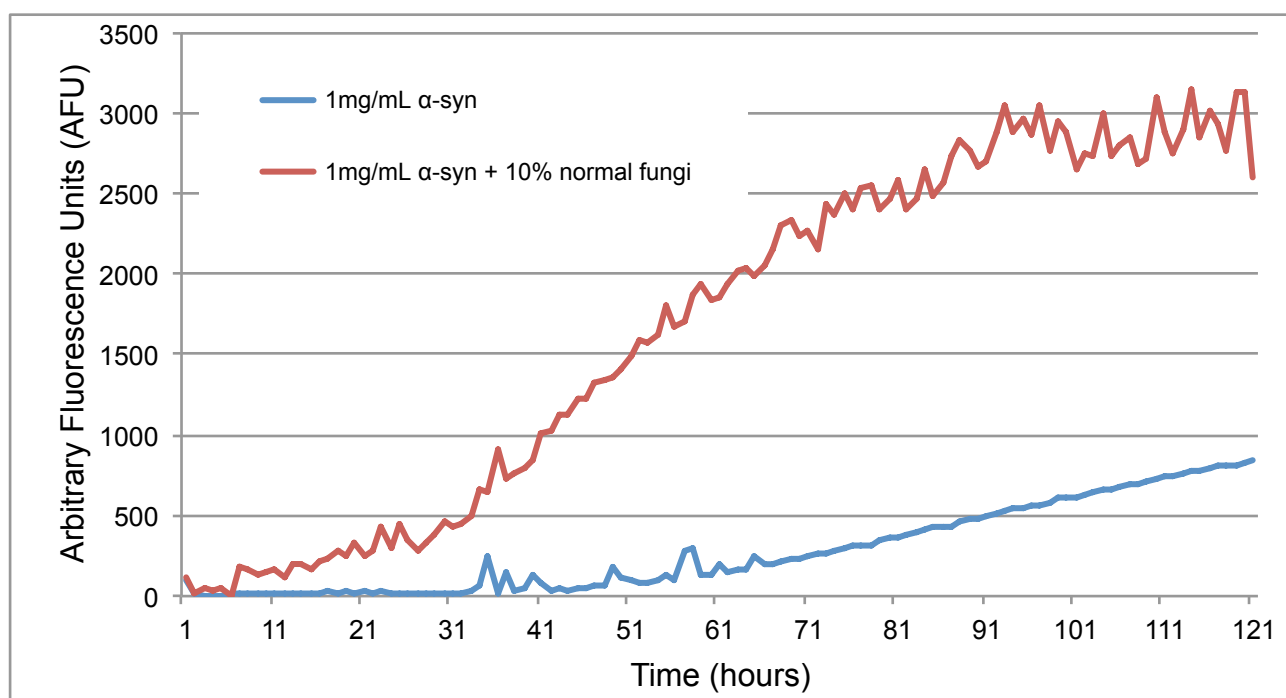


Figure 2. The effect of raw fungal homogenate on the aggregation of α -synuclein over five days compared with α -synuclein alone. Typically α -synuclein will begin to aggregate at the concentration used (1 mg/mL) by about 46 hours, but 10% vol/vol of raw fungal homogenate reduced the latency of aggregation to 11 hours and induced an approximately 4-fold increase in the maximum fluorescence reached over α -synuclein alone.

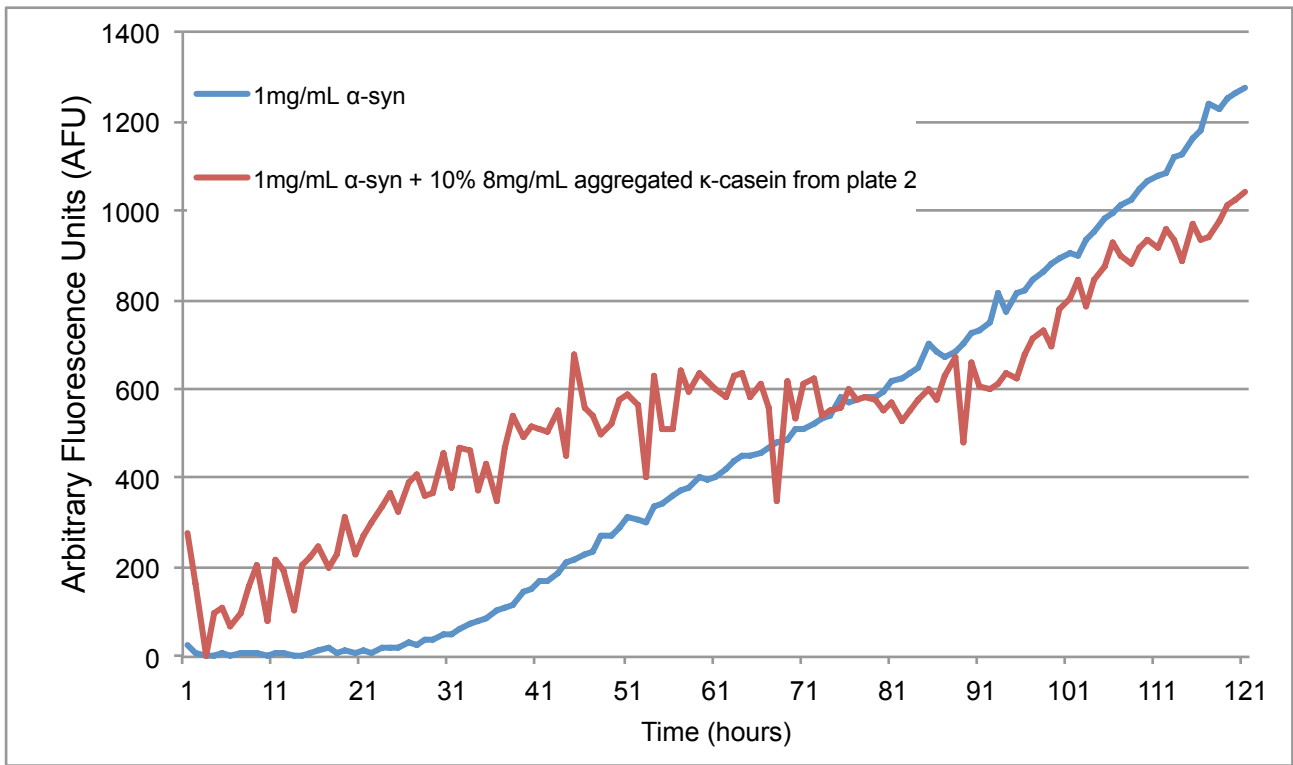


Figure 3 α -synuclein in cows milk is another amyloid protein that humans are commonly exposed to. κ -casein itself is highly amyloidogenic. We found in the early part of the curve that there was a slight enhancement of α -synuclein aggregation over α -synuclein alone. This is the first time this has effect has been reported.

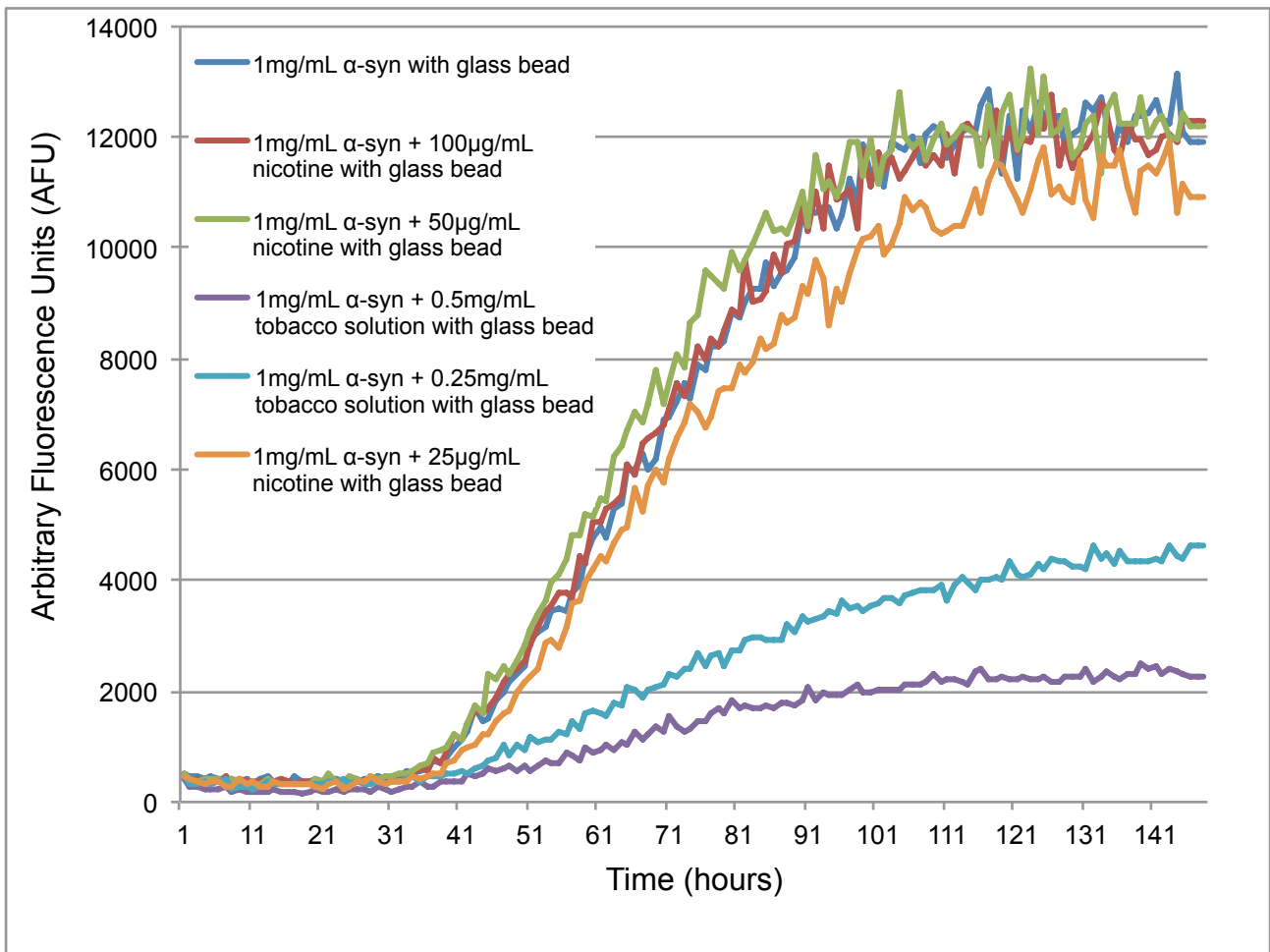


Figure 4. This diagram shows that raw tobacco solution dose-dependently decreases the aggregation of α -synuclein compared to α -synuclein alone, while nicotine does not appear to affect α -synuclein aggregation. This result suggests that compounds or mechanisms other than nicotine in tobacco may be responsible for the decreased risk of developing Parkinson's disease associated with smoking.

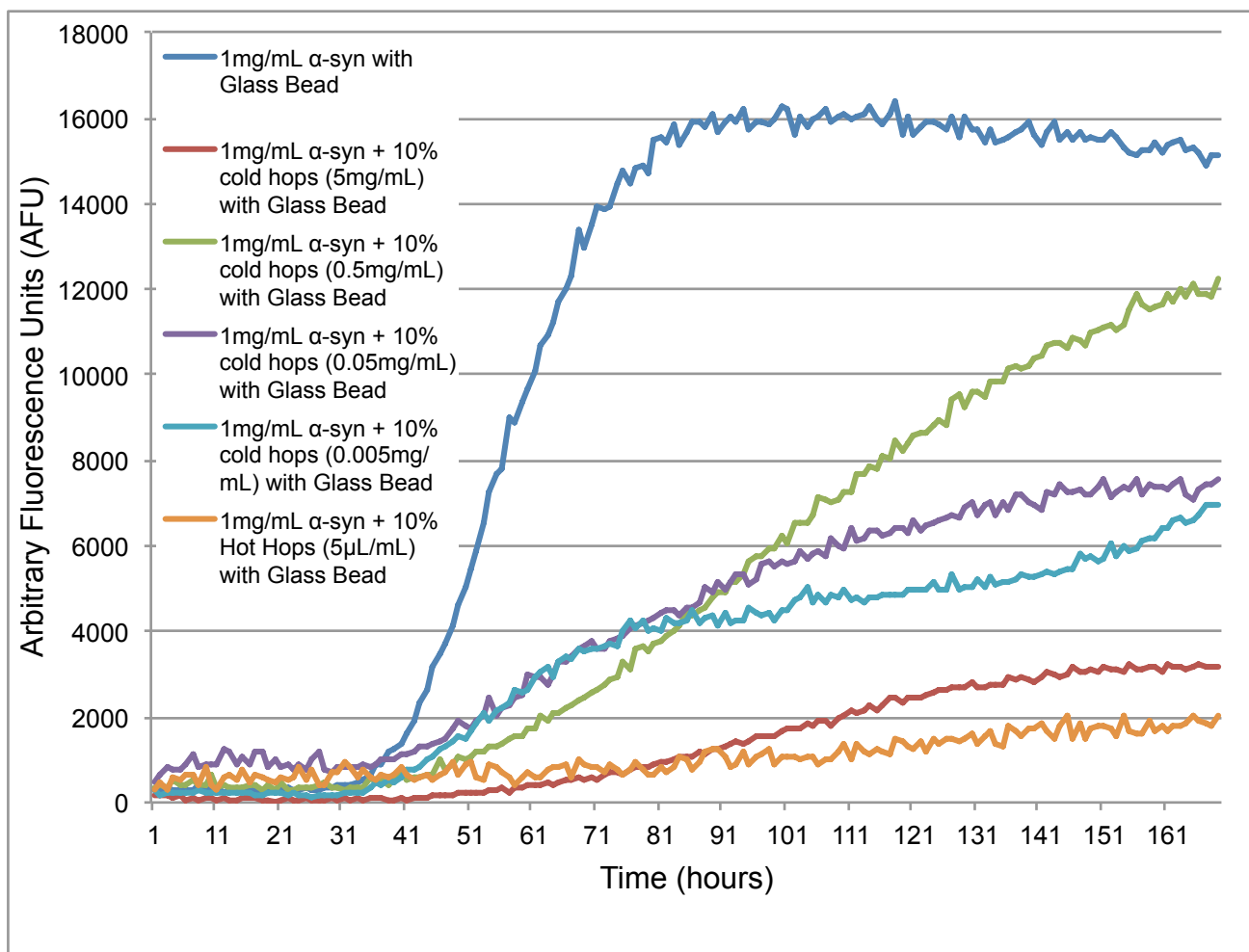


Figure 5. Shown is the effect of a raw homogenate of dried hops on α -synuclein aggregation compared to α -synuclein alone. There is generally a decrease in aggregation of α -synuclein when treated with a 10% vol/vol solution of hops homogenate. It is not clear if the decrease is dose dependent as the change in aggregation rate and maximum fluorescence achieved is not in the order of concentrations used, although the greatest effect of hops homogenate was observed at the highest concentration used. Work is ongoing to confirm this result.

The plate readers we used for these experiments were housed in the Bosch Molecular Biology Facility. Due to the length of time it takes for α -synuclein to aggregate, we experienced difficulties obtaining sufficient time on the plate readers, but with the help of Donna Lai we have gradually collected the data from these experiments.

In 2014 and 2015 I created a series of lab projects for advanced, undergraduate neuroscience students, which we carried out in the X-lab using the teaching plate readers. Since there is no animal work in these experiments they are ideal for giving undergraduate students real research problems as part of our undergraduate teaching, and had the added benefit of furthering this body of research.

In 2014 Madeline Noonan examined the role of fungal hydrophobins on α -synuclein aggregation, in particular by extracting purified hydrophobins from the fungi and growing cultures taken from the human nasal cavity, one of the sites reported to be associated with the earliest pathologies of Parkinson's disease. She succeeded in demonstrating that the purified hydrophobins in particular greatly exacerbated α -synuclein aggregation over what was seen using α -synuclein alone.

During 2014 and 2015 Courtney Wright continued her study examining the effect of feeding as well as injecting rats with aggregated α -synuclein. In total her study contained a total of 269 animals. She sacrificed the last of the animals in Dec 2015 and is now processing, staining, imaging and analyzing the tissue.

Lastly, during these two years Abdurrahman Mubayyid continued his work in setting up an *in vivo* invertebrate model for screening compounds that might alter α -synuclein aggregation. The model he selected involved use of the laboratory nematode *Caenorhabditis elegans*. He developed the technique for growing and filming the worms, and reached a stage where he was able to examine his experimental treatments.

Journal Articles

No publications in 2014 and 2015

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime
Haydn Allbutt	21	34	19	19	23	198*

*Lifetime = to end 2015

H-index = 7

News Media: Television

2014 (1)

Allbutt HN. Brain strain. *Live Well Australia*, Channel 7, 27 Jun 2014. <https://www.youtube.com/watch?v=FxA21Zj5N0w>

Grant Funding

Brain Foundation	Investigation of α -synuclein transmission as the mechanism of propagation of degenerative pathologies throughout the brain in Parkinson's disease	Allbutt HN	2014	\$29,700
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Teaching

2014

Unit of study	code	Class	Hours/year	Enrolment
Integrated Physiology	PHSI2905/ PHSI2906	Practical	56	50
Neuroscience	NEUR3004	Practical	20	10
Neuroscience	NEUR3006	Paper session	16	12

2015

Unit of study	code	Class	Hours/year	Enrolment
Integrated Physiology	PHSI2905/ PHSI2906	Practical	56	36
Neuroscience	NEUR3004	Practical	20	8
Neuroscience	NEUR3006	Paper session	16	12

MUSCLE CELL FUNCTION LABORATORY

DAVID G ALLEN

Laboratory Personnel 2014–2015

David G. Allen	Professor	University	1989–
Yue-kun Ju	Senior Research Officer	NHMRC	1996–2014
Victoria Benson	Senior Research Officer	NHMRC	2010–2014
Sofie Trajanovska	Senior Research Officer	ARC/NHMRC	2010–2014
Yu Li	Visiting Scholar		2013–2014
Kushdeep Athwal	MPhil(Med) student		2013–2014
Total effective full-time personnel		2014: 6	2015: 1

Lab Overview

The Laboratory studies the function of cardiac and skeletal muscle in health and various diseases

Research Activities

In 2013 Dr Ju discovered that inositol triphosphate receptors are expressed in the sarcoplasmic reticulum of the pacemaker cells of the heart. This led her to investigate their contribution to Ca^{2+} release and to pacemaker firing. Dr Benson studied the effects of muscle length on ventricular myocytes. When cultured cells are stretched for long periods she discovered that their excitability and Ca^{2+} release are modified. Dr Trajanovska studied intact skeletal muscle and was involved in developing techniques to measure intracellular calcium in blood-perfused muscle. She, together with Kushy Athwal, studied muscle fatigue and stretch-induced muscle damage, with a particular aim to identify the proteins whose altered function affects Ca^{2+} release. Dr Li, a visiting PhD student from China, studied traumatic brain damage. He grew neurons in culture and exposed them to sudden brief stretches which mimics some aspects of brain damage. Stretched neurons develop localized swellings and we hypothesized that these are caused by stretch-activated channels.

Journal Articles

2014

Yu Z-Y, Tan JC, McMahon AC, Iismaa S, Xiao X-H, Kesteven SH, Reichelt ME, Mohl MC, Fatkin D, Allen DG, Head SI, Graham RM, Feneley MP. RhoA/Rock signalling and pleiotropic α_{1A} -adrenergic receptor regulation of cardiac contractility. *PLoS One* 2014; 9: e99024.

2015

Lovelace MD, Gu B, Eamegdool SS, Weible II MW, Wiley JS, Allen DG, Chan-Ling T. P2X7 receptors mediate innate phagocytosis by human neural precursor cells and neuroblasts. *Stem Cells* 2015; 33: 526-541.

Liu J, Xin L, Benson VL, Allen DG, Ju YK. Store-operated calcium entry and the localisation of STIM1 and Orai1 proteins in isolated mouse sinoatrial node cells. *Front Physiol* 2015; 6: 69.

Ju YK, Lee BH, Trajanovska S, Hao G, Allen DG, Lei M, Cannell MB. The Involvement of TRPC3 channels in sinoatrial arrhythmias. *Front Physiol* 2015; 6: 86.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
DG Allen	646	578	584	601	563	15,287

*'Lifetime' = to end of 2015

Official for Scientific Societies

Member, Executive Committee, Australian Physiological Society, 2010–

Invited Presentations at National and International Conferences

2014

Chair, Muscle Performance, Fatigue and Damage, Gage Conference, Canberra, Apr 2014

2015

Calcium and muscle fatigue, *World Congress on the Basic Science of Exercise Fatigue*, American College of Sports Medicine, San Diego, USA, May 2015

Other Recognition

2015

Festschrift in honour of David Allen, Univ of Sydney, Feb 2015

Editorial Boards of Journals

DG Allen

Editor, *Proceedings of the Australian Physiological Society*, 2014–

Associate Editor, *Journal of Molecular and Cellular Cardiology*, 2007–

Editor, *Clinical and Experimental Pharmacology and Physiology*, 2014–

Associate Editor, *Frontiers in Skeletal Muscle Physiology*, 2011–

MPhil Awarded

2014

Kushdeep Athwal

Manuscripts Refereed for Journals

2014 (15)

J Physiol (2), *J Mol Cell Cardiol* (3), *Am J Physiol Heart Circ* (2), *Cardiovas Res* (2), *Circ Res* (2), *Clin Exp Pharmacol Physiol* (1), *Heart Rhythm* (1), *Med Sci Sport Exercise* (3)

2015 (13)

Am J Physiol Heart Circ (1), *J Mol Cell Cardiol* (2), *Acta Physiol* (1), *J App Physiol* (2), *J Physiol* (1), *PLoS One* (1), *Physiol Rep* (1), *Front Physiol* (1), *Clin Exp Pharmacol Physiol* (1), *Pflüg Arch* (1), *Circ Res* (1)

Grants Assessed for Funding Bodies

2014

NHMRC (2)

ARC (1)

AFM Telethon (1)

NSERC Canada (1)

2015

Australian Academy of Science (5)

Muscular Dystrophy (1)

NHMRC (3)

ARC (2)

AFM Telethon (2)

Higher Degree Theses Examined

2014

PhD, Univ of Sydney

Promotions Refereed for other Universities

2015

To Associate Professor at Univ of Queensland

To Associate Professor at Univ of Sydney (2)

Service to the University

Chair, Animal Ethical Review Committee, 2012–2015

Sub-Dean Research, Anderson-Stuart Precinct, 2001–2015

Member, Academic Planning and Development Advisor (13 staff in the Discipline of Physiology), 2014

Member, Era Advisory Group, 2014

Chair, Advisory Committee for Bosch Small Grants, 2014

Chair of the Advisory Committee for Bosch Small Grants, 2015

Service to Government and the Profession

Member, Cardiovascular and Renal Grant Review Panel NHMRC, 2014

Member, Cardiovascular and Renal Grant Review Panel NHMRC, 2015

Chair of the Board, Sydney Heart Bank, 2015–

Grant Funding

NHMRC Program Grant	Molecular mechanisms of cardiac function and disease	Graham R	2010	
		Fatkin D	2011	
		Feneley M	2012	
	*Funding to Allen Lab = \$330,000	Harvey R	2013	
		McDonald P	2014	\$ 1,977, 900*

ANDROLOGY RESEARCH GROUP

STEPHEN J ASSINDER

Laboratory Personnel 2014–2015

Stephen J Assinder	Associate Professor	University	2010–
Nicole Tom	PhD student	University	2010–2014
Mohammad Ghalayini	PhD student		2012–2014
Vicki Velonas	PhD student		2012–
Bobbi Boumelhem	PhD student		2012–
Vanitha Bhoopalan	PhD student		2014–
Jonathan Suriya	MPhil student		2014–
Angela Nova	BSc(Hons) student		2015
Total effective full-time personnel	2014: 7	2015: 6	

Lab Overview

The work of Andrology Research Group is concerned with issues of male health, with a focus on prostate disease. Prostate cancer is the most commonly diagnosed cancer in Australia, and is the second leading cause of cancer death in men. More than 2,700 men die of prostate cancer in Australia each year. Benign prostatic hyperplasia is the most common benign growth in men, resulting in severe morbidity.

Research Activities

In 2014 and 2015 the Lab carried our research on (i) understanding how the loss of structural proteins involved in organization of the cell cytoskeleton contribute to the development of cancer cell phenotypes, (ii) hormone regulation of prostate cell behavior – in particular how oestrogen and oxytocin may be associated with abnormal growth of the prostate, and (iii) dysfunction of cytokine signalling pathways, which are well-known as a factor in the development of cancer. Integration and regulators of the FGF and TGF- β signalling pathways were the focus of collaborations within the Bosch Prostate Cancer Group and with Assoc Prof Frank Lovicu of the Bosch Institute.

Journal Articles

2015

Assinder SJ, Beniamen D, Lovicu FJ. Cosuppression of Sprouty and Sprouty-related negative regulators of FGF signalling in prostate cancer: a working hypothesis. *Biomed Res Int* 2015; 2015: 827462.

Assinder SJ, Davies K, Suriya J, Liu-Fu F. Oxytocin differentially effects 3 β -hydroxysteroid dehydrogenase and 5 α -reductase activities in prostate cancer cell lines. *Peptides* 2015; 71: 149-155.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
SJ Assinder	98	86	114	164	156	1193

*'Lifetime' = to end of 2015

Editorial Boards of Journals

SJ Assinder:

Guest Editor, *Diagnostics*, 2015–

Reviews Editor, *Frontiers in Integrative Physiology*, 2012–

Invited Presentation at National and International Conferences

2015

Moderator, Panel discussion, Australasian Ethics Network, Univ of Sydney

2015

Invited Speaker and Session Chair, *International Prostate Cancer Conference*, Orlando, FL, USA

Invited Speaker, *PeCaN symposium*, Sydney

Selected Presenter, *World Congress on Breast Cancer*, Birmingham, UK

Invited Panel Chair, *Australasian Ethics Network Workshop*, Macquarie Univ

Service to the University

Chair, Human Research Ethics Committee, 2010–

Service to Scientific Society

2014

Chair, Scientific Organizing Committee, Australasian Ethics Network

Grant Funding

NBCF Novel Concept Award	Chemotherapy transporters in breast cancer	Fraser S	2013	–
		Assinder SJ	2014	\$100,000
Bosch Translational Grant in Aid	Making “platinum-class” less exclusive. (Copper transporters as predictors of response to platinum based cancer chemotherapies)	Assinder SJ	2013	–
		Fraser S	2014	\$10,000
NHMRC Project Grant	Pharmacological targetting	Richardson D	2014	\$164,000
		Kovacevic Z	2015	\$164,000
		Assinder S	2016	–
		(Associate Investigator)		

Teaching

Unit of Study Coordination role

2014 & 2015

Unit of Study Coordinator PHSI4011 (Hons A); PHSI 4012 (Hons B); PHSI 4013 (Hons C); PHSI 4014 (Hons D).

Face to Face teaching hours 2014-2015

Activity	Lectures/Tutorials	PBL	Tutorials	Practicals
PHSI3005/3905	5		12	
PHSI3006/3906	3	12		12
HST03003	2			
HST03004				16
PHSI2601	4			
TSP			24	
Honours A-D	12		52	
SMP Stage 1	5			
SMP Stage 2	4			

NEUROBIOLOGY LABORATORY

MAXWELL R BENNETT

Laboratory Personnel 2014–2015

Maxwell R Bennett	Professor of Neuroscience	1982–
	University Chair	2000–
	Founding Director, Brain & Mind Research Institute	2009–
	Adjunct Professor of Neuropsychiatry, Univ of Sunshine Coast	2011–

Lab Overview

The focus of research is to gain an understanding of the function of synapses at the both the cellular and integrative level, particularly in neuropsychiatry.

Research Activities

Leading up to work in 2014 and 2015 I had shifted my attention from the study of peripheral synapses, which I had carried out over 50 years, to synapses of the central nervous system. This research has involved providing important translational insights into post-traumatic stress disorder (PTSD) and development of several hypotheses for the origins of this condition at the molecular level of synaptic function. The hypothesis that PTSD is caused by changes in brain derived neurotrophic factor at specific synapses in the brain provided the foundation for our current experimental research program (see Bennett *et al.*, *Progress in Neurobiology*, 2014). The translational insights into PTSD were summarized in a review by Bennett *et al.* published in *Brain Structure and Function* in 2015. A highlight was solving the problem of what is being measured in fMRI studies of synaptic function in the brain. A solution to the problem of the origins of the inverse relationship between the BOLD signal and the on-going synaptic activity in cortical areas of interest was published in *Proceedings of the National Academy of Sciences of the USA*. We had previously solved the problem of how non-invasive imaging glucose metabolism, as an energetic measurement of cortical function, is related to synaptic activity in the brain (Hyder *et al.* *PNAS* 2013).

Journal Articles

2014

- Wilkinson SM, Gunosewoyo H, Barron ML, Boucher A, McDonnell M, Turner P, Morrison DE, Bennett MR, McGregor IS, Rendina LM, Kassiou M. The first CNS-active carborane: A novel P2X7 receptor antagonist with antidepressant activity. *ACS Chem Neurosci* 2014; 5: 335-339.
- O'Doherty DC, Chitty KM, Saddiqui S, Bennett MR, Lagopoulos J. A systematic review and meta-analysis of magnetic resonance imaging measurement of structural volumes in posttraumatic stress disorder. *Psychiatry Res* 2015; 232: 1-33.
- Hatton SN, Lagopoulos J, Hermens DF, Hickie IB, Scott E, Bennett MR. Short association fibres of the insula-temporoparietal junction in early psychosis: a diffusion tensor imaging study. *PLoS One* 2014; 9: e112842.
- Hatton SN, Lagopoulos J, Hermens DF, Hickie IB, Scott E, Bennett MR. White matter tractography in early psychosis: clinical and neurocognitive associations. *J Psychiatry Neurosci* 2014; 39: 417-427.
- Chohan TW, Nguyen A, Todd SM, Bennett MR, Callaghan P, Arnold JC. Partial genetic deletion of neuregulin 1 and adolescent stress interact to alter NMDA receptor binding in the medial prefrontal cortex. *Front Behav Neurosci* 2014; 8: 298.
- Chohan TW, Boucher AA, Spencer JR, Kassem MS, Hamdi AA, Karl T, Fok SY, Bennett MR, Arnold JC. Partial genetic deletion of neuregulin 1 modulates the effects of stress on sensorimotor gating, dendritic morphology, and HPA axis activity in adolescent mice. *Schizophr Bull* 2014; 40: 1272-284.
- Bennett MR, Lagopoulos J. Stress and trauma: BDNF control of dendritic-spine formation and regression. *Prog Neurobiol* 2014;112: 80-99.

2015

Bennett MR. Excitable neurofibrils and the problem of identifying the structure of central excitatory synapses in the nineteenth century. *J Hist Neurosci* 2015; 24: 229-243.

Bennett MR, Farnell L, Gibson WG, Lagopoulos J. Cortical network models of firing rates in the resting and active states predict BOLD responses. *PLoS One* 2015; 10: e0144796.

Bennett MR, Farnell L, Gibson WG, Lagopoulos J. Cortical network models of impulse firing in the resting and active states predict cortical energetics. *Proc Natl Acad Sci USA* 2015; 112: 4134-4139.

Bennett MR, Farnell L, Gibson W, Lagopoulos J. On the origins of the 'global signal' determined by functional magnetic resonance imaging in the resting state. *J Neural Eng* 2016; 13: 016012.

Bennett MR, Hatton SN, Lagopoulos J. Stress, trauma and PTSD: translational insights into the core synaptic circuitry and its modulation. *Brain Struct Funct* 2016; 221: 2401-2426.

Total Annual Citations

The high number of citations of publications by Max Bennett has resulted in a high H factor of 57, an H-factor that exceeds the H-factor of the average Fellow at the time of election to the US National Academy of Sciences. To date, the largest number of citations Prof Bennett has received for a single work is 1625.

Service to External Body

Chair, Tropical Brain and Mind Research Foundation, Townsville, a body whose formation he initiated in 2002.

SKELETAL ENDOCRINE LABORATORY

TARA C BRENNAN-SPERANZA

Laboratory Personnel 2014–2015

Tara C Brennan-Speranza	Senior Lecturer	University	2014–
Elysia Neist	Research Assistant	University	2015
Sandra Bermeo Serrato	Research Assistant	University	2015
Bianca Volpato	BMedSc(Hons) student		2014
Syed Haider	BSc Graduate Dip student		2015
Total effective full-time personnel		2014: 2	2015: 4

Lab Overview

Research in this Laboratory focuses on (i) the role the musculoskeletal system plays in metabolic control and (ii) the detrimental effects of hyperglycaemia (especially in type 2 diabetes) on the musculoskeletal system and dental health.

Research Activities

During 2014 and 2015 this new Laboratory was established in the Discipline of Physiology. We continued to investigate the mechanism of action of the bone-derived protein, osteocalcin, on insulin sensitization of peripheral tissues. We found that *in vivo* and *ex vivo*, osteocalcin improves the effect of both insulin and muscle contraction on glucose uptake. We also investigated the nature of osteocalcin-sensing, focusing in particular on two possible candidates for the osteocalcin receptor.

The Lab also conducted both *in vitro* and *in vivo* studies on the effects of high glucose levels on bones and bone cells, since it is known that patients with type 2 diabetes have high fracture risk even though they have moderate to good bone mass. We observed that bone markers are very low in mice that become hyperglycaemic and, *in vitro*, several signalling pathways are inhibited in high glucose media.

We characterized the muscles from an *ATP7aT985I* conditional knock-in mouse model for X-linked distal hereditary motor neuropathy with collaborators Marina Kennerson and her group at the ANZAC Research Institute, as well as vitamin D content, receptor and binding protein levels in muscle biopsies from humans with severe osteoarthritis compared to controls.

Journal Articles

2014

Henneicke H, Gasparini SJ, Brennan-Speranza TC, Zhou H, Seibel, MJ. The role of glucocorticoids in bone: local effects and systemic implications. *Trends Endocrinol Metab* 2014; 25: 197-211.

Abboud M, Gordon-Thomson C, Hoy AJ, Balaban S, Rybchyn MS, Cole L, SuY-Y, Brennan-Speranza, TC, Fraser DR, Mason RS. Uptake of 25-hydroxyvitamin D by muscle and fat cells. *J Steroid Biochem Mol Biol* 2014; 144 (Pt A): 232-236.

2015

Levinger I, Brennan-Speranza TC, Jerums G, Stepto NK, Serpiello FR, McConell GK, Anderson M, Hare DL, Byrnes E, Ebeling PR, Seeman E. The effect of hyperinsulinemic-euglycemic-clamp and exercise on bone remodeling markers in obese men. *Bonekey Rep* 2015; 26: 731.

Brennan-Speranza TC, Conigrave AD. Osteocalcin: an osteoblast-derived polypeptide hormone that modulates whole body energy metabolism. (Review) *Calcif Tissue Int* 2015; 96: 1-10

King S, Deshpande S, Brennan-Speranza TC, Johansson C, Voss K. Bioscaffold augmentation of the alveolar bone: A pilot study in the rabbit to define the protocol. *Int J Dent Oral Sci* 2015; 2: 135-141.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Brennan-Speranza TC or Brennan TC	78	79	107	135	139	687

*'Lifetime' = to end of 2015

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014

Brennan-Speranza TC, Blankenstein KI, Zhou H, Seibel MJ. Effects of circulating osteocalcin on bone remodelling. Herbert-Fleisch Workshop, *International Bone and Mineral Society Conference*, Brugge, Belgium, 16-19 Mar 2014. O

Brennan-Speranza TC, Blankenstein KI, Zhou H, Seibel MJ. 2014. Effects of circulating osteocalcin on bone remodelling. *American Society of Bone and Mineral Research Congress*, Houston, Texas, USA, 11-15 Sep 2014. P+O

Rybchyn MS, Green W, Conigrave AD, Mason RS Brennan-Speranza TC, Cation activation of G-class signalling in human osteoblasts. *American Society of Bone and Mineral Research Congress*, Houston, Texas, USA, 11-15 Sep 2014. P

2015

Levinger I, Jerums G, McConell GK, Rybchyn MS, Cassar S, Hare DL, Byrnes E, Ebeling PR, Seeman E, Brennan-Speranza TC. The effect of glucose-load on bone remodeling markers in vivo and osteoblast function in vitro. *International Osteoporosis Foundation Conference*, Milan, Italy, Mar 2015. O

Levinger I, Jerums G, McConell GK, Rybchyn MS, Cassar S, Hare DL, Byrnes E, Ebeling PR, Seeman E, Brennan-Speranza TC. The effect of glucose-load on bone remodeling markers in vivo and osteoblast function in vitro. *European Calcified Tissue Society Annual Conference*, Rotterdam, The Netherlands, Apr 2015. O

Armour LP, Rybchyn MS, Brennan-Speranza TC, Conigrave AD, Mason RS. CaSR acting modulator has novel anabolic therapy for the treatment of osteoporosis. *European Calcified Tissue Society Annual Conference*, Rotterdam, The Netherlands, 2015. P

Rybchyn MS, Brennan-Speranza TC, Conigrave AD, Mason RS. The upstream and downstream of CaSR-dependent Akt signalling in human osteoblasts. *2nd Symposium on the Calcium-Sensing Receptor*, 3-4 Mar 2015, San Diego, CA, USA. O

Invited Presentations at National and International Conferences

2014

Bone Metabolism and Disease Symposium at Monash Institute of Pharmaceutical Science, Melbourne

Australian Society for Medical Research conference, Ballarat, Vic

2015

First invited speaker at the Inaugural Australian Institute of Musculoskeletal Sciences Symposium

Session Chair

2014

Biomedical Sciences session at the annual conference of the Australian and New Zealand Bone and Mineral Society

Bone session at the Australian Society for Medical Research conference, Ballarat, Vic

Bone Biology Session at the Inaugural Herbert Fleisch Workshop for bone diseases, International Bone and Mineral Society, Brugge, Belgium

Bone and Energy Metabolism session at the American Society of Bone and Mineral Research annual meeting, Houston, Texas

2015

Bone and Energy Metabolism session at the annual conference of the Australian and New Zealand Bone and Mineral Society, Hobart, Tas

Seminar

2014

'Life after graduation' – at the graduate night for the Faculty of Science, Univ of Sydney

Award and Travel Grant

2014

Young Investigator Award: American Society of Bone and Mineral Research Society: Bone and Diabetes Symposium, Houston, Texas, USA

International Travel Grant from the Australian and New Zealand Bone and Mineral Society to attend the Herbert Fleisch Workshop in Brugge, Belgium

PhD Awarded

2015

Henneicke H

BMedSc(Hons) Awarded

2014

Volpato B

Graduate Diploma of Science Awarded

2015

Haider S

Manuscripts Refereed for Journals

2014 (11)

Osteoporos Int (4), *Calcif Tiss Int* (3), *Bone* (2), *J Bone Mineral Res* (1), *PLoS One* (1)

2015 (9)

Calcif Tissue Int (4), *Osteopor Int* (3), *Horm Metab Res* (1), *J Bone Mineral Res* (1)

Grants Assessed for Funding Bodies

2014

NHMRC (3)

Sir Charles Gairdner and Osborne Park Health Care Group (1)

2015

NHMRC (2)

Higher Degree Theses Examined

2015

PhD, Univ of Sydney

Service to the University

Academic Representative, Welcome Panel for new University staff, 2014-2015

Grant Funding

NHMRC	Early Career Fellowship: The involvement of bone cells in the adverse side effects associated with therapeutic glucocorticoid use (Total \$325,310)	Brennan-Speranza TC	2011 2012 2013 2014 2015	(Career disruption) - \$48,797 \$48,797
Bosch Institute RIBG	The Osteomeasure bone analysis suite (\$22,000 to Brennan-Speranza Lab)	Brennan-Speranza TC Mason RS Conigrave AD	2015	\$22,000
2015-2017: Clive and Vera Ramaciotti Establishment Grant	Does osteocalcin-sensing require the insulin receptor-related receptor (\$75,000 to Brennan Speranza Lab)	Brennan-Speranza TC	2015 2016	\$75,500

Teaching

2014 and 2015

Degree program/course coordinator duties

Talented Student Program School of Medical Sciences Coordinator; Enrolment in 2014 = 22

Unit of study name	code	Class	Hours/year	Enrolment
Human Cellular Physiology, Theory	PHSI3005	Lectures	1 in 2014	~220
Human Cellular Physiology, Theory	PHSI3005	Lectures	2 in 2015	~220
Cardiovascular and Respiratory Systems	BMED2403	Practical	28 in 2014	~280
Nerve and Muscle	BMED2402	Practical	8 in 2014	~280
Endocrine and Renal Physiology	BMED2406	Lectures	3 in 2015	~280
Endocrine and Renal Physiology	BMED2406	Practical	12 in 2015	~220
Heart & Circulation	PHSI3007/3008	Tutorial (PBL)	24 in 2014	~200 (11 in group)
Human Cellular Physiology	PHSI3006	Tutorial (PBL)	24 in 2014	~200 (12 in group)
Block 2 Musculoskeletal	GDMP1011	Lecture	3 in 2014	308

Talented Student Program School of Medical Sciences Coordinator; Enrolment in 2015 = 33

BRAIN RESEARCH LABORATORY

WILLIAM (LIAM) BURKE

Lab Overview

Current research is focused on neurophysiological aspects of respiration and factors that determine the timing of spawning in corals.

Research Activities

Breathing: Research on breathing using a spirometer has continued in collaboration with Roger Dampney and Dane King. However, because of my absence abroad and a similar absence on study leave by Roger progress has been slow. I summarized our preliminary results in the 2012+2013 biennial report. Nevertheless, we expect to complete this project in 2016.

Spawning in corals: For most of 2014 and 2015 I have been collaborating with Maria Byrne in the Discipline of Anatomy & Histology, with Jackie Wolstenholme at James Cook University and with Yoko Nozawa in Taiwan, studying reproduction in corals, both in the Great Barrier Reef (GBR) and in Japan (Kochi). The main problem we investigated was the reason why corals spawn so rarely, usually only one day in the year. We propose that spawning is triggered by the near coincidence of two factors. There was some evidence that one factor was associated with a lunar quarter. There was some weaker evidence that a second factor might be associated with the lunar declination. A calculation using reasonable assumptions about lunar rhythms showed that every 13 or so lunar cycles there could be a near coincidence of the two rhythms, a lunar quarter and a lunar zero declination. A zero declination denotes the time when the moon is directly over the equator. There is never an exact coincidence of the two rhythms but if each factor has a duration of 2–3 days then that provides a reasonable hypothesis. In addition to the calculation we also designed a diagram and a video to illustrate the hypothesis. When we used data from corals in both GBR and Kochi, we found good agreement with the hypothesis. The manuscript related to this project was written and submission is expected soon in 2016.

Journal Articles

2014

Burke W. The ionic composition of nasal fluid and its function. *Health* 2014; 6: 720-728.

Burke W, Robinson J. The occurrence of migraine auras and possible triggers. *Health* 2014; 6: 2688-2696.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Liam Burke	36	38	34	44	28	2795

*'Lifetime' = to end of 2015

Chapter in Book

Burke W. Cystoid macular edema: a difficult ocular disorder to cure. In: Davison E (ed) *Macular Edema: Risk Factors, Treatment Options and Long-Term Outcomes*. Nova Science Publishers, New York, 2014, pp. 139-151.

AUDITORY NEUROSCIENCE LABORATORY

SIMON CARLILE

Laboratory Personnel 2014–2015

Simon Carlile	Professor	University	1993–
Heather Kelly	Research Officer	ARC	2009–
Rick Ballan	Research Associate		2012–
Johahn Leung	PhD student	University	2011–
Imran Dhamani	PhD student	(with Macquarie Univ)	2010–2014
Gavin Lin	PhD student	University	2013–
Narayan Sankaran	PhD student	University	2012–
Anthony Wakulicz	PhD student	University	2014–
Martin Burgess	PhD student	University	2014–2015
Chris Watson	BMedSc(Hons) student	University	2014
Francesca Meliton	BSc(Hons) student	University	2013– Jun 2014
Jennifer Lee	BSc(Hons) student	University	2014
Madeleine Bautista	BSc(Hons) student	University	2014
Tamara Dzudovic Simpson	BMedSc(Hons) student	University	2015
Robert Mills	BMedSc(Hons) student	University	2015
Total effective full-time personnel		2014: 13	2015: 10

Lab Overview

The Lab investigates the impact on hearing of background noise, auditory impairment, ageing and motion.

Research Activities

Research in the Laboratory during 2014 and 2015 focused on three main areas: (i) The role of spatial attention and localization in speech intelligibility in noisy environments in normally hearing and hearing impaired individuals; (ii) The capacity to accelerate the adaptation by the auditory system to chronic changes in spectral input as occurs with normal ageing and with the fitting of a new hearing aid or hearing prosthesis; (iii) The perception of moving auditory stimuli and specifically testing current models of auditory motion perception.

Journal Articles

2014

Sharma M, Dhamani I, Leung J, Carlile S. Attention, memory, and auditory processing and in 10- to 15-year-old children with listening difficulties. *J Speech Lang Hear Res* 2014; 57: 2308-2321.

Sankaran N, Leung J, Carlile S. Effects of virtual speaker density and room reverberation on spatiotemporal thresholds of audio-visual motion coherence. *PLoS One* 2014; 9: e108437 (7 pages).

Reijnen J, Vanderelst D, Jin C, Carlile S, Peremans H. An ideal-observer model of human sound localization. *Biol Cybern* 2014; 108: 169-181.

Kalluri S, Carlile S. Mapping HRTFs: Acoustic cues for three-dimensional spatial hearing across hearing aid styles. *Hearing Rev* 2014; 21: 34-37.

Freeman T, Leung J, Wufong E, Orchard-Mills E, Carlile S, Alais D. Discrimination contours for moving sounds reveal duration and distance cues dominate auditory speed perception. *PLoS One* 2014; 9: e102864 (10 pages).

Feinkohl A, Locke S, Leung J, Carlile S. The effect of velocity on auditory representational momentum. *J Acoust Soc Am* 2014; 136: EL20-EL25.

2015

Lin G, Carlile S. Costs of switching auditory spatial attention in following conversational turn-taking. *Front Neurosci* 2015; 19: 125.

Leung JW, Wei V, Burgess M, Carlile S. Head tracking of Auditory, Visual and Audio-Visual Targets. *Front Neurosci* 2015; 9.

Carlile S, Corkhill C. Selective spatial attention modulates bottom-up informational masking of speech. *Sci Rep* 2015; 5: 8662 (7 pages).

Carlile S. Auditory perception: Attentive solution to the cocktail party problem. *Curr Biol* 2015; 25: R757-R759.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
S Carlile	68	57	72	134	89	1196

*Lifetime = to end of 2015

In newspaper articles

2014

ABC Health Report 5.30 pm 17 Feb 2014. Hearing and the cocktail party problem. By documentary-maker Aviva Ziegler. Text and audio available at:

<http://www.abc.net.au/radionational/programs/healthreport/monday-february-16th/5234802>

2015

Sydney Symphony Orchestra (SSO), 19 Aug 2014. A conductor and a scientist: David Robertson visits the brain lab. Appeared in the lead-up to SSO concert 'Hear it Feel it' with chief conductor David Robertson and Simon Carlile – Available at: <https://www.youtube.com/watch?v=LPKsTTkEQPO>

The Australian. Available to subscribers at: <http://www.theaustralian.com.au/news/health-science/wind-farm-effect-on-balance-akin-to-seasickness-scientist/news-story/c10f39002304bb4153a29bb73b69ac8b>

Editorial Board of Journal

Scientific Reports (a Nature journal), 2015–

BSc(Hons) Students

2014

Francesca Meliton (completed in Jun 2015)

Jennifer Lee

Madeleine Bautista

BMedSc(Hons) Students

2014

Chris Watson

2015

Tamara Dzudovic Simpson

Robert Mills

Funding

Funding for the Auditory Neuroscience Laboratory over this period was from Industry-based research contracts.

REPORT OF HONORARY ASSOCIATE PROFESSOR

JOHN CARMODY

Activities

I have the honour, after 40 years as a member of the School of Physiology & Pharmacology in the Faculty of Medicine at the University of New South Wales, of having been appointed as an Honorary Fellow of the Discipline of Physiology at the University of Sydney.

My principal research activity has been the history and philosophy of medicine and medical science (notably in neuroscience). Each year since my honorary appointment I have been involved in sessions to introduce medical students at the University of Sydney to the importance of history as a backbone of their professional lives. Each year I give one or two historical seminars in the Anderson Stuart seminar series. In addition I present papers at the conferences of the Australian and New Zealand Society for the History of Medicine and the *ISHN*. Each year, for many years, I have delivered talks in the *Occam's Razor* series on ABC Radio National.

I regularly attend the research seminars at the Conservatorium of Music and deliver papers at meetings of the MSA and in "Q-Station Lectures" at the former quarantine station at Manly. I also present regular lectures to various U3A groups in Sydney.

Articles in Journals

2014

Carmody J. Trampled in the rush: Ethical casualties in the first Australian heart transplants. *Health & History* section of: *J Aust NZ Soc Hist Med* 2014 16: 87-106.

2015

Carmody J. Patrick White, Composer Manqué: The Centrality of Music in White's Artistic Aspiration. *Antipodes* 2015; 29: 153-161.

Hunter BH, Carmody JJ. Estimating the aboriginal population in early colonial Australia: the role of chickenpox reconsidered. *Aust Econ History Rev* 2015; 55: 112-138.*

(*This paper was awarded the Sir Timothy Coghlan Prize by the Economic History Society of Australia and New Zealand for the best article published by the *Australian Economic History Review* in 2015)

Book Reviews in Journals

2014

Carmody J. *Silences and Secrets: The Australian Experience of the Weintraubs Syncopators* (book review). *Musicol Aust* 2014; 36: 299-302.

Carmody J. *Galvani's Spark: The Story of the Nerve Impulse* by Alan J McComas (book review). *Int J History Neurosci* 2014; 23: 408-412.

2015

Carmody, J. *Daniel Mannix: His legacy* (book review). *J Aust Catholic Historical Soc* 2015; 35: 123.

Conference Presentations

2014

Carmody J. So near, yet so far: the centenary of Henry Dale's virtual discovery of the neurotransmitter role of acetylcholine. *Proceedings of the International Society for the History of the Neurosciences*, Brussels, 2014, 27.

Carmody J. Thoughts prompted by two important anniversaries: World War I and the birth of 'behaviourism'. *Proceedings of the International Society for the History of the Neurosciences*, Brussels, 2014, 56.

2015

Carmody J. More than the circulation: William Harvey, the first modern physiologist – a fresh assessment. *15th Biennial Conference of the Australian and New Zealand Society for the History of Medicine*, Sydney, 30 Jun–4 Jul 2015, 31-32.

Carmody J. Call in the cavalry: How not to celebrate the centenary of a great Australian music school. *Musicological Society of Australia, 38th Annual Conference*, Sydney, 1–4 Oct 2015, 29.

Articles in Newspapers

2014

Carmody J. No fighting words (the beginnings of World War I). *The Australian*, 2 Aug 2014.

Carmody J. Brisbane (in “Opera Around the World). *Opera* (London), Nov 2014.

Carmody J. Abstraktion und Apotheose. *Opernwelt* (Berlin), Nov 2014, 46.

Carmody J. Brisbane (in “Opera Around the World). *Opera* (London), Dec 2014.

2015

Carmody J. Music on the brain. *Limelight* Jun 2015, 28-34.

Carmody J. Australia: Brisbane. *Opera* (London), Oct 2015, 1261-1262.

Carmody J. Composer manqué: music was central to Patrick White’s artistic inspiration. *The Australian*, 21 Nov 2015 (“Review”, 16-17).

Book Reviews in Newspapers and Magazines

2014

Carmody J. Nazism and the science of survival (book review). *The Australian*, 7 Jun 2014.

2015

Carmody J. Keys to success (book review). *Sydney Morning Herald*, 14 Feb 2015.

Carmody J. The music of Nigel Butterley (book review). *Limelight*, Sep 2015, 95.

Radio Broadcasts

Carmody J. World War I and the birth of behaviourism. *Occam’s Razor* (program), *ABC Radio National*, 9 Nov 2014.

Carmody J. The sordid history of Australian heart transplants. *Occam’s Razor* (program), *ABC Radio National*, 26 Jul 2015.

Community Activities

I am in high demand to give lectures to several Sydney groups of the ‘University of the Third Age’ movement and others with the specific focus on opera and concert music. I also give occasional lectures in the monthly “Q-Station” (Manly) history series, which is curated by Dr Paul Lancaster (formerly of the Discipline of Public Health, Univ of Sydney).

For over 25 years I have been an active member of the NSW Working Party of the *Australian Dictionary of Biography* and over the years have contributed approx. 30 entries to that authoritative publication. One of our current projects is the revision of its early volumes.

Service to Professional Societies

President, Australian Catholic Historical Society

Honorary Life Member, Australian Physiological Society

Member, International Society for the History of the Neurosciences

Member, Musicological Society of Australia

Member, Australian and New Zealand Society for the History of Medicine

LABORATORY OF EXOCRINE PHYSIOLOGY AND BIOPHYSICS

DAVID I COOK & ANUWAT DINUDOM

Laboratory Personnel 2014–2015

David I Cook	Professor of Cellular Physiology	University	1986–
Anuwat Dinudom	Principal Research Fellow	University	1994–
Arie Moran	Visiting Scholar	ARC	2010–
Il-Ha Lee	Senior Research Associate	NHMRC	2004–2015
Craig R Campbell	Research Associate	NHMRC/ARC	2010–
Total effective full-time personnel		2014: 5	2015: 5

Lab Overview

Our main research interest concerns the regulation of ion transport in epithelia such as in the kidney, lung, gut and exocrine glands, as well as ion transport aberrations in these tissues caused by cystic fibrosis, hypertension or infection.

Research Activities

Our collaboration with Prof Arie Moran (Ben Gurion University of the Negev, Israel) and Prof Shmuel Muallem (NIH), has continued with funding support from the ARC. We have furthered our studies to elucidate the regulatory mechanisms underlying the activity of the cellular zinc transporter, ZnT1, especially with respect to its relationship to both Ca^{2+} release and the epithelial Na^+ channel (ENaC). Cellular zinc is under tight regulatory control due to its toxicity, being the major cause of neuronal damage during brain ischaemia, seizures and trauma, but it has important cellular functions, for example in embryonic development. A second manuscript describing our recent findings was submitted for publication.

Our collaboration with Mahidol University (Bangkok) has also been productive. We continued to investigate the role of Cl^- secretion in respiratory epithelial cells in response to H5N1 influenza. A manuscript describing our discoveries relating to the role of purinergic signalling in the induction of the proinflammatory cytokine response (cytokine storm) has also been submitted for publication.

Journal Articles

2014

Shusterman E, Beharier O, Shiri L, Zarivach R, Etzion Y, Campbell CR, Lee IH, Okabayashi K, Dinudom A, Cook DI, Katz A, Moran A. ZnT-1 extrudes zinc from mammalian cells functioning as a $\text{Zn}^{2+}/\text{H}^+$ exchanger. *Metallomics* 2014; 6: 1656-1663.

2015

Lee IH, Song SH, Cook DI, Dinudom A. H-Ras mediates the inhibitory effect of epidermal growth factor on the epithelial Na^+ channel. *PLoS One* 2015; 10: e0116938.

Tomoda A, Marunaka Y, Eaton DC, Dinudom A. Membrane transport: ionic environments, signal transduction, and development of therapeutic targets. *Biomed Res Int* 2015; 2015: 581626.

Lam YY, Ha CW, Hoffmann JM, Oscarsson J, Dinudom A, Mather TJ, Cook DI, Hunt NH, Caterson ID, Holmes AJ, Storlien LH. Effects of dietary fat profile on gut permeability and microbiota and their relationships with metabolic changes in mice. *Obesity* 2015; 23: 1429-1439.

Published Conference Abstract

2014

Okabayashi K, Lee IH, Campbell CR, Dinudom A, Cook DI. Regulation of cell surface expression of ENaC by IRBIT. *Acta Physiol* 2014; 211: 85.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
DI Cook	91	87	85	82	81	3220
A Dinudom	99	118	104	131	123	1587

*'Lifetime' = to end of 2015

Official for Scientific Societies

DI Cook

Treasurer, Federation of the Asian & Oceanian Physiological Societies, 2011–2015

A Dinudom

Treasurer, Federation of the Asian & Oceanian Physiological Societies, 2015–

In newspaper article

2015

DI Cook

Sydney University medical students invented patients for assignments. *Sydney Morning Herald*, 6 Jun 2015. <http://www.smh.com.au/national/education/sydney-university-medical-students-invented-patients-for-assignments-20150604-ghgsy2.html>

Membership of Editorial Boards of Journals

David Cook

Cellular Physiology and Biochemistry, 2002–

Anuwat Dinudom

The Japanese Dental Science Review, 2013–

Clinical and Experimental Pharmacology and Physiology, 2013–14.

Biomedical Research International, 2015

Service to the University

DI Cook

Deputy Dean, Faculty of Medicine

Academic Director, Charles Perkins Centre, Camperdown, 2013–2014

Academic Director, Charles Perkins Centre, Westmead, 2015–

Grant Funding

ARC	ZnT-1 regulates store operated calcium channels in salivary gland physiology and pathology	Cook DI	2013	–
		Moran A	2014	\$170,000
		Muallem S	2015	\$170,000
NHMRC	Regulation of epithelial sodium channels by caveolin	Cook DI	2012	–
		Dinudom A	2013	–
			2014	\$131,000
NHMRC	How avian influenza affects the lungs	Cook DI	2012	–
		Dinudom A	2013	–
			2014	\$200,000

Teaching

2014 and 2015

David Cook

Acting Director, Sydney Medical Program, 2013–2015

Anuwat Dinudom

Unit of Study Coordinator, PHSI3006/3906, Human Cellular Physiology: Research, 2015–

CARDIOVASCULAR NEUROSCIENCE LABORATORY

ROGER A L DAMPNEY

Laboratory Personnel 2014–2015

Roger AL Dampney	Professor Emeritus (from 2012 onwards)	1977–
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Theme

Current research is focused on the coordinated regulation of cardiorespiratory function.

Research Activities

This is my main research interest and in 2014 and 2015 was carried out in collaboration with Assoc Prof Ann Goodchild and Dr Simon McMullan at Macquarie University. The research has shown that there are neurons within the midbrain tectum that are capable of producing highly synchronized cardiovascular and respiratory changes, together with appropriate somatomotor effects, in response to auditory, visual and somatosensory stimuli. In future research we will use optogenetic and advanced anatomical methods to define the inputs and outputs of the neurons that produce these coordinated physiological responses. Other activities included writing three invited reviews on the brain control of cardiorespiratory function, particularly in relation to behaviours such as arousal, exercise and sleep.

Journal Articles

2014

Furlong TM, McDowall LM, Horiuchi J, Polson JW, Dampney RAL. The effect of air puff stress on c-Fos expression in hypothalamus and brainstem: central circuitry mediating sympathoexcitation and baroreflex resetting. *Eur J Neurosci* 2014; 39: 1429-1438.

Müller-Ribeiro FCF, Dampney RAL, McMullan S, Fontes MAP, Goodchild AK. Disinhibition of the midbrain colliculi unmasks coordinated autonomic, respiratory and somatomotor responses to auditory and visual stimuli. *Am J Physiol Regul Integr Comp Physiol* 2014; 307: R1025-R1035.

2015

Dampney RAL. 2013 Carl Ludwig Distinguished Lectureship of the APS Neural Control and Autonomic Regulation Section: Central mechanisms regulating coordinated cardiovascular and respiratory function during stress and arousal. *Am J Physiol Regul Integr Comp Physiol* 2015; 309: R429-R443.

Beig M, Horiuchi J, Dampney RAL, Carrive P. Both Ox1R and Ox2R orexin receptors contribute to the cardiorespiratory response evoked from the perifornical hypothalamus. *Clin Exp Pharmacol Physiol* 2015; 42: 1059-1067.

Silvani A, Calandra-Buonara G, Benarroch EE, Dampney RAL, Cortelli P. Bidirectional interactions between the baroreceptor reflex and arousal: an update. *Sleep Med* 2015; 16: 210-216.

Müller-Ribeiro FCF, Goodchild AK, McMullan S, Fontes MAP, Dampney RAL. Coordinated autonomic and respiratory responses evoked by alerting stimuli: role of the midbrain colliculi. *Respir Physiol Neurobiol* Epub ahead of print 10 Nov 2015.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
RAL Dampney	390	415	418	373	372	9,051

*'Lifetime' = to end of 2015

Editorial in Journal

Morris BJ, Dampney RAL. Brain-stem microRNAs implicated in hypertension. *Physiol Genomics* 2015; 47: 386-387.

Conference and Symposia Organized

Co-Chair, Organizing Committee, Symposium on the Orexin/Hypocretin System and Autonomic Control, Meeting of the International Society for Autonomic Neuroscience (ISAN2015), 26–29 Sep 2015.

Invited Presentations at National and International Conferences

2014

Dampney RAL. *Oxford Breathing Meeting, Sydney, 27–31 Oct 2014*

2015

Dampney RAL. Refresher Course on the Brain and Systems Control, *Experimental Biology Meeting, Boston, 28 Mar–1 Apr 2015*.

Session Chair at International Conference

2015

Symposium on the Orexin/Hypocretin System and Autonomic Control, *Meeting of the International Society for Autonomic Neuroscience (ISN2015), 26–29 Sep 2015*.

Seminars

2014

Dampney RAL. Brain mechanisms generating coordinated cardiovascular, respiratory and somatomotor responses to alerting stimuli: role of midbrain command neurons. (This seminar was presented at Univ of Nebraska, 18 Jun 2014; Univ of St Louis, 23 Jun 2014; Univ of Virginia, 8 Jul 2014; Wayne State Univ, 23 Jul 2014; Oregon Health Sciences Univ, 30 Jul 2014; Univ of Newcastle, NSW, 26 Sep 2014.

2015

Dampney RAL. How does the brain generate coordinated cardiovascular and respiratory changes associated with defensive behavior and exercise? Sydney Univ, 24 Apr 2015

Awards, Prizes and Other Recognition

2014

Levitt Visiting Professorship, Univ of Iowa, May–Sep 2014

Editorial Boards of Journals

Member of the Editorial Board of *American Journal of Physiology (Regulatory, Integrative and Comparative Physiology)*, 2010–

Member of the Editorial Board of *American Journal of Physiology (Heart and Circulatory Physiology)*, 2010–

Manuscripts Refereed for Journals

2014 and 2015

Approximately 30 per year in total, for *Am J Physiol*, *J Physiol*, *Autonom Neurosci* and other journals

Grants Assessed for Funding Bodies

2014

NHMRC (5)

ARC (2)

2015

NHMRC (5)

ARC (1)

Higher Degree Thesis Examined

2014

PhD, Monash Univ

Service to the University

Member, Bosch Executive leadership Group, 2015–

Member, Council of the University of Sydney Association of Professors, 2012–2015

Service to Government and the Profession

Member, NSW Cardiovascular Research Network, 2012–

Grant Funding

NHMRC	Reduction of the cardiovascular response of psychological stress through blockade of orexin's action on one of its receptors.	Carrive P	2012	
		Dampney RAL	2013	
		Horiuchi J	2014	\$124,975
		McNally G		
		Klugmann M		

Teaching

2014 and 2015

Lecturer and PBL Tutor, Cardiovascular Block, Sydney Medical Program

DEVELOPMENTAL PHYSIOLOGY LABORATORY

MARGOT L DAY

Laboratory Personnel 2014–2015

Margot L Day	Associate Professor/Co-ordinator (Foundation Studies), University of Sydney Medical Program	2000–
Sarah Dalati	PhD student	2010–2015
Charmaine Green	PhD student	2011–
Radu Zamfirescu	PhD student	2014–
Nicola Pitt	PhD student (part-time)	2013–
Salini Sreedharan	MPhil	2013–2015
Miriam Span	GradDip student	2015
Marisa Perera	BSc(Hons) student	2014
Total effective full-time personnel	2014: 7	2015: 7

Lab Overview

Our main research interest is related to the cellular processes occurring during development of the embryo before implantation, including fertilization, cell division and cell differentiation.

Research Activities

Approximately 3% of babies born in Australia result from assisted reproduction involving fertilization and then culture of the embryo *in vitro*. It is known that the embryo culture environment causes significant alterations in gene expression, epigenetics, metabolism and cell proliferation during preimplantation development and that these alterations may have effects on later life. Our studies aim to help us to understand the impact of the culture environment on pre-implantation embryonic development in order to improve reproductive outcomes. We used a range of techniques including *in vitro* fertilization, isolation and culture of preimplantation mouse embryos, measurement of gene expression and cell signalling, electrophysiology and live cell imaging.

During 2014 and 2015 we performed experiments aimed at understanding the regulation and role of ion and solute transport during preimplantation embryonic development. Some of our studies showed that oocytes fertilized in the presence of the specific amino acid, L-proline, show improved development to the blastocyst stage. Furthermore, embryos cultured in medium containing L-proline from the 1-cell stage to the blastocyst stage, developed significantly better than embryos cultured with other amino acids. We used competitive inhibitors of L-proline to identify the transporter responsible for the uptake of L-proline into the embryo. These studies provided evidence for the beneficial effect of specific amino acids, such as L-proline, on development and their inclusion in culture medium may be useful for improving human assisted reproduction.

Journal Articles

2014

Kaneko Y, Murphy CR, Day ML. Calpain 2 activity increases at the time of implantation in rat uterine luminal epithelial cells and administration of calpain inhibitor significantly reduces implantation sites. *Histochem Cell Biol* 2014; 141: 423-430.

Huang C, Day ML, Poronnik P, Pollock CA, Chen XM. Inhibition of KCa3.1 suppresses TGF- β 1 induced MCP-1 expression in human proximal tubular cells through Smad3, p38 and ERK1/2 signaling pathways. *Int J of Biochem Cell Biol* 2014; 47: 1-10.

Poon CE, Lecce L, Day ML, Murphy CR. Mucin 15 is lost but mucin 13 remains in uterine luminal epithelial cells and the blastocyst at the time of implantation in the rat. *Reprod Fertil Dev* 2014; 26: 421-431.

Hinton T, Yeoman P, Carvalho L, Parisio M, Day M, Byrne S, Bell A, Donohoe K, Radford J, Tregloan P, Poronnik P, Goodyear P. Participating in the communication of science: Identifying relationships between laboratory space designs and students' activities. *Int J Innov Sci Math Educ* 2014; 22: 30-42.

2015

Poon CE, Madawala RJ, Day ML, Murphy CR. EpCAM is decreased but is still present in uterine epithelial cells during early pregnancy in the rat: potential mechanism for maintenance of mucosal integrity during implantation. *Cell Tissue Res* 2015; 359: 655-664.

Green CJ, Fraser ST, Day ML. Insulin-like growth factor 1 increases apical fibronectin in blastocysts to increase blastocyst attachment to endometrial epithelial cells in vitro. *Hum Reprod* 2015; 30: 284-298.

Teaching

2014 and 2015

Co-ordinator Foundation Studies, Sydney Medical Program, 2014–

LABORATORY OF BLOOD CELL DEVELOPMENT

STUART T FRASER

Laboratory Personnel 2014–2015

Stuart T Fraser	Senior Lecturer	University	2010–
Janine Street	Research Assistant	NBCF	2013–2014
Veronica Antas	PhD student		2010–2014
Mohammad Al-Drees	PhD student		2012–
Badwi Bob Boumelhem	PhD student		2012–
Kurt Brigden	PhD student		2012–
Jia Hao Yeo	PhD student	Macintosh scholarship	2013–
Chanukya Colonne	PhD student (part-time)		2011–
Chelsea Pilgrim	BSc(Hons) student		2015
Henry Williams	BSc(Hons) student		2015
Total effective full-time personnel	2014: 8	2015: 8	

Lab Overview

The Laboratory of Blood Cell Development explores the mechanisms that allow healthy adult humans to produce over 2 billion new red blood cells per day, and to maintain homeostasis. We explore the processes leading to the production of the very earliest blood cells in the embryo through to diseases affecting blood cell production in humans.

Research Activities

In 2014 and 2015 the Laboratory expanded its interest in visualizing red blood cell production at the nano-scale by developing novel techniques for scanning electron microscope. We have also developed novel flow cytometric techniques for analysing adipose tissues. We have discovered a new cell type possibly involved in maternal-fetal immunology and have identified a unique expression profile of copper transporter-2 suggesting an unexpected role in embryonic development and gene regulation.

Journal Articles

2014

Zhang H, Nieves JL, Fraser ST, Isern J, Douvaras P, Papatsenko D, D'Souza SL, Lemischka IR, Dyer MA, Baron MH. Expression of podocalyxin separates the hematopoietic and vascular potentials of mouse embryonic stem cell-derived mesoderm. *Stem Cells* 2014; 32: 191-203.

Antas VI, Brigden KW, Prudence AJ, Fraser ST. Gastrokine-2 is transiently expressed in the endodermal and endothelial cells of the maturing mouse yolk sac. *Gene Expr Patterns* 2014; 16: 69-74.

Acosta JR, Goldsbury C, Winnick C, Badrock AP, Fraser ST, Laird AS, Hall TE, Don EK, Fifita JA, Blair IP, Nicholson GA, Cole NJ. Mutant human FUS is ubiquitously mislocalized and generates persistent stress granules in primary cultured transgenic zebrafish cells. *PLoS One* 2014; 9: e90572 (9 pages).

2015

Fraser ST, Midwinter RG, Coupland LA, Kong S, Berger BS, Yeo JH, Andrade OC, Cromer D, Suarna C, Lam M, Maghzal GJ, Chong BH, Parish CR, Stocker R. Heme oxygenase-1 deficiency alters erythroblastic island formation, steady-state erythropoiesis and red blood cell lifespan in mice. *Haematologica* 2015 100: 601-610.

Morin-Adeline V, Fraser ST, Stack C, Slapeta J. Host origin determines pH tolerance of *Tritrichomonas foetus* isolates from the feline gastrointestinal and bovine urogenital tracts. *Exp Parasitol* 2015; 157: 68-77.

Green CJ, Fraser ST, Day, ML. Insulin-like growth factor 1 increases apical fibronectin in blastocysts to increase blastocyst attachment to endometrial epithelial cells in vitro. *Hum Reprod* 2015; 30: 284-298.

Al-Drees MA, Yeo JH, Boumelhem BB, Antas VI, Brigden KW, Colonne CK, Fraser ST. Making blood: The haematopoietic niche throughout ontogeny. *Stem Cells Int* 2015; 2015: 571893 (14 pages).

Kaur A, Brigden KW, Cashman TF, Fraser ST, New EJ. Mitochondrially targeted redox probe reveals the variations in oxidative capacity of the haematopoietic cells. *Org Biomol Chem* 2015; 13: 6686-6689.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
ST Fraser	111	126	158	140	138	1429

*Lifetime = to end of 2015

Official for Scientific Societies

NSW Representative, Australia-New Zealand Society for Cell and Developmental Biology (ANZSCDB), 2015–2017

Service to the University

Member, Charles Perkins Centre Teaching Advisory Group

Physiology Representative, School of Medical Sciences Learning and Teaching Committee

Grants Assessed for Funding Bodies

2014

NHMRC

ARC

MRC (UK)

Czech Science Foundation

2015

NHMRC

ARC

MRC (UK)

Czech Science Foundation

Grant Funding

National Breast Cancer Foundation	Chemotherapy transporters in breast cancer	Fraser ST	2013	–
			2014	\$100,000
Japan Society for the Promotion of Science-Joint Research Bilateral Program	Identification of target molecules for myelodysplastic syndromes (MDS) and its functional analysis	Fraser ST Inoue T (Kyushu Univ)	2014	\$25,000
			2015	\$25,000
Univ of Sydney NHMRC Equipment Grant 2014	EVOS FL2 Auto Live Cell Imaging System	Mason RS Fraser ST Hambley T Lovicu F Cook DI	2014	\$89,000

Teaching

2014 and 2015

Stuart Fraser teaches in several units of study including:

ANAT2008 Principles of Histology

PHSI2006 Intermediate Physiology B

PHSI2601 Physiology for Pharmacy

PHSI3005/3905 Human Cellular Physiology: Theory

PHSI3006/3905 Human Cellular Physiology: Research

PHSI3007/3907 Heart and Circulation: Function

PHSI3008/3908 Heart and Circulation: Dysfunction

HSTO3003 Cells and Development

HSTO3004 Cells and Development (Advanced)

Sydney Medical Programme

Unit of Study Coordination role

PHSI3005/3905, Human Cellular Physiology: Theory, 2015

HSTO3004 Cells and Development (Advanced)

TEACHING AND RESEARCH REPORT

MIRIAM I FROMMER

Face-to-Face Teaching Hours 2014–2015

Activity	Physiology 2	Physiology 3	Pharmacy	BMedSc	USydMP	MechEng
Lectures/Tutorials	1/1	–	–	6/2	–	–
PBL Tutorials	–	38/14	–	–	18/44	–
Practicals/ Tutorials	6/0	–	45/39	27/21	–	6/6
Total	7/1	38/14	45/39	33/23	18/44	6/6
						Grand total = 147/127

I was co-ordinator for BMedSc from mid-semester 2 in 2015.

Time was also spent on setting and marking assessments for all courses, including the application of new standards for criterion-based assessment.

University of Sydney Medical Program

I continued tutoring in problem-based learning (PBL) sessions (2014: 2 in Block 1, 5 in block 5, 5 in Block 8; 2015: 5 in Block 5, 17 in Block 7, 5 in Block 8, 2 in Block 9). I also contributed to the evaluation of the process and content of PBLs.

TEACHING REPORT

SHARON M HERKES

Overview

During 2014 and 2015 I was contracted as a full-time teaching academic. My interest in developing evidence-based teaching approaches has provided a number of emerging research areas including: (i) development and evaluation of blended learning approaches, (ii) strategies for improving student engagement with physiological content and (iii) development of simple tools for improving feedback systems.

To further develop my scholarship in teaching and learning I completed a Graduate Certificate in Educational Studies (Higher Education) in 2015.

Research Activities

Blended Learning Tools and Approaches: In 2014, the opening of the Charles Perkins Centre (CPC) provided the opportunity to manage the design and implementation of an innovative blended learning approach in practical and tutorial classes for intermediate BMedSc physiology students. The implementation of the 'LabTutor[®]' System was achieved by a primary project team including Dr Sharon Herkes, Dr Isabel Arnaiz, Dr Clare Gordon-Thomson, Dr Dane King, and Nicholas Randal. This produced 15 online practical modules, comprising approximately 65 lessons in total and requiring in excess of 3000 development hours in 2014, with further development in 2015. Evaluation of student participation, usage data, degree of satisfaction and module development is ongoing with over 24,000 usage files generated to date. Learning analytics is a focus for this project. Additionally, some of the newly-developed LabTutor[®] modules have been adopted for use in other units of study including PHSI2005/2905, PHSI2006/2906, ELEC3802, MECH2901 and within the Sydney Medical Program.

Interactive Lecture Model: Increasing student attendance, engagement with content and improvement in exam performance has been driving the development of an interactive lecture model. Preliminary results show an improvement of approximately 5-10% in the mean marks achieved by each of three cohorts for lecture-related assessments.

Gamification: Reducing failure rates using games to learn core concepts. This project created the eFlip game, a mobile card-matching game requiring students to identify physiological concepts and their inter-relationships. The game entered its pilot phase at the end of 2015. Game usage analysis allows correlation between predicted and achieved assessment outcomes with performance and time spent within the online game platform. Additionally, this project enabled the establishment of a generic blackboard site – the PHSI – PLAI ground (Physiology Learning Activities and Information) which supports the eFlip game and to which other games and interactive modules can be added as they are developed. This blackboard site allows enrolment of physiology (and other) students from various cohorts and year levels.

Tailoring feedback for students: This project is developing and/or evaluating the use of simple, low cost tools to:

- Create seamless continual feedback loops between teachers and students
- Provide automated individualized assessment feedback
- Gauge factors students use to inform validation of study techniques and predicted performance.

Total Citations

S Herkes (nee Burns): Lifetime (to end of 2015): 224

Conference Abstract and Presentation

2015

King D, Arnaiz I, Gordon-Thomson C, Herkes S, Randal N. Evaluation and use of an online data acquisition and content platform for delivery of physiology practicals and tutorials. *Proceedings of the Australian Conference on Science and Mathematics Education*, Curtin Univ, 30 Sep–1 Oct 2015, pp 40-41, ISBN Number 978-0-9871834-4-6. ○

Conference and Symposia Organized

Co-convenor, Blended Learning in Labs and Lesson (Inaugural Symposium), Charles Perkins Centre, Univ of Sydney, Jul 2015.

Session Chair at National Conferences

2015

Herkes SM. *Blended Learning in Labs and Lessons – The Labtutor® Experience*. Sydney, 15 Jul 2015.

Invited Presentations at National Conferences

2015

Herkes SM. The University of Sydney Labtutor Experience, *Blended Learning in Labs and Lessons – The Labtutor® Experience*. Sydney, 15 Jul 2015.

Seminar

2015

Herkes SM, King DK, Arnaiz IA, Randal N. LabTutor as an electronic platform for practical classes. Anderson Stuart Seminar Series, Univ of Sydney 12 Jun 2015

Awards, Prizes and Other Recognition

2015

Sharon Herkes, Dane King, Isabel Arnaiz, Clare Gordon-Thomson and Nicholas Randal. Sydney Medical School Academic Excellence Award for Support of the Student Experience: Introducing a blended learning program for practical classes in Bachelor of Medical Sciences (BMED) intermediate physiology.

Grant Funding

Univ of Sydney	Educational Innovation Grant:	Herkes SM King DK Isabel IA Muir MM	2014	\$2,500
AD Instruments	Blended Learning Symposium	Herkes SM Muir MM	2015	\$5,000
Sydney Medical School	Academic Excellence Teaching Award	Herkes SM King D Arnaiz I Gordon-Thomson C Randal N	2015	\$5,000

Teaching

Face-to-Face Teaching Hours 2014/2015

Activity	Physiology 2	Physiology 3	Pharmacy	BMedSc	USydMP
Lectures	14/14	–	7/7	4/4	–
PBLs/Tutorials	–	25/10	–	–	41/7
Practicals/ Tutorials	86/88	–	–	156/116	–
Total	100/102	25/10	7/7	160/120	41/7
					Grand total = 333/246*

*Teaching hours reduced whilst completing Graduate Certificate in Educational Studies in 2015

Course coordinator duties

Physiology Discipline Representative, Bachelor of Medical Sciences Program 2011–

Unit of Study Coordination role

Cardiovascular and Respiratory Systems BMED2403, 2012–

(Enrolment per year in 2014 and 2015 = approx. 250)

Teaching Committee membership(s)

Member: School of Medical Science Learning and Teaching Committee, Faculty of Medicine, 2013–

INTERNATIONAL RESEARCH NETWORKS GROUP

JOHN HEARN

Personnel 2014–2015

John Hearn	Professor	2004–
Mike Hasenmueller	General Manager	2009–
Grace Liu	Associate Professor	2015–
Marije Nieuwenhuis	Program Manager	2015–
Total effective full-time personnel	2014: 2	2015: 4

Lab Overview (one sentence)

The group addresses international research and education networks, especially global challenges.

Research Activities

Higher education reform: During 2014–2015 we addressed international approaches to reform of higher education, studying the main drivers to 2025. These included the evolution of Universities in the leadership and management of talent, public-private balance, interdisciplinary research, enlightened curriculum, the student experience, transfer of technology, business models, engagement with communities and influence on society.

Stem cell biology and regenerative medicine. We investigated international developments in the science, ethics and policy of stem cell science. This was studied to gain a global perspective on approaches to the discovery, development, translation and application of stem cell therapies.

Human and animal reproduction and fertility. The group also conducted long term studies on the fertility of primates and large mammals, including humans, centre on the regulatory endocrinology of males and females, and how animals are uniquely tuned to their micro-environments for seasonal and sustainable reproduction.

Book Chapters

2014

Hearn JP. Global Research Networks: Experiments in Internationalisation. IEE Networker, Spring 2014, pp. 39-45. Online: www.nxtbook.com/naylor/IIEB/IIEB0114/index.php?startid=39

Hearn J, Fenwick B, Halevi G, Lawton W, and Chicherina N. Teamwork Time: experiments in international cooperation. In Stiansy T, Gore T (eds) *Going Global: Inclusion, Innovation, Impact.*, vol 4, pp 154-162. London, British Council and Institute of Education Press.

Hearn J, Achampong J, Van't Land H, Manners P, (2016) Global innovation networks: the anatomy of change. In Stiansy T, Gore T (eds) *Going Global: Connecting Cultures, Forging Futures*, vol, pp206-215. London, UCL Institute of Education Press.

Reports

2014

Hearn J. The Annual Report of the Worldwide Universities Network. www.wun.ac.uk

Hearn J. The Annual Report of the Australia Africa Universities Network. www.aun.edu.au

2015

Hearn J. The Annual report of the Worldwide Universities Network. www.wun.ac.uk

Hearn J. The Annual Report of the Australia Africa Universities Network. www.aun.edu.au

Citations

Lifetime = approx. 5000 (from Research Gate)

Conference Presentations

(O, oral)

John Hearn

- China's Path in international Higher Education and Research: Global Perspectives. Renmin University International Conference: The Chinese Path in International Perspectives, Jun 2015. ○
- Reform of Higher Education and Research to 2020. BOAO Forum, Hainan, Apr 2014 ○
- The balance of education and employment. OECD Forum, Paris, May 2014. ○
- The future of work. OECD Forum. Paris, May 2015 ○
- Promoting strategic partnership between government, academia and business. Australia Africa Conference, Canberra, 2015 ○
- Opportunities for equal research partnerships addressing global challenges. AAUN Africa International Conference, Pretoria, 2015. ○

Official for Scientific Societies, including for National and International Conferences

John Hearn

Executive Director, *Worldwide Universities Network*, a consortium of 20 peer research universities working in climate and food security, public health in non-communicable disease, higher education and research reform, and understanding cultures.

Chairman and Executive Director, *Australian African Universities Network*, with ten Australian and ten African research universities in the partnership; and a research agenda in development, food, health, education, mining and public sector reform.

International Agencies:

Scientific adviser to WHO, EU, Association of Commonwealth Universities, British Council, as well as Australian and other governments.

Conferences and Symposia Organized

6 strategic conferences and workshops in 2014–2015 for international networks

Invited Presentations at International Conferences

Ten in each year, at universities and conferences

Grant Funding

ACIAR	Food/Nutrition Security	Hearn J	2014	\$100,000
			2015	\$100,000
DFAT	Conference support	Hearn J	2014	\$35,000
			2015	\$35,000
Network partners	Subscriptions	Hearn J	2014	\$100,000
			2015	\$100,000

Teaching Activities in 2014 and 2015

Human Biology 1003: 9–12 lectures a year on integrated physiology of reproduction (1500 students).

Physiology 2006: 5 lectures per year on advanced physiology of fertility, reproduction and stem cell biology, with follow-up advice on research questions and career opportunities (200 students).

Mentorship: Mentored 2 individuals from the Talented Students Program. Regular advice on research and career development to undergraduate, postgraduate and early career postdoctoral researchers.

LIPID METABOLISM LABORATORY

ANDREW J HOY

Laboratory Personnel 2014–2015

Andrew J Hoy	Research Fellow; Senior Lecturer	DVCR Bridging Fellowship (2014); Sydney Medical School Foundation (2015)	2012–
Elham Hosseini-Beheshti	Postdoctoral Associate	Prostate Cancer Foundation of Aust	2015– November
Seher Balaban	PhD student	APA	2012–
Quanqing (Helen) Gao	PhD student; in collaboration with Prof Dai Hibbs and A/Prof Thomas Grewal (Faculty of Pharmacy)	APA	2015–
Holly Johnson	PhD Student; in collaboration with Dr Kim Bell-Anderson (Faculty of Science)	APA	2011–
Harrison Shtein	MPhil student		2013–
Tim Nguyen	MPhil student		2013–
Sundeeep Joshua Wason	MSc student; in collaboration with A/Prof Thomas Grewal (Faculty of Pharmacy)		2014
Shilpa Nagarajan	MPhil student		2015–
Lisa Lee	Hons student		2014
Total effective full-time personnel		2014: 7	2015: 8

Lab Overview

The Laboratory investigates the role that metabolism plays in diseases such as type 2 diabetes, obesity and cancer.

Research Activities

Lipid metabolism and insulin resistance: The accumulation of lipid in tissue responsible for regulating blood glucose levels, including skeletal muscle and liver, can lead to insulin resistance. The vast majority of fatty acids are stored in the lipid droplet as triacylglycerols. Hence, the lipid droplet is at the centre of intracellular lipid homeostasis. However, triacylglycerols are not mechanistically linked to the development of insulin resistance. Other lipid species that can arise from lipid processes that occur at the lipid droplet have been implicated. Our research in 2014 and 2015 continued in aiming to understand the role of the metabolic processes that occur at the lipid droplet that are altered with insulin resistance.

Lipid metabolism and cancer: Metabolic diseases such as obesity and insulin resistance are risk factors for some cancers. Cancer is characterized by a substantial shift in the metabolic phenotype, primarily towards non-oxidative metabolism and increased lipid synthesis. That said, the role of fatty acid metabolism in the sustained growth of cancer cells has yet to be fully elucidated. Our research has attempted to characterize the fatty acid metabolism of cancer cells and its potential as a therapeutic target.

Journal Articles

2014

Briggs DI, Lockie SH, Benzler J, Wu Q, Stark R, Reichenbach A, Hoy AJ, Lemus MB, Coleman HA, Parkington HC, Tups A, Andrews ZB. Evidence that diet-induced hyperleptinemia, but not hypothalamic gliosis, causes ghrelin resistance in NPY/AgRP neurons of male mice. *Endocrinology* 2014; 155: 2411-2422.

Abboud M, Gordon-Thomson C, Hoy AJ, Balaban S, Rybchyn MS, Cole L, Su Y, Brennan-Speranza TC, Fraser DR, Mason RS. Uptake of 25-hydroxyvitamin D by muscle and fat cells. *J Biochem Mol Biol* 2014; 144 (Pt A): 232-236.

Balaban S, Lee LS, Schreuder M, Hoy AJ. Obesity and cancer progression: is there a role of fatty acid metabolism? (Invited Review) *BioMed Res Int* 2015; 2015: article 274585 (17 pages)

2015

Gao Q, Hanh J, Váradi L, Cairns R, Sjöström H, Liao VW, Wood P, Balaban S, Ong JA, Lin HY, Lai F, Hoy AJ, Grewal T, Groundwater PW, Hibbs DE. Identification of dual PPAR α/γ agonists and their effects on lipid metabolism. *Bioorg Medic Chem* 2015; 23: 7676-7684.

Meex RC, Hoy AJ, Morris A, Brown RD, Lo JC, Burke M, Goode RJ, Kingwell BA, Kraakman MJ, Febbraio MA, Greeve JW, Rensen SS, Molloy MP, Lancaster GI, Bruce CR, Watt MJ. Fetuin B is a secreted hepatocyte factor linking steatosis to impaired glucose metabolism. *Cell Metab* 2015; 22: 1078-1089.

Kamili A, Roslan N, Frost S, Cantrill LC, Wang D, Della-Franca A, Bright RK, Groblewski GE, Straub BK, Hoy AJ, Chen Y, Byrne JA. TPD52 expression increases neutral lipid storage within cultured cells. *J Cell Sci* 2015; 128: 3223-3238.

Meex RCR, Hoy AJ, Mason RM, Mason SD, McGee SL, Bruce CR, Watt MJ. ATGL-mediated triglyceride turnover and the regulation of mitochondrial capacity in skeletal muscle. *Am J Physiol Endocrinol Metab* 2015; 308: E960-70.

Wang K, Hardie R, Hoy A, van Geldermalsen M, Gao D, Fazli L, Sadowski M, Balaban S, Schreuder M, Nagarajah R, Wong J, Metierre C, Pinello N, Otte N, Bailey C, Ritchie W, Rasko J, Holst J, Targeting ASCT2-mediated glutamine uptake blocks prostate cancer growth and tumour development. *J Pathol* 2015; 236: 278-289.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
A J Hoy	120	133	167	177	179	931

Conference Abstracts and Presentations

2014

Balaban S, Saunders DN, Hoy AJ. A role for adipocyte lipolysis in breast cancer progression. *Keystone Symposia - Lipid Pathways in Biology and Disease*. Royal Dublin Society, Dublin, Ireland, 19–24 Mar 2014. P

Balaban S, Saunders DN, Hoy AJ. A role for adipocyte lipolysis in breast cancer progression. *Lowy Cancer Symposium*, University of New South Wales, Sydney, 15–17 May 2014. P

Wang Q, Hardie R-A, Hoy AJ, van Geldermalsen M, Fazli L, Nagarajah R, Bailey CG, Rasko JEJ, Holst J. Inhibition of glutamine uptake regulates mTORC1, glutamine metabolism and cell growth in prostate cancer. *Metabolism, Diet and Disease 2014*, Georgetown Univ, Washington DC, USA, 28–30 May 2014. P

2015

Nagarajan S, McKenna J, Brandon AE, Shtein H, Suryana E, Cooney GJ, Saunders DN, Hoy AJ. Protein ubiquitination in rat liver is insulin sensitive and is altered in insulin resistant high-fat fed rats. *Australian Diabetes Society & Australian Diabetes Educators Association Annual Scientific Meeting*, Adelaide Convention Centre, Adelaide, South Australia, 26–28 Aug 2015. P

Balaban S, Schreuder M, Shearer RF, Lee LS, van Geldermalsen M, Thomas K, Shtein H, Cairns R, Grewal T, Holst J, Saunders DN, Hoy AJ. A role for adipocyte lipolysis in breast cancer progression. *Gordon Research Conferences – Molecular and Cellular Biology of Lipids*. Waterville Valley Resort, 26–31 Jul 2015, Waterville Valley, NH, USA. P

Balaban S, Schreuder M, Shearer RF, Lee LS, van Geldermalsen M, Thomas K, Shtein H, Cairns R, Grewal T, Holst J, Saunders DN, Hoy AJ. A role for adipocyte lipolysis in breast cancer progression. *1st Australian Cancer and Metabolism Meeting*. Garvan Institute of Medical Research, Sydney, 29 Apr–1 May 2015. O

Centenera MM, Iranni S, Hoy AJ, Swinnen J, Butler LM. Use of human prostate cancer explants for metabolism studies. *1st Australian Cancer and Metabolism Meeting*. Garvan Institute of Medical Research, Sydney, 29 Apr–1 May 2015. P

Hardie R-A, van Dam E, Cowley M, Han T-L, Balaban S, Pajic M, Ionomou M, Shearer R, Miller D, Waddell N, Pearson JV, Australian Pancreatic Cancer Genome Initiative. *1st Australian Cancer and Metabolism Meeting*. Garvan Institute of Medical Research, Sydney, 29 Apr–1 May 2015. P

Sazanov L, Biankin AV, Grimmond SM, Hoy AJ, Vilas-Boas S, Turner N, Saunders DN. Somatic mitochondrial mutations driving metabolic adaptation in pancreatic cancer. *1st Australian Cancer and Metabolism Meeting. Garvan Institute of Medical Research, Sydney, 29 Apr–1 May 2015.* P

Official for Scientific Societies

IT Manager, Australian Physiological Society, 2014

Conferences and Symposia Organized

Symposium organizer, Lipid Metabolism in Health & Disease – novel techniques to assess lipids, 2015

Session Chair, Australian Physiological Society Annual Conference, 2015

Co-organizer, the First Australian Cancer and Metabolism Meeting, 2015

Invited Presentations at National and International Conferences

2014

Centenary Institute Seminar Series Sydney, 2014

2015

Prostate Cancer World Congress, Cairns Convention Centre, Cairns, Qld, 2015

Prostate Cancer Theme, Dana Faber Cancer Institute/Harvard Cancer Centre, Boston, MA, USA, 2015

Departments of Pharmacology, Physiology, and Anatomy Seminar Series Univ of NSW, Sydney, 2015

Bosch Institute Young Investigator and Annual Scientific Meeting – Canceromics: From Molecular and Cellular Biology to Breakthrough Therapeutics Univ of Sydney, 2015

Prostate Cancer Special Interest Group Scientific Meeting. Univ of Sydney Cancer Research Network, Sydney, 2015

Faculty of Pharmacy Seminar Series Univ of Sydney, 2015

Discipline of Pharmacology Seminar Series Univ of Sydney

News Media

New research could prevent unnecessary prostate cancer treatment; Univ of Sydney Media Release, 12 Dec 2014. <http://sydney.edu.au/news/84.html?newscategoryid=1&newsstoryid=14452>

Obesity could make prostate cancer more aggressive, PM, ABC Radio, Fri 12 Dec 2014. <http://www.abc.net.au/pm/content/2014/s4147889.htm>

Fellowship Awarded

2015

Hoy AJ, Sydney Medical School Helen and Robert Ellis Postdoctoral Research Fellowship

BMedSc(Hons) Awarded

2014

Lisa Lee

Manuscripts Refereed for Journals

2014 (6)

Am J Physiol Endocrinol Metab (3), *Clin Exp Pharmacol Physiol* (1), *J Physiol* (1), *Obesity* (1)

2015 (2)

Sci Rep (1), *Nutr Rev* (1),

Grants Assessed for Funding Bodies

2014

NHMRC (5)

Diabetes Australia Research Trust (2)

2015

NHMRC (4)

Diabetes UK (1)

Medical Research Council, UK (1)

Prostate Cancer Foundation of Australia (1)

Diabetes Australia Research Trust (3)

Biotechnology and Biological Sciences Research Council, UK (1)

Higher Degree Theses Examined

2015

PhD, Univ of NSW

PhD, Univ of Sydney

Service to the University

Sydney Medical School representative, Univ of Sydney Laboratory Animal Services Advisory Committee, 2014–

Member, Sydney Medical School Research Grants Working Party, May-Jun 2015

Participant, Univ of Sydney Research Support website redevelopment, 2 Oct 2015

Organiser for establishment of the Charles Perkins Centre Level 3 West fortnightly presentation series 2015

Grant Funding

Univ of Sydney Bridging Support Grant	Linking breast cancer progression to mammary gland lipid metabolism	Hoy AJ	2014	\$30,000
Univ of Sydney HMR+ Implementation Fund	Nutrient transporters: elucidating and targeting their function in cancer	Holst J James DE Rasko J Vandenberg R Ryan R Jormakka M Horvath L Hibbs D Cordwell S Hoy AJ	2015	\$130,000
Univ of Sydney Faculty of Pharmacy Seed Funding Challenge	Assessing anti-obesity and anti-cancer drugs in the link between obesity and breast cancer	Grewal T Hibbs D Hoy AJ	2015	\$25,000

Movember Revolutionary Team Award	Exploiting alterations in lipid metabolism to improve diagnosis, treatment and molecular imaging of prostate cancer * ~\$200,000 p.a to the Hoy Lab	Butler LM	2015	\$500,000*
		Tilley WD	2016	
		Scott AM	2017	
		Hoy AJ		
		Wittert GA		
		Swinnen JV		

Teaching

Face-to-Face Teaching Hours 2014-15

Activity	PHSI2005	PHSI3007	PHSI3008	PHSI3905	Medicine	NTUM3001	TSP
Lectures/Tutorials	3	4			5	1	
PBL Tutorials			18		18		
Supervision				26 (3 students each year)		-	42

Co-Coordinator of the School of Medical Sciences Talented Student Program

LABORATORY OF DEVELOPMENTAL NEUROBIOLOGY

CATHERINE A LEAMEY

Laboratory Personnel 2014–2015

Catherine A Leamey	Senior Lecturer	University	2003–
Heidi Tran	PhD student	APA	2010–2014
Sam C. Liu	PhD student	APA	2013–
Nigel Tse	MPhil student (co-supervised with W Phillips)		2013–2014
Joanna Wong	PhD student	APA	2014
Isabella Breukelaar	BSc(Hons) student		2014
Niluni Madapatha	BSc(Hons) student		2014
Sarah Hawes	MPhil student		2015
Total effective full-time personnel		2014: 7	2015: 3

Lab Overview

Research in this Laboratory focuses on (i) understanding the mechanisms that control the normal development of the nervous system, (ii) the changes in function when development mechanisms fail and (iii) the degree to which neural plasticity can help to compensate for these changes.

Journal Articles

2014

Leamey CA, Sawatari A. The teneurins: new players in the generation of visual topography. *Semin Cell Dev Biol* 2014; 35: 173-179.

Tse N, Morsch M, Ghazanfari N, Cole L, Visvanathan A, Leamey CA, Phillips WD. The neuromuscular junction: Measuring synapse size, fragmentation and changes in synaptic protein density using confocal fluorescence microscopy. *J Vis Ex* 2014; 26 (94): no page numbers for articles in this journal.

O'Connor A, Burton T, Leamey CA, Sawatari A. The use of the puzzle box as a means of assessing the efficacy of environmental enrichment. *J. Vis. Exp* 2014. 29 (94): no page numbers for articles in this journal.

Carr O, Glendinning KA, Leamey CA Marotte LR. Retinal overexpression of Ten-m3 alters ipsilateral retinogeniculate projections in the wallaby (*Macropus eugenii*). *Neurosci Lett* 2014; 566: 167-171.

2015

Tran H, Sawatari A Leamey CA. Ten-m3 mediates topography and patterning of thalamostriatal projections from the parafascicular nucleus in mice. *Eur J Neurosci* 2015; 41: 55-68.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Catherine Leamey	32	49	69	58	58	627

*'Lifetime' = to end of 2015

PhD Awarded

2014

Heidi Tran

MPhil Awarded

2014

Nigel Tse (co-supervised with W Phillips)

BSc(Hons) Awarded

2014

Isabella Breukelaar

Niluni Madapatha

Grants Assessed for Funding Bodies

2014

NHMRC (2)

2015

NHMRC (2)

Higher Degree Theses Examined

2014

PhD, Univ of Sydney

2015

MSc, Univ of Western Australia

Service to the University

Member, Bosch Executive leadership Group, 2013–

Service to the Community

CSIRO Scientists in Schools Program: Active partnership with International Grammar School, Ultimo.

Grant Funding

MJ Fox Foundation	Rapid Response Innovation Award	Sawatari A	2014	\$37,500
		Leamey CA	2015	\$37,500
Univ of Sydney	Brown Equity Fellowship	Leamey CA	2014	\$50,000

Teaching

2014 and 2015

Unit of Study Coordination role

Cellular and Developmental Neuroscience (NEUR3003/3903) – approx. 90 enrolments

Integrative Neuroscience (NEUR3004/3904) – approx. 100 enrolments

VISUAL NEUROSCIENCE RESEARCH LABORATORY

PAUL R MARTIN

Laboratory Personnel 2014–2015

Paul R Martin	Professor	University	2010 –
Ulrike Grünert	Associate Professor	University	2010–
Alexander (Sander) Pietersen	Postdoctoral Research Associate	NHMRC	2011–
Spencer Chen	Postdoctoral Research Associate	ARC	2012–15
Sammy Lee	Postdoctoral Research Associate	NHMRC	2010–
Sivaraman Purushothuman	Postdoctoral Research Associate	NHMRC	2014–2015
Calvin Eiber	Postdoctoral Research Associate	ARC	2015–
Selina Solomon	PhD student	APA	2011–2015
Natalie Zeater	PhD student	APA	2012–
Suba Nasir-Ahmad	BSc(Hons) student		2015
Abrar Rahman	BSc(Hons) student		2015
Ashleigh Chandra	GradDipSc student		2015–
Cindy Guy	Administrator	ARC	2010–
Arzu Demir	Technical Officer	NHMRC	2010–
Will Dobbie	Computer Programmer	ARC	2010–15
Rania Masri	Research Assistant	NHMRC	2014–2015
Rhian Aghajani	Research Assistant	ARC	2014
Angus Begg	Research Assistant (Casual)	ARC	2015
Xin (Phillip) Chen	Research Assistant (Casual)	ARC	2015–
Christoph Hammans	Research Assistant (Casual)	ARC	2015
Anika Larsen	Research Assistant (Casual)	ARC	2014
Joshua Richards	Research Assistant (Casual)	NHMRC	2015
Eliot Smolyanski	Research Assistant (Casual)	ARC	2014–2015

Total effective full-time personnel

2014: 16

2015: 21

Lab Overview

Vision is our most important sense, and diseases that cause visual loss and blindness are terribly debilitating. The Visual Neuroscience Research Group studies the normal structure and function of the visual system, by measuring the connections between nerve cells (neurones) in the retina and by studying the activity of single neurones in the retina and early stages of the visual pathway.

Our chief research interest is how colour, form, and motion in the visual world are processed in the retina and sent as distinct streams of information to the brain. Methods used include immunohistochemical analysis of neurotransmitter receptors, light and electron microscopy, single cell extracellular recording, linear systems analysis of visual responses.

Research Activities

Research in 2014 and 2015 comprised anatomical studies of retinal (bipolar, ganglion and amacrine) inputs to vigilance and attention-related visual pathways, physiological studies of subcortical brain pathways (geniculate, colliculus and parabigeminal) for feature selection and target tracking, as well as physical analysis of complex brain wave patterns (in collaboration with Ai Gong).

Journal Articles

2014

Percival KA, Koizumi A, Masri RA, Buzás P, Martin PR, Grünert U. Identification of a pathway from the retina to

koniocellular layer K1 in the lateral geniculate nucleus of marmoset. *J Neurosci* 2014; 34: 3821-3825.

Pietersen ANJ, Cheong SK, Solomon SG, Tailby C, Martin PR. Temporal response properties of koniocellular (blue-on and blue-off) cells in marmoset lateral geniculate nucleus. *J Neurophysiol* 2014; 112: 1421-1438.

Weltzien F, Dimarco S, Protti DA, Daraio T, Martin PR, Grünert U. Characterization of secretagogin-immunoreactive amacrine cells in marmoset retina. *J Comp Neurol* 2014; 522: 435-455.

Martin PR, Lee BB. Distribution and specificity of S-cone ("blue cone") signals in subcortical visual pathways. (Review). *Vis Neurosci* 2014; 31: 177-187.

Miyagishima, KJ, Grünert U, Li W. Processing of S-cone signals in the inner plexiform layer of the mammalian retina. *Vis Neurosci* 2014; 31: 153-163.

2015

FitzGibbon T, Erikoz B, Grünert U, Martin PR. Analysis of the lateral geniculate nucleus in dichromatic and trichromatic marmosets. *J Comp Neurol* 2015; 523: 1948-1966.

Townsend RG, Solomon SS, Chen SC, Pietersen ANJ, Martin PR, Solomon SG, Gong P. Emergence of complex wave patterns in primate cerebral cortex. *J Neurosci* 2015; 35: 4657-4662.

Weltzien, F, Percival KA, Martin PR, Grünert U. Analysis of bipolar and amacrine populations in marmoset retina. *J Comp Neurol* 2015; 523: 313-334.

Zeater N, Cheong SK, Solomon SG, Dreher B, Martin PR. Binocular visual responses in primate lateral geniculate nucleus. *Curr Biol* 2015; 25: 3190-3195.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Paul Martin	226	146	239	376	192	4322
Ulrike Grünert	256	150	194	313	186	5008

*'Lifetime' = to end of 2015

Chapter in Book

Sefton AJ, Dreher B, Harvey AR, Martin PR (2014) Visual system. Chapter 30. In Paxinos G (ed), *The rat nervous system*. San Diego: Elsevier Academic Press, pp. 947-983.

Editorials in Journals

Marshak DW, Martin PR. Short wavelength-sensitive cones and the processing of their signals (Introduction). *Vis Neurosci* 2014; 31, 111-113.

Martin PR. Neuroscience: Who needs a parasol at night? (Dispatch) *Curr Biol* 2014; 24: R1164-R1166.

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014

Pietersen ANJ, Munn B, Cheong SK, Townsend R, Gong P, Solomon SG, Martin PR. Relation of Koniocellular pathway activity to low frequency (delta) electroencephalogram power in anaesthetised marmosets. *34th Annual Meeting of the Australasian Neuroscience Society, Adelaide, 28-31 Jan 2014; ORAL-17-07.* O

Chen SC, Morley JW, Solomon SG. Distributed coding of visual space in marmoset area MT. *34th Annual Meeting of the Australasian Neuroscience Society, Adelaide, 28-31 Jan 2014; ORAL-17-08.* O

Gharaei S, Arabzadeh E, Solomon SG. Distribution of visual and somatosensory signals in superior colliculus of rat. *34th Annual Meeting of the Australasian Neuroscience Society, Adelaide, 28-31 Jan 2014. POS-WED-187.* P

Solomon SS, Chen SC, Morley JW, Solomon SG. Correlated spiking activity mirrors coherence of local field potentials in the middle temporal (MT) area of marmoset. *34th Annual Meeting of the Australasian Neuroscience Society Adelaide, 28-31 Jan 2014. POS-THU-186.* P

Weltzien F, Lee SCS, Denkhau C, Martin PR, Grünert U. Characterization of calretinin immunoreactive cells in the human retina. *34th Annual Meeting of the Australasian Neuroscience Society, Adelaide, 28-31 Jan 2014. POS-THU-190.* P

Zeater N, Cheong SK, Solomon SG, Dreher B, Morley JW, Focke CMB, Martin PR. Binocular receptive fields in the marmoset lateral geniculate nucleus. *34th Annual Meeting of the Australasian Neuroscience Society, Adelaide, 28-31*

Jan 2014; POS-THU-194

P

Solomon SS, Chen SC, Morley JW, Solomon SG. Spatio-temporal distribution of gamma power and coherence in primate middle temporal area of the visual cortex. *Society for Neuroscience Meeting, Washington, DC, USA, 15–19 Nov 2014*. Poster 236.02/Z4

P

Townsend R, Solomon S, Martin PR, Solomon SG, Gong P. Dynamic coherent structures in slow-wave activity of primate visual cortex. *Society for Neuroscience Meeting, Washington, DC, USA, 15–19 Nov 2014*. Poster 39.04/C61

P

Zeater N, Cheong SK, Solomon SG, Dreher B, Morley JW, Martin PR. Binocular visual responses in primate lateral geniculate nucleus. *Society for Neuroscience Meeting, Washington, DC, USA, 15–19 Nov 2014*. Poster 333.05/EE15P

Grünert U, Weltzien F, Percival KA, Martin PR. Analysis of bipolar and amacrine populations in marmoset retina. *FASEB Meeting, Vermont, USA, 22–27 Jun 2014*.

P

2015

Grünert U, Lee SC, Weltzien F. Identification of calretinin immunoreactive amacrine cells in human retina. *Association for Research Vision and Ophthalmology meeting, Denver, Colorado, USA, 3–7 May 2015*. Poster A0082.

P

Masri R, Percival K, Koizumi A, Martin P, Grünert U. Synaptic contacts between the diffuse cone bipolar cell type DB3A and ganglion cells in the marmoset retina. *35th Annual Meeting of the Australasian Neuroscience Society, Cairns, 23–27 Aug 2015*. Poster MTU15-09.

P

Pietersen A, Zeater N, Cheong SK, Solomon SS, Martin PR. Effect of spike rate on response characteristics of koniocellular cells in the lateral geniculate nucleus of common marmosets. *35th Annual Meeting of the Australasian Neuroscience Society, Cairns, 23–27 Aug 2015*. Poster WTH18-12.

P

Purushothuma S, Lee SCS, Martin PR, Grünert U. Spatial relationship between cones and midget bipolar cells in human retina. *35th Annual Meeting of the Australasian Neuroscience Society, Cairns, 23–27 Aug 2015*. Poster WTH18-14.

P

Zeater N, Cheong SK, Solomon SG, Dreher B, Solomon SS, Pietersen A, Martin PR. Binocular neurons in marmoset lateral geniculate nucleus contrast sensitivity and response summation. *35th Annual Meeting of the Australasian Neuroscience Society, Cairns, 23–27 August 2015*. Poster WTH18-19.

P

Official for Scientific Societies

Member, Board of Directors, International Colour Vision Society, 2014–2015

Invited Presentations at National and International Conferences

2014

Grünert U, Percival KA, Koizumi A, Masri RA, Buzas P, Martin PR. Parallel pathways in the primate visual system. *Australian Neuroscience Society Satellite Meeting, Adelaide, 27 Jan 2014*

Grünert U, Masri RA, Percival KA, Koizumi A, Martin PR. Connections between bipolar and ganglion cells in the marmoset retina. *Asian Retina Meeting, Sendai, Japan, 14–15 Sep 2014*.

Martin PR. What happens to retinal signals at the first synapse in the brain? *Asian Retina Meeting, Sendai, Japan, 14–15 Sep 2014*.

Martin PR. Binocular inputs to single neurons in primate lateral geniculate nucleus. *Fall Vision Meeting, Philadelphia, PA, USA, 11 Oct 2014*.

2015

Martin PR, Zeater N, Cheong SK, Solomon SG, Pietersen ANJ, Dreher B. Binocular inputs to blue-ON and blue-OFF cells in marmoset lateral geniculate nucleus. *The 23rd Symposium of the International Colour Vision Society 2015, Sendai, Japan, 3–7 Jul 2015*.

Seminars

Martin PR

2014

Neuroscience Research Institute, Univ of California–Santa Barbara, Santa Barbara, CA, USA, Sep 2014

Department of Cell & Developmental Biology, Vanderbilt Univ, Nashville, TN, USA, Oct 2014

Centre for Perceptual Systems, Univ of Texas–Austin, Austin, TX, USA, Oct 2014

2015

Interaction of eye and brain signals in parallel visual pathways. Ernst Strungmann Institute for Neuroscience, Frankfurt, Germany, Jan 2015.

World of Colour: anatomy and physiology of colour vision pathways in primates. Eccles Neuroscience Institute, Australian National Univ, Canberra, Mar 2015.

Subcortical colour vision pathways: why do I study colour vision in colour-blind monkeys? Univ of Pisa, Italy, 26 May 2015.

Presidential Seminar: Behind the blue door: use of blue colours to understand the physiology of primitive visual pathways. National Institute for Physiological Sciences, Okazaki, Japan, 2 Jul 2015.

Radio

Martin PR

2014 (1)

It's just not cricket, interviewed by Glynn Greensmith, ABC 702, 4 pm 20 May 2014

2015 (1)

interviewed by Patricia Karvelas, ABC Radio National, ABC 702, 4 pm, 27 Feb 2015

Editorial Board(s) of Journal(s)

Martin PR

Associate Editor, *Visual Neuroscience*

Member, Editorial Board, *Vision Research*

Grünert U

Member, Editorial Board, *Journal of Comparative Neurology*

PhD Awarded

2015

Selena Solomon (co-supervised with SG Solomon [no relation]).

Manuscripts Refereed for Journals

2014 (19)

Cerebral Cortex (1), *Curr Biol* (1), *J Neurosci* (2), *J Physiol* (1), *Neuron* (1), *Vis Neurosci* (7), *Vis Res* (6)

2015

J Neurosci (2), *J Physiol* (1), *Nature* (1), *PLoS One* (1), *Procs Natl Acad Sci USA* (2), *Vis Neurosci* (4), *Vis Res* (4)

Grants Assessed for Funding Bodies

2014

NHMRC (14)

ARC (2)

Human Frontiers Science Program (1)

Belgian Research Council (1)

2015

NHMRC (16)

ARC (2)

Belgian Research Council (2)

Higher Degree Thesis Examined

2015

PhD, Australian National Univ

Service to the University

Member, Save Sight Institute Management Committee (2014–2015)

Grant Funding

NHMRC	Interaction of thalamic and cortical activity in the primate visual system	Martin PR	2012	–
		Solomon SG	2013	–
		Grünert U	2014	\$153,745
		Dreher B		
NHMRC	The cellular organization of interneurons in human retina	Grünert U	2013	
		Martin PR	2014	\$169,428
			2015	\$169,428
NHMRC	Brain pathways serving conscious and sub-conscious vision	Martin PR	2015	\$184,518
		Solomon SG	2016	
		Dreher B	2017	
		Grünert U		
		Rosa M		
ARC	ARC Centre of Excellence for Integrative Brain Function	Egan G	2014	\$276,034
		Robinson P	2015	\$276,034
		Martin PR	2016	
		Grünert U	2017	
			2018	
			2019	

Teaching

2014 and 2015

Unit of study name	Code	Class	Hours/year	Enrolment
Neuroscience: Motor Systems & Behaviour	NEUR3002	Lectures	4	120
Neuroscience: Motor Systems & Behaviour	NEUR3002	Tutorials	12	10
Integrative Neuroscience	NEUR3004	Paper session	8	10
Ophthalmic Science Training Course		Lectures	2	17
Australian Course in Advanced Neuroscience		Lectures	4	12

VITAMIN D, BONE & SKIN LABORATORY

REBECCA S MASON

Laboratory Personnel 2014–2015

Rebecca S Mason	Professor	University	1988–
Mark Rybchyn	Research Fellow	NHMRC (from 2010)	2005–
Tara Brennan-Speranza	Research Fellow (p/t)	NHMRC Early Career Fellowship	2013–14
Wannit Tongkao-On	PhD student	APA (Part-time 2014–)	2010–15
Myriam Abboud	PhD student	APA (2013–)	2012–15
Eric Song	MMed student (p/t)		2010–14
Sally Carter	MPhil student	Part-time (2013–)	2012–14
Kevin Lee	MPhil student	Part-time (2014–)	2013–15
Bianca McCarthy	PhD student	Faculty scholarship	2014–
Manori De Silva	PhD student		2015–
Ashley Yang	PhD student	APA	Jul 2015–
Jeremy Han	BSc(Hons) student		2015
Total effective full-time personnel		2014: 6	2015: 6

Lab Overview

This Laboratory has two major areas of interest – Vitamin D physiology generally with a particular interest in protection from UV irradiation by vitamin D compounds and how muscle contributes to the maintenance of vitamin D status; and the physiology of bone remodelling, with relevance to the prevention and treatment of osteoporosis.

Research Activities

In 2014-15, the group carried out further studies on the mechanism of action of vitamin D compounds in photoprotection, in collaboration with Profs Gary Halliday, Diona Damian, Assoc Prof Vivienne Reeve and Dr Katie Dixon. In collaboration with Dr Rob Tuckey from Univ of Western Australia, the group also examined naturally produced, but novel vitamin D compounds, produced in skin, for their capacity to reduce UV-induced DNA damage. The studies showed that the active vitamin D hormone, 1,25-dihydroxyvitamin D, as well as a range of vitamin D compounds, and some structurally related chemicals, protected from UV-induced DNA damage through an increase in DNA repair. This was partly due to improved energy availability, as well as more active repair in the cells and in skin. The protective effects of all these compounds required the presence of the vitamin D receptor in skin cells. Work in our group showed that vitamin D-like compounds, which have less capacity to cause hypercalcaemia and are cheaper and more stable than the vitamin D hormone, provide additional protection from the DNA damage inducing effects of UV when added to a 50+ sunscreen.

In work carried out with Prof David Fraser, evidence was obtained for specific regulation by mineral regulating hormones, of uptake and release mechanisms in muscle for the major circulating vitamin D metabolite. This mechanism may explain why the half-life of the major circulating metabolite of vitamin D, 25hydroxyvitamin D is much longer than any other steroid and much longer than that of its binding protein in blood.

In collaboration with Profs Arthur Conigrave and Wenhan Chang (Univ of California San Francisco) and Dr Tara Speranza, the group discovered that Homer proteins act as key links in signalling between calcium sensing receptors and anabolic and survival pathways in human bone cells. This work identified one of the Homer proteins as a potential therapeutic target for the treatment of osteoporosis.

Journal Articles

2014

- Abboud MA, Gordon-Thomson C, Hoy AJ, Balaban S, Rybchyn MS, Cole L, Su Y, Brennan-Speranza TC, Fraser DR, Mason RS. Uptake of 25-hydroxyvitamin D by muscle and fat cells. *J Steroid Biochem Mol Biol* 2014; 144: 232-236.
- Ke L, Ho J, Feng J, Mpofu E, Dibley MJ, Feng X, Van F, Leong S, Lau W, Lueng P, Kowk C, Li Y, Mason RS, Brock KE. Modifiable risk factors including sunlight exposure and fish consumption are associated with risk of hypertension in a large representative population from Macau. *J Steroid Biochem Mol Biol* 2014; 144: 152-155.
- Sun J, Lucas RL, Harrison SL, van der Mei I, Whiteman DC, Mason RS, Nowak M, Brodie AM, Kimlin MG. Measuring exposure to solar ultraviolet radiation using a dosimetric technique: Understanding participant compliance. *Photochem Photobiol* 2014; 90: 919–924.
- Girgis CM, Mokbel N, Cha KM, Houweling PJ, Abboud M, Fraser DR, Mason RS, Clifton-Bligh RJ, Gunton JE. The vitamin D receptor (VDR) is expressed in skeletal muscle of male mice and modulates 25-hydroxyvitamin D (25OHD) uptake in myofibers. *Endocrinology* 2014; 155: 3227–3237.
- Saw RPM, Armstrong, BA, Mason RS, Morton RL, Shannon KF, Spillane AJ, Stretch JR, Thompson JF. Adjuvant therapy with high dose vitamin D following primary treatment of melanoma at high risk of recurrence: A placebo controlled randomised phase II trial. *BMC Cancer* 2014, 14: 780.
- Mak JC, Klein LK, Finnegan T, Mason RS, Cameron ID. An initial loading-dose vitamin D versus placebo after hip fracture surgery: baseline characteristics of a randomized controlled trial (REVITAHIP). *BMC Geriatr* 2014; 14: 101.
- Durvasula S, Gies P, Mason RS, Chen JS, Henderson S, Seibel M, Sambrook PN, March LM, Lord SR, Kok C. Vitamin D response of older people in residential aged care to sunlight derived ultraviolet radiation. *Arch Osteoporosis* 2014; 9: 197.
- Gordon-Thomson C, Tongkao-On W, Song EJ, Carter SE, Dixon KM, Mason RS. Protection from UV damage and photocarcinogenesis by vitamin D compounds. *Adv Exp Med Biol* 2014; 810: 303-328.
- Lee WH, Loo CY, Bebawy M, Young PM, Traini D, Luk F, Mason RS, Rohanizadeh R. Recent advances in curcumin nano-formulation for cancer therapy. *Expert Opin Drug Deliv* 2014; 11: 1183-1201.
- McCarthy BY, Dixon KM, Halliday GM, Reeve VE, Mason RS. The vitamin D saga: Breaking dawn. *Immunol Endocr Metab Agents Medicinal Chem* 2014; 14: 137-151.

2015

- Klein LK, Mak JC, Mason RS, Cameron ID. Contemporary pain management in elderly patients after hip fracture surgery: Cross-sectional analyses at baseline of a randomized controlled trial. *Clin J Pain* 2015; 31: 788 – 793.
- Tongkao-on W, Carter S, Reeve VE, Dixon KM, Gordon-Thomson C, Halliday GM, Tuckey RC, Mason RS. CYP11A1 in skin: An alternative route to photoprotection by vitamin D compounds. *J Steroid Biochem Mol Biol*; 148: 72-78.
- Lee WH, Bebawy M, Loo CY, Luk F, Mason RS, Rohanizadeh R. Fabrication of curcumin micellar nanoparticles with enhanced anti-cancer activity. *J Biomed Nanotechnol* 2015; 11: 1093-1105.
- Ke L, Mason RS, Mpofu E, Dibley M, Brock KE. Vitamin D and parathyroid hormone status in a representative population living in Macau, China. *J Steroid Biochem Mol Biol* 2015; 148: 261-268.
- Durvasula S, Mason RS, Kok C, Macara M, Parmenter TR, Cameron ID. Outdoor areas of Australian residential aged care facilities do not facilitate appropriate sun exposure. *Aust Health Rev* 2015; 39: 406-410.
- Ke L, Mason RS, Mpofu E, Dibley M, Brock KE. Vitamin D and parathyroid hormone status in a representative population living in Macau, China. *J Steroid Biochem Mol Biol* 2015; 148, 261-268.
- Ke L, Mason RS, Kariuki M, Mpofu E, Brock KE. Vitamin D status and hypertension: a review. *Integrated Blood Press Control* 2015; 8: 13-35.

Chapter in Book

- Gordon-Thomson C, Tongkao-On W, Song EJ, Carter SE, Dixon KM, Mason RS. Protection from UV damage and photocarcinogenesis by vitamin D compounds. Biosciences chapter 17. In: Reichrath L (ed). *Sunlight, Vitamin D and Skin Cancer*, 2nd edition, 2014, pp 303-328.

Official for Scientific Societies, including for National and International Conferences

- Member, finance committee, International Workshops on Vitamin D, 2014–

Selected Invited Presentations at National and International Conferences

2014

Mason RS. An update on Vitamin D. *Pediatric Endocrinology Group, Rambam Hospital, Technion, Haifa, Israel, Aug 2014.*

Mason RS. Photoprotection by vitamin D compounds. *Sydney Cancer Conference, Nov 2014.*

2015

Rybchyn MS (Speranza TC, Conigrave AD, Mason RS). The upstream and downstream of CASR-dependent AKT signaling in human osteoblasts. *Second Symposium on the Calcium-Sensing Receptor, San Diego, CA, USA, Mar 2015.*

Mason RS. Mechanisms of protection from UV-induced DNA damage by vitamin D compounds. *Joint Meeting of the Molecular and Experimental Pathology Society of Australasia, the ANZ Bone and Mineral Society and the Matrix Biology Society of ANZ. Hobart, Tas, Nov 2015.*

News Media

In newspapers

2014

ABS statistics on vit D deficiency, by Lucy Carroll. *Sydney Morning Herald / The Age, 15 April 2014*

2015

Vitamin D in winter, by Daniela Hutchens. *Daily Telegraph, 7 May 2015*

In magazine articles

2014

Vitamin D in winter, by Sarah Marinos. *Coles Baby & Toddler Magazine, May 2014*

Vitamin D testing, by Katherine Boehringer. *Medical Observer, 27 Nov 2014.*

Television

2014

ABS vitamin D statistics. *Prime TV, 16 Apr 2014*

Vitamin D deficiency. Interviewed by Angela Brown. *HeathyMe TV. 14 Nov 2014*

Melanoma. *Save Your Life Tonite, ABC2, 14 Nov 2014*

Skin – Save Your Life Tonight. *Wild Fury Productions, ABC TV, 21 Dec 2014*

2015

Risks and benefits of sun exposure. Interviewed by Gabby Rogers. *Channel 9 News, 6 pm, 30 Jul 2015*

Radio

2014

ABS vit D stats. *3AW Melbourne radio, Apr 16 2014*

ABS vit D stats. *Josh Becker, ABC Central West, Apr 16 2014*

ABS vit D stats. *BBC5 (phone), Apr 16 2014*

ABS vit D stats. *Dave O'Neill, Melbourne 774, Apr 22 2014*

2015

Vitamin D in workers. Interviewed by Clinton Maynard. *2UE, 1 pm 7 May 2015*

Editorial Board of Journals

Journal of Bone & Mineral Research, 2010–

Endocrinology, 2013–

Scholarships Awarded

2014

APA – Wannit Tongkao-On

APA – Myriam Abboud

SMS Faculty Award – Bianca McCarthy

2015

SMS Faculty Award – Bianca McCarthy

APA – Myriam Abboud (till mid-year)

IPRS – Chen (Ashley) Yang (from mid-year)

PhDs Awarded

2015

Wannit (Anna) Tongkao-On

Myriam Abboud

MPhils Awarded

2014

Eric Song

Sally Carter

2015

Kevin Lee

BSc(Hons) Awarded

2015

Jeremy Han

Service to the University

Deputy Director, Bosch Institute, 2010–

Head, Discipline of Physiology, 2002–

Service to Government and the Profession

Board Member, Osteoporosis, 2002–

Member, working party, Sun and Health, Cancer Councils of Australia, 2004–

Member, Technical Committee, Commission Internationale de L'Eclairage (International Commission of Illumination) – 6-66 (Maintaining summer levels of 25-hydroxyvitamin D during winter), 2012–

Grant Funding

NHMRC	Is CYP11A1 critical for the vitamin D photoprotective system in skin?	Mason RS	2014	\$171,598
		Halliday GM	2015	\$171,598
		Tuckey R		
NHMRC	Engendering biased signalling at the human calcium sensing receptor (CaSR) to correct pathophysiology.	Dixon KM		
		Reeve VE		
		Leach K	2015	\$214,718
		Conigrave AC		
		Mason RS		

ENVIRONMENTAL PHYSIOLOGY LABORATORY

BRONWYN M McALLAN

Bronwyn M McAllan	Senior Lecturer	University	2011–
Hayley Stannard	ARC Postdoctoral fellow	University	2014–
Lihong Yuan	China Scholarship Council Visiting Fellow	University	2014
Petra Hanke	Research assistant (p/t)	University	2013–2014
Melanie Laird	PhD student		2013–
Jessica Dudley	PhD student		2014–
Total effective full-time personnel		2014: 6	2015: 5

Lab Overview

This Lab works in the area of comparative physiology. Research is aimed at understanding the mechanisms by which mammals respond physiologically to environmental change. Work has involved photoperiodic control of reproduction and torpor in mammals, with a focus on Australian mammals. Current work involves the evolution of the placenta in diverse mammals and the use of diet selection in optimizing reproduction in endangered Australian mammals, including the Tasmanian Devil.

Research Activities

Animal models are frequently used to understand physiological mechanisms. Comparative physiologists use the diverse information that can be discovered in a wide variety of non-laboratory animals to help formulate ideas about physiological processes. Of particular interest in this Laboratory is the photoperiodic regulation of physiological activities and the mechanism by which photic information is transduced from the eye, to the nervous system and into an endocrine signal. The expression of photoperiodism in humans is best seen in those individuals who experience seasonal affective disorder (SAD).

Research in 2014 and 2015 focused on the environmental control of structure and function in mammals, especially marsupials. Research areas included the photoperiodic control of reproduction, and the seasonal implications for metabolism. Other research related to the seasonal physiological and endocrine changes in mammals and the morphological implications of these. During 2014 and 2015 we continued work on the environmental control of reproduction and thermoregulation in marsupials, especially the dunnarts (*Sminthopsis* spp). We also worked on the evolution of the structure and function of the placenta, our focus being primarily the placentae of marsupials. We also continued collaborative work with colleagues from around the world on the physiology, biochemistry and molecular biology of mammals. We are continuing work on the anatomy and physiology of marsupials using dunnarts in collaboration with Prof David Raubenheimer, Prof Stephen Simpson (Charles Perkins Centre), Prof Chris Murphy (Anatomy & Histology), Prof Michael Thompson (School of Life and Environmental Sciences), Dr Jan Slapeta (Veterinary Sciences) and Prof Fritz Geiser (University of New England).

Journal Articles

2014

Stannard HJ, McAllan BM, Old JM. Dietary composition and nutritional outcomes in two marsupials, *Sminthopsis macroura* and *S. crassicaudata*. *J Mammal* 2014; 95: 503-515.

McAllan BM. Stress and life: Lessons from comparative models. *Endocrinologist* 2014; 113: 14.

McAllan BM, Geiser F. Torpor during reproduction in mammals and birds: Dealing with an energetic conundrum. *Integr Comp Biol* 2014; 54: 516-532.

Laird MK, Thompson MB, Murphy CR, McAllan BM. Uterine epithelial cell changes during pregnancy in a marsupial (*Sminthopsis crassicaudata*; Dasyuridae). *J Morphol* 2014; 275: 1081-1092.

2015

Dudley JS, Murphy CR, Thompson MB, McAllan BM. Desmoglein-2 during pregnancy and its role in the evolution of viviparity in a marsupial (*Sminthopsis crassicaudata*; Dasyuridae). *J Morphol* 2015; 276: 261-272.

Van Herck SL, Delbaere J, Bourgeois NM, McAllan BM, Richardson SJ, Darras VM. Expression of thyroid hormone transporters and deiodinases at the brain barriers in the embryonic chicken: Insights into the regulation of thyroid hormone availability during neurodevelopment. *Gen Comp Endocrinol* 2014; 214: 30-39.

Laird MK, Turancova M, McAllan BM, Murphy CR, Thompson MB. Unlocking amniote live birth: The 'other' mammalian model. *J Proc Royal Soc New South Wales* 2015; 148: 52-59.

Member of Editorial Board of Journal

Associate Editor, *Australian Mammalogy*, 2007–

Service to Professional Society

Member, governing committee, Asia and Oceania Society for Comparative Endocrinology 2009– (sole Australian representative)

Manuscripts Refereed for Journals

Oecologia, *Reproduction*, *Am J Physiol*, *J Applied Physiol*, *J Comp Physiol B*, *Gen Comp Endocrinol*, *J Endocrinol*, *Comp Biochem Physiol*, *J Mammal*, *J Zool*, *Aust J Zool Wildlife Res*.

Grant Applications Assessed

ARC

Grant Funding

ARC Discovery Project DP130101589	Lively reproduction: do common molecules underlie all vertebrate live birth?	Murphy CR	2013	\$310,000
		Prof MB	2014	
		Thompson MB	2015	
		McAllan BM		
ARC Linkage Program LP140100235	Dining with Dasyurids: Using nutritional geometry to improve diets for captive breeding programs	Raubenheimer D	2014	\$284,500
		Wilder S	2015	
		McAllan BM	2016	
		Simpson S	2017	
		Spindler R		
		Van Sluys M		
Shaw M				

BASIC & CLINICAL GENOMICS LABORATORY

BRIAN J MORRIS

Laboratory Personnel 2014–2015

Brian J Morris	Professor Emeritus (from 2013)	1978–
Lilian J Morris	Honorary Research Assistant (casual)	2001–
Francine Z Marques	Honorary Associate	2012–
M Andrea Markus	Honorary Associate	2010–15
Yu (Eric) Wang	Honorary Associate	2013–15
Total effective full-time personnel	2014: 1.1	2015: 1.1

Lab Overview

Research involves (i) molecular genetics of hypertension, (ii) molecular genetics of longevity, (iii) the function of splicing factors, (iv) the placental (pro)renin-angiotensin system in premature labour, and (v) the benefits of male circumcision.

Research Activities

Longevity: Research continued on the molecular genetic basis of attainment of extreme old age (living to 95 years or older). This involved collaboration with Brad Willcox and colleagues at Kuakini Medical Center and University of Hawaii in Honolulu. The subjects had been recruited in the mid-1960s as part of the Honolulu Heart Program (HHP) that over time and extensive follow-up became the Hawaii Lifespan Study. All were American men of Japanese ancestry living on the island of Oahu. During the study period we evaluated multiple single nucleotide polymorphisms (SNPs) in genes in the mechanistic target of rapamycin (mTOR) pathway (which is involved in growth). None of the SNPs were associated with longevity.

The Kuakini group was the first to implicate genetic variation in the gene encoding the transcription factor FoxO3 with longevity. We set out to discover what causes of death the longevity-associated allele protected against. A 15 year longitudinal study showed it was mainly coronary heart disease. Subjects with the protective allele had lower serum tumor necrosis factor- α , so implicating reduced inflammation, which is contributes to atheroma. The protective allele of FOXO3 was also associated with reduced prevalence of infection.

We also demonstrated an association of the FOXO3 protective allele with reduced height and shorter stature with longer lifespan.

Hypertension: Studies involving the offspring of the HHP subjects led us to find an association of the major longevity-associated variant of FOXO3 with hypertension and blood pressure in women. Another study found that SNPs in the gene encoding raptor, which is a component of the TOR complex, were associated with being overweight, but not hypertension.

With former PhD student Francine Marques, now at the Baker IDI Institute in Melbourne, Fadi Charchar at Federation University of Australia and Maciej Tomaszewski, University of Leicester, we found the microRNA miR-181a in kidney tissue from 200 human subjects correlated inversely with renin expression in the collecting duct and directly with miR-181a in the circulation, as well as with blood pressure. By next generation RNA sequencing the signatures of miR-181a in the renal transcriptome were determined. These included mitochondrial pathways and signalling cascades of adaptive immunity and inflammation. The findings added to prior studies in my Lab that have revealed pathway abnormalities and mechanisms responsible for the etiology of essential hypertension. Those studies implicated elevated intrarenal renin expression caused by downregulation of miR-181a as a pathogenic mechanism of essential hypertension.

Splicing factor RBM4: Analyses were completed on transcriptome-wide exon array experiments that identified all of the messenger RNA targets for the splicing factor RBM4 cloned by the Lab. These data and the results of functional experiments implicating RBM4 in various cancers were written up and accepted for publication.

Journal Articles

2014 (5)

Morris BJ, Donlon TA, He Q, Grove JS, Masaki KH, Elliott A, Willcox DC, Willcox BJ. Association analyses of insulin signalling pathway gene polymorphisms with healthy aging and longevity in Americans of Japanese ancestry. *J Gerontol A Biol Sci Med Sci* 2014; 69: 270-273. (+ 8 page online supplement containing 1 Figure and 2 Tables).

He Q, Morris BJ, Grove JS, Petrovic H, Ross W, Masaki KH, Rodriguez B, Chen R, Donlon TA, Willcox BJ. Shorter men live longer: Association of height with longevity and FOXO3A genotype in American men of Japanese ancestry. *PLoS One* 2014; 9: article e94385, 1-8.

Morris BJ, Bailis SA, Wiswell TE. Circumcision rates in the United States: Rising or falling? What effect might the new affirmative pediatric policy statement have? *Mayo Clin Proc* 2014; 89: 677-686. Supporting video at: <http://youtu.be/6Oq9GONsBlk> [Invited Review]

Morris BJ, Hankins CA, Tobian AAR, Krieger JN, Klausner JD. Does male circumcision protect against sexually transmitted infections? – Arguments and meta-analyses to the contrary fail to withstand scrutiny. *ISRN Urol* 2014: article 684706: 1-23.

Morris BJ, Tobian AAR, Hankins CA, Klausner JD, Banerjee J, Bailis SA, Wiswell TE. Veracity and rhetoric in paediatric medicine: A critique of Svoboda and Van Howe's response to the AAP policy on infant male circumcision. *J Med Ethics* 2014: 40: 463-470.

2015 (10)

Morris BJ. Renin, genes, microRNAs, and renal mechanisms involved in hypertension. (Irvine Page–Alva Bradley Lifetime Award) *Hypertension* 2015; 65: 956-962.

Morris BJ, Donlon TA, He Q, Grove JS, Masaki KH, Elliott A, Willcox DC, Willcox BJ. Genetic analysis of TOR complex gene variation with human longevity: A nested case-control study of American men of Japanese ancestry. *J Gerontol A Biol Sci Med Sci* 2015; 70: 133-142. (+ online supplement containing 4 Figures and 2 Tables).

Morris BJ, Carnes BA, Chen R, Donlon TA, He Q, Grove JS, Masaki KH, Willcox DC, Allsopp R, Willcox BJ. Genetic variation in the raptor gene is associated with overweight but not hypertension in American men of Japanese ancestry. *Am J Hypertens* 2015; 28: 508-517.

Wamai RG,* Morris BJ,* Bailey RC, Klausner JD, Boedicker MN. Male circumcision for protection against HIV infection in sub-Saharan Africa: the evidence in favour justifies the implementation now in progress. *Glob Public Health* 2015; 10: 639-666. (*equal first author)

Cox G, Krieger JN, Morris BJ. Histological correlates of penile sexual sensation: Does circumcision make a difference? *Sex Med* 2015; 3: 76-85.

Morris BJ, Krieger JN. Male circumcision does not reduce sexual function, sensitivity or satisfaction. *Adv Sex Med* 2015; 5: 53-60.

Morris BJ, Willcox DC, Willcox BJ, Donlon TA. FOXO3 – A major gene for human longevity. (Invited Review) *Gerontology* 2015; 61: 515-525.

Marques FZ, Romaine SPR, Denniff M, Eales J, Dormer J, Garrelds IM, Wojnar L, Musialik K, Duda-Raszewska B, Kiszka B, Duda M, Morris BJ, Samani NJ, Danser AHJ, Bogdanski P, Zukowska-Szczechowska E, Charchar FJ, Tomaszewski M. Signatures of miRNA-181a on the transcriptome of human kidney and blood pressure regulation. *Mol Med* 2015; 21: 739-748.

Morris BJ, Chen R, Donlon TA, Evans DS, Tranah GJ, Parimi N, Ehret GB, Newton-Cheh C, Seto T, Willcox DC, Masaki KH, Kamide K, Ryuno H, Oguro R, Nakama C, Kabayama M, Yamamoto K, Sugimoto K, Ikebe K, Masui Y, Arai Y, Ishizaki T, Gondo Y, Rakugi H, Willcox BJ. Association analysis of FOXO3 longevity variants with blood pressure and essential hypertension. *Am J Hypertens*; Epub ahead of print Oct 16, 2015: 1-9.

Morris BJ, Wamai RG, Krieger JN, Banerjee J, Klausner JD. Male circumcision to prevent syphilis in 1855 and HIV in 1986 is supported by accumulated scientific evidence to 2015: Response to Darby. *Glob Public Health*; Epub ahead of print Nov 13, 2015: 1-19.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Brian J Morris	321	286	239	278	371	7,101

*'Lifetime' = to end of 2015

H index: 44

Chapter in Book

Morris BJ, Green EC. Circumcision, male. In: Cockerham WC, Dingwall R, Quah SR (eds), *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*, 1st edition, John Wiley & Sons, 2014, pp 253-256, Online ISBN: 9781118410868, DOI: 10.1002/9781118410868, 4 pages.

Editorials in Journals

2015 (4)

Morris BJ, Klausner JD. In developed countries male circumcision prevalence is inversely related to HIV prevalence. *Israel J Health Policy Res* 2015; 4: article 40; 1-4.

Harrap SB, Morris BJ. Blood pressure genetics just don't add up. *Circ Cardiovasc Genet* 2015; 8: 541-543.

Morris BJ, Dampney RAL. Brain-stem microRNAs implicated in hypertension. *Physiol Genomics* 2015 47: 386-387.

Morris BJ. Do the benefits of male circumcision outweigh the risks? A critique of the proposed CDC guidelines. (Critical Commentary on article by Earp BD) *Frontiers Pediatr* 2015; 3: article 88.

Letters to the Editor (in Journals)

2014 (4)

Morris BJ. Reply to "Circumcision: A bioethical challenge" by Svoboda & Van Howe. *J Med Ethics* -2014: E-Letter 16791. http://jme.bmj.com/content/early/2013/08/16/medethics-2013-101614/reply#medethics_el_16791.

Morris BJ, Tobian AAR, Hankins CA, Klausner JD, Banerjee J, Bailis SA, Wiswell TE, Zoloth LS. Unethical not to recommend circumcision. *J Med Ethics* 2014; E-letter 16815. http://jme.bmj.com/content/early/2013/08/16/medethics-2013-101614/reply#medethics_el_16815

Morris BJ, Bailis SA, Wiswell TE. In reply – Bias and male circumcision. *Mayo Clin Proc* 2014; 89: 1588-1589.

Morris BJ. Scientific evidence dispels false claims about circumcision. *Can Urol Assoc J* 2014; 8: 396-397.

2015 (4)

Morris BJ, Krieger JN. The literature supports policies promoting neonatal male circumcision in North America. *J Sex Med* 2015; 12: 1305.

Wamai RG, Morris BJ,* Bailey RC, Klausner JD, Boedicker MN. Debating male circumcision for HIV prevention: A one-sided argument does not represent a legitimate 'controversy' analysis: Reply to de Camargo et al. *Glob Public Health* 2015; 10: 672-678. (*equal first authors)

Morris BJ, Wiswell TE. 'Circumcision pain' unlikely to cause autism. *J Roy Soc Med* 2015: 108: 297.

Morris BJ. Implications of circumcision complications for hospital policy. *J Paediatr Child Health* 2015; 51: 1244-1245.

Youtube video published by journal

Circumcision rates in the US: Rising or falling? By Brian Morris. Youtube video posted by *Mayo Clinic Proceedings*, 2 Apr 2014. <http://www.youtube.com/watch?v=6Oq9GONsBlk>

Scholarly Magazine and Newsletter Articles

2014 (2)

Morris BJ. Comment on: Circumcision rates in the United States: Rising or falling? What effect might the new affirmative pediatric policy statement have? *MDLinx* 2014; May 3. <http://www.mdlinx.com/hospital-administration/news-article.cfm/5249736>

Morris BJ. Comment on: Genetic variation in the raptor gene is associated with overweight but not hypertension in American men of Japanese ancestry. *MDLinx* 2014; Oct 3. <http://www.mdlinx.com/cardiology/news-article.cfm/5590058>

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014 (9)

Wang Y, Morris BJ, Roberts C, Broughton-Pipkin F, Lumbers ER, Pringle K. Effect of low oxygen on the pro-angiogenic pathways of the renin-angiotensin system (RAS) in a human trophoblast cell line. *Perinatal Society of Australia and New Zealand, 17th Annual Congress, Adelaide, 6-9 Apr 2014.*

Morris BJ. Irvine Page—Alva Bradley Lifetime Achievement Award. Renin and hypertension: 44 years of molecular discoveries. *High Blood Pressure Research Scientific Sessions 2014.* Council on Hypertension, American Heart Association, San Francisco, 9-12 Sep. (Invited) O/I

Morris BJ, Willcox BJ, Chen R, Masaki KH, He Q, Grove JS, Willcox DC, Allsopp R, Moisyadi, S, Poon LW, Donlon TA. FOXO3 genotype increases lifespan by a major effect on cardiovascular mortality. *High Blood Pressure Research Scientific Sessions 2014*, American Heart Association, San Francisco, 9-12 Sep 2014, abstract # 661, p 181. P

Morris BJ, Carnes BA, Chen R, Donlon TA, He Q, Grove JS, Masaki KH, Elliott A, Willcox DC, Allsopp R, Willcox BJ. Association analysis of raptor gene variants with overweight and hypertension in American men of Japanese ancestry. *High Blood Pressure Research Scientific Sessions 2014*, American Heart Association, San Francisco, 9-12 Sep 2014, abstract 662, p 182. P

Morris BJ, Willcox BJ, Tranah GJ, Chen R, Masaki KH, He Q, Grove JS, Willcox DC, Allsopp R, Moisyadi, S, Poon LW, Newman AB, Harris TB, Cummings SR, Parimi N, Evans DS, Donlon TA. FOXO3 genotype increases lifespan by a major effect on cardiovascular mortality. *2014 Lifespan Research Day*, University of Sydney, 3 Nov 2014, abstract O7, p 11. O

Morris BJ, Tobian AAR, Wodak AD, Hankins CA, Krieger JN, Wiswell TE, Klausner JD. Risk-benefit analysis attest to the importance of neonatal male circumcision to public health and individual well-being. *2014 Lifespan Research Day*, University of Sydney, 3 Nov 2014, abstract P21, p 27. P

Morris BJ, Willcox BJ, Tranah GJ, Chen R, Masaki KH, He Q, Grove JS, Willcox DC, Allsopp R, Moisyadi, S, Poon LW, Newman AB, Harris TB, Cummings SR, Parimi N, Evans DS, Donlon TA. FOXO3 genotype increases lifespan by a major effect on cardiovascular mortality. *State of the Heart 2014* (joint meeting of the High Blood Pressure Research Council of Australia and other societies), Adelaide, South Australia, 26-28 Nov 2014, abstract # 74, p 54. O

Marques FZ, Romaine SPR, Denniff M, Eales J, Dormer J, Garrelds I, Wojnar L, Musialik K, Raszewska BD, Kiszka B, Duda M, Morris BJ, Samani NJ, Danser AHJ, Bogdanki P, Zukowska-Szczechowska E, Tomaszewski M,, Charchar FJ. Kidney and circulating miR-181a are associated with renin and blood pressure in humans. *State of the Heart 2014* (joint meeting of the High Blood Pressure Research Council of Australia and other societies), Adelaide, South Australia, 26-28 Nov 2014, abstract # HBP 24, p 119. P

Morris BJ, Carnes BA, Chen R, Donlon TA, He Q, Grove JS, Masaki KH, Elliott A, Willcox DC, Allsopp R, Willcox BJ. Genetic variation in the raptor gene is associated with overweight but not hypertension in American men of Japanese ancestry. *State of the Heart 2014* (joint meeting of the High Blood Pressure Research Council of Australia and other societies), Adelaide, South Australia, 26-28 Nov 2014, abstract # HBP 25, p 120. P

2015 (4)

Wachtel MS, Yang S, Morris BJ. Countries with high circumcision prevalence have lower prostate cancer mortality. *Prostate Cancer Special Interest Group Mini-Symposium*, Sydney 26 Jun 2015. O

Wachtel MS, Yang S, Morris BJ. Countries with high circumcision prevalence have lower prostate cancer mortality. *Chris O'Brien Lifehouse Research Symposium*, Sydney, 18 Sep 2015. P

Willcox BJ, Morris BJ, Tranah GJ, Chen R, Masaki KH, He Q, Willcox DC, Allsopp R, Moisyadi S, Poon LW, Rodriguez B, Newman AB, Harris TB, Cummings SR, Liu Y, Parimi N, Evans DS, Donlon TA. FOXO3 genotype strongly impacts coronary heart disease mortality in three populations. *American Heart Association Scientific Sessions*, Orlando, Florida, USA, 7–11 Nov 2015, abstract 19547. *Circulation* 2015; 135: e29–e322. O

Morris BJ, Chen R, Donlon TA, Evans DS, Tranah GJ, Parimi N, Ehret GB, Newton-Cheh C, Seto T, Willcox DC, Masaki KH, Kamide K, Ryuno H, Oguro R, Nakama C, Kabayama M, Yamamoto K, Sugimoto K, Ikebe K, Masui Y, Arai Y, Ishizaki T, Gondo Y, Rakugi H, Willcox BJ. Association analysis of FOXO3 longevity variants with blood pressure and essential hypertension. *37th Annual Scientific Meeting of the High Blood Pressure Research Council of Australia*, Melbourne, 2-4 Dec 2015, 41. O

Commercial Activities

Advancing business and laboratory arrangements for involvement of a commercial testing facility in testing for high-risk human papillomavirus (HPV) types from self-collected cervicovaginal samples as Australia moves towards adoption of the testing modality (PCR) Brian Morris and Brian Nightingale patented with a globally competitive priority date of 26 Feb 1987 in the USA, Australia and several European countries.

Official for Scientific Societies

Member, Executive Committee, High Blood Pressure Research Council of Australia, Dec 2013–Dec 2016 (with option to be elected for a further 3 years) – (NSW representative and Editor of Proceedings)

Invited Presentation at International Conference

Invited Presentation at International Conference

2015

Morris BJ. Irvine Page–Alva Bradley Lifetime Achievement Award. Renin and hypertension: 44 years of molecular discoveries. *High Blood Pressure Research Scientific Sessions 2014*. American Heart Association, San Francisco, 9-12 Sep.

Session Chair

2014

State of the Heart 2014 (joint meeting of the High Blood Pressure Research Council of Australia and other societies), Adelaide, South Australia, 26-28 Nov 2014

2015

37th Annual Scientific Meeting of the High Blood Pressure Research Council of Australia, Melbourne, 2-4 Dec 2015

News Media

News report in journal

Circumcision: Rates, risks, and benefits. By Cornelius W. Van Niel, MD, *New England Journal of Medicine*, 13 May 2014 <http://www.jwatch.org/na34595/2014/05/13/circumcision-rates-risks-and-benefits>

In newspaper articles

2014 (14)

Circumcision divide between Denmark and Israel. *The Copenhagen Post* 24 Jan 2014.

Circumcision as vaccine? Public health risk seen in falling rates. *Los Angeles Herald*, 2 Apr 2014. <http://www.losangelesherald.com/index.php/sid/220756649/scat/fb382975d494227f>

Childhood benefits from circumcision. By Nicolas Bakalar, *New York Times*, 8 Apr 8 2014, page D6.), http://well.blogs.nytimes.com/2014/04/07/circumcision-benefits-outweigh-risks-study-reports/?_php=true&_type=blogs&_r=0

To snip or not to snip – Sydney University Emeritus Professor Brian Morris claims circumcision should be a routine procedure for boys. By Brad Crouch, *Daily Telegraph*, 3 Apr 2014 <http://www.dailytelegraph.com.au/news/to-snip-or-not-to-snip-sydney-university-emeritus-professor-brian-morris-claims-circumcision-should-be-a-routine-procedure-for-boys/story-fnii5yv6-1226873397508>

To snip or not to snip – Sydney University Emeritus Professor Brian Morris claims circumcision should be a routine procedure for boys. By Beth Crouch, *The Advertiser*, 3 Apr 2014 <http://www.adelaidenow.com.au/news/south-australia/to-snip-or-not-to-snip-sydney-university-emeritus-professor-brian-morris-claims-circumcision-should-be-a-routine-procedure-for-boys/story-fni6uo1m-1226873397508>

Circumcision as important as vaccination, controversial study suggests. *New Zealand Herald*, 3 Apr 2014 http://www.nzherald.co.nz/lifestyle/news/article.cfm?c_id=6&objectid=11231449

On 'mandatory' circumcision. By Wendy Tuohy, *Herald Sun*, 4 Apr 2014. http://blogs.news.com.au/heraldsun/theperch/index.php/heraldsun/comments/should_circumcision_be_mandatory/

Circumcision should be offered 'like vaccines'. *The Sunday Times*, 6 Apr 2014. <http://www.sundaytimes.lk/140406/sunday-times-2/circumcision-should-be-offered-like-vaccines-91611.html>

Short men live longer – and it's all because of their genes: Those below 5ft 2in have longest lives, study shows. By Ben Spencer, *Daily Mail*, 12 May 2014. <http://www.dailymail.co.uk/health/article-2625870/Short-men-live-longer-genes-Those-5ft-2in-longest-lives-study-says.html>

Shorter men live longer, scientists find. *The Telegraph*, 12 May 2014. <http://www.telegraph.co.uk/news/science/science-news/10823649/Shorter-men-live-longer-scientists-find.html>

Shorter men are likely to live longer because they carry the 'longevity gene', scientists reveal. *The Independent*, UK, 12 May 2014. <http://www.independent.co.uk/life-style/health-and-families/health-news/short-men-are-likely-to-live-longer-because-they-carry-the-longevity-gene-scientists-reveal-9356759.html>

Shorter men live longer lives, study finds. By Derek Andersen, *USA Today*, 16 May 2014. <http://www.usatoday.com/story/news/nation/2014/05/16/newser-shorter-men-live-longer-lives/9184935/>

Hitchen's phallus-y. *Honi Soit*, week 8 Semester 1 2014, p 7.

More boys get the snip the rise despite 'unethical' ban. By Lucy Carroll, *Sydney Morning Herald*, 7 Jun 2014 p 3.

In magazine articles

2014 (4)

Experts head to head over circumcision. By Emily Dunn, *Medical Observer* (Australia), 8 Apr 2014 <http://www.medicalobserver.com.au/news/experts-head-to-head-over-circumcision>

Benefits of neonatal circumcision outweigh risks. *Pri•Med, Genitourinary News*, 8 Apr 2014. <http://www.pri-med.com/pmo/MedicalNewsDetail.aspx?id=13183&topic=mc-topic::JJY7Y3J02>

NZ health expert damns research calling for the return of male circumcision. By Amanda Cameron, *NZ Doctor*, 3 Apr 2014 <http://www.nzdoctor.co.nz/news/2014/april-2014/03/nz-health-expert-damns-research-calling-for-the-return-of-male-circumcision.aspx>

Circumcision rates in the United States: Rising or falling? What effect might the new affirmative pediatric policy statement have? *MDLinx*, 2 May 2014. <http://mdlinx.pdr.net/hospital-administration/news-article.cfm/5249736/circumcision-rate>

2015 (1)

Are circumcised men better lovers? By Matty Silver, *The Beast*, Dec issue 2015.

Television interviews

2014 (2)

To cut or not to cut. *Al Jazeera*, "In the Stream" program, Live TV interview (via Skype), Interviewer Femi Oke, Washington, DC, 21 Apr 2014. <http://stream.aljazeera.com/story/201404212110-0023656>

The truth about male circumcision. Interviewed by Andrew Rochford, *Channel 7 Evening News*, 22 Sep 2014.

In television news reports

2014 (9)

Circumcision rates declining in U.S., study says. Jessica Ferger, *CBS News*, 2 Apr 2014 <http://www.cbsnews.com/news/circumcision-rates-declining-health-risks-rising-study-says/>

Study: Circumcision rates declining among US males. *CBS Atlanta, CW69 cable*, 3Apr 2014 <http://atlanta.cbslocal.com/2014/04/03/study-circumcision-rates-declining-among-us-males/>

Circumcision rate falls despite health risks. Linda Carroll, *NBC News*, 2 Apr 2 2014 <http://www.nbcnews.com/health/kids-health/circumcision-rate-falls-despite-health-risks-n69891>

Circumcision study 'worrying and non-substantive'. *OneNews, TVNZ, 'Breakfast'*, 3 Apr 2014. <http://tvnz.co.nz/breakfast-news/circumcision-study-worrying-and-non-substantive-video-5883865>

Circumcision study questioned. *3 News, New Zealand*, 3 Apr 2014 <http://www.3news.co.nz/Circumcision-study-questioned/tabid/423/articleID/338515/Default.aspx>

Circumcision may be a financial decision. By Dr. Brian McDonough, *CBS Philly*, 24 Apr 2014. <http://philadelphia.cbslocal.com/2014/04/24/circumcision-may-be-a-financial-decision/>

Circumcision rates declining in U.S., study says. *News Channel 5, Los Angeles*, 4 Apr 2014. <http://www.kalb.com/category/249602/latest-news>

Shorter men live longer, Hawaii study finds. *NBC News*, 10 May 2014.

Shorter men live longer, Hawaii study finds. *WSMV Channel 4*, 11 May 2014.

Radio

2014 (7)

Circumcision (on *Mayo Clinic Proceedings* article). Interviewed by Will Goodings, 'Afternoons' show, *Nova*, Adelaide, 1.05 pm, Fri Apr 4, 2014.

Circumcision. News on KLFD AM 1410 and other stations in USA

Short men live longer. *BBC World Report* 12 May 2014.

Do short men live longer? *MPR* 12 May 2014.

Circumcision in NSW public hospitals. Interviewed by Luke Grant, 2GB, 1.15 pm Mon 9 Jun 2014.

Longevity. ABC regional, Western Victoria, 3.30 pm Thu 23 Oct 2014.

Why fasting prolongs life. Interviewed by Lexi Metherell, ABC Sydney, 24 Dec 2014.

On-line news

2014 (194)

Circumcision rates in the United States: Rising or falling? What effect might the new affirmative pediatric policy statement have? *Unbound Medline*, 28 Mar 2014. http://www.unboundmedicine.com/medline/journal/mayo_clin_proc?start=30&prev=true

Circumcision for male infants may be becoming less common in the US. Lead story on *AMA Morning Rounds*, *American Medical Association*, 8 am. 2 Apr 2014. <http://ama.bulletinhealthcare.com/>

Circumcision benefits far outweigh risks, finds study in *Mayo Clinic Proceedings*. By Rachel Gleeson, *ElsevierConnect*, 2 Apr 2014. <http://www.elsevier.com/connect/circumcision-benefits-far-outweigh-risks-finds-study-in-mayo-clinic-proceedings>

Circumcision benefits exceed risks 'a hundred times over'. By Ludovica Laccino, *International Business Times*, 2 Apr 2014. <http://www.ibtimes.co.uk/circumcision-benefits-exceed-risks-hundred-times-over-embargo-6-30pm-1443097>

Declining U.S. circumcision rates put males' health at risk: study. *WebMD*, 2 Apr 2014. <http://www.webmd.com/diabetes/news/20140402/inhaled-insulin>

Drop in circumcision rates prompts call for Medicaid coverage. By Bianca Nogrady, *Family Practice News Digital Network*, 2 Apr 2014. <http://www.familypracticenews.com/news/child-adolescent-medicine/single-article/drop-in-circumcision-rates-prompts-call-for-medicaid-coverage/bc631dcad9d517348712e92d32bb7d4d.html>

Drop in circumcision rates prompts call for Medicaid coverage. By Bianca Nogrady, *Pediatric News Digital Network*, 2 Apr 2014. [http://www.pediatricnews.com/index.php?id=7989&type=98&tx_ttnews\[tt_news\]=245601&cHash=da03e20e36](http://www.pediatricnews.com/index.php?id=7989&type=98&tx_ttnews[tt_news]=245601&cHash=da03e20e36)

Circumcision benefits exceed risks 100 to 1, 'equivalent to childhood vaccination'. By Chris Weller, *Medical Daily*, 2 Apr 2014. <http://www.medicaldaily.com/circumcision-benefits-exceed-risks-100-1-equivalent-childhood-vaccination-273992>

Circumcision rates declining in U.S., study says. By adavv321, *Medic Finder*, 2 Apr 2014 <http://medifinder.wordpress.com/2014/04/02/circumcision-rates-declining-in-u-s-study-says/>

Infants' circumcision rates declining in United States. By Thomas Carannante, *Science World Report*, Apr 2, 2014 <http://www.scienceworldreport.com/articles/13817/20140402/infants-circumcision-rates-declining-united-states.htm>

Mayo Clinic: Circumcision's health benefits outweigh risks. By reporter Gary, *Regator*, 2 Apr 2014. <http://reportergary.com/2014/04/mayo-clinic-circumcisions-health-benefits-outweigh-risks/>

Mayo Clinic: Circumcision's health benefits outweigh risks. By reporter Gary, *PalTalk News Network*, 2 Apr 2014. http://regator.com/p/263782827/mayo_clinic_circumcisions_health_benefits_outweigh_risks/

Declining U.S. circumcision rates put males' health at risk: Study. *US News, Health Highlights*, 2 Apr 2014. <http://health.usnews.com/health-news/articles/2014/04/02/health-highlights-april-2-2014>

Call for circumcision gets a boost. By Rachel Zaleski, *Eureka Alert*, 2 Apr 2014. http://www.eurekaalert.org/pub_releases/2014-04/ehs-cfc033114.php

Call for circumcision gets a boost. *Science Newsline, Medicine*, 2 Apr 2014. <http://www.sciencenewsline.com/summary/2014040217540005.html>

Declining U.S. circumcision rates put males' health at risk: Study. *Clinton Drug Store*, 2 Apr 2014. <https://clintondrugstore.com/article.php?id=686447>

Sorry intactivists: The Mayo Clinic says that the health benefits of circumcision exceed any risks by 100 to 1. *Inagist*, 2 Apr 2014. <http://inagist.com/all/451410099144519681/>

Mayo Clinic: Circumcision's health benefits outweigh risks. *The Jewish Reporter*, 2 Apr 2014. <http://thejewishreporter.com/category/religion/>

Declining U.S. circumcision rates put males' health at risk: Study. *Double Oak Mountain, Health News*, 2 Apr 2014. <https://doubleoakmountainrx.com/article.php?id=686447>

U.S. infant circumcision rates fall. *MD Connects*, 2 Apr 2014. <http://www.mdconnects.com/articles/1014/20140402/us-infant-circumcision-rates-fall-study.htm>

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Should you circumcise your child? By P.Z. Myers, *Pharyngula*, 11 Apr 2014. <http://freethoughtblogs.com/pharyngula/2014/04/11/should-you-circumcise-your-child/>

Circumcision. *Silobreaker*, Apr 11, 2014. http://news.silobreaker.com/circumcision-11_834556

Circumcision benefits outweigh risks, study reports. By Abdul Alim, *The Muslim Times*, 13 Apr 2014. <http://www.themuslimtimes.org/2014/04/americas/circumcision-benefits-outweigh-risks-study-reports>

Circumcision should be offered 'like vaccines' to the parents of baby boys, new study. By Daily Mail Reporter, *Islamic Updates*, 14 Apr 2014. <http://islamicnafahat.wordpress.com/2014/04/14/circumcision-should-be-offered-like-vaccines-to-the-parents-of-baby-boys-new-study/>

The health benefits of circumcision 'outweigh the risks 100 to one'. *Islamic Life*, 14 Apr 2014. <http://www.islamic-life.com/forums/quran-hadith-prophet-muhammad/circumcision-islam-questions-4320/page2>

Scribblings: History of the recognition condition. By Tzvi Fleischer, *AIJAC (Australia/Israel & Jewish Affairs Council)*, 14 Apr 2014. <http://www.aijac.org.au/news/article/scribblings-history-of-the-recognition-condition>

Why you should circumcise your newborn boy. By Gary A. Emmett, M.D., *Philly.com*, 15 Apr 2014. http://www.philly.com/philly/blogs/healthy_kids/?cat=Gary+A.+Emmett&main=PC+Healthy+Kids

Should infant boys be circumcised? By Mark Rosati, *Health eNews*, 16 Apr 2014. <http://www.ahchealthnews.com/2014/04/16/should-infant-boys-be-circumcised/>

Health benefits of circumcision reinforced. By Anthony Weiss, *Jewish Journal*, 16 Apr 2014. http://www.jewishjournal.com/health/item/health_benefits_of_circumcision_reinforced

Why you should circumcise your newborn boy. By LoP Guest, *Lunatic Outpost*, 16 Apr 2014. <http://lunaticoutpost.com/Topic-Why-you-should-circumcise-your-newborn-boy>

To cut or not to cut. *Storify*, 18 Apr 2014. <https://storify.com/ajstream/male-circumcision-in-africa>

Study: Circumcision benefits exceed risks. *CalorieLab*, 18 Apr 2014. <http://calorielab.com/labnotes/20140418/new-journal-argues-circumcisions-should-be-mandatory/>

Medicalization of circumcision – A timeline and history. *Circumcision Decision-Maker*, 20 Apr 2014. <http://circumcisiondecisionmaker.com/circumcision-facts/history/>

To snip or not to snip: Is circumcision the healthiest? By Esther Chung, *Rewards for Mum*, 21 Apr 2014. <http://www.rewards4mom.com/snip-snip-circumcision-healthiest/>

Are you circumcised? To cut or not to cut. *Nairaland*, 22 Apr 2014. <http://www.nairaland.com/1713890/circumcised-cut-not-cut-pix>

Circumcision may be a financial decision. *14U News*, 24 Apr 2014. <http://www.i4u.com/news/2014/04/may-circumcision-be-financial-decision>

New Mayo Clinic Study: Circumcision Benefits Far Outweigh Risks. By Rabbi David Ani, *Make a Bris*, 25 Apr 2014. <http://www.makeabris.com/mayo-clinic-calls-for-circumcision/>

Health benefits of circumcision far outweigh the risks. *Zola Levitt Ministries*, 25 Apr 2014. <http://www.levitt.com/news/2014/04/25/health-benefits-of-circumcision-far-outweigh-the-risks/>

Study says newborn circumcision is more good than harm. *Joomla!*, 26 Apr 2014. <http://jk486.dldhang.com/elderly/1116.html>

Mandatory circumcision? *SLUniverse Forums*, 27 Apr 2014. <http://www.sluniverse.com/php/vb/politics-religion-society/94079-mandatory-circumcision-31.html>

Snipping circumcision rates. By Ned Ketyer, MD, 29 Apr 2014. <http://www.thepediablog.com/2014/04/29/snipping-circumcision-rates/>

Universal circumcision is the dumbest proposal ever. By Ali A. Rizvi, *The Good Men Project*, 29 Apr 2014. <http://goodmenproject.com/featured-content/universal-circumcision-dumbest-proposal-ever/> (And at <https://evangelicallyatheist.wordpress.com/tag/circumcision/> on 30 Apr 2014.)

Call for circumcision gets a boost. *Conference of European Rabbis*, posted late April 2014. <http://www.confEurorabbis.org/en/news/news/mayo-clinic-proceeding.html>

Circumcision rates in the US rising or falling. *Frequency*, posted late Apr, 2014. <http://www.frequency.com/video/circumcision-rates-in-us-rising-falling/159875918/-/5-386>

Another US call for neonatal circumcision. *Trends Urology & Men's Health*, 1 May 2014. http://www.trendsinurology.com/details/news/6138821/Another_US_call_for_neonatal_circumcision.html

Study: Circumcision rates decline, despite evidence of benefits. By Jessica Mador, *Rick Kupchella's BringMeTheNews*, 7 May 2014. <http://bringmethenews.com/2014/05/07/study-circumcision-benefits-outweigh-risks-amid-declining-rates/>

PubMed update on how medical profession views circumcision. Dr Reed, *PenisDoctor*, 11 May 2014. <http://penisdoctor.com/blog/category/adult-circumcision/>

Circumcision rates in the United States: Rising or falling? *Société Algérienne de Neurochirurgie*, 12 May 2014. <http://www.sanc-dz.com/newsrss.php?lng=fr&id=805>

Latest salvo in circumcision war, study cuts against 'intactivist' arguments. *Care2*, 19 May 2014. <http://www.care2.com/news/member/292997114/3771264>

DocGuide.com <http://www.docguide.com/journals/mayo-clin-proc?tsid=5>

Circumcision rates in the United States: Rising or falling? *Mayo Clin Proc. DocGuide.com*, May 20, 2014.

Circumcision study: If you're gonna snip, do it early. *Trend Mixer*, 22 May 2014. <http://www.trendmixer.com/circumcision>

Infant circumcision is becoming less common in the US, but why? *BioPortfolio*, 28 May 2014. <http://www.bioportfolio.com/search/local-anesthetic-for-adult-circumcision.html>

The circumcision risk debate gets fired up again due to new data from Mayo Clinic Proceedings. *Veooz*, (no date). <http://www.veooz.com/news/iH2bi3L.html>

Benefits of circumcision exceed risks. *2014 Holidays.org*, (no date) <http://2014holidays.org/s/benefits-of-circumcision-exceed-risks-100-to-1>

Short? You might just live longer. By Carla Herreria, *The Huffington Post*, 17 May 2014. http://www.huffingtonpost.com.au/entry/short-men-live-longer-study_n_5299557.html?section=australia

Shorter men may live longer, study shows. *Science Daily*, 9 May 2014. https://www.google.com.au/search?client=safari&rls=en&q=st+vincents+private+hospital+darlinghurst+telephone&ie=UTF-8&oe=UTF-8&gfe_rd=cr&ei=beQvV8KxJKTu8wfl8L-wBA#q=do+shorter+men+live+longer%3F+12+may+2014

Circumcision on the rise despite hospital ban. By Lucy Carroll, *Sydney Morning Herald*, 7 Jun 2014. <http://www.smh.com.au/nsw/circumcision-on-the-rise-despite-hospital-ban-20140606-39ohq.html>

Circumcision on the rise in NSW despite hospital bans. By Lucy Carroll, *Daily Life*, 7 Jun 2014. <http://www.dailylife.com.au/news-and-views/circumcision-on-the-rise-in-nsw-despite-hospital-bans-20140606-39pem.html>

Is it time to re-introduce circumcision to public hospitals? By Lucy Carroll, *Essential Baby*, 7 Jun 2014. <http://www.essentialbaby.com.au/baby/baby-health/is-it-time-to-reintroduce-circumcision-to-public-hospitals-20140607-39qo7>

2015 (5)

Controversial Danish research links circumcision to autism. By Kimberly Martin, *ninemsn, Health*, 12 Jan 2015. <http://coach.ninemsn.com.au/2015/02/16/16/38/controversial-danish-research-links-circumcision-to-autism>

Circumcision has a long and complicated history. By Jessica Wapner, *Business Insider*, 5 Mar 2015. <http://www.businessinsider.com/circumcision-has-a-long-and-complicated-history-2015-2?IR=T>

Circumcision debate raises health claims and ethical issues. By Matty Silver, *Sydney Morning Herald, Life & Style*, 12 May 2015. <http://www.smh.com.au/lifestyle/life/circumcision-debate-raises-health-claims-and-ethical-issues-20150511-ggz7ce.html>

The case for circumcision. By Tsvi Bisk, *Institute for Ethics and Emerging Technologies*, 9 Jun 2015. <http://ieet.org/index.php/IEET/more/bisk20150609>

Israeli study shows circumcision reduces risk of HIV infection. By Judy Siegel-Itzkovich, *Jerusalem Post*, 20 Aug 2015. <http://www.jpost.com/Business-and-Innovation/Health-and-Science/Israeli-study-shows-circumcision-reduces-risk-of-HIV-infection-412743>

Podcast

2014

Irvine Page—Alva Bradley Lifetime Achievement Award (promo), 15 Sep 2014: http://my-americanheart.org/professional/Sessions/HBPR/ScienceNews-HBPR-2014-Wednesday_UCM_467736_Article.jsp?utm_campaign=hbpr14&utm_source=dailysn&utm_medium=email&utm_content=we

Awards, Prizes and Other Recognition

2014

The Irvine Page—Alva Bradley Lifetime Achievement Award, from the American Heart Association, Council on Hypertension (formerly Council for High Blood Pressure Research), at *High Blood Pressure Research Scientific Sessions 2014*, American Heart Association, San Francisco, 9-12 Sep 2014.

Editorial Board of Journal

Member, Editorial Board, *Hypertension*, 2002–

Manuscripts Refereed for Journals

2014 (35)

Hypertension (5), *J Hum Hypertens* (5), *PLoS One* (3), *AIDS Clin Res* (2), *Afr J AIDS Res* (1), *Aging Cell* (1), *Am J Hypertens* (1), *BioMed Res Int* (1), *Chin J Physiol* (1), *Circulation* (1), *Circ Cardiovasc Genet* (1), *Clin Exp Pharmacol Physiol* (1), *Free Radic Biol Med* (1), *Heart Lung Circ* (1), *J Gerontol Biol Sci* (1), *J Hypertens* (1), *J Int AIDS Soc* (1), *J Publ Health Epidemiol* (1), *Lancet* (1), *Life Sci* (1), *Mol Cell Biol* (1), *Pediatrics* (1), *Pharmacogenom J* (1), *Rejuv Res* (1).

2015 (38)

Hypertension (6), *Age* (2), *J Hypertens* (2), *Pediatrics* (2), *Oncotarget* (2), *AIDS Res Treat* (1), *J Am Chem Soc* (1), *Asian J Androl* (1), *Biosci Rep* (1), *BMC Pediatr* (1), *BMJ* (1), *BMJ Open* (1), *Can Urol Assoc J* (1), *Cel Discov* (1), *Circ Res* (1), *Int J Hypertens* (1), *Int J Mol Sci* (1), *Int Med J* (1), *J Epidemiol Comm Hlth* (1), *J Gerontol Biol Sci* (1), *J Hum Hypertens* (1), *Lancet HIV* (1), *Maturatis* (1), *Mol Cancer* (1), *Pan Afr Med J* (1), *Physiol Genomics* (1), *PLoS One* (1), *Publ Health Ethics* (1), *Saudi Med J* (1)

Grants Assessed for Funding Bodies

2014 (4)

NHMRC (2)

Victorian Fellowship (1)

2015 (1)

MRC, UK (1)

Higher Degree Thesis Examined

2014

PhD, Univ of Queensland

Promotion Refereed for another University

2014

To Professor at Univ of Toronto

Service to the Profession

Website maintenance and information updates, Circumcision Academy of Australia: 2010–

Grant Funding

NHMRC	Regulation of placental renin-angiotensin system and placentation. (*Consulting fee = \$150,000 per annum)	Lumbers ER	2013	–
		Roberts C	2014	\$155,462*
		Broughton Pipkin F	2015	\$155,462*
		Morris BJ		

LABORATORY EMBRYONIC STEM CELL

MICHAEL B MORRIS

Laboratory Personnel 2014–2015

Michael B Morris	Sesqui Senior Lecturer in Embryonic Stem Cells	University	2007–
Rachel Shparberg	PhD (2013–)		2012–
Hannah Glover	MSc student		2014–
Mohammed Bahrami	MSc student		2014–
Jonathan Larach	MSc student		2013–2014
Tanya Saraogi	PhD student		2012–
Nicola Pitt	PhD student		2013–
Radu Zamfirescu	PhD student		2011–
Aneesha Chawla	BSc(Hons) student		2014–2015
Adam Yurka	BSc(Hons) student		2015
Sandra Li	Faculty of Medicine Summer Scholar		2013–2014
Igor Reis	University of Sydney Study Abroad Internship Program		2014–2015
Tim Mason	Talented Student Program		2013–2015

Total effective full-time personnel **2014: 7.5** **2015: 7.5**

Lab Overview

Our research involves the (i) molecular mechanisms underpinning pluripotency and directed differentiation of embryonic stem (ES) cells and embryos and (ii) developing computational tools for predicting, refining, and comparing the 3D structures of integral-membrane proteins.

Research Activities

We continued our ongoing work using mouse ES cells as a model of embryogenesis and investigating the signalling circuitry controlling neural-cell fate resulting from metabolic status and the activities of growth factors. This has provided information of the molecular mechanisms underpinning normal and abnormal development, as well as protocols for the generation of neural cells that can be used in animal models of human disease and injury. Of particular importance in our work has been the idea that selected amino acids behave as growth factors and can act at multiple points in the developmental process. Included in this hypothesis has been that differentiation and metabolic status are much more closely linked to stem-cell fate than has been previously recognized.

To confirm molecular models generated from the ES-cell model *in vitro*, we have been collaborating with Dr Margot Day (Physiology and Bosch Institute) to examine signalling pathways and amino-acid transporters controlling preimplantation mouse embryo development. This work has implications for improving the number and quality of embryos generated in artificial reproductive technologies being used and developed for humans, livestock and the horse-racing industry.

We also collaborate with Assoc Prof Paul Thomas, University of Adelaide, to examine Sox3-mediated transcriptional regulation of embryonic brain development using a mouse model.

The Lab continued its research in developing computational tools for predicting, refining, and comparing the 3D structures of integral-membrane proteins, with a particular focus on the use of our new tool, REPIMPS, applied to G protein-coupled receptors. This work was performed in collaboration with Dr B. Church in the Faculty of Pharmacy, and Dr S. Dastmalchi, at Tabriz University, Iran.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
M Morris	37	35	56	68	76	1086

*'Lifetime' = to end of 2015

H-index = 20

Chapters in Books

2015

Sokouti B, Church WB, Morris MB, Dastmalchi S. Computational approaches in drug design for G protein-coupled receptors. In: *Encyclopedia of Information Science and Technology*, 3rd Edition, Khosrow-Pour M (ed.), IGI-Global, Hershey, PA, USA, pp. 479-489, 2015

Shparberg R, Morris MB. Understanding the molecular mechanisms underlying mammalian neurogenesis using embryonic stem cells in *Frontiers in Stem Cell and Regenerative Medicine Research*, Bentham Science, 2015

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

Shparberg R, Morris MB, L-Proline mediated neurectoderm formation from mouse embryonic stem cells. *NSW Cell and Developmental Biology Meeting*, Sydney, abstract #35, 2014. P

Larach J, Morris MB, L-Proline-mediated differentiation of mouse ES cells may occur via activation of mTOR co-localised to mitochondria. *NSW Cell and Developmental Biology Meeting*, Sydney, abstract #60, 2014. P

Zamfirescu R, Morris M, Day ML. D-Amino acid-dependent signal transduction in the preimplantation mouse embryo from oocyte to 8-cell stage. *NSW Cell and Developmental Biology Meeting*, Sydney, abstract #70, 2014. P

Morris MB, et al. Amino acids act as growth factors to stimulate embryo development up to and including early neurogenesis. *11th Annual World Congress Society for Brain Mapping and Therapeutics*, Sydney, p 63, 2014. O

Day ML, et al. Amino acids act as growth factors during early embryogenesis. *14th Hunter Cell Biology Meeting*, 2014. P

Shparberg R, Morris MB, L-Proline induces the differentiation of mouse embryonic stem cells to neurectoderm in the absence of leukaemia inhibitory factor. *22nd ASMR NSW Annual Scientific Meeting*, Sydney, PP-1, 2014. P

Zamfirescu R, Morris M, Day M, Amino acid-dependent signal transduction in the preimplantation mouse embryo from oocyte to 8-cell stage. *22nd ASMR NSW Annual Scientific Meeting*, Sydney, PP-24, 2014. P

Zamfirescu R, et al. Importance of amino acids in the development of preimplantation mouse embryo. *3rd World Congress of Reproductive Biology*, Edinburgh, abstract #P059, 2014. P

Day ML, et al. Transporters for L-proline in the pre-implantation mouse embryo, *3rd World Congress of Reproductive Biology*, Edinburgh, abstract #P085, 2014. P

Shparberg R, Morris MB. L-Proline induces the differentiation of mouse embryonic stem cells (mESCs) to neurectoderm. *Company of Biologists Stem Cells and Development Workshop*, Surrey, UK, P58, 2014. O

Carroll L, et al. Differentiation of human embryonic stem cells into insulin producing cell precursors while encapsulated in immune-protective alginate. *Islet Society – AISG Joint Annual Meeting*, Sydney, 2015. P

Shparberg R, Mason T, Morris MB. Modelling mammalian neurogenesis from mouse embryonic stem cells using the amino acid L-proline, *23rd ASMR NSW Annual Scientific Meeting*, Sydney, OP2-3, 2015. P

Glover HJ, Holliday H, Morris MB. Signalling pathway activity mediating mouse embryonic stem cell pluripotency and differentiation, *ANZSCDB NSW and ACT Cell and Developmental Biology Meeting 2015*, Sydney, 2015. P

Glover HJ, Holliday H, Morris MB. L-Proline mediated signalling activity during the differentiation of mouse embryonic stem cells to early primitive ectoderm-like cells. *Int. Soc. Stem Cell Res. Annual Meeting 2015*, Stockholm, 2015. P

Glover HJ, Holliday H and Morris MB, L-Proline mediated signalling activity during the differentiation of mouse embryonic stem cells to early primitive ectoderm-like cells, *22nd International Student Congress of (bio)Medical Sciences*, The Netherlands, 2015. P

Carroll L, et al. Differentiation of human embryonic stem cells into insulin producing cell precursors while encapsulated in immune-protective alginate. *Australasian Society for Stem Cell Research 8th Annual Scientific Meeting*, abs#210, 2015. P

Shparberg R, Mason T, Morris MB. L-Proline induces the differentiation of mouse embryonic stem cells to neurectoderm and mature neural cells. *Australasian Society for Stem Cell Research 8th Annual Scientific Meeting*, abs#20, 2015. ○

Official for Scientific Societies

Secretary and Public Officer, Australasian Society for Stem Cell Research, 2012–

Member, Executive Committee, NSW Stem Cell Network, 2011–

Member, Executive Committee, Sydney Centre for Developmental and Regenerative Medicine, 2009–

Conferences and Symposia Organized

Committee member, 5th Australia and New Zealand regional meeting for the International Society for Cellular Therapy (ISCT ANZ) and 7th Meeting of the Australian Society for Stem Cell Research (ASSCR), Lorne, Vic, 2014

Convenor, 1st Annual NSW Reproduction Forum, Sydney, 2014

Invited Presentations at National Conferences

Invited presentation

The Future of Research Conference: Enhancing innovation, collaboration and translational approaches in research, 12 Dec 2014, Sydney.

Invited Panelist

Jl Day Event, 8th Australasian Society for Stem Cell Research Conference, Nov 2015, Hunter Valley.

Service to Scientific Society

Session Chair

Blended Learning in Labs and Lessons Workshop, 15 July 2015, Sydney.

Manuscripts Refereed for Journals

Int J Biochem Cell Biol (5), *Front Physiol* (1)

Grant Application Assessed

2015

NHMRC (1)

Editorial Boards of Journals

Member, Editorial Board, *Journal of Pediatric Biochemistry*, 2009–

Review Editor, *Frontiers in Integrative Physiology*, 2011–

Translation into Policy/Practice

Submission, by Australasian Society for Stem Cell Research to TGA Public Consultation on regulation of autologous cell interventions

Submission, by NSW Stem Cell Network, to TGA Public Consultation on regulation of autologous cell interventions

Service to the University

Member, Charles Perkins Centre Teaching Advisory Committee, 2015–

Grant Funding

Bosch Institute Equipment Grant	Hypoxia chamber for growing cells and embryos	Grau Y Morris MB Day ML	2014	\$15,000
Bosch Institute Equipment Grant	Live cell imaging	Morris MB Lovelace Day M Cole L	2015	\$16,000

Teaching

Coordinator, PHSI2005 Integrated Physiology A, 2012–

Total face-to-face and teaching-related hours per year: 1200

LabTutor – a new online teaching platform for the University of Sydney:

A core team of academics was responsible for generating and running ~50 new practical modules in the online teaching platform, LabTutor, which went live to students in 2014. The modules covered experiments in physiology and pharmacology using human subjects and isolated animal tissues. There were 2000 students involved, from 3 different Faculties, and 20 Units of Study, in which degrees were undertaken in BSc, BMedSc and BEng.

TEACHING AND RESEARCH REPORT

MELONI M MUIR

Research Activities

Flipped teaching and learning: In 2014 I began co-supervising a PhD student, Rena Bokosmaty, who is examining undergraduate science students' approaches to learning in the online component of a flipped classroom model. Our goal is to identify design aspects of the online activities that influence deep versus surface learning.

Impact of student diversity on teaching and curriculum design: I, along with colleagues from the Learning Centre, the Sydney Business School and the Schools of Psychology and Mathematics and Statistics, in 2013 developed a Knowing Your Student (KYS) report to help academics to learn more about their student cohorts. We have been studying how academics in science and business use the report to inform their assessment and curriculum designs. The customized report will be available university-wide to unit of study coordinators in 2015.

Using games to learn core concepts and reduce failure rates: This project involved the creation of an online card matching game, eFlip, which requires students to identify physiological concepts and their inter-relationships. Students access the game through a generic Blackboard site. A team of academics from Physiology developed content across body systems with tiered levels of conceptual difficulty for each system. The design is flexible to allow for content changes/additions. Student interaction can be tracked to analyze game usage and its impact on learning outcomes. eFlip will be piloted at the end of 2015.

Improving student writing in the sciences: This research involves the development of online resources to promote and support academic writing by science students. Qualitative and quantitative data are used to examine how students communicate their understanding of science, what they perceive as useful feedback and how they use feedback to improve their written communication.

Journal Articles

2014

Drury H, Muir MM. Using an e-learning environment for developing science students' written communication: the case of writing laboratory reports in Physiology. *Int J Innov Sci Math Educ* 2014; 22: 79-93.

Total Annual Citations

Muir MM: Lifetime (to end of 2015): 150

Conference Abstracts and Presentations

2014

Drury H, Muir MM. Students becoming scientists: Evidence of learning from writing the lab report. Workshop presented at *Communicating Science*, Brisbane, Qld, Nov 2014.

Muir MM, Tarr G, Drury H, White F, Morrison K. Knowing Your Students: An approach to encourage pedagogical creativity and change. *International Society for the Scholarship of Teaching and Learning Conference*, Quebec City, Quebec, Canada, 22-25 Oct 2014.

Muir MM, Drury H, Ryan, L. A holistic approach to assessment and feedback: the case of feedback on written assessment tasks in the sciences. *Sydney University Teaching Colloquium*, Sydney, 29-30 Sep 2014.

2015

Muir MM, Drury H, Tarr G, White F, Morrison, K. A start to fostering knowledge, skills and attitudes to ensure inclusive teaching environments. *International Society for the Scholarship of Teaching and Learning Conference*, Melbourne, 27-30 Oct 2015.

Muir MM, Drury H, Tarr G, Morrison K, White, F. Encouraging pedagogical creativity and change in science academics. *Australian Conference on Science and Mathematics Education*, Perth, Western Australia, 30 Sept–2 Oct 2015.

Official for Scientific Societies

Member, Executive Board, Institute for Innovation in Science and Mathematics Education 2013–

Conference and Symposia Organized

Co-convenor, *Blended Learning in Labs and Lesson* (Inaugural Symposium), Charles Perkins Centre, Univ of Sydney, 15 Jul 2015.

Awards, Prizes and Other Recognition

2014

Systems that Achieve Collective Excellence in Learning and Teaching Award, Sydney Medical School; team member of the Charles Perkins Centre Education Users Support Group.

Social Inclusion Scholar, Sydney Medical School, 2010–

Editorial Boards of Journals

Review editor, *Frontiers in Physiology*, 2012–

Review editor, *International Journal of Innovation in Science and Mathematics Education*, 2010–

Manuscripts Refereed for Journals

2014 (2)

Int J Innov Sci Math Educ

2015 (2)

Int J Innov Sci Math Educ

Scholarships Assessed for University

2014 (35)

2015 (42)

Service to the University

Sub-Dean, Student Affairs, Faculty of Science, 2009–

First Year Experience Network, 2012–

Judge, I-Science Fair, University of Sydney, 2013–

Scholarship Assessor, Faculty of Science, 2014–

Reviewer, University of Sydney Supporting Academics to Teach Cultural Competence Modules, 2015

Session Chair, *Blended Learning in Labs and Lessons Symposium*, Sydney, 15 Jul 2015

Service to the Profession

Reviewer, Conference abstract submissions for the International Society for the Scholarship of Teaching and Learning Conference, 2010–

Reviewer, Conference abstract submissions for the Australian Conference of Science and Mathematics Education, 2014–

Judge, Student Posters, *International Society for the Scholarship of Teaching and Learning Conference*, Melbourne, Oct 2015

Grant Funding

Univ of Sydney	Education Innovation Grant	Herkes SM King DK Arnaiz IA Muir MM	2014	\$2,500
AD Instrument	Blended Learning Symposium	Herkes SH Muir MM	2015	\$5,000

Teaching

In addition to Sydney Medical School PBL teaching, in 2014–2015 I taught in the following units of study:

PHSI2005/2905	Intermediate Physiology A
PHSI2006/2906	Intermediate Physiology B
BMED2403	Cardiovascular and Respiratory Systems
BMED2406	Hormones, Kidney and Reproduction
PHSI3006/3906	Human Cellular Physiology: Research
PHSI3008/3908	Heart and Circulation: Dysfunction

Unit of Study Coordination

PHSI2006 Intermediate Physiology B, 2005–2015 (Enrollment = ~200 students per year).

Research Student Supervision

In 2014 I undertook co-supervision of one PhD student, Rena Bokosmaty.

Teaching Committees

School of Medical Sciences Representative: Faculty of Science Teaching Committee, 2006–2015

School of Medical Sciences Representative: Faculty of Science Undergraduate Studies Committee, 2013–2015

Disciple Representative: Charles Perkins Centre Education Working Group, 2012–2014

Disciple Representative: School of Medical Science Learning and Teaching Committee, Faculty of Medicine, 2009–2015

DEVELOPMENTAL & CANCER BIOLOGY LABORATORY

MATTHEW J NAYLOR

Laboratory Personnel 2014–2015

Matthew J Naylor	Associate Professor	University	2011–
Pauline Aubel	Research Officer	NHMRC	2015–
Thomas Owens	Research Officer	NHMRC	2011–2015
Elysia Neist	Research Assistant	NBCF/CCNSW	2011–2014
Monique Fasavalu	Technical Officer	PCFA/NHMRC	2011–
Anne-Marie Mooney	PhD student	APA	2011–2015
Alison Ferguson	PhD student	APA	2011–
Quinlan Vasey	BSc(Hons) student		2014
Tuba Gide	BSc(Hons) student		2014
Andra Rucoi	BSc(Hons) student		2015
Justin Barford	BSc(Hons) student		2015
Kyle Alderman	BSc(Hons) student		2015
Total effective full-time personnel		2014: 8	2015: 9

Lab Overview

Research in the Developmental & Cancer Biology Laboratory focuses on understanding the mechanisms that control normal development and cell function and then how these processes are perturbed in human disease such as cancer.

Research Activities

The Lab continued to investigate the role of transcriptional regulators of mammary gland development and breast cancer.

We identified a novel function for Runx2, a transcription factor best known for its role in bone development, as a master regulator of both normal breast development and breast cancer progression. Runx2 was shown to regulate mammary progenitor cell populations to control normal breast development during pregnancy. In addition, inhibition of Runx2 impaired breast cancer progression in preclinical models of human disease, while its expression induced an aggressive metastatic phenotype in normal mammary cells, indicating that targeting Runx2 may have therapeutic potential for the treatment of breast cancer. These findings were published in *Cancer Research*, and together with ongoing work on the Runx heterodimer binding protein CBF β , remain an ongoing focus by the Lab.

Together with our colleagues at the Garvan Institute we also demonstrated a novel role for Elf5, another transcription factor and long-term focus of the Lab, as a key driver of breast cancer metastasis via modulation of immune cell function (published in *PLoS Biology*). In addition, the protein ‘inhibitor of differentiation 4’ was shown to regulate stem cell function both during normal mammary gland development and in basal breast cancer through inhibition of the Notch pathway (published in *Nature Communications*).

A number of additional projects were initiated to examine integrin function during mammary gland development and breast cancer, and to investigate the role of key enzymes involved in *de novo* lipogenesis during breast cancer progression. This work is ongoing but early data indicate that both of these pathways are utilized by breast cancer cells to drive tumour progression.

Journal Articles

2014

Nair R, Roden DL, Teo WS, McFarland A, Junankar S, Ye S, Nguyen A, Yang J, Nikolic I, Hui M, Morey A, Shah J, Pfefferle AD, Usary J, Selinger C, Baker LA, Armstrong N, Cowley MJ, Naylor MJ, Ormandy CJ, Lakhani SR, Herschkowitz JI, Perou CM, Kaplan W, O’Toole SA, Swarbrick A. c-Myc and Her2 cooperate to drive a stem-like phenotype with poor prognosis in breast cancer. *Oncogene* 2014; 33: 3992-4002.

Anderson LR, Owens TW, Naylor MJ. Integrins in development and cancer. *Biophys Rev* 2014; 6: 191–202.

Anderson LR, Owens TW, Naylor MJ. Structural and mechanical functions of integrins. *Biophys Rev* 2014; 6: 203–213.

Roselli S, Kahl RGS, Copeland BT, Naylor MJ, Weidenhofer J, Muller WJ, Ashman LK. Deletion of *Cd151* reduces mammary tumorigenesis in the MMTV/PyMT mouse model. *BMC Cancer* 2014; 14: 509 (10 pages).

Owens TW, Rogers RL, Best S, Ledger A, Mooney A-M, Ferguson A, Shore P, Swarbrick A, Ormandy CJ, Simpson PT, Carroll JS, Visvader JE, Naylor MJ. Runx2 is a novel regulator of mammary epithelial cell fate in development and breast cancer. *Cancer Res* 2014; 74: 5277-5286.

2015

Junankar S, Baker LA, Roden DL, Nair R, Elsworth B, Gallego-Ortega D, Lacaze P, Cazet A, Nikolic I, Teo WS, Yang J, MacFarland A, Harvey K, Naylow MJ, Lakhani SR, Simpson PT, Raghavendra A, Saunus J, Madore J, Kaplan W, Ormandy C, Millar EKA, O'Toole S, Yun K, Swarbrick A. ID4 controls mammary stem cells and marks breast cancers with a stem-cell-like phenotype. *Nat Commun* 2015; 6: 6548 (12 pages).

Gallego-Ortega D, Ledger A, Roden DL, Law AM, Magenau A, Kikhtyak Z, Cho C, Allerdice SL, Lee HJ, Valdes-Mora F, Hermann D, Salomon R, Young AI, Lee BY, Sergio CM, Kaplan W, Piggins C, Conway JR, Rabinovicg B, Millar EK, Oakes SR, Chtanova T, Swarbrick A, Naylor MJ, O'Toole S, Green AR, Timpson P, Gee JM, Ellis IO, Clark SJ, Ormandy CJ. ELF5 drives lung metastasis in luminal breast cancer via recruitment of Gr1+ CD11b+ myeloid derived suppressor cells. *PLoS Biol* 2015; 13: e1002330 (27 pages).

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Matthew Naylor	96	95	90	129	106	1064

*'Lifetime' = to end of 2015.

Invited Presentations at National and International Conferences

Naylor MJ. Runx2 is a novel regulator of mammary epithelial cell fate in development and breast cancer. Invited speaker. *Queenstown Molecular Biology Reproduction and Developmental Biology Meeting*, Queenstown, New Zealand, 28-29 Aug 2014.

Naylor MJ. Runx transcription factor regulation of epithelial cell fate in mammary gland development and breast cancer. *7th Garvan Signalling Symposium*, Garvan Institute of Medical Research, Sydney, 13-14 Oct 2014.

PhD Awarded

2015

Anne-Marie Mooney

BSc(Hons) Awarded

2014

Quinlan Vasey

Tuba Gide

2015

Andra Rucoi

Justin Barford

Kyle Alderman

Manuscripts Refereed for Journals

2014 & 2015

Approximately 10 each year, mainly for *Cancer Res*, *Dev Biol*, *Dev Dynamics*, *Mol Endocrinol*, *Endocrinology*

Grant & Award Applications Assessed

2014 & 2015

Approximately 15–30 each year, mainly for NHMRC, ARC, National Breast Cancer Foundation, Prostate Cancer Foundation of Australia

Editorial Board of Journal

Frontiers in Integrative Physiology (2011–)

Service to Government and the Profession

Panel Member, NHMRC Grant Review Panel 2014

Official for Scientific Societies

State Representative (NSW), Australian and New Zealand Society for Cell and Developmental Biology: 2013–2014

Session Chair, 29th International Association for Breast Cancer Research Conference, Manly, NSW, 14-17 Sep 2014

Grant Funding (2014-2015)

Cancer Council NSW	Personalizing breast cancer management by discovering the transcriptional basis for tumour phenotype. * \$150,000 to Naylor Lab	Ormandy CJ	2011	–
		Carroll JS	2012	–
		Kaplan W	2013	–
		Lakhani S	2014	\$450,000*
		Naylor MJ	2015	\$450,000*
		Swarbrick A		
NHMRC	CBF β in breast cancer.	Naylor MJ	2014	\$205,000
		Simpson P	2015	\$220,000
			2016	–
Univ of Sydney	Sydney Medical School Early Career Researcher Pilot Grant	Owens T	2014	\$25,000

Teaching Activities & Research Supervision

Face-to-face teaching

In 2014–2015 Matthew Naylor continued to teach the following subjects:

PHSI3005 Human Cellular Physiology Theory; PHSI3007 Heart & Circulation Normal Function; PHSI3907 Heart & Circulation Normal Function Advanced; PHSI3008 Heart & Circulation Dysfunction; PHSI3908 Heart & Circulation Dysfunction Advanced

In 2014–2015, lecturing, problem-based learning tutorials, wet lab practicals and advanced student projects amounted to approximately 240 face-to-face contact teaching hours.

Unit of Study Coordination

In 2014–2015 Mathew Naylor was Unit of Study Coordinator for 4 advanced level (3rd year) subjects in the BMedSc and BSc degrees:

PHSI3007 Heart & Circulation Normal Function

PHSI3907 Heart & Circulation Normal Function Advanced

PHSI3008 Heart & Circulation Dysfunction

PHSI3908 Heart & Circulation Dysfunction Advanced

Research Student Supervision

In 2014 and 2015 Mathew Naylor undertook research student supervision of PhD students, Honours students and advanced project lab-based and research project students from the PHSI3907 Heart & Circulation Normal Function Advanced and PHSI3908 Heart & Circulation Dysfunction Advanced undergraduate units, as follows:

Anne-Marie Mooney (PhD student)

Alison Ferguson (PhD student)

Quinlan Vasey (BSc(Hons) student in 2014)

Tuba Gide (BSc(Hons) student in 2014)

Andra Rucoi (BSc(Hons) student in 2015)

Justin Barford (BSc(Hons) student in 2015)

Kyle Alderman (BSc(Hons) student in 2015)

12 Advanced Student Projects (2014–2015)

Total = 874 research student supervision teaching hours for 2014–2015

CLINICAL NEUROPHYSIOLOGY

SUSANNA B PARK

Laboratory Personnel 2014–2015

Susanna Park	Senior Lecturer	University	2014–
Hannah Timmins	Research Assistant	NHMRC	2015–
Total effective full-time personnel	2014: 1	2015: 2	

Lab Overview

Our research focuses on developing novel outcome measures and neurophysiological assessments in the clinical setting and how these can be applied to improve diagnosis, treatment and management of human disease.

Research Activities

Chemotherapy-induced peripheral neuropathy

Nerve damage following chemotherapy treatment (chemotherapy-induced peripheral neuropathy; CIPN) is a major side effect of the treatment of cancer, leading to early cessation of treatment and long-lasting disability. CIPN develops with some of the most commonly used chemotherapies and produces tingling and numbness in the extremities, leading to loss of sensation, functional difficulties and significant disability. There is a critical need to understand the mechanisms underlying CIPN, optimize clinical assessment and develop neuroprotective interventions to prevent nerve damage. The primary focus of our research is to quantify the impact of CIPN on the function and quality of life of cancer survivors. Currently there remains a lack of tools to identify toxicity and no standardized measurement criteria to assess the impact of CIPN. We investigated the scope and impact of CIPN via large-scale cross-sectional and prospective studies, incorporating patients with colorectal cancer, breast cancer, ovarian cancer and haematological malignancies. By cross-sectional study we developed a study examining patients 1–5 years post chemotherapy to quantify sensory loss and functional disability and determine the impact of lasting CIPN on both the patient and the health system. The prospective study will follow patients throughout treatment and at follow-up to identify the earliest signs of permanent nerve damage and determine how best to identify patients at-risk of severe neurotoxicity. The data from these two study arms will provide an extensive databank which we will utilize to examine risk factors for the development of CIPN, including age, type 2 diabetes, genetic polymorphisms and the presence of acute neurotoxicity. This project will identify the best assessment strategies for early detection of CIPN for implementation in the clinical oncology setting, and categorize a patient-specific neurotoxicity risk profile to enable better identification and measurement of CIPN. The study will lead to improved outcomes for cancer survivors following chemotherapy.

Inflammatory neuropathy

Inflammatory neuropathies are autoimmune disorders producing severe disability and represent a significant, costly burden to the healthcare system. There remains a lack of markers to identify treatment response and disease activity, which are clearly necessary to stabilize nerve function and prevent further chronic disability. The search for target autoantibodies in inflammatory neuropathy has been ongoing for more than 30 years, focusing on myelin-derived targets. Our ongoing project has combined neuroimmunology and neurophysiology, together with clinical phenotyping, to identify specific nodal antigenic targets and associated phenotypic profiles in order to monitor treatment responsiveness, and identify patients at risk of deterioration and ongoing disability. We developed sensitive neurophysiological assays to probe nodal function *in vivo*. These novel neurophysiological approaches will enable examination of pathogenicity, nodal function and clinical significance in parallel with examination of autoantibody identity in patients with inflammatory neuropathies. The project will determine the patterns of change in clinical, immunological and neurophysiological metrics associated with response to treatment, to develop sensitive markers of treatment response. Identification of the modulation of these markers in response to therapy will provide for the development of individualized treatment strategies.

Journal Articles

2014

Park SB, Kwok JB, Loy CT, Friedlander ML, Lin CSY, Krishnan AV, Lewis CR, Kiernan MC. Paclitaxel-induced neuropathy: potential association of MAPT and GSK3B genotypes. *BMC Cancer* 2014; 14: 993.

Park SB, Lin CSY, Krishnan AV, Simon NG, Bostock H, Vincent A, Kiernan MC. Axonal dysfunction with voltage-gated potassium channel complex antibodies. *Exp Neurology* 2014; 261C: 337-342.

Sung J-Y, Tani J, Park SB, Kiernan MC, Lin CSY. Early identification of 'acute-onset' chronic inflammatory demyelinating polyneuropathy. *Brain* 2014; 137: 2155-2163.

Farrar MA, Park SB, Krishnan AV, Kiernan MC, Lin CS. Axonal dysfunction, dysmyelination, and conduction failure in hereditary neuropathy with liability to pressure palsies. *Muscle Nerve* 2014; 49: 858-865.

2015

Park SB, Vucic S, Cheah BC, Lin CSY, Kirby A, Mann KP, Zoing MC, Winhammar J, Kiernan MC. Flecainide in amyotrophic lateral sclerosis as a neuroprotective strategy (FANS): A Randomized Placebo-Controlled Trial. *EBioMed* 2015; 2: 1916-1922.

Mathey EK, Park SB, Hughes RAC, Pollard JD, Armati PJ, Barnett MH, Taylor BV, Dyck PJ, Kiernan MC, Lin CSY. Chronic inflammatory demyelinating polyradiculoneuropathy: From pathology to phenotype. *J Neurol Neurosurg Psychiatr* 2015; 86: 973-985.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
Susanna Park	93	134	171	167	250	963

*'Lifetime' = to end of 2015

Editorials in Journals

Park SB. The clinical relevance of VGKC-complex antibodies: The story is still unfolding. *J Neurol Neurosurg Psychiatr* 2014; 85: 596.

Krishnan AV, Park SB. Chemotherapy-induced peripheral neuropathy: the end of the beginning? *J Neurol Neurosurg Psychiatr* 2014; 85: 359.

Letters to the Editor (in Journals)

Park SB, Sung JY, Tani J, Kiernan MC, Lin CSY. Reply: Biomarkers of 'acute-onset' chronic inflammatory demyelinating polyneuropathy. *Brain* 2015; 138: e336.

Conference Abstracts and Presentations

2014

Park SB, Davare M, Bridgewater J, Hochhauser D, Arkenau HT, Koltzenburg M. Neurological outcomes following chemotherapy treatment: Assessment of functional impairment, precision grip and nerve function. *International Congress of Clinical Neurophysiology, Berlin Germany, Mar 2014.* P

2015

Park SB. Clinical applications of nerve excitability techniques in toxic neuropathies. *2nd International Nerve Excitability Symposium, Taipei, Taiwan, May 2015.* O

Park SB. Clinical utility of axonal excitability testing in toxic neuropathies. *European Congress of Clinical Neurophysiology, Brno, Czech Republic, Sep 2015.* O

Timmins HC, Cheah BC, Lin C S-Y, Vucic S, Kiernan MC, Park SB. Neurophysiological measures correlate with functional outcomes in ALS. *Australian and New Zealand Association of Neurologists Clinical Neurophysiology Workshop, Gold Coast, Oct 2015.* P+O

- Kandula T, Farrar M, Murray J, Krishnan A, Park SB. Subclinical peripheral neuropathy prior to chemotherapy in colorectal cancer patients – Myth or reality? *Australian and New Zealand Association of Neurologists Clinical Neurophysiology Workshop, Gold Coast, Oct 2015.* P+O
- Garg N, Park SB, Mathey EK, Yiannikas C, Kiernan MC. Neurophysiological and immunological profile of multifocal motor neuropathy. *Australian and New Zealand Association of Neurologists Clinical Neurophysiology Workshop, Gold Coast, Oct 2015.* P+O
- Howells J, Park SB, Burke D, Kiernan MC. Dysfunctional properties of single motor units in ALS. *Australian and New Zealand Association of Neurologists Clinical Neurophysiology Workshop, Gold Coast, Oct 2015.* P+O

Invited Presentations at National and International Conferences

2015

- Park SB. *European Congress of Clinical Neurophysiology.* Brno, Czech Republic, Sep 2015.
- Park SB. *2nd International Nerve Excitability Symposium.* Taipei, Taiwan, May 2015.

Seminar(s)

2014

- Park SB. Chemotherapy-induced neuropathy: Mechanisms and impacts in cancer survivors. Kids Cancer Centre, Sydney Children's Hospital, Sydney, Mar 2014

2015

- Park SB. Chemotherapy-induced peripheral neuropathy. Community presentation, Multiple Myeloma Support Group, Chris O'Brien Lifehouse, Sydney, Aug 2015
- Park SB. Neurophysiology Platforms. CNS Infection, Inflammation and Immunology Joint Symposium of the Marie Bashir Institute and Brain & Mind Centre, Sydney, Oct 2015

Awards, Prizes and Other Recognition

2014

- SB Park. Commonwealth Science Conference Delegate, Bangalore, India, Nov 2014

Manuscripts Refereed for Journals

2014 (15)

- J Neuro Neurosurg Psychiatr* (5), *J Support Care Cancer* (2), *J Pain Symptom Manag* (1)
Int J Neurosci (1), *Medicine* (1), *J Cancer Survivorship* (1), *Muscle Nerve* (1), *Brain* (1), *Clin Neurophys* (1), *J Clin Oncology* (1)

2015 (9)

- BMJ Open* (1), *Toxics* (2), *Support Care Cancer* (2), *Clin Neurophys* (2), *Nature Comm* (1), *JNNP* (1)

Grants Assessed for Funding Bodies

2014

- Istituto Toscano Tumori (1)
MRC Medical Research Foundation UK (1)

2015

- NHMRC (1)

Service to the University

- Member, Postgraduate Review Panel, Brain & Mind Centre 2014–

Grant Funding

NHMRC	CJ Martin Early Career Fellowship	Park SB	2011	–
			2012	–
			2013	–
			2014	\$72,508
Menzies Foundation	RG Menzies Fellowship	Park SB	2011	–
			2012	–
			2013	–
			2014	\$5,000
Ramaciotti Foundation	Establishment Grant	Park SB	2013	\$75,000
			2014	–
			2015	–
Cancer Institute NSW	Chemotherapy-induced peripheral neuropathy: assessment strategies, treatment and risk factors	Goldstein D	2015	\$568,153
		Park SB	2016	–
		Friedlander ML	2017	–
		Kiernan MC	2018	–
		Krishnan AV	2019	–
		Boyle F		
		Moalem-Taylor G		
		Haas M		
		Cohn R		
Farrar M				
NHMRC	Long-term nerve damage in cancer survivors: identification of risk factors and optimal assessment strategies	Park SB	2015	\$235,631
		Krishnan AV	2016	–
		Goldstein D	2017	–
		Lin C	2018	–
		Kwok J	2019	–
		Boyle F		
		Horvath L		
		Haas M		
		Barnes E		
International Guillain-Barre Syndrome/Chronic Inflammatory Demyelinating Polyneuropathy Foundation	The clinical and functional significance of autoimmune responses to nodal antigens in patients with inflammatory demyelinating neuropathies	Mathey EK	2015	\$45,000
		Kiernan MC		
		Lin CSY		
		Park SB		
		Pollard J		
		Armati P		

Teaching

Unit of study name	Code	Class	Hours/year
Heart and Circulation	PHSI3008	Practical	25
Fundamental Neuroscience	BMRI5002	Lectures	5
Cancer Sciences for Exercise Physiology	HESC3208	Lectures	5

MOLECULAR NEUROSCIENCE LABORATORY

WILLIAM D PHILLIPS

Laboratory Personnel 2014–2015

William (Bill) Phillips	Associate Professor	University	1993–
Nazanin Ghazanfari	PhD student	APA	2010–2014
Archunan Visvanathan	MPhil student		2013–2015
Nigel Tse	MPhil student (co-supervised with C Leamy)		2013–2014
Eva Kichkin	BSc(Hons) student		2014
Erna Linsao	BMedSc(Hons) student		2014
Joshua Way	BSc(Hons) student		2014
Total effective full-time personnel	2014: 6	2015: 3	

Lab Overview

The neuromuscular junction is the connection between nerve and muscle: the synapse through which all our living thoughts are put into action. This Laboratory investigates the physiological signalling mechanisms through which the nerve-muscle relationship adapts to the challenges of life. We also study how we might use these natural adaptive mechanisms to prevent or delay the failure of muscle control in neuromuscular diseases and in old age.

Research Activities

The Lab has played a leading role in investigating a new form of the autoimmune muscle weakness disease, myasthenia gravis. Some myasthenia patients have antibodies in their blood that bind to a muscle protein called muscle specific kinase (MuSK). We had previously shown that these antibodies cause myasthenia gravis when injected into mice. In 2014 and 2015 we went on to show that these antibodies suppress a form of chemical signalling at the neuromuscular junction referred to as tyrosine phosphorylation. We showed, moreover, that supplementing the lost MuSK protein in our experimental mice, using a gene therapy vector, was sufficient to protect muscles from the harmful effects of the pathogenic anti-MuSK antibodies from patients. Using our mouse model of anti-MuSK myasthenia gravis we also showed that a drug commonly used to treat asthma had some potential to reduce weakness, although this will need to be confirmed in patients.

Journal Articles

2014

Tse N, Morsch M, Ghazanfari N, Cole L, Visvanathan A, Leamey C, Phillips WD. The neuromuscular junction: Measuring synapse size, fragmentation and changes in synaptic protein density using confocal fluorescence microscopy. *J Vis Exp* 2014; (94): e52220.

Reddel SW, Morsch M, Phillips,WD. Clinical and scientific aspects of muscle-specific tyrosine kinase-related myasthenia gravis. *Curr Opin Neurol* 2014; 27: 558-565.

Ghazanfari N, Morsch M, Reddel SW, Liang SX, Phillips WD. Muscle-specific kinase (MuSK) autoantibodies suppress the MuSK pathway and ACh receptor retention at the mouse neuromuscular junction. *J Physiol (Lond)* 2014; 592: 2881-2897.

Ghazanfari N, Morsch M, Tse N, Reddel SW, Phillips WD. Effects of the β 2-adrenoceptor agonist, albuterol, in a mouse model of anti-MuSK myasthenia gravis. *PLoS One* 2014; 9: e87840 (11 pages).

2015

Ghazanfari N, Linsao ELTB, Trajanovska S, Morsch M, Gregorevic P, Liang SX, Reddel SW, Phillips WD. Forced expression of muscle specific kinase slows postsynaptic acetylcholine receptor loss in a mouse model of MuSK myasthenia gravis. *Physiol Rep* 2015; 3: e12658.

Ban J, Phillips WD. Mouse models of myasthenia gravis. *Curr Pharmaceut Design* 2015; 21: 2468-2486.

Phillips WD, Christadoss P, Losen M, Punga A, Shigemoto K, Verschuuren J, Vincent A. Guidelines for pre-clinical animal and cellular models of MuSK-myasthenia gravis. *Exp Neurol* 2015; 270: 29-40.

Plomp JJ, Morsch M, Phillips WD, Verschuuren JJ. Electrophysiological analysis of neuromuscular synaptic function in myasthenia gravis patients and animal models. *Exp Neurol* 2015; 270: 41-54.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
WD Phillips	43	63	63	48	60	1223

*'Lifetime' = to end of 2015

Conference Abstracts and Presentations

2014

Reddel SW, Morsch M, Cole R, Ghazanfari N, Ngo S, Cheng S, Toyka K, Phillips WD. Antibodies to MuSK disrupt the functional homeostasis of the mature neuromuscular synapse. *Australian Neuroscience Society Annual Meeting, Adelaide, 28-31 Jan 2014, SYM-04-04* ○

Ghazanfari N, Morsch M, Tse N, Reddel SW, Phillips WD. Maintenance and adaptation of the neuromuscular junction under autoantibody challenge and drug treatment. *Australian Neuroscience Society Annual Meeting, Adelaide, 28-31 Jan 2014, POS-THU-050* P

Morsch M, Protti D, Reddel SW, Phillips WD. Cannabinoids modulate quantal size at the mouse neuromuscular junction. *Australian Neuroscience Society Annual Meeting, Adelaide, 28-31 Jan 2014, ORAL-05-05* ○

Morsch M, Ghazanfari N, Reddel SW, Phillips WD. Muscle-specific kinase autoantibodies inhibit a postsynaptic signaling system required to stabilize acetylcholine receptors at the neuromuscular junction. *International Conference on Autoimmunity and Transplantation, Goa, India, 12-16 Oct 2014, A113* ○

2015

Phillips WD. Anti-MuSK myasthenia gravis: synapse loss due to blockade of tyrosine kinase signalling? *International Society for Neurochemistry, Cairns, 23-27 Aug 2015, WTH04-08* P

Phillips WD, Ghazanfari N, Linsao ELTB, Trajanovska S, Reddel SW, Muscle specific kinase autoantibodies: their impact upon the postsynaptic membrane scaffold at the neuromuscular junction. *Society for Neuroscience Annual Meeting, Chicago, USA, 16-21 Oct 2015, 339.13* P

Official at International Conference

2014

Session Chair (MGFA/NIH funded participant): Preclinical Guidelines for MG Therapeutic Development – Standards for Preclinical Efficacy Evaluation for Myasthenia Gravis conference. Bethesda, MD, USA 23-25 Sep 2014.

Editorial Board of Journal

Academic Editor, *PLoS One* (2012–)

PhD Awarded

2015

Ghazanfari N

MPhil Awarded

2015

Tse N (co-supervised with C Leamey)

BMedSc(Hons) Awarded

2014

Linsao E

BSc(Hons) Awarded

2014

Kichkin E

Way JA-H

Manuscripts Refereed for Journals

2014 (5)

Curr Pharm Des (2), *Exp Neurol* (1), *J Physiol* (1), *Sci Sig* (1)

2015 (4)

Am J Pathol (1), *Exp Neurol* (1), *PLoS One*(1), *Annals Neurol* (1)

Grants Assessed for Funding Bodies

2014

Princess Beatrix Fond, Netherlands (1)

MRC, UK (1)

2015

MRC, UK (2)

AMF-Telethon, France (1)

Service to the University

Member, Bosch Executive Leadership Group, 2011–

Chair (2003–2013) then co-chair (2013–), School of Medical Science Teaching Committee

Member, Institutional Biosafety Committee (1995–)

Coordinator for the Anderson Stuart (Research) Seminar Series (1993–)

Grant Funding

Univ of Sydney	Muscle-specific kinase system in neuromuscular disease: bridging grant	Phillips WD	2015	\$30,000
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Teaching 2014–2015

Unit of study name	Code	Class	Hours/year	Enrolment
Integrative Physiology	PHSI2005	Lectures	7	~200
Physiology for Pharmacy	PHSI2601	Lectures	5	~200
Human Cellular Physiology: Theory	PHSI3005	Lectures	5	203
Human Cellular Physiology: Research	PHSI3006	Lectures	3	142
	PHSI3006	PBL sessions	18	~12/gp
Neuroscience	NEUR3001 & NEUR3002	Lectures	4	~120 each unit
	NEUR3001 & NEUR3002	Research paper sessions	20	~12/gp
	NEUR3001 & NEUR3002	Practical classes	24	~30/gp
Cellular & Developmental Neuroscience	NEUR3003	Lectures	6	
Medicine	Year 1	Lectures	2	

Unit of Study Coordination role

2014

Human Cellular Physiology: Theory (PHSI3005) 2006–2014. Enrolment in 2014 = 203

Human Cellular Physiology: Research (PHSI3006) 2006–2014. Enrolment in 2014 = 142

2015

Neuroscience: Movement and Behavior (NEUR3002), with Paul Austin, 2015. Enrolment in 2015 = 122.

Teaching Committee membership is listed above under 'Service'

HIGH BLOOD PRESSURE RESEARCH GROUP

PAUL M PILOWSKY

The High Blood Pressure Research Group is a Laboratory in the Discipline of Physiology that is physically located in the Heart Research Institute (HRI) at 7 Eliza St, Newtown, close to the University of Sydney main campus.

Laboratory Personnel 2014–2015 (29)

Paul M Pilowsky	NHMRC Fellow	NHMRC	2012–
Melissa MJ Farnham	Senior Research Officer	NHMRC	2014
Stephen BG Abbott	CJ Martin Research Fellow	NHMRC	2014
Suja Mohammed	Research Officer	HRI	2011
Polina Nedoboy	Research Officer	NHMRC	2014
Sarah Zhao	Research Officer	HRI	2015
Lei Cao	Visiting Scientist	RMO, Hornsby	2014
Komal Kapoor	PhD student	APA	2012–
Amol M Bhandare	PhD student	APA	2013–
Seungjae Kim	PhD student	APA	2015–
Zohra Kakall	BSc(Hons) student	Univ of Sydney	2015
Yeon Jae Kim	BMedSc(Hons) student	Univ of Sydney	2015
Myfanwy Cohen	BMedSc(Hons) student	Univ of Technol Sydney	2015
Thara Pannadewi	BMedSc(Hons) student	Univ of Technol Sydney	2015
Artemis Zhu	Study Abroad Intern, BSc	Penn State Univ	2015
Renzo Balboa	TSP student	Univ of Sydney	2014
Aidan Yuen	TSP student	Univ of Sydney	2014
Akhil Bansal	TSP student	Univ of Sydney	2015
Madelyn Rubenstein	Study Abroad Intern, BSc	Univ of Rochester	2014
Bruno Capella	Study Abroad Intern, Medicine	Universidade Federal de Santa Catarina, Brazil	2015
John Santa Cruz	Study Abroad Intern, BSc	Texas Christian Univ	2015
Casey Rieck	CAPA student, BSc	Univ of Minnesota	2014
Joey Montgomery	CAPA student, BSc	Purdue Univ	2014
Michael Goings	CAPA student, BSc	Purdue Univ	2014
Hannah Mitchell	CAPA student, BSc	Univ of California, Davis	2014
Patrick Dumas	CAPA student, BPharmSci	Univ of Rhode Island	2015
Joe Christian	CAPA student, BPharmSci	Univ of Rhode Island	2015
Tyler Buss	CAPA student, BA	Augustana College, USA	2015
Kaitlin Coyle	CAPA student, BSc	Univ of California, Davis	2015

Total effective full-time personnel

2014: 15

2015: 22

National and International collaborators

Prof John Morrey and Dr Katherine Zukor, Univ of Utah

Prof Jacqueline Phillips, Macquarie Univ

Prof Richard Wilson, Univ of Calgary

Prof Karu Esselle, Macquarie Univ

Prof Ewa Goldys, Macquarie Univ

Overview

Broadly, research in the High Blood Pressure Research Group focuses on the way that the central nervous system controls the upper airways, ventilatory system, heart and blood vessels. The aim of this control system is to maintain resting blood pressure levels so that the brain, heart and kidneys receive adequate amounts of blood, energy and oxygen at all times, whilst at the same time ensuring a constant pH and removal of metabolic waste on a second to second basis. These activities are fundamental to life.

Research Activities

The research in our Laboratory led to 16 publications and 23 conference presentations in 2014 and 2015. The research we conducted during these two years dealt with problems associated with high blood pressure. High blood pressure is generally caused by over-activation of the sympathetic nervous system. In turn, it leads to high blood pressure, atherosclerosis and subsequently, cardiovascular disease, stroke, kidney disease and other problems. The reasons for over-activation of the sympathetic nervous system are many and varied. They include sleep apnoea, epilepsy and unknown genetic causes to name a few. The approaches we used to study these problems, and that are currently available in our Laboratory, include: molecular biology (PCR and *in situ* hybridization histochemistry), immunohistochemistry (multiple labelling and fluorescence staining, development and characterization of novel monoclonal antibodies), and manipulation of gene expression *in vivo*, pharmacology, physiology and pathophysiology of disorders such as sleep apnoea, epilepsy and hypertension. In humans, we studied the effects of pregnancy and eating combined with changes in posture on control of the cardiovascular system. Within the general theme of autonomic control of the cardiorespiratory system, our Group is always open to new ideas for investigation.

Journal Articles

2014

Islam SM, Esselle KP, Bull D, Pilowsky PM. Converting a wireless medical telemetry system to an implantable system through antenna redesign. *IEEE Trans Microwave Theory Techniques* 2014; 62: 1890-1897.

Cao L, Pilowsky PM, Quiet standing induces central sympathetic activation in the postprandial state and is pressor in young healthy males. *Auton Neurosci* 2014; 185: 112-119

Bautista TG, Sun Q-J, Pilowsky PM. The generation of pharyngeal phase of swallow and its coordination with breathing: interaction between the swallow and respiratory central pattern generators *Prog Brain Res* 2014; 212: 253-275.

Lalley PM, Pilowsky PM, Forster HV, Zuperku EJ. Opposing view: The pre-Bötzinger complex is not essential for respiratory depression following systemic administration of opioid analgesics. *J Physiol* 2014; 592: 1163-1166.

Xing T, Pilowsky PM, Fong AY. Mechanism of sympathetic activation and blood pressure elevation in humans and animals following acute intermittent hypoxia. *Prog Brain Res* 2014; 209: 131-146.

Pilowsky PM. Peptides, serotonin and breathing: the role of the raphe in the control of respiration. *Prog Brain Res* 2014; 209: 169-89.

Deng W, Goldys E, Farnham M, Pilowsky PM. Optogenetics, the intersection between physics and neuroscience: Light stimulation of neurons in physiological conditions. *Am J Physiol Regul Integr Comp Physiol* 2014; 307: R1292-R1302.

2015

Zhao WJ, Sun QJ, Guo RC, Pilowsky PM. Catecholamine inputs to expiratory laryngeal motoneurons in rats. *J Comp Neurol* 2015; 523: 381-390.

Deng W, Farnham MJ, Goldys EM, Mohammed S, Pilowsky PM. Gene interference with morpholinos with a gold nanoparticle-based delivery platform and functional response to neurite outgrowth in rat PC12 cells. *J Biomed Nanotech* 2015; 11: 2111-2123

Bhandare A, Mohammed S, Pilowsky PM, Farnham MMJ. Antagonism of PACAP or microglia function worsens the cardiovascular consequences of kainic acid induced seizures in rats. *J Neurosci* 2015; 35: 2283-2292.

Yao Y, Hildreth C, Farnham MM, Saha M, Sun Q-J, Pilowsky PM, Phillips JK. The effect of losartan on differential reflex control of sympathetic nerve activity in chronic kidney disease *J Hypertens* 2015; 33: 1249-1260.

Farnham MM, O'Connor ET, Wilson RJ, Pilowsky PM. Surgical preparation of mice for recording cardiorespiratory parameters in vivo. *J Neurosci Methods* 2015; 248: 41-45.

Published Conference Proceedings

Islam SM, Esselle KP, Matekovits L, Bull D, Pilowsky PM. An implantable Hilbert PIFA antenna for RFID based telemetry. *IEEE International Conference on Electromagnetics in Advanced Applications (ICEAA)*. 2014 (From conference in Turin, Italy, 9-13 Sep 2013), pp 790-793.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime
Paul M Pilowsky	244	335	260	264	225	5462

*'Lifetime' = to end of 2015

Chapter in Book

Bautista TG, Pitts TE, Pilowsky PM, Morris KF. The brainstem respiratory network. Ch 18, In: Faingold C, Blumenfeld H (eds), *Neuronal Networks in Brain Function, CNS Disorders, and Therapeutics*, 1st Edn, Academic Press, 2014, pp 235-245

Letters to the Editor (in Journals)

Pilowsky PM. A simple, novel and accurate method to estimate track record: a new 'P' value. *Med J Aust* 2014; 201: 549

Lalley PM, Pilowsky PM, Forster HV, Zuperku EJ. Rebuttal from Peter M. Lalley, Paul M. Pilowsky, Hubert V. Forster and Edward J. Zuperku. *J Physiol (Lond)* 592: 1169.

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014

Bhandar AM, Kapoor K, Mohammed S, Farnham MMJ, Pilowsky PM. Central autonomic and cardiovascular dysfunction in seizure and sudden unexpected death in epilepsy. *Cardiovascular and Respiratory Control: Future Directions*, AMREP Education Centre, Melbourne, 15-16 Sep 2014. P

Kapoor, K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Role of microglia in cardiovascular neurons: a morphological analysis. *Cardiovascular and Respiratory Control: Future Directions*, AMREP Education Centre, Melbourne, 15-16 Sep 2014. P

Bhandare AM, Kapoor K, Mohammed S, Farnham MMJ, Pilowsky PM. Kainic acid-induced seizure causes dose dependent cardiorespiratory changes. *The 13th Oxford Breathing Meeting, Respiratory and Cardiovascular*, Sydney, 26-31 Oct, 2014. P

Kapoor K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Association of microglia with RVLM neurons during hypo- and hyper- tension. *The 13th Oxford Breathing Meeting, Respiratory and Cardiovascular*, Sydney, 26-31 Oct 2014. P

Kim SJ, Pilowsky PM, Farnham MMJ. The role of orexin in the development of sympathetic long-term facilitation induced by acute intermittent hypoxia in rats. *The 13th Oxford Breathing Meeting, Respiratory and Cardiovascular*, Sydney, 26-31 Oct 2014. P

Farnham MMJ. PACAP causes the long-term increase in sympathetic activity evoked by acute intermittent hypoxia. *The 13th Oxford Breathing Meeting, Respiratory and Cardiovascular*, Sydney, 26-31 Oct 2014. P

2015

Kapoor K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Acute hypertension results in increased microglial contact with neuronal synapses in cardiovascular nuclei in rat brainstem. *Sydney Glia Meeting*, Sydney, 19-22 Aug 2015. O

Bhandare AM, Kapoor K, Mohammed S, Farnham MMJ, Pilowsky PM. Antagonism of pacap or microglia function worsens the cardiovascular consequences of kainic acid (KA)-induced seizures in rats. *25th Meeting of the International Society for Neurochemistry (ISN); Asian Pacific Society for Neurochemistry (APSN) – Joint Biennial Meeting in conjunction with Australasian Neuroscience Society (ANS)*, Cairns, 23-28 Aug 2015. P

- Bhandare AM, Kapoor K, Farnham MMJ, Pilowsky PM. Seizure-induced sympathoexcitation is caused by activation of glutamatergic receptors in RVLM that also causes proarrhythmic changes mediated by PACAP and microglia in rats. *Neuroscience 2015, the 45th Annual Meeting of the Society for Neuroscience (SfN)*, 17-21 Oct 2015, Chicago, IL, USA. P
- Kapoor K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Microglial alertness in rostral- and caudal-ventrolateral medullary nuclei is triggered by variations in neuronal activity in rat brainstem. *Neuroscience 2015, the 45th Annual Meeting of the Society for Neuroscience (SfN) 2015*, 17-21 Oct 2015, Chicago, USA. P
- Bansal A, Nedoboy PE, Kim YJ, Kapoor K, Pilowsky PM. Tyrosine hydroxylase neurons in hypothalamic neurons of WKY and hypertensive rats. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Zhu A, Kim SJ, Nedoboy PE, Bhandare AM and Pilowsky PM. Distribution of tyrosine hydroxylase in A5 neurons of rat brain. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Cohen EM, Pilowsky PM. The relationship between spectral measures of sympathetic activity and direct nerve recordings in vagotomised rats. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Nedoboy PE, Mohammed S, Bhandare AM, Kapoor K, Kim SJ, Farnham MMJ, Pilowsky PM. A novel set of mouse monoclonal antibodies to catecholaminergic antigens: tyrosine hydroxylase, Ser40-phosphorylated tyrosine hydroxylase and norepinephrine transporter. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Nedoboy PE, Mohammed S, Bhandare AM, Kapoor K, Kim SJ, Farnham MMJ, Pilowsky PM. pSer40 tyrosine hydroxylase immunohistochemistry identifies the anatomical location of C1 neurons in rat RVLM that are activated by hypotension. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Kim SJ, Nedoboy PE, Pilowsky PM and Farnham MMJ. Spinal intermittent orexin-A is sufficient for sympathetic long-term facilitation, and sensitizes the chemoreceptor response to hypoxia in rats. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Abbott SBG. Excitatory and inhibitory neurons in the anterior pre optic region exert opposing effects on thirst in mice. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. O
- Pannadewi T, Pilowsky PM. Effect of carbohydrate intake on sympathetic activity using continuous blood pressure measurement. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Kim YJ, Bhandare AM, Nedoboy PE, Kapoor K, Kim SJ, Farnham MMJ, Pilowsky PM. The effect of minocycline on sympathetic activity in the spontaneously hypertensive rat model of essential hypertension. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P
- Kakall Z, Bhandare AM, Kim SJ, Nedoboy PE, Farnham MMJ, Pilowsky PM Intermittent microinjections of PACAP into rat RVLM induce sympathetic long-term facilitation. *Central Cardiorespiratory Control: Future Directions Scientific Meeting 2015*, Sydney. P

Conference Organized

Chair, Organizing Committee and Convenor of international meeting, 13th Oxford Breathing Meeting, Respiratory and Cardiovascular, 26-31 Oct 2014, Sydney

Seminar(s)

2014

Bhandare AM. Central autonomic cardiovascular dysfunction in seizure and SUDEP, Heart Research Institute, 24 Nov 2014

2015

Kapoor K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Microglia and Hypertension: in cardiovascular nuclei in rat brainstem. Univ of Rochester, New York, USA.

Kapoor K, Bhandare AM, Mohammed S, Farnham MMJ, Pilowsky PM. Microglia and Hypertension: in cardiovascular nuclei in rat brainstem. Mayo Clinic, Minnesota, USA.

Bhandare AM. Mechanism of central autonomic cardiovascular dysfunction in seizure: Role of PACAP, microglia and glutamate, Macquarie Univ, 1 Dec 2015

Farnham MMJ. Increased sympathetic nerve activity in cardiovascular disease, Heart Research Institute, Mar 2015

News Media

Television

2015

Safe levels of blood pressure. Channel 7 (Sydney), 9 Nov 2015

Awards, Prizes and Other Recognition

2014

Melissa MJ Farnham, Young Achiever Award for Excellence Fellowship, 2014

Amol Bhandare, Best poster prize, *Cardiovascular and Respiratory Control: Future Directions*, 2014

2015

Amol Bhandare, HRI excellence Young Achievers Award, 2015

Komal Kapoor, HRI excellence Young Achievers Award, 2015

Komal Kapoor, Travel award for Sydney Glia meeting, 2015

Amol Bhandare, Post Graduate Research Fund (PGRF, Round 2, 2015) with a Deputy Vice-Chancellor (Research) Commendation from Macquarie Univ (Oct 2015)

Komal Kapoor, Macquarie Univ PGRF (Postgraduate Research Fund), 2015

Editorial Board(s) of Journal(s)

Paul Pilowsky:

Member, Editorial Board, *American Journal of Physiology: Heart and Circulatory Physiology* 2013–

Member, Editorial Board, *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology*, 2005–

Member, Editorial Board, *Brain Research*, 2012–

Member, Editorial board, *Neuroscience*, 2012–

Review Editor, *Frontiers in Integrative Physiology*, 2011–

Member, Editorial Board, *Respiration Physiology and Neurobiology*, 2010–

Member, Editorial Board, *Clinical and Experimental Pharmacology and Physiology*, 2002–

Fellowship Awarded

2015

Melissa MJ Farnham, Young Achiever Award for Excellence Fellowship

PhD Awarded

2014

Cao L

BMedSc(Hons) Awarded

2014

Kim SJ

2015

Cohen EM

Pannadewi T

Kim YJ

BSc(Hons) Awarded

2015

Kakall Z

Manuscripts Refereed for Journals

2014 (24)

Neuroscience (3), *Respir Physiol Neurobiol* (5), *J Neurophysiol* (1), *Br J Pharmacol* (2), *J Appl Physiol* (2), *Am J Physiol – Reg Integr Comp Physiol* (2), *Brain* (1), *Exp Physiol* (1), *Neuropharmacology* (1), *Am J Physiol Heart Circ Physiol* (1), *Hypertension* (1), *J Comp Neurol* (1), *Autonom Neurosci Basic Clin* (2), *Regulatory Peptides* (1)

2015 (15)

Respir Physiol Neurobiol (7), *J Neurophysiol* (2), *Neuroscience* (1), *Exp Physiol* (1), *PLoS One* (1), *Am J Physiol Reg Integr Comp Physiol* (1), *J Comp Neurol* (1), *Neuropharmacology* (1)

Grants Assessed for Funding Bodies

2014

NHMRC (6)

2015

NHMRC (5)

Service to Government and the Profession

Member, Heart Foundation of Australia (NSW Division), 2002–

Member, Department of Cardiology, Royal Prince Alfred Hospital. 2015–

Group Leader, High Blood Pressure Group, Heart Research Institute, 2013–

Member, NHMRC Assigners Academy, 2009–

Member, Research and Scientific Advisory Committee, National Heart Foundation (NSW Division), 1999–

Grant Funding

NHMRC	PACAP: The mechanism underlying sleep apnoea-induced hypertension. (1065485)	Pilowsky PM	2014	\$119,707
		Farnham MMJ	2015	\$188,742
		Wilson RJA	2016	–
NHMRC	How does chronic epilepsy result in cardiac electrophysiological dysfunction? (1082215)	O'Brien T	2015	\$46,179
		Powell K	2016	–
		Pilowsky PM	2017	–
		Royse C	2018	–
NHMRC	Vascular and neurogenic determinants of hypertension in chronic kidney disease. (1030297)	Philips JK	2012	–
		Avolio AP	2013	–
		Pilowsky PM	2014	\$163,670
NHMRC	Fellowship (1024489)	Pilowsky PM	2012	–
			2013	–
			2014	\$140,500
			2015	\$140,500
			2016	–
Australian Research Council	Blood pressure control by neural activation: underlying mechanisms of electric field stimulation and photostimulation of genetically targeted neurons. (LP120100463)	Avolio AP	2012	–
		Pilowsky PM	2013	–
		Town GE	2014	\$80,000
		Dutkiewicz E Goldys EM		
DECRA		Farnham MMJ	2010	–
			2013	–
			2014	\$125,000

National Institutes of Health	Cellular mechanisms of fatal respiratory insufficiency in arboviral encephalitis. (1 R21 NS088400)	Morrey J Siddharthan V Wang H Pilowsky PM (consultant)	2015 2016	US\$ 173,550
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Teaching

Members of the High Blood Pressure Group participate in teaching and training at all levels from undergraduate to postgraduate and post-doctoral. In addition, during 2014 to 2015 the Group delivered a small number of lectures and tutorials to undergraduates to assist organizers of larger programs.

LABORATORY OF MOLECULAR MEMBRANE PHYSIOLOGY

PHILIP PORONNIK

Laboratory Personnel 2014–2015

Philip Poronnik	Professor of Biomedical Science	University	2012–
Cas van der Made	MSc	Radboud	2014
Lisa Huis in t'Vald	MSc	Radboud	2015
Kevin Bragg	Honours	University	2015
Will Swan	Honours	University	2015

Total effective full-time personnel **2014: 2** **2015: 4**

Lab Overview

The Lab focuses on the molecular mechanisms that underpin membrane function such as the accessory proteins that modify the activity of ion channels, transporters and receptors. Key research areas include diabetic kidney disease and proteostatic changes in the ageing brain. The Lab also has a strong focus on data representation and communication using multimedia platforms including projection mapping, animations and mixed realities.

Research Activities

In an ongoing collaboration with Dr Darren Saunders at University of New South Wales and Professor Sharad Kumar at University of South Australia we have been developing new methods to investigate the cellular ubiquitome and how it changes in disease. These novel methods are allowing us to describe new targets and pathways that are regulated by ubiquitin. In collaboration with Dr Deanne Skelly at the University of Melbourne we have continued to further our understanding of the molecular mechanisms that govern albumin uptake by the proximal tubule.

In addition to bench research, we are very active in science education research and science communication. This includes research into the development of innovative learning spaces (in collaboration with Woods-Bagott architects), together with data sonification, as well as creative coding and data representation with Assoc Prof William Martens (Architecture and Design), Dr Oliver Bown at University of New South Wales and Dr Martin Krzywinski at University of British Columbia and SyngGlyphX. The work also involves public communication of science with world renowned light artist Bruce Ramus and Dr Caitilin de Berigny (Architecture and Design).

Prof Poronnik is also an adjunct Professor at University of New South Wales Art and Design.

Journal Articles

2014

Briffa JF, Grinfeld E, McAinch AJ, Poronnik P, Hryciw DH. Short term exposure to elevated levels of leptin reduces proximal tubule cell metabolic activity. *Mol Cell Endocrinol* 2014; 382: 38-45.

Ekberg JA, Boase NA, Rychkov G, Manning J, Poronnik P, Kumar S. Nedd4-2 (NEDD4L) controls intracellular Na⁺-mediated activity of voltage-gated sodium channels in primary cortical neurons. *Biochem J* 2014; 457: 27-31.

2015

Camera D, Boase NA, Kumar S, Pow DV, Poronnik P. Subtle gait abnormalities in Nedd4 heterozygous mice. *Behav Brain Res* 2014; 260: 15-24.

Jenkin KA, McAinch AJ, Briffa JF, Zhang Y, Kelly DJ, Pollock CA, Poronnik P, Hryciw DH. Cannabinoid receptor 2 expression in human proximal tubule cells is regulated by albumin independent of ERK1/2 signaling. *Cell Physiol Biochem* 2013; 32: 1309-1319.

Hinton T, Yeoman P, Carvalho L, Parisio P, Day M, Byrne S, Bell A, Donohoe K, Radford J, Tregloan P, Poronnik P, Goodyear P. Participating in the communication of science: Identifying relationships between laboratory space designs and students' activities. *Int J Innov Sci Math Educ* 2014; 22: 30-42.

Huang C, Day ML, Poronnik P, Pollock CA, Chen XM. Inhibition of KCa3.1 suppresses TGF- β 1 induced MCP-1 expression in human proximal tubular cells through Smad3, p38 and ERK1/2 signaling pathways. *Int J Biochem Cell Biol* 2014; 47: 1-10.

Briffa JF, Grinfeld E, Mathai ML, Poronnik P, McAinch AJ, Hryciw DH. Acute leptin exposure reduces megalin expression and upregulates TGFβ1 in cultured renal proximal tubule cells. *Mol Cell Endocrinol* 2015; 401: 25-34.

Lee A, Slattery C, Nikolic-Paterson DJ, Hryciw DH, Wilk S, Wilk E, Zhang Y, Valova VA, Robinson PJ, Kelly DJ, Poronnik P. Chloride channel CIC-5 binds to aspartyl aminopeptidase to regulate renal albumin endocytosis. *Am J Physiol Renal Physiol* 2015; 308: F784-F792.

Briffa JF, Grinfeld E, Jenkin KA, Mathai ML, Poronnik P, McAinch AJ, Hryciw DH. Diet induced obesity in rats reduces NHE3 and Na⁺ /K⁺ -ATPase expression in the kidney. *Clin Exp Pharmacol Physiol* 2015; 42: 1118-1126.

Poronnik P, Nikolic-Paterson DJ. Renal physiology: The proximal tubule and albuminuria-at last a starring role. *Nat Rev Nephrol* 2015; 11: 573-575

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
P Poronnik	179	176	177	136	176	2450

*'Lifetime' = to end of 2015

Installations and Projections

In 2015 we created projections for the Quadrangle in collaboration with Dr Caitilin de Berigny from Architecture and Design and an installation as part of the official *Destination NSW Vivid 2015 Festival of Light*.

<http://www.vividsydney.com/event/light/machine-cells>

<http://www.vividsydney.com/event/light/quadrangle>

Official for Scientific Societies

P Poronnik

Member, National Committee on Biomedical Sciences, Australian Academy of Science

Co-Director, Biosciences Education Australia Network

Editorial Boards of Journals

P Poronnik

Member, Editorial Board, *International Journal of Biochemistry and Cell Biology*

Member, Editorial Review Board, *American Journal of Physiology – Renal*

Member, Editorial Board, *

Service to the University

P Poronnik

Associate Dean, BMedSc (Faculty of Science)

Program Director, BMedSc

Grant Funding

NHMRC project grant	The transportome: a coordinate complex regulating brain excitation and inhibition.	Pow D	2013	–
		Lee A	2014	\$150,000
		Poronnik P	2015	\$150,000
		Balcar V		
Office for Learning and Teaching	The Global Canopy: linking international inbound students with domestic outbound students for improved learning and global connections.	McLaughlin P Poronnik P and others	2015	\$200,000
Office for Learning and Teaching	The STEM Ecosystem: building cross-disciplinary leadership capacity in science, technology, engineering and mathematics (STEM)	McLaughlin P Poronnik P and others	2015	\$200K

DVC-Education Large Innovation Grant	Creative coding tools for immersive engagement and learning of statistical analysis	Poronnik P Hinton T Day ML	2015	\$25,000
DVC-Education Small innovation grant	Towards a toolkit for the interdisciplinary teaching of data analysis, interpretation and visualization.	Bell-Anderson K James DJ Poronnik P		\$10,000

Teaching

2014 and 2015

Degree program/course coordinator duties

P Poronnik

Program Director, BMedSc

LABORATORY OF VISUAL NEUROSCIENCE

DARIO A PROTTI

Laboratory Personnel 2014–2015

Dario A Protti	Senior Lecturer	University	2003–
Jin Huang	Lecturer	University	2008–
Charles Yates	BSc(Hons) student/ Research Assistant	University	2014–2015
Josef Daroczy	BSc(Hons) student	University	2014
Ibrahim Darwish	BMedSc(Hons) student	University	2014
Total effective full-time personnel	2014: 5	2015: 3	

Lab Overview

Our research focuses on signal processing in the retina, in particular on the synaptic mechanisms involved in the extraction of visual information. We are also interested in understanding the role of different neurotransmitters and receptors in the modulation of signal transmission in the retina and in plasticity phenomena in the early stages of visual processing.

Research Activities

During this period, our Lab focused on the study of the modulatory effects of cannabinoids and endocannabinoids (eCBs) on signal transmission in the retina and on cellular excitability. We also continued our studies on the mechanisms involved in lateral inhibition in retinal circuits.

Effects of endocannabinoid on retinal signaling: The endocannabinoids are bioactive lipids that act as neuromodulators in the central nervous system. We have previously shown that endocannabinoids are released in the retina and modulate the strength of light-responses as well as the receptive field properties of retinal ganglion cells. During 2014 and 2015 we delved into the effects of endocannabinoids on retinal signalling. We found that eCBs reduce the strength of synaptic transmission in the retina, as expected from their known effects in other brain areas. We also found, that paradoxically, that eCBs enhanced retinal ganglion cell excitability by modulating the sensitivity of voltage-gated sodium channels.

Lateral inhibition in the primate retina: We characterized the synaptic mechanisms that shape the receptive field of retinal ganglion cells in the mouse and primate retina. We found that both pre- and post-synaptic inhibitory mechanisms originating in the inner plexiform layer mediate lateral inhibition in ganglion cells.

Journal Articles

2014

Protti DA, Di Marco S., Huang JY, Vonhoff CR, Nguyen V, Solomon SG. Inner retinal inhibition shapes the receptive field of retinal ganglion cells in primate. *J Physiol* 2014; 592: 49-65.

Weltzien F, Di Marco S, Protti DA, Daraio, T, Martin PR, Grunert U. Characterization of secretagogin-immunoreactive amacrine cells in marmoset retina. *J Comp Neurol* 2014; 522: 435-455.

2015

Wijesinghe R, Protti DA, Camp AJ. Vestibular Interactions in the thalamus. *Front Neural Circuits* 2015; 9: 79.

Wijesinghe R, Tung VW, Camp AJ, Protti DA, Mathews MA. Exciting potential: the importance of the right environment. *J Physiol* 2015; 593: 2253-2255.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
DA Protti	50	43	53	45	50	1160

*'Lifetime' = to end of 2015

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014

Brandli A, Protti DA. Green eyes – Cannabinoid modulation of visual function in mice. *Proceedings of the Australian Neuroscience Society*, Adelaide, Feb 2014. P

Morsch M, Phillips WD. Cannabinoids modulate quantal size at the mouse neuromuscular synapse in health and disease. *Proceedings of the Australian Neuroscience Society*, Adelaide, Feb 2014. P

Huang JY, Pietersen AN, Protti DA. Interactions between the ON and OFF pathways on the response output of ganglion cells of the eye. *Australian Neuroscience Society, Vision Satellite*, Jan 2014. P

2015

Protti DA, Darwish I, Huang JY, Yates CF. The endocannabinoid system exerts a paradoxical effect on visually-evoked responses of mouse retinal ganglion cells. *Society for Neuroscience*, Chicago, USA, Oct 2015. P

Protti DA, Darwish I, Huang JY, Yates CF. Paradoxical effect of endocannabinoids on visually-evoked responses of mouse retinal ganglion cells. *Joint Meeting of the International Society for Neurochemistry and the Australasian Neuroscience Society*, Cairns, Aug 2015. P

Official for Scientific Societies

Convenor of Vision Discussion Seminars, which bring together approximately 100 visual scientists in the Sydney area.

Invited Presentation at National Conference

2014

Protti DA. Smokey vision: Cannabinoids modulate synaptic inputs onto retinal ganglion cells. *Vision 2014 – Genes to Behaviour: Australian Neuroscience Society Satellite Meeting*, Adelaide, Feb 2014

PhD Awarded

2014

Middleton TP

BMedSc(Hons) Awarded

2014

Darwish I, 1st Class

BSc(Hons) Awarded

2014

Yates CF, 1st Class

Daroczy J, 2nd Class

Manuscripts Refereed for Journals

2014 (3)

Curr Eye Res (1), *Neurosci Lett* (1), *J Neurophysiol* (1)

2015 (2)

Vis Neurosci (1), *PLoS One* (1)

Thesis Examined for Another University

2015

PhD, Univ of Melbourne

Grant Assessed for Funding Body

2015

ARC (1)

Service to the University

Deputy Postgraduate Co-ordinator

Grant Funding

Rebecca Cooper Foundation	Understanding retinal ganglion cell function in glaucoma	Protti DA Huang JY	2014	\$22,000
Institute of Teaching and Learning, University of Sydney	Deeper learning engagement through hands-on experience with equipment assembly and collection of electrophysiological data	Protti DA Mason R Phillips WD Hinton T	2015	\$9,975

Teaching

Unit of Study Coordination role

2014

Unit of Study Co Coordinator: NEUR3001, NEUR3901, NEUR3002, NEUR3902

2015

Unit of Study Coordinator: NEUR3901, NEUR3902

Teaching

2014

Unit of study name	code	Class	Hours/year	Enrolment	
Neuroscience: Special Senses and Neuroscience: Movement & Behaviour	NEUR3001, NEUR3002, NEUR3901, NEUR3902	Lectures	9	18	
		Practical	16		
		Paper session	16		
		Lab project: Advanced student supervision			2 students
Physiology for Pharmacy	PHSI2601	Lectures	3	187	
Nerve and Muscle	BMED2402	Lectures	6	233	
Graduate Medical Program, Block 6 Graduate Dentistry Program, Block 6		Lectures	0	~300	
		Practical	4.5		

Cellular and Developmental Neuroscience & Integrative Neuroscience	NEUR3003, NEUR3903, NEUR3004, NEUR3904		88 15 82 19
		Advanced Students supervision	
		Lab project: Advanced student supervision	3 students
TSP group mentoring			10

2015

Unit of study name	code	Class	Hours/year	Enrolment
Neuroscience: Special Senses and Neuroscience: Movement & Behaviour	NEUR3001, NEUR3002, NEUR3901, NEUR3902			119 28 122 28
		Lectures	9	
		Practical	32	
		Paper session	16	
		Library Projects	12	
		Lab project: Advanced student supervision		2 students
Physiology for Pharmacy	PHSI2601	Lectures	3	277
Nerve and Muscle	BMED2402	Lectures	6	268
Human Cellular Physiology: Theory	PHSI3005	PBL	18	164
Graduate Medical Program-Block 6 Graduate Dentistry Program-Block 6		Lectures	1	~300
		Practical	4.5	
Cellular and Developmental Neuroscience & Integrative Neuroscience	NEUR3003, NEUR3903, NEUR3004, NEUR3904			87 9 92 10
		Library Projects	30	
		Lab project: Advanced student supervision		2 students

SYSTEMS NEUROSCIENCE LABORATORY

ATOMU SAWATARI

Laboratory Personnel 2014–2015

Atomu Sawatari	Lecturer	University	2006–
Michael D Bourke	PhD student	APA	2010–2014
Darius Rountree-Harrison	MPhil student		2010–2014
Angela M O' Connor	PhD student	APA	2010–2015
Thomas Burton	PhD student	APA	2012–
Dylan Kilpatrick	MPhil student		2014–
Total effective full-time personnel		2014: 5	2015: 4

Lab Overview

Research in our Laboratory focuses on revealing the genetic mechanisms as well as the role environmental factors contribute to the development and function of neural circuits involved in perception, social interaction, learning and decision making.

Research Activities

During 2014 and 2015 exciting projects examining the manner in which mice acquire and relearn complex cognitive tasks were conducted and are ongoing. The Lab also carried out behavioural studies revealing responses to ethologically relevant stimuli. These too will continue. A number of new research projects were initiated, including a study which aimed at determining how increasing neural plasticity can affect the therapeutic efficacy of neurotrophic treatment in Parkinson's disease. This project was funded by the Michael J. Fox Foundation.

Three postgraduate students completed their training during this period (see list above and completions below). Portions of their theses have contributed to the preparation of several manuscripts, one which has been accepted for publication and another which is currently being revised for resubmission. Two more are being finalized for submission.

Journal Articles

2014

O'Connor AM, Burton TJ, Leamey CA, Sawatari A. The use of the puzzle box as a means of assessing the efficacy of environmental enrichment. *J Vis Exp* 2014; (94).

Leamey CA, Sawatari A. The teneurins: new players in the generation of visual topography. *Semin Cell Dev Biol* 2014; 35: 173-9.

2015

Tran H, Sawatari A, Leamey CA. The glycoprotein Ten-m3 mediates topography and patterning of thalamostriatal projections from the parafascicular nucleus in mice. *Eur J Neurosci* 2015; 41: 55-68.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
A Sawatari	20	27	36	37	32	398

*'Lifetime' = to end of 2015

Conference Abstracts and Presentations (Selected)

(O, oral; P, poster; P+O, poster with short oral)

2014

Burton TJ, Sawatari A. Assessing mouse cognition in the IntelliCage. Bosch Young Investigator's Symposium, Sydney, 16–17 Jul 2015. (Awarded Outstanding Poster Prize)

P

Burton TJ. New methods for investigating cognitive flexibility in mice. *Bosch Facilities User Group Meeting*, Sydney, 23 Oct 2014. ○

Burton TJ. A more naturalistic approach to assessing cognitive flexibility in mice. *Bosch Young Investigator's Symposium*, Sydney, 9 Dec 2014. ○

2015

Burton TJ. *A novel approach to testing executive functions in mice*. Oral Presentation at: *Kioloa Neuroscience Colloquium*, Kioloa, 31 Jan 2015. ○

Burton TJ. Learning and choice in a complex and dynamic world. *Learning and Memory. Inter-University Neuroscience and Mental Health Conference*, Sydney, 24-25 Sep 2015. ○

Burton TJ, Sawatari A. Assessing cognitive flexibility in the social home-cage. *Executive Function: Models of Disorders. Society for Neuroscience 45th Annual Meeting*, Chicago, USA, 17-21 Oct 2015. P

Editorial Board of Journal

Reviews Editor, *Frontiers of Integrative Physiology*, 2011–

PhDs Awarded

2014

Bourke MD

2015

O'Connor AM

MPhil Awarded

2014

Rountree-Harrison D

BMedSc(Hons) Awarded

2015

Yaourtis AM (1st class)

BSc(Hons) Awarded

2014

Westling J (1stclass)

Grants Assessed for Funding Bodies

2014

NHMRC (1)

External Theses Examined

2014

BSc(Hons), UTS

Grant Funding

Michael J Fox Foundation	Rapid Response Innovation Award	Sawatari A Leamey CA	2013	
			2014	\$38,000
			2015	\$38,000

Teaching

2014 and 2015

Unit of study name	Code	Class	Hours/year	Enrolment
Integrated Physiology A/Advanced Physiology	PHSI2005/PHSI2905	Lectures/Pracs	45	~250/~30
Integrated Physiology B/Advanced Physiology	PHSI2006/PHSI2906	Pracs	18	~250/~30
Physiology for Pharmacy	PHSI2601	Lectures	9	~250
Sensory and Motor Neuroscience	NEUR3001/3002	Lectures/Paper session/Advanced library/lab projects	86	~150
Cellular, Developmental and Integrative Neuroscience	NEUR3003/3004	Paper session/Advanced library/lab projects	66	~100
Medicine: Eye Movement Demonstration	Block 6: Practical 2	Demonstration	4.5	~200
Medicine: Muscle Lecture	Block 2: Lecture 4	Paper session/Advanced library/lab projects	1	~100

Degree program/course coordinator duties

Course coordinator for Advanced 2nd Year Physiology PHSI2905/PHSI2906

Unit of Study Coordination role

Advanced 2nd Year Physiology PHSI2905/PHSI2906

2006–2016 Enrolment in 2014 & 2015: ~30 students

RETINAL AND CEREBRAL NEUROBIOLOGY LABORATORY

JONATHAN STONE & DANIEL M JOHNSTONE

Laboratory Personnel 2014–2015

Jonathan Stone	Professor of Retinal and Cerebral Neurobiology	University	2007–
Daniel M Johnstone	Early Career Fellow	NHMRC ECF	2012–
Sharon Spana	Research Assistant		2008–
Alice Brandli	PhD student		2011–15
Charith Nandasena	PhD student		2010–15
Ji Yeon Kim	PhD student		2015–
Tianchen Feng	MPhil student		2013–
Nicholas Skladnev	BMedSc(Hons) student		2015
Varshika Ganeshan	BMedSc(Hons) student		2015
Marcus Andersson	BMedSc(Hons) student		2015–
Total effective full-time personnel	2014: 6	2015: 9	

Lab Overview

Our work concerns the stability of the central nervous system, focusing on ways of mitigating degenerations characteristic of ageing – age-related dementia (Alzheimer’s disease), Parkinson’s disease and age-related macular degeneration.

Research Activities

Our work in 2014 and 2015 has involved the following strands:

The cause of age-related dementia.

The potential of photobiomodulation in the stabilization of the brain in rodent and primate models of parkinsonism

The use of photobiomodulation, saffron and remote ischaemic conditioning in rodent models of dementia.

The demonstration of supernormal retinal function following remote ischemic conditioning.

In 2015, we published a novel understanding of the cause of age-related dementia in vascular ageing (‘The Pulse Destroys the Brain’). The idea has achieved wide publicity. This review, a synthesis of many strands of data, is backed up by a wide range of experimental studies on neuroprotection.

Valuable collaborations with Clinattec (Grenoble), Rowan University (USA) and the Victor Chang Cardiac Research Institute have strengthened and broadened our work, to include human and non-human primate studies, the analysis of the role of circulating bone marrow-derived stem cells in neuroprotection, and to the role of vascular ageing in age-related degenerations.

Journal Articles

2014

Aryal R, Woods JJ, Johnstone DM, Horvat JC, Milward EA. Is the A-beta peptide of Alzheimer’s disease an antimicrobial peptide? *J Gerontol Geriatr Res* 2014; 3: 165.

Brandli A, Stone J. Remote ischemia influences the responsiveness of the retina: observations in the rat. *Invest Ophthalmol Vis Sci* 2014; 55: 2088-2096.

Di Marco F, Di Paolo M, Romeo S, Colecchi L, Fiorani L, Spana S, Stone J, Bisti S. Combining neuroprotectants in a model of retinal degeneration: no additive benefit. *PLoS One* 2014; 9: e100389.

Johnstone DM, Coleman K, Moro C, Torres N, Eells JT, Baker GE, Ashkan K, Stone J, Benabid AL, Mitrofanis J. The potential of light therapy in Parkinson's disease. *ChronoPhysiol Ther* 2014; 4: 1-14.

Johnstone DM, El Massri N, Moro C, Spana S, Wang XS, Torres N, Chabrol C, De Jaeger X, Reinhart F, Purushothuman S, Benabid AL, Stone J, Mitrofanis J. Indirect application of near infrared light induces neuroprotection in a mouse model of parkinsonism – an abscopal neuroprotective effect. *Neuroscience* 2014; 274: 93-101.

Mate K, Riveros C, Weidenhofer J, Goldie B, Scott J, Moscato P, Johnstone D, Milward E. Strategies for enhancing communication between students, academics and researchers participating in large-scale undergraduate research projects. *Int J Innov Sci Math Educ* 2014; 22: 14-29.

Milward EA, Moscato P, Riveros C, Johnstone DM. Beyond statistics – a new combinatorial approach to identifying biomarker panels for the early detection and diagnosis of Alzheimer's disease. *J Alzheimers Dis* 2014; 39: 211-217.

Moro C, El Massri N, Torres N, Ratel D, Chabrol C, Perraut F, Bourgerette A, Purushothuman S, Johnstone D, Stone J, Mitrofanis J, Benabid AL. Photobiomodulation inside the brain: a novel method of intracranial application of near-infrared light and its impact on dopaminergic cell survival in MPTP-treated mice. *J Neurosurg* 2014; 120: 670-683.

Purushothuman S, Johnstone DM, Nandasena C, Mitrofanis J, Stone J. Photobiomodulation with near infrared light mitigates Alzheimer's disease-related pathology in cerebral cortex – evidence from two transgenic mouse models. *Alzheimers Res Ther* 2014; 6: 2.

2015

Brandli A. Remote limb ischemic preconditioning: a neuroprotective technique in rodents. *J Vis Exp* 2015; e52213.

Brandli A, Stone J. Using the electroretinogram to assess function in the rodent retina and the protective effects of remote limb ischemic preconditioning. *J Vis Exp* 2015: e52658.

Bravo-Nuevo A, Brandli AA, Gerhart J, Nichols J, Pitts M, Suter CK, Assali S, Scheinfeld V, Prendergast GC, Stone J, George-Weinstein M. Neuroprotective effect of Myo/Nog cells in the stressed retina. *Exp Eye Res* 2015; 146: 22-25.

Johnstone DM, Mitrofanis J, Stone J. Targeting the body to protect the brain: inducing neuroprotection with remotely-applied near infrared light. *Neural Regen Res* 2015; 10: 349-351.

Purushothuman S, Johnstone DM, Nandasena C, Ittner L, Mitrofanis J, Stone J. Near infrared light mitigates cerebellar pathology in transgenic mouse models of dementia. *Neurosci Lett* 2015; 591: 155-159.

Purushothuman S, Stone J. The reaction of cerebral cortex to a nearby lesion: damage, survival, self-protection. *Brain Res* 2015; 1601: 52-63.

Reinhart F, El Massri N, Darlot F, Torres N, Johnstone DM, Chabrol C, Costecalde T, Stone J, Mitrofanis J, Benabid AL, Moro C. 810 nm near-infrared light offers neuroprotection and improves locomotor activity in MPTP-treated mice. *Neurosci Res* 2015; 92: 86-90.

Shahandeh A, Purushothuman S, Martin K, Graham M, Johnstone DM, Milward EA. Anti-oxidant phytochemicals as potential treatments for age-related macular degeneration. *J Antioxidant Activity* 2015; 1: 26-38.

Stone J, Johnstone DM, Mitrofanis J, O'Rourke M. The mechanical cause of age-related dementia (Alzheimer's disease): the brain is destroyed by the pulse. *J Alzheimers Dis* 2015; 44: 355-373.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
J Stone	464	565	536	507	595	14,776
D Johnstone	13	32	58	75	125	328

J Stone, H-index according to Google Scholar = 64

*'Lifetime' = to end of 2015

Chapter in Book

Milward EA, Shahandeh A, Heidari M, Johnstone DM, Daneshi N, Hondermarck H. Transcriptomics. In: Bradshaw R, Stahl P (eds). *Encyclopedia of Cell Biology*, Elsevier, Vol.4, 2015, pp 160-165.

Official for Scientific Society

D Johnstone

Director, Australian Society for Medical Research, Nov 2012–

President-Elect, Australian Society for Medical Research, Nov 2015–

Conference and Symposia Organized

D Johnstone

Convenor of Scientific Program, Haemochromatosis and Iron Overload conference, Melbourne, Vic, 2014

Invited Presentations at National Conferences

2014

D Johnstone

Australian Health and Medical Research Congress, Melbourne, 16-19 Nov 2014.

Inter-University Neuroscience and Mental Health Conference, Sydney, 29-30 Sep 2014.

Haemochromatosis and Iron Overload Conference, Melbourne, 17-18 May 2014.

2015

D Johnstone

Dementia, Ageing and Neurodegenerative DISEases (DANDIS) Meeting, Cairns, 22 Aug 2015.

Bosch Institute Annual Scientific Meeting, Sydney, 16-17 Jul 2015.

"Kioloa at Newcastle" Neuroscience Colloquium, Newcastle, 31 Jan–1 Feb 2015

Session Chair at National and International Conferences

2014

D Johnstone

Australian Health and Medical Research Congress, Melbourne, 16-19 Nov 2014.

Haemochromatosis and Iron Overload Conference, Melbourne, 17-18 May 2014.

2015

D Johnstone

Chair of Edwards Oration. *Australian Society for Medical Research National Scientific Conference, Adelaide, 15-18 Nov 2015.*

Seminar

2015

D Johnstone

Stop at the red light: the common feature of traffic and neurodegeneration. Discipline of Pharmacology Seminar, Univ of Sydney, 6 May 2015.

Awards, Prizes and Other Recognition

2015

D Johnstone

NSW Young Tall Poppy Award, Australian Institute of Policy & Science, 2015

Fellowship Awarded

2015

D Johnstone

Ron Rickards Fellowship, Australian Academy of Science

BSc(Hons) Awarded

2015

Skladnev N

Ganeshan V

Manuscripts Refereed for Journals

2014 (4)

J Alzheimers Dis (2), *Brain Res* (1), *J Biophotonics* (1)

2015 (5)

Alzheimers Dementia (1), *Front Neurosci* (1), *PLoS One* (1), *Neural Regen Res* (1), *Neuromod Technol Neural Interface* (1)

Grants Assessed for Funding Bodies

2014

NHMRC (1)

Neurological Foundation of New Zealand (1)

2015

NHMRC (2)

Service to the University

J Stone

Director, Bosch Institute

D Johnstone

ECR Coordinator, School of Medical Sciences, 2015–

Grant Funding

NHMRC	Early Career Fellowship	D Johnstone	2013	
			2014	\$75,000
			2015	\$75,000
			2016	
Parkinson's NSW	Seed Grant	D Johnstone Stone J Mitrofanis J	2015	\$19,990
Uni of Sydney	BRIG Scheme	Camp A Johnstone D	2015	\$20,000

DIABETES AND STEM CELLS

BERNARD E TUCH

Laboratory Personnel 2014–2015

Bernard E Tuch	Honorary Professor	Aust Found for Diab Res/University	2014–
Auvro Mridha	Research Officer	University	2015–
Luke Carroll	PhD student	AFDR/JDRF/CSIRO	2014–
Total effective full-time personnel	2014: 2	2015: 3	

Lab Overview

Research in this Laboratory focuses on developing a clinically applicable cell therapy for type 1 diabetes, both in terms of the human cells needed, and being able to deliver them, in a bioengineered device, to the recipient without the need for immunosuppressive drugs.

Research Activities

Bioengineered diabetes therapy project

This research began in July 2015, after a collaborative Research Agreement had been signed with the funder, the Australian Foundation for Diabetes Research and Queensland University of Technology. A prototype device containing the insulin-producing cells was made. This involved immune-isolating the cells in a semi-permeable microcapsule made of barium alginate, and placing these encapsulated cells in a scaffold made to order by 3D printing. The device was transplanted into diabetic mice, and evidence of function was shown after several weeks, with the blood glucose levels of the mice being lowered. Optimizing the device to achieve normalization of blood sugar levels is the next goal of this research.

Differentiation of human pluripotent stem cells into mature insulin-producing cells

The novelty of this research is the differentiation of human pluripotent stem cells into precursors of insulin-producing cells *in vitro* inside barium alginate microcapsules, which are used to immunoisolate cells when implanted into recipients. Theoretical advantages of this approach over differentiation in 2D culture dishes, which has already been demonstrated by others, are that: the microcapsules offer a more physiological approach with 3D spatial configuration, and, once the cells have been suitably differentiated *in vitro*, they can be transplanted into diabetic recipients without the need to administer anti-rejection therapy. Results achieved since the beginning of 2015, when the research was commenced at The University of Sydney, has been the successful production and characterization of definitive endoderm from the pluripotent stem cells, and subsequently differentiation to posterior foregut cells. It is the PDX-1 cells in this foregut that are the precursors to insulin-producing cells. Transplanting the encapsulated posterior foregut cells into diabetic immunodeficient mice, in which insulin-producing cells should develop, is the next goal of this research.

Journal Articles

2014

Tuch BE, Wall DM. Self-regulation of autologous cell therapies. *Med J Aust* 2014; 200: 196.

Tuch BE, Wall DM. Self-regulation of autologous cell therapies. *Med J Aust* 2014: 201: 514.

Tuch BE, Gao SY, Lees JG. Scaffolds to support islets and the differentiation of stem cells and progenitor cells into insulin-secreting cells. *Front Biosci* 2014; 19:126-123.

Vaithilingam V, Kollarikova G, Qi M, Larsson R, Lacik I, Formo K, Marchese E, Oberholzer J, Guillemin GJ, Tuch BE. Beneficial effect of coating alginate microcapsules with macromolecular heparin conjugates – *In vitro* and *in vivo* study. *Tissue Eng Part A* 2014; 20: 324-334.

2015

Tuch BE. Clinical use of GLP-1 agonists and DPP4 inhibitors. *Pancreatology* Epub ahead of print 9 Jun 2015.

Vaithilingam V, Evans MDM, Rowe A, Bean PA, McFarland GA, Tuch BE. Co-encapsulation of target effector cells with mesenchymal stem cells reduces pericapsular fibrosis and improves graft survival in a xenotransplanted animal model. *Cell Transplantat* Epub ahead of print 7 Sep 2015.

Total Annual Citations

	2011	2012	2013	2014	2015	Lifetime*
BE Tuch	221	200	338	244	190	3019

*'Lifetime' = to end of 2015

Letter to the Editor (in Journal)

Tuch BE, Wall DM. Self-regulation of autologous cell therapies. *Med J Aust* 2014; 201: 514.

Conference Abstracts and Presentations

(O, oral; P, poster; P+O, poster with short oral)

2014

Tuch BE, Sivanandam R, Mathiyalagan B, Verma P, Lukic J. Suitability of IVF discarded immature oocytes for therapeutic cloning. *Joint Scientific Meeting of the Australian Society for Stem Cell Research, Stem Cells Australia and the International Society for Cellular Therapy (Australia/New Zealand region)*, Lorne, Vic, 9-11 Nov 2014; 7: 55 (Abstract 101). P

Goldberg D, Main H, Tuch BE. The impact of science communication to drive the promise of stem cells. *Australian Science Communicators conference*, Brisbane, 2–5 Feb 2014. P

2015

Carroll L, Morris MB, Hardikar A, Tuch B. Differentiation of human embryonic stem cells into insulin producing cell precursors while encapsulated in immune-protective alginate. *Islet Society and the Australian Islet Study Group 2015 Annual Meeting*, 19-21 Jul. P

Vaithilingam V, Evans MDM, Lewy DM, Bean PA, Bal S, Tuch BE. Function of allografted encapsulated islets improved when co-encapsulated or co-transplanted with activated mesenchymal stem cells. *Islet Society and the Australian Islet Study Group 2015 Annual Meeting*, Univ of Sydney, 19-21 July, AO62, 95. B

Carroll L, Morris MB, Hardikar A, Tuch B. Successful differentiation of human embryonic stem cells into primitive gut tube while encapsulated in immune-isolative alginate. *Australasian Society for Stem Cell Research 2015 Annual Meeting*, Hunter Valley, NSW, 8-10 Nov, 8: 75 (Abstract 210). P

Vaithilingam V, Evans MDM, Lewy DM, Bean PA, Bal S, Tuch BE. Co-encapsulation and co-transplantation of stimulated mesenchymal stem cells reduces pericapsular fibrosis and improves encapsulated islet survival. *Annual Scientific Meeting of the Australasian Society for Stem Cell Research 2015 Annual Meeting*, Hunter Valley, NSW, 8-10 Nov, 31: 41. O

Commercial Activities

Non-executive Director of the ASX listed company, Living Cell Technologies Limited, Jul 2011–

Non-Executive Director, Diatrans Otsuka Limited, Aug 2014–Apr 2015

Director, Sydney Cell Therapy Foundation Pty Ltd, from its creation in 2004–present.

Member, Scientific Advisory Committee, Impromy (a CSIRO supported company), 2014–

Official for Scientific Societies

Director, NSW Stem Cell Network, 2002–

Board Member, Australasian Society for Stem Cell Research, 2008–Nov 2014

Member, Australian Diabetes Council, Research Advisory Committee, 2012–2014

Member, Australian Diabetes Council, Health Professional Advisory Committee 2011–2014

Member, Advisory Board, Australian Friends of Technion Institute, 2013–

Conference and Symposia Organized

Chair of the following Workshops of the NSW Stem Cell Network:

2014

20th Workshop on Stem Cells in Multiple Sclerosis and Neurological Disease, Univ of Sydney, 28 May 2014.

21st Workshop on Bioengineering and Stem Cells, Univ of Sydney, 23 Sep 2014.

2015

22nd Workshop on Stem Cells and Genetic Muscle Disorders, Univ of Sydney, 13 Apr 2015.

23rd Workshop on Stem Cells and the Gastrointestinal System, Univ of Sydney, 7 Oct 2015.

Invited Presentations at National and International Conferences

2015

Symposium on Stem Cell Companies: More than one way to get to the market place, Annual Scientific Meeting of Australasian Society for Stem Cell Research, Hunter Valley, 8–10 Nov 2015.

Seminars

2014

The biomaterial challenge of delivering cell therapies. Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, China, 11 May 2014.

Taking stem cells to the clinic. NSW Stem Cell Network education evening for clinicians, especially general practitioners, Glebe, Sydney. 11 Jun 2014.

Stem cell transplantation. Directions in Transplantation 2014, Sydney (sponsored by Lilly), 20 Jul 2014.

The Diabetes Conundrum. What's next beyond sulphonylureas and metformin? (A talk to general practitioners), Sydney (sponsored by Janssen), 5 Aug 2014.

The clinical need for innovation, within boundaries: an exempt clinic's perspective, a talk in symposium: Delineating the boundaries between clinical responsibility and TGA oversight in autologous cell therapy at Annual Regional Scientific Meeting of the International Society of Cellular Therapies, Lorne, Vic, 10 Nov 2014.

Talk at: Stem Cells for Bionics Workshop on Bioengineering and Stem Cells as a Therapy for Insulin Dependent Diabetes, Wollongong, 25 Nov 2014.

2015

TED talk: Is it kosher to genetically modify human embryos? Coogee Synagogue, 23 May 2015

Wellbeing Program Q&A at Limmud Oz, Medical issues and Halacha today, Univ of New South Wales, 7 Jun 2015.

Q&A Style Evening: Stakeholder Perspectives on Autologous Stem Cell Therapy Regulation. Australasian Society for Stem Cell Research, Sydney, 1 Jul 2015.

At a morning tea for diabetes. Diabetes Therapies, Past, Present and Future. Bellevue Hill (private home), 29 May 2015.

News Media

In newspaper articles

2014 (1)

Potential diabetes therapy: scientists grow insulin-producing cells using cloning techniques, by Nicky Phillips, *Sydney Morning Herald*, 29 Apr 2015.

Radio

2014 (1)

Radio interview by Nadia Kulikova on therapeutic cloning and usefulness for treatment of diabetes, *The Voice of Russia*, Moscow, 30 Apr 2015.

Podcasts

2015

Review of Podcast on stem cells for Royal Australasian College Physicians.

Manuscripts Refereed for Journals

2014 (6)

Bioengineering (1), *Diab Res & Clinical Pract* (1), *Materials* (1), *Tissue Eng* (1), *Transplantation* (1), *Trends Mol Med* (1)

2015 (4)

J Diab Res (1), *Med J Aust* (1), *Pancreatology* (1), *J Med Case Rep* (1)

Grants Assessed for Funding Bodies

2014

NHMRC (1)

Diabetes Australia Research Trust (3)

Diabetes UK (2)

Willy Gepts Scientific Fund, Belgium (1)

2015

NHMRC (1)

Higher Degree Thesis Examined

2014

Univ of Western Australia (1)

Other Professional Assessments

2014

Ethics Reviews for Murdoch Children's Research Institute (2)

2015

Australasian Society for Stem Cell Research, Abstracts (46)

Australasian Society for Stem Cell Research, Presentations (4)

Service to the University

Adjunct Professor, Centre for Genetic Diseases, Hudson Institute of Medical Research, Faculty of Medicine, Nursing & Health Sciences, Monash Univ, Jan 2012–

Service to Government and the Profession

Director, Australian Foundation for Diabetes Research (a not-for-profit health promotion charity that provides advice to Government on stem cells and their uses), from its creation 2001–2009; Nov 2014–present.

Specialist Practitioner, Endocrinology, Prince of Wales Private Hospital, Sydney, 1997–

Specialist Practitioner, Endocrinology, St Vincent's Private Hospital, Sydney, 2015 –

Grant Funding

Australian Foundation for Diabetes Research	Bioengineered diabetes therapy project.	Tuch BE Dargaville T	2015 2016 2017	\$137,000
Australian Foundation for Diabetes Research	Differentiation of human pluripotent stem cells into mature insulin producing cells: scholarship stipend	Carroll L	2013 2014 2015	\$28,000
Juvenile Diabetes Research Foundation	Differentiation of human pluripotent stem cells into mature insulin producing cells: Scholarship Stipend top up	Carroll L	2015 2016 2017	\$3,000
CSIRO	Differentiation of human pluripotent stem cells into mature insulin producing cells: Scholarship consumables	Tuch BE	2014 2015 2016	\$25,000
Wolper Jewish Hospital Health Foundation Research Grant *	Establishing an Australian stem cell clinic	Tuch BE Hopper K	2015	\$20,000
NSW Government Office for Health & Medical Research*	NSW Stem Cell Network	Tuch BE Shparberg R	2013 2014 2015	\$40,000 \$40,000
Novo Nordisk Regional Diabetes Support Scheme*	Mobile App for people with Type 1 diabetes mellitus who have stopped engaging with health services.	Lau A Tuch BE Wiley J Coiera E	2015	\$14,908

* Funds not administered by The University of Sydney

Teaching

Mentoring 1 postdoc

Mentoring 1 PhD student

Microbiology science experiments for Year 5 at Mount Sinai College (a primary school).

JOURNALS OF PUBLICATION

Number in each, and ranking for Discipline of Physiology in the last five years

From SCI® Journal Citation Reports: based on source items in 2015

The rankings of journals are made according to the 2015 SCI® Science Citation Index 'impact factor', which is a measure of the frequency with the 'average article' in a given journal in a given year has been cited in a given year. It is a ratio between citations and citable items published. The 2015 impact factor for a journal has been calculated by dividing the number of all the SCI® Science Citation Index source journals' 2015 citations of articles that journal published in 2014 and 2015 by the total number of source items it published in 2014 and 2015. For all journals covered by the Index, a plot impact factor score vs number of journals with that score gives a distribution skewed towards the higher scores and having a median of 0.6 and a mode of 0.1. (In the left column below NL means that the journal has not been listed in the index.)

Impact Factor	Journal Title	2011	2012	2013	2014	2015
4.3	ACS Chemical Neuroscience	-	-	-	1	-
4.1	Acta Physiologica	-	-	1	-	-
15.6	Advanced Drug Delivery Reviews	-	1	-	-	-
2.0	Advances in Experimental Medicine and Biology	-	-	-	1	-
2.5	Advances in Hematology	1	-	-	-	-
NL	Advances in Sexual Medicine	-	-	-	-	1
2.5	Advances in Urology	1	-	-	-	-
5.8	Aging Cell	-	1	-	-	-
NL	AIDS Care	-	1	-	-	-
5.2	Alzheimer's Research & Therapy	-	-	-	1	-
5.0	American Journal of Epidemiology	-	-	1	-	-
3.2	American Journal of Hypertension	-	-	-	-	2
NL	American Journal of Neurodegenerative Disease	-	-	1	-	-
3.4	American Journal of Physiology: Cell physiology	1	-	-	-	-
3.8	American Journal of Physiology: Endocrinology and Metabolism	-	2	-	-	1
3.3	American Journal of Physiology: Heart and Circulation Physiology	-	1	5	-	-
3.2	American Journal of Physiology: Regulatory Integrative and Comparative Physiology	1	2	-	2	1
3.4	American Journal of Physiology: Renal Physiology	-	-	-	-	1
4.5	American Journal of Preventive Medicine	1	-	-	-	-
7.1	Antioxidants & Redox Signaling	1	-	-	-	-
1.9	Antipodes	-	-	-	-	1
2.4	Archives of Osteoporosis	-	-	-	1	-
2.6	Asian Journal of Andrology	-	1	-	-	-
NL	Asian Pacific Journal of Cancer Prevention	-	1	-	-	-
NL	Australian and New Zealand Journal of Surgery	1	-	-	-	-
0.4	Australian Economic History Review	-	-	-	-	1
0.8	Australian Family Physician	-	1	-	-	-
0.8	Australian Health Review	-	-	-	-	1
1.6	Autonomic Neuroscience: Basic & Clinical	-	-	1	1	-
3.0	Behavioural Brain Research	-	-	-	-	1
3.6	Biochemical Journal	-	-	-	1	-
2.9	Biochemistry	1	-	-	-	-
5.1	Biochimica et Biophysica Acta	-	-	1	-	-
NL	Bioethical Inquiry	1	-	-	-	-
1.6	Biological Cybernetics	-	-	-	1	-

Impact Factor	Journal Title	2011	2012	2013	2014	2015
0.7	Biological Rhythm Research	1	2	2	-	-
3.5	Biology of Reproduction	2	-	-	-	-
2.1	BioMed Research International	-	-	-	1	2
2.9	Biorganic & Medicinal Chemistry	-	-	-	-	1
NL	Biophysical Reviews	-	-	-	2	-
2.4	Bioscience Reports	-	-	1	-	-
11.8	Blood	1	1	-	-	-
3.3	BMC Cancer	-	-	-	3	-
2.3	BMC Neuroscience	-	-	1	-	-
1.8	BMC Paediatrics	-	1	1	-	-
2.6	BMC Psychiatry	-	1	-	-	-
NL	BoneKEy Reports	-	-	-	-	1
10.1	Brain	-	-	-	1	-
2.6	Brain Research	-	1	1	-	1
5.8	Brain Structure and Function	-	-	-	-	1
5.6	British Journal of Cancer	-	-	1	-	-
3.3	British Journal of Nutrition	1	-	-	-	-
1.3	Bulletin of Mathematical Biology	1	1	-	-	-
3.1	Calcified Tissue International	-	-	-	-	1
3.9	Cancer prevention research	1	-	-	1	-
3.2	Cardiovascular Drugs and Therapy	-	-	1	-	-
5.5	Cardiovascular Research	1	1	-	-	-
2.9	Cell and Tissue Research	-	-	-	-	1
17.3	Cell Metabolism	-	-	-	-	1
3.4	Cell Transplantation	-	-	-	-	1
4.7	Cellular Physiology and Biochemistry	1	-	-	-	1
8.3	Cerebral Cortex	-	-	2	-	-
NL	ChronoPhysiology and Therapy	-	-	-	1	-
11.6	Circulation Research	1	1	-	-	-
6.8	Circulation: Heart Failure	-	-	1	-	-
2.5	Climacteric	1	-	-	-	-
NL	Clinical and Experimental Pharmacology and Physiology	1	-	-	-	2
2.7	Clinical Journal of Pain	-	-	-	-	1
9.0	Current Biology	-	-	-	-	2
3.1	Current Hypertension Reports	-	1	-	-	-
3.8	Current Neuropharmacology	-	-	1	-	-
NL	Current Opinion in Clinical Nutrition and Metabolic Care Journal Impact Factor & Information	-	1	-	-	-
6.4	Current Opinion in Neurobiology	-	-	-	1	-
3.1	Current Pharmaceutical Design	-	-	-	-	1
2.3	Dermato-Endocrinology	-	-	1	-	-
2.5	Developmental Neurobiology	-	1	-	-	-
8.8	Diabetes	-	-	2	-	-
6.2	Diabetologia	-	1	-	-	-
5.6	Drug Discovery Today	-	-	1	-	-
2.6	Drugs & Aging	-	1	-	-	-
NL	e-biomed: The Journal of Regenerative Medicine	-	-	-	-	1

Impact Factor	Journal Title	2011	2012	2013	2014	2015
NL	Endocrinologist	-	-	-	1	-
4.2	Endocrinology	-	1	1	2	-
2.9	European Journal of Clinical Nutrition	1	-	-	-	-
3.0	European Journal of Neuroscience	1	-	-	1	2
NL	European Journal of Surgical Oncology	1	-	-	-	-
2.7	Experimental Dermatology	-	-	1	-	-
3.0	Experimental Eye Research	1	-	-	-	1
4.7	Experimental Neurology	-	1	-	1	2
1.6	Experimental Parasitology	-	-	-	-	1
5.4	Expert Opinion on Drug Delivery	-	-	-	1	-
5.8	Free Radical Biology & Medicine	-	-	1	-	-
2.5	Frontiers Bioscience	-	-	-	1	-
3.4	Frontiers in Behavioral Neuroscience	-	-	-	1	-
3.4	Frontiers in Neuroscience	-	-	-	-	2
4.0	Frontiers in Physiology	-	-	-	-	2
2.5	Frontiers in Psychology	-	1	1	-	-
1.5	Gene Expression Patterns	-	-	-	1	-
2.7	General and Comparative Endocrinology	-	1	-	1	1
2.2	Genesis	-	-	1	-	-
NL	Geriatric Orthopaedic Surgery & Rehabilitation	1	1	-	-	-
3.1	Gerontology	-	-	-	-	1
2.0	Global Public Health	-	-	-	-	2
6.7	Haematologica	-	-	-	-	1
4.1	Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine	-	-	1	2	-
3.6	Hearing Review	-	-	-	1	-
3.6	Heart Failure Reviews	-	-	1	-	-
2.8	Histochemistry and Cell Biology	-	-	1	1	-
4.6	Human Reproduction	-	-	-	-	1
6.4	Hypertension	3	-	1	-	1
3.8	IEEE Transactions on Microwave Theory and Techniques	-	-	-	1	-
NL	Immunology, Endocrine and Metabolic Agents in Medicinal Chemistry	-	-	-	1	-
2.4	Influenza and Other Respiratory Viruses	-	-	1	-	-
NL	Integrated Blood Pressure Control	-	-	-	-	1
3.0	Integrative and Comparative Biology	-	-	-	-	1
1.5	Internal Medicine Journal	-	1	-	-	-
NL	International Journal Biochem Cell Biology	2	2	5	-	1
4.2	International Journal for Parasitology	1	-	-	-	-
3.9	International Journal of Biochemistry & Cell Biology	-	-	-	1	-
NL	International Journal of Bipolar Disorders	-	-	1	-	-
0.8	International Journal of Dental Hygiene	-	-	-	-	1
1.8	International Journal of Developmental Biology	-	-	1	-	-
2.4	International Journal of Developmental Neuroscience	-	-	1	-	-
NL	International Journal of Innovation in Science and Mathematics Education	-	-	-	3	-
3.3	International Journal of Molecular Sciences	-	-	2	-	-
1.1	International Journal of Science and Mathematics Education	-	-	-	-	1

Impact Factor	Journal Title	2011	2012	2013	2014	2015
1.3	International Journal of STD & AIDS	1	1	-	-	-
NL	International Scholarly Research Network Urol	-	-	-	1	-
NL	International Scholarly Research Notices: Hematology	-	-	1	-	-
NL	International Scholarly Research Notices: Neurology	-	1	-	-	-
3.4	Investigative Ophthalmology & Visual Science	-	-	-	1	-
NL	Journal and proceedings of the Royal Society of New South Wales	-	-	-	-	1
3.9	Journal of Alzheimer's Disease	-	1	-	1	1
NL	Journal of Antioxidant Activity	-	-	-	-	1
3.0	Journal of Applied Physiology	1	1	-	-	-
4.3	Journal of Biological Chemistry	3	1	-	-	-
3.9	Journal of Biomedical Nanotechnology	-	-	-	-	2
3.2	Journal of Cardiovascular Translational Research	-	-	1	-	-
4.7	Journal of Cell Science	1	1	-	-	1
3.3	Journal of Comparative Neurology	1	-	-	1	3
11.2	Journal of Experimental Medicine	-	1	1	-	-
NL	Journal of Gerontology & Geriatric Research	-	-	-	1	-
5.1	Journal of Hypertension	-	-	-	-	1
NL	Journal of Invest Dermatolgy	-	-	1	-	-
1.4	Journal of Law and Medicine	-	1	-	-	-
4.4	Journal of Lipid Research	-	-	1	-	-
1.6	Journal of Mammalogy	-	-	-	1	-
1.8	Journal of Medical Ethics	-	-	1	1	-
NL	Journal of Metabolic Syndrome	-	1	-	-	-
4.9	Journal of Molecular and Cellular Cardiology	-	1	-	-	-
1.5	Journal of Morphology	-	2	-	1	1
3.5	Journal of Neural Engineering	-	-	-	-	1
6.4	Journal of Neurology, Neurosurgery & Psychiatry	-	-	-	-	1
2.7	Journal of Neurophysiology	2	-	1	1	-
5.9	Journal of Neuroscience	-	-	3	1	2
2.1	Journal of Neuroscience Methods	-	-	-	-	1
3.4	Journal of Neurosurgery	-	-	1	1	-
3.0	Journal of Parkinson's Disease	-	-	1	-	-
7.4	Journal of Pathology	-	-	-	-	1
4.7	Journal of Physiology (London)	4	2	2	2	-
NL	Journal of Public Health Africa	1	-	-	-	-
2.8	Journal of Sexual Medicine	-	-	1	-	-
1.5	Journal of Speech Language and Hearing Research	-	-	-	1	-
4.0	Journal of Steroid Biochemistry and Molecular Biology	-	-	4	2	2
1.6	Journal of the Acoustical Society of America	2			1	-
3.8	Journal of the American Geriatrics Society	1	-	-	-	-
NL	Journal of the American Medical Association Pediatrics	-	-	1	-	-
NL	Journal of the Australian and New Zealand Society of the History of Medicine	-	-	-	1	-
0.5	Journal of the History of the Neurosciences	-	-	-	-	1
6.3	Journal of the International AIDS Society	1	-	-	-	-
4.7	Journal of Urology	-	-	1	-	-
2.3	Journal of Vision	1	-	-	-	-

Impact Factor	Journal Title	2011	2012	2013	2014	2015
NL	Journal of Visualized Experiments	-	-	1	3	2
5.5	Journals of Gerontology. Series A, Biological sciences and medical sciences	-	-	1	1	1
12.1	Leukemia	-	1	-	-	-
4.5	Liver International	-	-	1	-	-
1.1	Medical Hypotheses	1	1	-	-	-
3.4	Medical Journal of Australia	1	1	1	2	-
NL	Medicographia	-	1	-	-	-
3.5	Metallomics	-	-	-	1	-
NL	Microarrays	-	-	1	-	-
2.4	Microcirculation	-	-	1	-	-
5.9	Molecular & Cellular Proteomics	-	1	-	-	-
4.4	Molecular and Cellular Biology	-	1	1	-	-
3.9	Molecular and Cellular Endocrinology	-	-	-	1	1
1.7	Molecular Biology Reports	-	-	2	-	-
3.4	Molecular Endocrinology	-	1	-	-	-
3.5	Molecular Medicine	-	-	-	-	1
5.4	Molecular Neurobiology	-	-	1	-	-
3.1	Molecular Pain	1	-	-	-	-
1.0	Multisensory Research	-	-	1	-	-
2.7	Muscle & Nerve	-	-	-	1	-
11.3	Nature Communications	1	-	-	-	1
9.5	Nature Reviews Nephrology	-	-	-	-	1
1.8	Naturwissenschaften	1	-	-	-	-
1.0	Neural Regeneration Research	-	-	-	-	1
3.2	Neuroscience	2	1	1	1	-
2.1	Neuroscience Letters	-	-	-	1	1
2.0	Neuroscience Research	-	-	-	-	1
2.8	Nutrition	-	1	-	-	-
3.6	Obesity	-	-	-	-	1
7.9	Oncogene	-	-	1	1	-
NL	Open Journal of Preventive Medicine	-	1	-	-	-
3.6	Organic & Biomolecular Chemistry	-	-	-	-	1
3.4	Osteoporosis International	-	1	-	-	-
2.4	Pancreatology	-	-	-	-	1
3.2	Parasites & Vectors	-	-	2	-	-
3.8	Parkinsonism & Related Disorders	-	1	-	-	-
1.7	Parkinsons Disease	-	1	-	-	-
2.5	Peptides	-	-	-	-	1
3.7	Pflügers Archiv-European Journal of Physiology	1	-	-	-	-
2.2	Photochemical & Photobiological Sciences	-	1	-	1	-
2.6	Physiological Genomics	1	-	-	-	-
NL	Physiological Reports	-	-	-	-	1
3.0	Placenta	1	-	-	-	-
8.7	PLoS Biology	-	1	-	-	1
3.1	PloS One	2	9	5	8	2
9.4	Proceedings of the National Academy of Sciences USA	1	-	1	-	1

Impact Factor	Journal Title	2011	2012	2013	2014	2015
4.8	Proceedings of the Royal Society of London Series B-Biological Sciences	-	1	-	-	-
1.7	Progress in Brain Research	-	-	-	3	-
13.2	Progress in Neurobiology	3			1	-
2.5	Psychiatry Research	-	-	-	1	-
3.2	Reproduction	-	-	3	-	-
2.1	Reproduction, Fertility and Development	-	-	-	1	-
1.8	Respiratory Physiology & Neurobiology	-	-	-	-	1
7.8	Schizophrenia Bulletin	-	-	-	1	-
5.2	Scientific Reports	-	1	1	-	1
NL	Scientific World Journal	1	-	-	-	-
5.2	Seminars in Cell & Developmental Biology	-	-	-	1	-
1.2	Sexual Medicine	-	-	-	-	1
3.3	Sleep Medicine	-	-	-	-	1
NL	Stem Cell International	-	-	-	-	1
5.9	Stem Cells	-	-	-	1	1
NL	Therapeutic Advances in Musculoskeletal Disease	1	-	-	-	-
3.9	Tissue Engineering Part A	-	-	-	1	-
5.5	Translational Psychiatry	-	-	1	-	-
9.0	Trends in Endocrinology Metabolism	-	-	-	1	-
2.9	Veterinary Research	1	-	-	-	-
1.9	Visual Neuroscience	1	1	-	1	-
NL	Womens Health	-	-	1	-	-

Mean \pm SD of impact factors for journals of publication

3.68 \pm 2.01 for 2014

3.97 \pm 2.63 for 2015

4.00 \pm 2.52 for five years of publication 2011–2015

% published in top 10% of journals (ie, impact factor > 3.8) = 40% over the five years of publication

GRANT FUNDING TOTALS

	2011	2012	2013	2014	2015
Research Infrastructure Block Grants (RIBG)	230,619	357,312	351,334	383,253	425,032
Australian Research Council (ARC)	464,415	367,920	324,739	181,876	424,342
National Health and Medical Research Council (NHMRC)	1,738,589	1,305,760	1,098,828	596,715	1,931,674
Sustainable Research Excellence	179,691	76,602	153,994	291,674	333,387
Commonwealth Government Research	0	0	0	65,000	0
Research Grants Individual & Foundations	356,500	100,000	214,750	197,000	276,490
Research Grants Overseas	0	0	41,416	38,991	0
Research Shared Australian University	0	0	65,000	(14,125)	129,748
Research Shared Non University	489,078	551,600	518,929	472,013	245,863
Research Contract Domestic	0	0	0	123,973	0
Research Contract Overseas	13,580	0	0	0	0
Research Grants Total	3,472,471	2,759,194	2,768,989	2,336,370	3,766,536
Grants Excluding Research Total	498,940	737,647	818,026	1,201,643	1,350,914
Total Grant income	3,971,411	3,496,841	3,587,015	3,538,013	5,117,450



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2014 & 2015 Biennial Report