University of Otago Student Research Symposium
Te Wānaka Rakahau - Ākoka 2017

August 5-6, 2017
St David Lecture Theatre Complex

Sponsored by the
University of Otago Graduate Research School and the
Otago University Students’ Association (OUSa)

This booklet contains:
• the Symposium programme (p. ii-x) and
• the abstracts of student presenters – listed alphabetically (and indexed at the back).

We hope the University community will enjoy these two days, which offer several keynote sessions, and four parallel sessions with oral and Pecha Kucha presentations by student presenters. The first day will conclude with a poster wine and cheese session in the foyer of the St David complex.

Thanks are due to:
• the University of Otago Graduate Research School for funding this event
• OUSA for co-sponsoring the poster session
• the many students who peer reviewed abstracts
• the Symposium Planning Committee consisting of:
  o Yasmin Abdul Aziz (PhD candidate, Pharmacy)
  o Christian Chukwuka (PhD candidate, Zoology)
  o Susan Craig (Executive Administrator, Graduate Research School)
  o Sheba Duque (PhD candidate, Food Science)
  o Natalie Forsdick (PhD candidate, Anatomy) - Programme subcommittee
  o Joel Gordon (PhD Classics) – Programme subcommittee
  o Dianne Hanson (Administrator, Graduate Research School)
  o Harriet Harrex (PhD candidate, Medicine)
  o Emmanuel Osigwe (PhD candidate, Management)
  o Padmini Parthasarathy (MSc candidate, Biochemistry)
  o Faezeh Tashakori (PhD candidate, Psychology)
  o Lianne Ten Have (MSc candidate, Psychology)

Professor Rachel Spronken-Smith
Symposium Convener
# Programme for ‘University of Otago Student Research Symposium Te Wānaka Rakahau - Ākoka 2017’

**August 5-6, 2017, St David St Lecture Theatre Complex**

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<th>Aug 5 8.30-9.00</th>
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<td>9.10-9.55</td>
<td>Opening Keynote: Vice-Chancellor Professor Harlene Hayne (St David Lecture Theatre)</td>
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<td>Chair: Srinidhi Bheesette</td>
<td>Chair: Suzi Wereta</td>
<td>Chair: Aidan Gnoth</td>
<td>Chair: Leila Crawford</td>
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<tr>
<td>10.00-10.20 Patients’ Perspectives of the Outcome of Anterior Cruciate Ligament (ACL) Reconstruction Surgery</td>
<td>'You Can’t Hate Yourself Thin'</td>
<td>‘Opening up’ the Underworld: Enlarging the Study of Ancient Eschatology</td>
<td>Marsden, Shirres and Tate as Guides to Articulating our Pirirākau Contextual Theology</td>
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<tr>
<td>Donald Manlapaz (Centre for Health, Activity and Rehabilitation Research, Physiotherapy)</td>
<td>Katrin Ottley (Psychological Medicine/National Addiction Centre)</td>
<td>Joel Gordon (Classics)</td>
<td>Graham Bidois Cameron (Theology &amp; Religion)</td>
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<tr>
<td>Donald Manlapaz (Centre for Health, Activity and Rehabilitation Research, Physiotherapy)</td>
<td>Rachelle Martin (Rehabilitation Teaching and Research Unit, Medicine, UOW)</td>
<td>Paramjeet Kaur (English)</td>
<td>Kevin Fletcher (Media, Film &amp; Communication)</td>
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<p>| 10.40-11.10 | Morning tea (St David Foyer) |</p>
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<td>11.30-11.50</td>
<td>Spectral CT Imaging of Bone and Implants using MARS CT</td>
<td>Blood Will Tell; Circulating Tumour DNA as a Clinical Diagnostic and Surveillance Tool for Cancer Patients in New Zealand</td>
<td>‘A Landscape Fossilized’: Peatlands and Archives in Seamus Heaney’s North</td>
<td>Through their Eyes: A Samoan Perspective of Child Wellbeing</td>
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<td>12.10-12.30</td>
<td>Footwear and Running-Related Injuries: A Systematic Review of Current Footwear Assessment Methods</td>
<td>Profiling Human Innate-like T Cell Populations in Cancer</td>
<td>Defining Macedonian Offices</td>
<td>Whānau Experiences of Adverse Perinatal Events</td>
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<td>12.30-1.20</td>
<td>Lunch (St David Foyer)</td>
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<td>Serena Gold (Classics)</td>
<td>Kendall Stevenson (Obstetrics &amp; Gynaecology, UOW)</td>
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<td>Chair: Codi Ramsey</td>
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<tr>
<td>1.20 Growth Attenuation Therapy for Children with Severe Physical and Cognitive Disability: Practice &amp; Perspectives of New Zealand Paediatricians</td>
<td>Rebekah Wrigley (Women’s and Children’s Health)</td>
<td>Genetic Engineering for Pest Control: Pros, Cons and Ethical Dilemmas</td>
<td>Improving Regional Innovation Systems Performance through Absorptive Capacity</td>
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<td>1.50 Innate Lymphoid Cell Response to Vaccination Against Tuberculosis in Mice</td>
<td>Brin Ryder (Microbiology &amp; Immunology)</td>
<td>A Primary Health Care Data Model to Support Population-based Workload Analysis</td>
<td>Measuring the Activity of Cancer Using Targeted Gold Nanoparticles and MARS-CT Imaging</td>
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<td>2.05 Comparison of Immune Cell Infiltrate Between Subcutaneous Melanoma and Colon Carcinoma Mouse Models</td>
<td>Ginny Niemi (Microbiology &amp; Immunology)</td>
<td>Effects of Ocean Acidification on the Larval Settlement of the Sea Urchin Evechinus chloroticus – Kina</td>
<td>Intuitive Eating and Body Mass Index: A Five Year Prospective Study of Mid-age Women</td>
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<td>Nadjejda Espinel (Marine Science)</td>
<td>Melanie Dubyk (Human Nutrition)</td>
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<td>Differences in the Effector Functions of MR1- and Cytokine Stimulated MAIT Cells</td>
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<td>Rajesh Lamichhane (Microbiology &amp; Immunology)</td>
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<td>2.40-3.00</td>
<td>Physical Activity in Obstructive Sleep Apnoea: A Step in the Right Direction</td>
<td>Mindfulness for Advanced Cancer</td>
<td>I Am What I Do: Detecting Behavioural Patterns in Student Spatiotemporal Data</td>
<td>Discovery World: Redevelopment Views from Staff</td>
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<tr>
<td>3.00-3.20</td>
<td>Being Adopted: The Lifelong Search for Self</td>
<td>Social Change and its Impact on Health at the Late Iron Age Site of Non Ban Jak, Northeast Thailand</td>
<td>Capturing Crimes on Camera: The Effect of Photo-taking on Confidence in Eyewitness Testimony</td>
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**Afternoon tea**

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<td><strong>Jenni Tupu (Te Tumu – School of Māori, Pacific &amp; Indigenous Studies)</strong></td>
<td><strong>Stacey Ward (Anatomy)</strong></td>
<td><strong>Andrew Mills (Psychology)</strong></td>
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<td><strong>Chair:</strong> Senorita John</td>
<td><strong>Chair:</strong> Emma Dunlop-Bennett</td>
<td><strong>Chair:</strong> Rachelle Martin</td>
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<td><strong>3.40-4.00</strong></td>
<td><strong>Trait or Heroine? Narrative Analysis and Myth in the Qualitative Analysis of Online News Coverage on the Controversy of Sisters in Islam</strong></td>
<td><strong>Conclusions and Outcomes that have Emerged from Studying Repetition</strong></td>
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<td><strong>Sex and Stress: Is Cortisol a Mediator of Sex Change in Fish?</strong></td>
<td><strong>Alexander Goikoetxea Perez de Mendiola (Anatomy)</strong></td>
<td><strong>Andrew Rutherford (Philosophy)</strong></td>
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<td><strong>4.00-4.30</strong></td>
<td><strong>Networking 101: The Theory of Networking: Professor Rachel Spronken-Smith, Dean of the Graduate Research School (St David Lecture Theatre)</strong></td>
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<td><strong>Poster Wine and Cheese (St David Foyer )</strong></td>
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<td><strong>4.30-5.30</strong></td>
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<tr>
<td>1. Physiological Monitoring for Spectral CT Imaging of Live Small Animals (Fatemeh Asghariomabad, Radiology and Centre for Bioengineering and Nanomedicine, UOC)</td>
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<td>2. Arrhythmogenic ATP Based Kinase Inhibitors Directly Increase the Activity of RyR2 (Akash Chakraborty, Physiology and HeartOtago)</td>
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<td>3. <em>In Vitro</em> Attachment and Invasion of Group B Streptococcus with Human Vaginal Epithelium, Using Wild Type and Knockout Strains (Agnes Chu, Microbiology &amp; Immunology)</td>
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<td>4. Establishing the Core Factors Considered by Stakeholders Choosing or Recommending Treatment Options for Hip or Knee Osteoarthritis in New Zealand (Jason Chua, Musculoskeletal Outcomes Research, Surgical Sciences)</td>
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<td>5. Understanding the Extent of TRAF RING Hetero-dimerization and Activity (Anubrita Das, Biochemistry)</td>
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<td>6. Effects of Ocean Acidification on the Larval Settlement of the Sea Urchin Euechinus chloroticus – Kina (Nadjejda Espinel (Marine Science)</td>
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<td>7. Development of an Anatomical Skin/Skull/Brain Model to Measure Impact Forces associated with Traumatic Brain Injury (Lisa Falland-Cheung, Sir John Walsh Research Institute, Dentistry)</td>
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<td>8. Pericyte Therapeutics to Repair the Stroke-lesioned Brain (Manju Ganesh, Physiology)</td>
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Posters (cont.)

9. Lysosome-associated Apoptotic Pathway Mediates the Cleavage of Antiviral Host Factor HDAC6 in Influenza Virus Infected Cells (Mazhar Hussain, Microbiology & Immunology)
10. Cryo-electron Microscopy Investigation of a Novel Oncolytic Virus-receptor Complex (Nadishka Jayawarden, Microbiology & Immunology)
11. The Role of DNA Hypomethylation in Zebrafish Cell Reprogramming During Tail Fin Regeneration (Morgan Jones, Anatomy)
12. Perception of Homeopathy by Homeopathy Users in New Zealand (Manon Knapen, Science Communication)
13. Effectiveness of Spinal Manipulation in Eliciting Changes in Biochemical Markers – A Systematic Review and Meta-analysis (Kesava Kovanur-Sampath, Physiotherapy)
14. Effect of Glucose on Enhancing Maturation of Heart Muscle Cells (Scott Lee, Physiology)
15. Gender Bias and Disease: An Insight into Adolescent Idiopathic Scoliosis (Jeremy McCallum-Loudeac, Anatomy)
16. Whole Genome Insight into Kea’s Alpine Lifestyle (Denise Martini, Anatomy)
17. Leisure Activities and Well-being in Residential Care Centres (Myunik Panthi, of Sociology, Gender and Social Work)
18. Comparison of Immune Cell Infiltrate Between Subcutaneous Melanoma and Colon Carcinoma Mouse Models (Ginny Niemi, Microbiology & Immunology)
19. SLC2A9 and hyperuricemia: Identification of population specific variants in New Zealand Maori and Pacific (Polynesian) people (Padmini Parthasarathy, Biochemistry)
20. Is The Hearing of Whales and Dolphins Fully Developed at Birth?: An Investigation of the Odontocete Inner Ear (Tiffany Plencner, Marine Science)
21. The Two Bodies of the Buddha in the Pussadeva's Paṭhamasambodhi (Phra Akbordin Rattana (Theology & Religion)
22. Trace Metal Distribution and Concentrations in the Bellingshausen Sea (Kyyas Seyitmuhammedov, Chemistry)
23. Novel Bioactive Peptides from Sheep Cheese Whey Beta-lactoglobulin (Hannah Sunde, Biochemistry)
24. Association of Earthquake Stressors with Stress Sensitivity and Schizotypy (Ellen Wright, Psychology)
25. Growth Attenuation Therapy for Children with Severe Physical and Cognitive Disability: Practice & Perspectives of New Zealand Paediatricians (Rebecca Wrigley, Women’s and Children’s Health)
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<td>Chair: Todd Redpath</td>
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<td>8.30-8.50</td>
<td>Adolescent Autonomy Revisited</td>
<td>Andrew MacLachlan (Bioethics)</td>
<td>Surrogate Technology for Assessing Protozoan and Virus Removal in New Zealand’s Drinking-water Filtration Systems</td>
<td>Annabelle Tham (Microbiology &amp; Immunology)</td>
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<td>From the Non-English Speaking Background Student Perspective: The Relevance of Completing a Bridging Program for Future Academic Success in Mainstream Academia</td>
<td>Anthony Gambrell (Philosophy)</td>
<td>Consent and Partial Legitimacy</td>
<td>Paul Winter (Politics)</td>
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<td>Teacherpreneurship: A Paradigm Shift Within the Digital Landscape of Higher Education</td>
<td>Paul Winter (Politics)</td>
<td>Divided Together: Civilizations and Alignment in World Politics</td>
<td>Budi Sidi (Politics)</td>
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<td>9.50-10.10</td>
<td>How do Clients Transition From Hospital to the Community Within a Regional Forensic Psychiatric Service?</td>
<td>Development of a Xenograft from Bovine Cancellous Bone</td>
<td>Jithendra Ratnayake (Anatomy)</td>
<td>The Impact of International Experiences on Women’s Career Development: A Narrative Study</td>
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<td>Penelope Kinney (Sociology, Gender &amp; Social Work)</td>
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<td>Salmah Kassim (Higher Education Development Centre)</td>
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<td>10.10-10.30</td>
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<td>Claudia Leong (Human Nutrition)</td>
<td>Adam Denny (Physiology)</td>
<td>Alena Malyarenko (Physics and NIWA)</td>
<td>Karishma Nagre (Management)</td>
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<td>Conway Niu (Paediatrics &amp; Child Health, UOW)</td>
<td>Joshua Neale (Physiology and HeartOtago)</td>
<td>Martin Forbes (Surveying)</td>
<td>Shijiao Chen (Marketing)</td>
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<td>Priyanki Gandhi (Pharmacy)</td>
<td>Nima Purvis (Physiology)</td>
<td>Todd Redpath (Surveying and Geography)</td>
<td>Rahul Argha Sen (Marketing)</td>
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<td>Third Molar Surgery Outcomes: A Choice Between Intravenous Sedation and General Anaesthetic</td>
<td>Understanding Heart Rate Generation in Type 2 Diabetes</td>
<td>A Paleomagnetic, Geochemical, and Diatom Based Record of Holocene Paleoclimate Evolution from Robertson Bay, Victoria Land, Antarctica</td>
<td>Financial Adequacy in Retirement: a New Zealand Perspective</td>
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<td>Soo-Wee Ong (Oral Diagnostics &amp; Surgical Sciences, Dentistry)</td>
<td>Sajida Parveen (Physiology)</td>
<td>Olivia Truax (Geology)</td>
<td>Jelita Noviarini (Accountancy &amp; Finance)</td>
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<td>11.50-12.20</td>
<td>Career Adaptive Behaviours: Yvonne Gaut, Career Adviser, Career Development Centre (St David Lecture Theatre)</td>
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<td>12.20-12.50</td>
<td>Looking Ahead – Finding your Place in the World with an Otago Research Degree: Deputy Vice-Chancellor (Research and Enterprise) Professor Richard Blaikie (St David Lecture Theatre)</td>
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<td>12.50-1.00</td>
<td>Symposium Wrap Up (St David Lecture Theatre)</td>
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Abstracts
(Listed in alphabetical order by the surname of the presenting student)

Exploring Internally Displaced Women’s Experiences and Resources for Prevention and Response to Sexual Violence in Northern Nigeria

Chidimma Aham-Chiabuotu
(Department of Population Health, University of Otago, Christchurch)

There has been excessive loss of lives, abduction of women and girls, and massive displacement of persons from North-east Nigeria, brought about through insurgency attacks by the extremist Islamic group popularly known as Boko Haram, counterterrorism attacks by the Nigerian military, and intermittent attacks by herdsmen. Internally displaced women are vulnerable to numerous health and social problems, including sexual violence and exploitation. Their vulnerabilities tend to increase with persistent socio-economic and political instability, such as is the case in Nigeria. Little is known about the lived experiences of internally displaced women in Nigeria. I have therefore undertaken an in-depth qualitative study to explore the perspectives of internally displaced women, including their experience of sexual violence.

Fifty-two women (ages 17-48), from four displacement settings in North-central Nigeria, volunteered to participate in semi-structured individual interviews and four focus group discussions. A thematic analysis identified three major themes: suffering and struggle for survival; tensions in gender relations and gender-based violence; and engagement and contentions with support and opposing systems. In this presentation, I will discuss the theme of suffering and struggle for survival.

Genetic Engineering for Pest Control: Pros, Cons and Ethical Dilemmas

Rami Al-Jiab & Neil Gemmell (Department of Anatomy, University of Otago)

My PhD investigates a pest control strategy called the “Trojan Female Technique” (TFT), where females, carrying rare but naturally occurring gene variants, are introduced into pest populations. “Trojan” females reproduce normally, and produce normal, fertile female offspring. However, the fertility of all their male offspring is compromised, which overtime leads to a population decline.
Given the low frequency of such disadvantageous alleles in most natural populations, and as a principle of proof for applicability in any pest species, I seek to produce females with a Trojan female mutation using the CRISPR/Cas9 gene editing system. CRISPR/Cas9’s advantage is it can be designed to introduce specific single nucleotide changes, rather than nonspecific insertions or deletions.

Compared to current chemical pesticides, TFT is species specific and is also considered a more humane approach, due to its impact via reduced fertility rather than lethality. Despite these advantages, the public’s ethical and/or safety views on such strategies may be an obstacle to their applicability. This presentation will mainly discuss the ethical and policy implications of such strategies, because of its importance to TFT’s real-life applicability.

The case, where CRISPR/Cas9 is introducing a natural gene variant to the pest species, begs the question, are they Genetically Modified (GM)? Generalised and dichotomous categorisations of such technologies is one of the main problems. These establish out-of-context safety and/or ethical profiles of certain applications that do not correspond to their legality. In New Zealand for example, random radiation and chemical mutagenesis of economical plants for human consumption is totally unregulated, whereas the specific and predictable CRISPR/Cas9 gene editing of pest species, is highly regulated.

Here I highlight the necessity for an open discussion on this matter. I also discuss the need for a collective progression in our thinking, where specific applications within a technology, are viewed independently of each other.

**Spectral CT Imaging of Bone and Implants using MARS CT**

*Maya Rajeswari Amma*  
*Centre for Bioengineering, University of Otago, Christchurch*  
*Tara Dalefield (Department of Physics, University of Canterbury)*  
*Aamir Younus Raja, Nigel Anderson & Anthony Butler (Centre for Bioengineering, University of Otago, Christchurch)*

The objective of this study is to use spectral CT scanner to qualitatively and quantitatively measure new bone ingrowth into metallic scaffold implant. Modern day prosthesis for hip and knee joint replacement are mostly made with porous metal like titanium which facilitates bone ingrowth into the implant’s pores. However, in conventional computed tomography (CT), the artefacts can severely limit assessment of any tissue adjacent to or within
metal structure. In this study, our aim is to optimise Medipix All Resolution System (MARS), a preclinical spectral CT scanner with photon counting detector, to reduce the effect of metal artefacts in CT images to measure the level of bony ingrowth into implants.

We used hydroxyapatite calibration phantoms and titanium scaffolds to optimise x-ray filtration and energy settings to minimise the streaking artefacts produced due to beam hardening. We also scanned an excised bone/scaffold specimen that was removed from a sheep tibia three weeks after implantation. Metal related artefacts are measured as linear attenuation differences between affected and non-affected regions. In the material decomposed images, different regions of interest in the bone were selected to determine Bone Mineral Density (BMD) and microstructure was measured with ImageJ (1) and Bone J (2).

MARS spectral scanner can distinguish bone and scaffold with fewer artefacts and measure bone mineral density. Comparison of images against histology indicated that not all the tissue identified at imaging as bone was correct. This implies that further work is required to optimise methodology to measure bone structure and density with titanium implants.

This work is aimed to optimise spectral CT methodology to measure bone structure and density with or without implants. The visualisation and quantification of bone growth would help in orthopaedic applications to determine the effectiveness of the implant treatment and help in the design of better scaffolds and implants.


Development of *in vitro* Models for Human Crohn’s Disease

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Kristina Aluzaite (Department of Medicine, Dunedin School of Medicine, University of Otago)
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Roslyn Kemp (Department of Microbiology and Immunology, Otago School of Biomedical Sciences, University of Otago)

Inflammatory Bowel Disease (IBD) is a rising epidemic in first-world countries. Crohn’s disease (CD) and ulcerative colitis are the two most prevalent forms of IBD. There is no current consensus on the cause of IBD; however, recent studies have suggested links between immune cell genetic defects and onset of disease. The human immune system must regulate the gastrointestinal tract, an environment home to 10^14 bacteria. Recent studies have indicated commensal-specific, and low tolerance T cells in Crohn’s disease patients can cause uncontrollable inflammation in the gut; leading to increased luminal permeability. Increased luminal permeability causes migration of luminal contents into the lamina-propria, where they are exposed to a strong immunological presence. The control of luminal migrants causes a positive-feedback loop, resulting in continuous inflammatory destruction of the luminal barrier.

Organoids are patient derived 3-dimensional models of the human gut epithelium. This novel model provides a unique opportunity to study human IBD, in vitro. My project aim is to optimise and utilise the organoid model to elucidate differences between healthy and Crohn’s disease intestinal tissue. The organoid model allows for in-depth analysis into the direct effects bacteria, immune cells, and IBD treatments can have on the intestinal epithelium of both healthy and Crohn’s disease intestinal tissue.
Phytoplankton is unicellular photoautotrophic microorganisms that form the base of the marine food web. It is responsible for approximately half of the global primary production in the ocean. Iron (Fe) is one of the essential micronutrients for phytoplankton metabolism, notably photosynthesis, yet the concentrations in the surface ocean are exceedingly low. Hence, it is limiting primary production, particularly in the subantarctic region known as a vast region of High Nutrient Low Chlorophyll (HNLC) area where the Fe input is very limited. Siderophores, the strong Fe-binding ligands known as the organic compound secreted by certain bacteria have been confirmed to enhance iron solubility and facilitate iron uptake by phytoplankton. The importance of these organic ligands demands the necessity to advance the knowledge in this field. However, limited information is available on the composition and characteristics of these compounds. Therefore, advanced studies still need to be done to better characterize the nature and cycling of dissolved iron, its speciation and the Fe-binding ligands in the marine system. The detection and quantification of Fe-binding ligands and its thermodynamic parameters will be done by competitive ligand equilibration - cathodic stripping voltammetry (CLE-CVS) technique. The study area is the subantarctic water in Hauraki Gulf, New Zealand as HNLC region in the Southern Ocean. This study focuses on determining the levels and the chemical features of Fe-binding ligands. The preliminary results on the water column profiles of the ligand concentrations give a better understanding of Fe speciation and the thermodynamic properties of Fe-binding ligands along the depth. By revealing the fate of these organic ligands, broader insight on its role in the iron cycle could be discovered, and accordingly, its greater implication on iron biogeochemistry in the open ocean, especially in the HNLC region.
Physiological Monitoring for Spectral CT Imaging of Live Small Animals

Fatemeh Asghariomabad (Radiology and Centre for Bioengineering and Nanomedicine, University of Otago, Christchurch)

Physiological monitoring of live specimens combined with fast imaging at low dose are key requirements for spectral molecular imaging. The MARS scanner is a micro-spectral CT scanner designed for studying small animals and biological specimens. It has the potential to depict markers of disease activity, disease burden, drug delivery and response to treatment in a single scan with low radiation dose, often obviating the need for biopsy. Motion artefacts and blurring in computed tomography images, induced by cardiorespiratory movements of live specimens, require image correction.

Our aim is to set small animal monitoring equipment and anaesthetics tubes in the MARS spectral scanner and provide recommendations for future integration of the simultaneously acquired physiological data. The ability of setting up the small animal monitoring equipment and anaesthetic tubes paves the way for measuring multiple biomarkers simultaneously in live animal models of cancer or pneumonia in a way that can be translated to human imaging once a human size MARS scanner is built in Christchurch.

In this presentation, we will share baseline information about the difficulties that could arise at the time. Results of ECG, respiratory rate, temperature of the healthy mice, measured by Small Animal Monitoring System 1025T will be presented. This project is part of a long-term program to have a fully integrated gating system on MARS system that adjusts the image capturing process and improve the overall image quality.

Physiological Gating of the MARS Spectral Micro CT Scanner I. Glass1, a, A. P. H. Butler1, 2, 3, P. H. Butler3, P. J. Bones1, b, S. J. Weddell1, c.
Child Oral-Health-Related Quality-of-Life Measures and Economic Evaluation

Deanna Beckett (Preventive and Social Medicine, School of Medicine, University of Otago)
Lyndie Foster Page (Oral Sciences, Faculty of Dentistry, University of Otago)
Claire Cameron (Preventive and Social Medicine, School of Medicine, University of Otago)
Murray Thomson (Oral Sciences, Faculty of Dentistry, University of Otago)

The aim of this research was to investigate the feasibility of obtaining quality adjusted life year (QALY) information using a general health measure (CHU-9D) as a proxy for oral-health-related quality of life measures.

We used the CHU-9D to measure quality of life (QoL) in children, as well as a combination of the 16-item CPQ11-14 and 25-item CPQ8-10 to measure oral-health-specific QoL, in a study in which children were followed for up to four years. Dental health and socio-demographic data were collected throughout.

The overall mean number of decayed, missing or filled surfaces (dmfs) in the primary dentition for participants was 6.4 (6.8 SD), with 18% recorded as having no caries. Caries experience in the permanent dentition was low, with no children presenting with a DMFS score above 1. Both CPQ measures demonstrated a gradient in the expected direction when looking at caries experience, although the differences were not statistically significant. CHU-9D scores were inconsistent in relation to dental caries, ethnicity, and deprivation.

In conclusion, the CHU-9D had low correlation with both the CPQ8-10 and CPQ11-14ISF:16, therefore making it inappropriate to use as a proxy to calculate a QALY in this group of children. In order to be able to calculate a QALY for oral-health-related research, it would be beneficial to formulate a preference based oral-health-specific measure that is able to calculate utility values.
Hunting for Neutrons at the Large Hadron Collider

Srinidhi Bheesette & Anthony Butler (Department of Radiology, University of Otago, Christchurch, European Organization for Nuclear Research (CERN), Geneva, Switzerland)
Philip Butler (Department of Physics and Astronomy, University of Canterbury, Christchurch, European Organization for Nuclear Research (CERN), Geneva, Switzerland)
Anne Dabrowski (European Organization for Nuclear Research (CERN), Geneva, Switzerland)

Compact Muon Solenoid (CMS) experiment is a gigantic high energy physics detectors built on the Large Hadron Collider (LHC) at CERN, Geneva. CMS along with its competing experiment called ATLAS, co-located on the LHC particle accelerator discovered the Higgs boson ("God particle") in 2012 which led to Nobel Prize for Peter Higgs. Medipix is a semiconductor based photon detector, developed for major applications in high-energy physics and medical imaging.

The main aim of our research work is to demonstrate Medipix's capability to precisely measure ambient radiation levels and its characteristics near the CMS experiment caused by the LHC accelerator. A network of devices that we are currently building at the University of Canterbury will deliver in real-time, simultaneous measurements of energies and intensities of radiation causing particles including neutrons. They will provide early warning of possible damage to the sensitive electronic systems located in the CMS experimental cavern. These measurements are thus crucial to ascertain the performance of various sub-systems of CMS and to predict their useful lifetimes. An important spin-off of our work in the medical domain would be the development of personalised radiation dosimeters.

Before designing the apparatus, I systematically studied by simulations, radiation levels and its characteristics at the proposed locations of monitoring devices in the cavern. The response function for neutron detection using different conversion layers was also carefully analysed. Post-processing algorithms were developed for particle track reconstruction and recognition. Cluster analysis techniques for labelling and determining the density of particle clusters were also developed.

Our simulation studies showed promising predictions on the capabilities of Medipix detectors. We will soon install the fabricated detectors in the CMS cavern. Post installation, they will be monitored and the data analysed remotely from New Zealand.
Agrippina, the Worst Mother: Rhetoric, Incest, and the Paterfamilias in Seneca the Younger and Tacitus

Campbell Calverley (Department of Classics, University of Otago)

The depiction of Agrippina the Younger in Tacitus’ Annales is one that is filled with rhetorical energy. It is also controversial, given that certain scenes in her depiction appear to have been directly lifted from the incest plays of Seneca the Younger and the Octavia. Though similarities have certainly been drawn between the works of Seneca the Younger and Tacitus (such as by Hind, 1972), there has not been a concerted effort to explain why those similarities might exist. My MA thesis seeks to explain these similarities, with a focus on the literary culture of rhetoric and declamation that both of these authors thrived in.

This presentation will be a compact version of one section of my MA thesis. I will compare the scene of the death of Agrippina the Younger’s death in Tacitus with related scenes in Seneca. I will then explain how both authors drew on stereotypes for their depiction of certain family members. These stereotypes found their origin in declamation, as part of the system of paterfamilias. This system had no basis in Roman law, but was a social custom that ensured the father was the head of the family (Thompson, 2006).

Under the paterfamilias, each family member stereotype had preconceived traits and crimes connected to them (Watson, 1995). I will explain how Seneca experimented with these stereotypes, and how Tacitus borrowed from Seneca’s works to depict Agrippina the Younger’s rise to power. This will ensure that, when we read Tacitus’ depiction of Agrippina the Younger, we understand that it is drawing on a tradition of rhetoric that is sensational and reliant on assumed common knowledge of stereotypes.


Marsden, Shirres and Tate as Guides to Articulating our Pirirākau Contextual Theology

Graham Bidois Cameron
(Department of Theology and Religion, University of Otago)

Reverend Māori Marsden, Michael Shirres and Pā Hēnare Tate are key figures in articulating a Māori theological tradition. They explained key concepts of Māori theology, and Tate went further to specifically bind those concepts to the wider Christian theological tradition.

I have attempted to use their framework of a theology based on tapu, mana and whakawhanaungatanga to articulate a contextual theology for our Tauranga-based hapū, Pirirākau and examine the theological transformation in the experience of contact, conflict, and confiscation in nineteenth century Tauranga Moana.

The Pirirākau contextual theology is developed in the day-to-day interaction and relationship with natural environment and historical experience and then translated into theological language and thinking: Creation-based rather than redemption-based; and more orthopraxy than orthodoxy. I argue that this communal Christian commitment, though shifting and changing, was enduring and reflects the agency of Pirirākau rather than an imposition of faith.

This research has presented particular challenges in available primary sources and interpretation of those sources, in understanding motivations, and in the complementarity of Māori concepts with Christian theology. The research demonstrates the utility of the work of Marsden, Shirres and Tate in Māori, iwi, hapū and whānau taking ownership of their own theological tradition.
Spontaneous calcium release via cardiac ryanodine receptors (RyR2) can occur under conditions of SR Calcium overload, a process termed store-overload–induced calcium release (SOICR), and is a known trigger for arrhythmia (abnormal heart rhythm). ATP (Adenosine triphosphate) based kinase inhibitors are an increasing class of drugs used to treat cancer. Several of these compounds have been linked to arrhythmias in clinical trials, but the underlying mechanism is unknown. ATP is an agonist for RyR2, therefore we hypothesised that the arrhythmogenic nature of ATP based kinase inhibitors is due to an “ATP-like” activation of RyR2 leading to SOICR.

To explore our hypothesis we examined four ATP based kinase inhibitors: CX-4945, sunitinib, ponatinib and nilotinib. CX-4945 and sunitinib are competitive ATP inhibitors (class I) and could be expected to bind to the ATP site within RyR2, whereas ponatinib and nilotinib are allosteric ATP inhibitors (class II). We found that both CX-4945 and sunitinib significantly increased the propensity for SOICR, whereas neither class II resulted in any changed compared to vehicle control. We confirmed a direct effect of the class I inhibitor CX-4945 on RyR2 using single channel recordings. The application of CX-4945 did not increase channel open probability but did induce regular prolonged openings consistent with the observed increase in SOICR. Importantly, the application of ATP prior to CX-4945 prevented CX-4945 from altering channel function suggesting an unoccupied ATP binding site is required for the action of CX-4945.

Combined, these data suggest that class I ATP based kinase inhibitors may be pro-arrhythmogenic due to the ability of these drugs to interact with the ATP binding site and trigger SOICR. The research helps to bring out a potential therapeutic target for patients undergoing clinical trials with anti-cancerous drugs.
Consumer Trust Erosion during an Industry-Wide Crisis: 
The Central Role of Legitimacy Judgment

Shijiao Chen & Damien Mather (Department of Marketing, University of Otago) 
Hongzhi Gao (School of Marketing and International Business, Victoria University of Wellington) 
John Knight (Department of Marketing, University of Otago)

Industry-wide product-harm crises—well-publicized instances of defective products, services, or management permeating in an industry—often strike consumers, especially in emerging markets. We have observed the 2008 Chinese milk melamine contamination which reportedly involved 22 dairy firms. In this crisis, consumers’ trust in the Chinese dairy industry was shaken to its core. As another example, in the year of 2017, more than 30 Brazilian meat manufacturers were reported to engage unhygienic and illegal practices, causing international fear about the safety of meat exported from Brazil. An industry-wide crisis erodes consumer trust in the affected industry as a whole.

Previous research on product-harm crises mostly focuses on trust erosion in individual firms rather than in entire industries (Coombs & Holladay, 1996; Klein & Dawar, 2004). Industry-wide crises differ from individual firm crises because the former is attributable to institutional reasons such as regulation, quality control, and industry norms. This paper aims to deepen the understanding of trust erosion from an institutional and psychological perspective. This paper focuses on a central concept in institutional theory—legitimacy and tests its role in the erosion of industry trust. We develop a measurement for consumer legitimacy judgment and conduct three experimental studies to investigate its impact on industry trust and its boundary condition. The results support that consumer legitimacy judgment plays a central role in the erosion of industry trust during an industry-wide crisis. The findings provide managerial implications for industry-wide crises in emerging markets.


In Vitro Attachment and Invasion of Group B Streptococcus with Human Vaginal Epithelium, Using Wild Type and Knockout Strains

Wing Yung Agnes Chu, Heather Brooks, Clare Fitzpatrick, Robin Simmonds (Department of Microbiology and Immunology, University of Otago)

The Lancefield Group B Streptococcus (GBS), Streptococcus agalactiae, colonizes the human vaginal epithelium in vivo, forming part of the microbiome. However, GBS can also cause severe disease, particularly in immune-compromised groups and neonates. CiaR is a recently discovered regulator in GBS for the SAN_0039 gene, and while CiaR appear to facilitate GBS intracellular survival in a mouse model, some researchers have found that GBS ΔciaR are more invasive in vitro.

This summer research project used laboratory assays to investigate the attachment and invasion of GBS COH1 wild type (WT), and two mutant strains lacking the genes of interest (ΔciaR and ΔSAN_0039), with the End1/E6E7 human vaginal epithelial cell line. WT, ΔciaR and ΔSAN_0039 showed 8.7%, 12% and 10% attachment; and 0.30%, 1.5% and 1.0% invasion respectively. These findings, as consistent with previous research, support the hypothesis that the effects of CiaR on the complement cascade and phagocytosis may play a much more important role than the invasion process itself.

Furthermore, this project also established an optimized experimental protocol. Over the ten-week research period, a series of experiments were carried out to optimize the multiplicity of infection, the number and volume of washes, and the concentration of Triton X-100. While Triton X-100 is a common agent used in similar protocols, on enumeration of treated samples, it was found that the agent reduces streptococcal viability count by approximately 1xlog10. In the future, alternative methods for cell lysis should be investigated to minimize bacterial toxicity.
Clinical guidelines for managing knee/hip osteoarthritis (OA) recommend conservative, non-surgical treatment options such as education and weight loss. Evidence however, suggests that delivery of quality care for people with OA is suboptimal. Exploring the perspectives of stakeholders involved in delivering or consuming OA health care may help explain this evidence-practice gap, with the ultimate goal of improving health service planning and delivery models more closely aligned with evidence. This study investigated the core factors considered by stakeholders making healthcare decisions in New Zealand (NZ) when recommending or choosing between treatment options for OA.

Stakeholder groups – consumers with OA (n=11), health care providers (n=10), policy-makers and advocacy (n=7), Maori advocacy (n=5) and content experts (n=5) – were purposively sampled from across NZ in 2016. The Nominal Group Technique was used to generate factors considered by stakeholders when choosing between OA interventions at any stage of the disease. Core themes and their components were derived from the qualitative data by content analysis across the stakeholder groups.

Regarding results, 364 factors were clustered, by the stakeholder groups, into 47 themes. Thematic analysis, by the investigators, of the 47 stakeholder-generated themes revealed 3 overarching super-themes, over 20 categories: 1) Health system factors: factors underlying the priority and feasibility of investing in, adopting and implementing interventions for OA; 2) Consumer factors: matching the circumstances of consumers (including disease status and comorbidities) to the characteristics of treatment options; and 3) Information resources about interventions: the various sources of information informing the decision to choose, adopt or implement an intervention option.

We have demonstrated that stakeholders in NZ consider a complex array of factors with respect to the health system, consumer, and information
resources about interventions. Future research activity involving stakeholder preferences for OA health care may benefit from the key considerations reported in this study.

Rights, Values, and Pragmatism: Philosophical Interpretations of the Whanganui River Settlement Act

Britta Clark (Department of Philosophy, University of Otago)

The recent Whanganui River Claims Settlement Act (Te Awa Tupua) has assigned the Whanganui River legal identity and the corresponding “rights, powers, duties, and liabilities of a legal person.” Affording a river the status of a person is, from a Western perspective strongly rooted in assigning ‘rights’ to individual entities, a strange legislative move that has provoked confusion and criticism. The notion of rivers-as-persons makes coherent ‘philosophical sense,’ from a Maori perspective, but dominant interpretations have begun to frame the Act as a codification of nature’s intrinsic value, or alternatively as a strange metaphysical statement assigning ‘natural personhood’ and associated moral concepts to the river. Both explanations are at odds with an authentic Maori understanding of the Whanganui River as well as deeply entrenched Western philosophical commitments. In this talk I will argue that these interpretations do not do Te Awa Tupua justice. Instead, the Act should be read as a paradigm example of pragmatic adaptive management and strong sustainability. The Act exemplifies pragmatic adaptive management in its commitment to solving the political problem of water ownership, translating between ecological facts and human values, and designating non-substitutable resources. If understood in this manner, Te Awa Tupua might shed what has been called ‘legislative lunacy,’ and function instead a sophisticated mechanism for the protection of both environmental and indigenous interests.

‘A Landscape Fossilized’: Peatlands and Archives in Seamus Heaney’s North

Leila Crawford (Centre for Irish and Scottish Studies, University of Otago)

In his essay ‘The Sense of Place,’ Northern Irish poet and Nobel Prize winner Seamus Heaney urges us to look to the land—‘the stable element’—for continuity. For Heaney, the Northern Irish landscape functions as a repository, a coffer of human history. The land – and in particular, the bog – retains and
embeds history, recording impressions and preserving inscriptions through its unique biological chemistry.

Heaney’s bogs are liminal spaces that at once call attention to multiple temporalities while simultaneously stabilizing the ‘floe of history’. \(^{ii}\) We might understand them in terms of Jacques Derrida’s Mal d’archive (1995), in which he asserts that the archive encompasses both the ‘death drive’ and the conservation drive. Heaney’s bogs are similarly contentious – sites of tension and conflict even as they work to embed the past in the present.

This paper explores the role of the Irish bog in Seamus Heaney’s poetry, engaging particularly with its archival potential. Looking at poems from North (1975) as well as later collections, I argue that the preservative properties of the bog enable Heaney to encounter a ‘landscape fossilized’ and thereby to engage with history on his own terms. Rather than reading this preserved past as anachronistic, however, I assert that it actually stabilizes chronotopes and provides Heaney with an historical narrative.


**Understanding the Extent of TRAF RING Hetero-dimerization and Activity**

*Anubrita Das, Adam Middleton, Peter Mace, & Catherine Day*

*(Department of Biochemistry, University of Otago)*

Ubiquitylation is one of the most abundant post-translational modification in cells and is a key player in immune signalling pathways. A cascade of enzymes (E1, E2 & E3s) promote attachment of a single ubiquitin or a chain of ubiquitin to a substrate lysine residue. E3 ubiquitin ligases catalyze the final step of the reaction and confer substrate specificity, thereby playing a significant role during cell signalling.

TRAFs (TNF Receptor Associated Factors) are adaptor proteins that regulate both cell survival and apoptosis in immune response pathways. Six of the seven TRAF proteins bear an N-terminal RING domain that is common to many E3s and is required for ubiquitin transfer. Previous studies indicate that homodimerization of the RING domain is crucial for E3 ligase activity of TRAFs. However, this has not been studied in detail.
My study indicates that RINGs of different TRAFs can form hetero-dimers. This is an exciting new observation and suggests a higher level of complexity in TRAF mediated signalling than previously reported. Among the TRAFs, only the E3 ligase activity of TRAF6 RING domain is widely studied. The activity of other RING bearing TRAFs (e.g. TRAF2, TRAF3 and TRAF5) has not been elucidated yet. We therefore hypothesise that formation of RING hetero-dimers between TRAFs that are active and inactive E3 ligases may act as a molecular switch to regulate ubiquitylation of a particular substrate. However, the exact mechanism by which these hetero-dimers can modulate downstream signalling pathways requires further investigation. Furthermore, the stability of the TRAF RING dimers varies and they are difficult to fully characterise. To better evaluate RING dimers, we have established the Chemically Induced Dimerization (CID) technique. This technique allows us to control dimer formation and therefore specifically characterize RING hetero-dimers. Our in vitro biochemical assays have shown that stable homo- and hetero-dimers can be made using the system. This suggests that the technique can be expanded to systematically identify active TRAF pairs and partner E2s using a combinatorial approach.

Is High Density-Lipoprotein-based Therapy an Option for the Treatment of Muscle Damage in Facioscapulohumeral Muscular Dystrophy?

Adam Denny & Alison Heather
(Department of Physiology, School of Biomedical Sciences, University of Otago)

Facioscapulohumeral muscular dystrophy (FSHD) is an inherited myopathy due to a genetic mutation on the 4q35 chromosome. The mutation leads to loss of methylation in the 4q35 region that, in turn, is permissive for DUX4 expression, a gene that is silenced in the healthy adult population. DUX4 functions as a transcription factor, driving expression of proteins involved in oxidative stress, cell death and inflammatory response pathways. DUX4 expression in skeletal muscle increases fibre disorganisation, death, and ultimately loss of contraction capacity. At present, there is no cure for FSHD and only limited effective therapies. High density lipoproteins (HDLs) are well-characterised for their anti-oxidant and anti-inflammatory properties and currently HDL-based therapies are in clinical trial for other oxidative stress-related diseases. We hypothesised that HDL treatment may be effective against DUX4-induced oxidative stress in skeletal muscle. To test this hypothesis, C2C12 mouse skeletal cells were transfected with a DUX4 expression vector or control vector.
for 48 hours to induce an oxidative stress, FSHD-like phenotype. For the final 4 hours, the cells were treated with HDL particles (32 μM, the physiologic circulating concentration) or vehicle (Milli-Q). DUX4 was highly expressed in transfected cells, with no expression in control transfected cells (determined by mRNA and western blot analysis) and it was this expression of DUX4 which induced the oxidative stress phenotype. The levels of oxidative stress were shown to be significantly reduced by 91% (P<0.0001) through HDL treatment. In keeping with reduced oxidative stress, HDL treatment also decreased cell death significantly by 75% (P<0.05). Furthermore, DUX4 expression resulted in a disrupted myotubes formation, and this was also improved following HDL treatment. In conclusion, our early results in vitro support that HDL is a potential therapy for FSHD, thus a follow up in vivo animal experiment is now warranted.

A Primary Health Care Data Model to Support Population-based Workload Analysis

Manjula Devananda
(Department of Information Science, University of Otago, Dunedin)

An aging population and growing prevalence of long-term conditions account for the growing demand for care in a primary health care setting. To improve the efficiency of primary care practices, the demand for care has to be met effectively within their capacity. I developed a rule-based simulation system which given patient details such as laboratory results and health care measurements like blood pressure etc., predicts the upcoming workload from the long-term condition patients registered at a primary health centre. Knowing this workload would help the medical practice to meet the upcoming demand for care effectively. My approach also aims to foresee how the changes like, for instance, shifting a few patients from general practitioner to a practice nurse, may affect efficiency of the practice. This work highlighted the need for data models to support population level reasoning for long-term condition management needs. Although the need for interoperability, standardisation and integrated care has motivated the development of health data models like Health Level Seven (HL7), these data models fail to adequately support population based workload analysis. My presentation will therefore also highlight what is required from a data model in order to provide support for population-level long-term condition management simulation. Following a design science research methodology, this data model is evaluated and
feedback is collected from a health expert. In future, this data model can be extended to include other aspects such as financial model of a primary health centre.

**Paracetamol Treatment for Patent Ductus Arteriosus: Current Clinical Practice and Attitudes**

*Laura Dowd (School of Pharmacy, University of Otago)*
*Ben Wheeler (Department of Women’s and Children’s Health, Dunedin School of Medicine, University of Otago)*
*Hesham Al-Sallami (School of Pharmacy, University of Otago)*
*Roland Broadbent, Liza Edmonds & David Reith (Department of Women’s and Children’s Health, Dunedin School of Medicine, University of Otago)*
*Natalie Medlicott (School of Pharmacy, University of Otago)*

A haemodynamically significant patent ductus arteriosus (PDA) is one of the most common complications encountered in the first week of life in the preterm infant. The most commonly prescribed drugs for the medical management of PDA are indometacin and ibuprofen. It has recently been reported that paracetamol may offer an effective alternative treatment with a favourable side effect profile (1), however its popularity is largely unknown. With this in mind, we conducted a web-based survey with the aim to describe the current clinical practice and attitudes of neonatologists towards paracetamol treatment of PDA in Australia (AU) and New Zealand (NZ). A literature review regarding treatment options for PDA closure was carried out to inform questionnaire design. A web-based survey of all neonatologists registered under the 2017 Australia New Zealand Neonatal Network (ANZNN) was then conducted. Survey response rate was 67% (141/210). Paracetamol for PDA closure has been prescribed by the majority of neonatologists registered under the ANZNN (70%), including 79% of AU respondents versus only 44% of NZ respondents (p<0.0001). Despite the high level of neonatologists that had prescribed paracetamol for PDA, 72% of respondents had only prescribed it five times or less. Multiple open-text responses state that paracetamol was only used when indometacin and ibuprofen were ineffective of contraindicated and as a last ditch attempt to avoid surgical ligation. Considerable practice variations in the decision to prescribe paracetamol for the medical management of PDA exist, including significantly
more use in AU. Further research is still required to clarify the optimal treatment of PDA in premature neonates.


**Intuitive Eating and Body Mass Index:**
**A Five Year Prospective Study of Mid-age Women**

*Melanie Dubyk & Jill Haszard (Human Nutrition, University of Otago)*
*Tracy Tylka (Psychology, The Ohio State University, Columbus and Marion Campuses, Marion OH, United States)*
*Caroline Horwath (Human Nutrition, University of Otago)*

Mid-age women are at high risk for weight gain and adverse health complications. Traditional dieting approaches are largely unsuccessful and repeat attempts at weight loss may harm physical and mental health. One alternative approach, ‘intuitive eating’, involves listening to body signals, focusing on eating when hungry and stopping when full, rather than following diet rules. No previous studies have examined the long-term relationship between intuitive eating and body mass index (BMI). The research objective was to examine associations between changes in intuitive eating and BMI over 5 years.

In 2009, a socioeconomically and ethnically representative sample of over 1600 mid-age NZ women (baseline age 40-50 years) was recruited from nationwide electoral rolls in order to study modifiable factors that may influence weight gain. The baseline, 2012 and 2014 surveys included the 21-item Intuitive Eating Scale (IES). For women with IES data at all three time points (n=745), slope was calculated as a summary measure of scores and used to define ‘increasing’, ‘stable’, and ‘decreasing’ categories over 5 years for total IES and subscales (Unconditional Permission to Eat (UPE), Eating for Physical rather than Emotional Reasons (EPR), and Reliance on Internal Hunger and Satiety (RHSC)).

IES scores were ‘stable’ for most women (Total IES 86.1%, UPE 69.1%, EPE 60.2%, RHSC 71.2%). Compared to those with stable scores, those who had increasing total IES scores and increasing EPR had lower BMI increases over 5 years (total IES; Coeff=-1.1 kg/m2; 95% CI: -1.9, 0.2 kg/m2; p=0.017; EPR; Coeff=-0.8 kg/m2; 95% CI: -1.2, -0.3 kg/m2; p<0.001).
While most women experienced stable levels of intuitive eating (total IES and IES subscales), eating more intuitively, and in particular eating for physical rather than emotional reasons, was associated with a significantly lower increase in BMI over 5 years.

Proactive Long Acting Reversible Contraception (LARC) Provision: Adolescents’ Perspectives

Rebecca Duncan (Bioethics Centre and Department of Women’s and Children’s Health, University of Otago)
Lynley Anderson (Bioethics Centre, University of Otago)
Helen Paterson (Department of Women’s and Children’s Health, University of Otago)
Neil Pickering (Bioethics Centre, University of Otago)

There is very little knowledge about the views of young women toward Long Acting Reversible Contraceptives (LARCs). Specifically, we lack information about the level of health literacy within this group about these methods and how to access them.

This qualitative research study of New Zealand adolescents recruited from high schools seeks to fill this gap. Four focus groups of 6 - 10 adolescent (15 to 18 year old) girls explored their knowledge about contraceptive use and access at a broad level. Furthermore, these adolescents were asked to consider LARC use and the option of a proactive LARC provision programme. The focus groups were designed to be conducted in varied populations to include adolescents from different geographical and socioeconomic backgrounds. The data collected was transcribed and analysed using a general inductive approach to identify common themes and ideas.

The identified themes were reproductive health fear, sex and body shame, adolescents’ priorities, barriers (to contraception access and use), and knowledge. Through the data, it is clear that there are knowledge gaps, misconceptions, and myths around contraception in the adolescent population. Adolescents appreciated the opportunity to ask questions about contraception and discuss it openly. When asked how they felt about a proactive LARC provision programme, they responded positively, and found the concept acceptable.
Through their Eyes: A Samoan Perspective of Child Wellbeing

Emma Dunlop-Bennett (Te Tumu/Pacific Islands Studies, University of Otago)

Child wellbeing is grounded in international consensus with 195 countries, including New Zealand, agreeing that every child has the right to develop to the, “…maximum extent including their physical, mental, spiritual, moral and social development” (UNICEF, 1989). It is also recognised as one of the smartest investments that a country can make. Investing in the wellbeing of children from an early age lays the foundations for better outcomes in education, health, and economic productivity, and can mitigate the negative effects of poverty.

The concept is prone to redefinition, as the wellbeing of children is shaped by their broader context. A one-size-fits-all approach cannot capture the diversity in the experiences of all children. That is where this study sits: understanding - from the perspective of Samoan children and their families –how they conceptualise wellbeing. As part of Tagata Pasifika, the Samoan diaspora is often portrayed as vulnerable and disengaged. Taking a strengths-based approach, this study’s starting point is that nothing matters more to Pasifika than the health, wellbeing and future success of its children (NZCYES, 2008).

Guided by Talanoa ile i’a (talking to the fish), this study privileges the voices of the ‘lessor known’ (Faleolo, 2009). Underpinning this culturally valid Samoan research approach, is that there are four perspectives – i’a (fish), pii ama (canoe), la’au (tree), and mauga (mountain) – all of which are needed to form a complete picture. The i’a - represented by 8-year old children living in Wellington - were asked to illustrate wellbeing through taking pue’ata (photos) of what makes them feel happy, safe, and loved. These pue’ata were then used by the children at the talanoaina i le fono (group discussion in a meeting). Individual talanoa’aga (discussions) were also held with parents, community partners, and government, which represent the pii ama, laa’u, and mauga. This presentation offers preliminary findings of what wellbeing means, through the lens of Samoan children and their families.

Notes
Tagata Pasifika is a group term used to refer to the disaporic Pacific peoples and cultures in New Zealand. It describes people who have migrated from the Pacific – a region comprising 22 Pacific Island Countries and Territories - or who identify as Pasifika through descent.
Effects of Ocean Acidification on the Larval Settlement of the Sea Urchin

*Evechinus chloroticus* – Kina

*Nadjieda Espinel, Samuel Karelitz & Miles Lamare*

*(Department of Marine Science, University Of Otago, Dunedin, New Zealand)*

Ocean acidification is caused by the direct uptake of anthropogenic atmospheric CO2. A reduced pH (increased H+ concentration) will decrease the availability of carbonate ions, therefore, ocean acidification is thought to be especially harmful to calcifying marine invertebrates, like shellfish or corals, as the carbonate ions are necessary for the skeletogenesis process. Many studies have shown that the early-life stages are the most sensitive to the effects of ocean acidification. In most marine species, reproduction is by an indirect lifecycle involving the key processes of larval settlement and metamorphosis. Although the direct effects of ocean acidification on single early life-stages of several marine invertebrates have previously been described, very few studies have investigated the effect of ocean acidification on at least two succeeding life-history stages. Moreover, very little is known on the effects of ocean acidification on the settlement phase and early post-settlement development of marine invertebrates. Altered settlement rates will influence the future distributions, abundances and ecology of marine benthic communities.

In this study we aimed to test the effects of ocean acidification on the larval settlement and early-post settlement processes of a key New Zealand species: the sea urchin *Evechinus chloroticus*. We tested the direct influence of reduced seawater pH in the larval settlement. Sea urchin larvae reared at ambient conditions were left to settle in a range of reduced seawater pH conditions, and settlement rates were measured at different timeframes.

Preliminary results show no direct effect on the settlement due to reduced seawater pH, suggesting that the effects of ocean acidification on the larval settlement of marine invertebrates might be through indirect mechanisms.
Development of an Anatomical Skin/Skull/Brain Model to Measure Impact Forces Associated with Traumatic Brain Injury

Lisa Falland-Cheung, Neil Waddell, Kunyu Li, Darryl Tong & Paul Brunton (Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago)

When the human head is subjected to blunt force impact, there are several mechanical responses that may result from the forces involved, including absorption of impact forces through the various layers of the head. The purpose of this study was to develop an anatomical head model to measure force transfer through the various layers of the head when subjected to short duration high velocity impacts. An anatomical head model was constructed using previously validated simulant materials: epoxy resin for the skull, polyvinyl siloxane for the scalp, an agar/glycerol/water mixture for the brain, and modified intravenous fluid for the cerebrospinal fluid. An array of accelerometers (4x4x1.45mm) with different acceleration ranges was incorporated into the various layers of the head (top and bottom of scalp; top and bottom of skull; top, middle and base of brain) to measure forces in x- (anterior/posterior), y- (left/right) and z- (up/down) axis. All sensors were connected to a signal conditioning board and to USB powered data loggers. The head model was placed into a rigid metal stand with an optical sensor to trigger data capturing. A weight (750g) was dropped from a height of 1m (n=20). Impact forces (z-axis) of 2982.20N were recorded on top of the skin, with decreasing values through the different layers (bottom of skin -115.39N, top of skull 496.86N, bottom of skull 140.52N, top of brain – 59.51N, middle of brain 64.03N and base of brain 97.10N). Forces in the x- and y-axes were similar to those of the z-axis. With the base of the brain still receiving 97.10N, this may indicate that the brain is subject to inertial forces, highlighting the potential danger of repetitive impact forces to the head. This study identified the importance of considering short duration high intensity impacts to the head and their effect on the underlying tissues.

My Little Pony, Communalism and Feminist Politics

Kevin Fletcher (Media, Film and Communication, University of Otago)

Recently, there has been a surge of research on the animated children’s programme My Little Pony: friendship Is Magic. For the most part, this work deals with the adult superfan subcultures (bronies, for example). In
contradistinction, I offer an analysis of the primary text itself. I argue that the main pony characters are styled as feminists, yet despite this, the show’s racial politics arguably conflate species and difference in troubling and conservative ways, and ultimately work to compromise My Little Pony’s feminist potential. I refer to the feminism of Lauren Faust, series developer and initial showrunner, and her role in shaping the text. My analysis focuses upon the operation of individual and collective agency and mutual recognition in the female-focused story material and how this is linked to contemporary gender politics. The paper makes progress in an under-researched area by analysing the racial representation of species in My Little Pony, such as the bison and the yaks. The particular significance of this project is that it aims to contribute to the wider conversation about the progressive potential for contemporary children’s screen culture.

How Crevasses Provide Insight into the Future of the Ross Ice Shelf

Martin Forbes (School of Surveying, University of Otago)

Geologic record tells us that future warming means future change in the polar ice sheets. However, that record is generally too coarse to tell us how that change will play out over human lifetimes. Ice shelves, marine extensions of terrestrial ice sheets, connect the interiors of ice sheets to the ocean, where small changes in water temperature can lead to large changes in the floating ice. Modern observations show that when climate warming induces ice shelf retreat, the tributary glaciers respond. Consequently, understanding ice shelves is critical to predicting future change in polar ice sheets.

The behaviour of an ice shelf depends on the balance between internal gravitational driving stresses and resistive stresses at its boundaries. These stresses generally induce viscous flow of the ice. If local stresses are important enough, the ice breaks, forming open cracks commonly referred to as crevasses. In addition to causing flow and breaking ice, stress conditions also change the mechanical properties of the ice through deformation-driven processes such as crystal scale alignment.

Due to the large scale and prevalence of crevasses on the Ross Ice Shelf, satellite imagery can be used to observe and map these crevasses. Considering their orientation, spacing, advective path and speeds, they tell a story about mechanical properties and stresses experienced by the ice. The Ross Ice Shelf, being subject to very little or no anthropogenic environmental forcing (so far) provides the ideal case-study to establish methods of translating maps of
crevasses into maps of stress states and mechanical properties. These maps and the relationships they imply will be key in sharpening the picture of future polar ice sheet response to climate change.

Consent and Partial Legitimacy

Anthony Gambrell (Department of Philosophy, University of Otago)

I am concerned with justification and legitimation of political power with regard to individual consent: Is political power, if legitimate, legitimated by individual consent? My objective, applying conceptual analysis, is to determine whether individual consent is a proper standard for political legitimacy. The problem at issue is whether we can accept partial legitimacy; for, if we apply individual consent essentially as a standard, legitimacy must be partial, that is, relevant to some individuals, viz. those who consent.

Here, I consider A. John Simmons’s critique of Rawls’s account of “hypothetical” consent. For Rawls, political legitimacy rests on justice as a stately moral virtue; assuming reasonable individuals consent to a just polity. However, as Simmons claims, Rawls conflates justice and legitimacy; whereas justice does not suffice to procure political legitimacy.

As Simmons argues, in his “Justification and Legitimacy,” (2001) Rawls’s “hypothetical” consent misses what individuals actually do accept. Political power, Simmons maintains, cannot be legitimated on generic justificatory grounds, with regard to stately moral virtues (e.g. justice). Political legitimacy requires, instead, individual consent, that is, an individual’s consensual relationship with the state.

I argue, however, that political legitimacy, if viable, must rest on a generic justification and would not apply to some individuals. This is the claim to political legitimacy: The body politic requires general consent. Given that, since we cannot generalize about state legitimacy from individual consent, if the requirement for political legitimacy is individual consent, legitimation of political power is impossible — and political obligation groundless. If so, not “All existing states are illegitimate” (2001) but all possible states. Yet the standard we have applied, that is, individual consent, does not meet the requirement set by the body politic. If we want to meet its requirement, we must apply another standard.

Neonatal Hyperglycaemia Management: Current Practice in Australia and New Zealand

Priyanki Gandhi (School of Pharmacy, University of Otago)
Ben Wheeler & Liza Edmonds (Department of Women’s and Children’s Health, Dunedin School of Medicine, University of Otago)
Natalie Medlicott (School of Pharmacy, University of Otago)
Roland Broadbent & David Reith (Department of Women’s and Children’s Health, Dunedin School of Medicine, University of Otago)
Hesham Al-Sallami (School of Pharmacy, University of Otago)

Neonatal hyperglycaemia is common amongst newborns of low gestational age and/or low birth weight. However, a standard treatment plan is lacking. The aim of this study is to describe and compare treatment protocols used in the management of neonatal hyperglycaemia in Australia and New Zealand. The 2017 Australia and New Zealand Neonatal Network directory was used to identify and contact all 29 neonatal intensive care units (NICUs). An email request was made for any protocols or resources used by each NICU to treat neonatal hyperglycaemia. A search for protocols published online was also carried out. Contents of protocols relating to diagnosis, treatment, insulin dose and type, and patient monitoring were compared and contrasted between NICUs. Treatment protocols for 25 out of 29 NICUs were available for analysis. A definition for neonatal hyperglycaemia was stated in only 35% of protocols, which included a random blood glucose concentration above a certain value (7 - 12 mmol/L). Treatment began when blood glucose concentration was above a specific value (10 - 15mmol/L) for 52% of protocols. The rest did not state any definition for diagnosis or treatment. In 57%, the first-line treatment option was intravenous infusion of neutral insulin (Actrapid®), whereas 35% recommend a reduction in glucose-containing infusions and 8% did not state a recommended treatment. A maintenance dose range of 0.01 - 0.1 units/kg/hour was recommended in 61% of protocols. Other protocols recommend dose ranges between 0.01 and 0.3 units/kg/hour. Furthermore, 26% of protocols report a method for insulin dose titration, 35% stated that titration of insulin was under the discretion of the consultant, and the remaining 39% had no information about dose adjustments. In 61% of protocols, blood glucose monitoring frequency is stated but varied, whereas 13% recommend monitoring as per consultant discretion and 26% did not mention frequency of monitoring.
Pericyte Therapeutics to Repair the Stroke-lesioned Brain

Manju Ganesh (Department of Physiology, University of Otago)
Alison Clare (Department of Biochemistry, University of Otago)
Mike Dragunow (Department of Pharmacology and Clinical Pharmacology, University of Auckland)
Stephanie Hughes (Department of Biochemistry, University of Otago)
Andrew Clarkson (Department of Anatomy, University of Otago; Faculty of Pharmacy, University of Sydney, Australia)
Ruth Empson (Department of Physiology, University of Otago)

Stroke results from blockage of the blood supply to the brain that leads to subsequent degeneration of brain tissue. The brain has little spontaneous repair capacity within the injured region so there is an urgent need to develop new therapeutic strategies. Pericytes are a subtype of mesenchymal stem cells that ensheathe endothelial cells and reinforce the vasculature. Following stroke, brain pericytes migrate and may help repair the damaged region by improving vasculature and neuronal networks. The multipotent nature of pericytes make them an ideal source for brain circuit regeneration. This project aims to identify the therapeutic potential of pericytes to migrate and functionally integrate within the stroke damaged cortex. Prior to integration, we initially isolated, enriched and characterized brain pericytes from 4-6-week-old mice. The isolated pericytes were then transduced with lentivirus expressing near infra-red fluorescent protein (iRFP) in order to tag the pericytes prior to grafting. Our preliminary results indicate that the 7-day passage-3 cultures were enriched for pericytes as determined by immunohistochemistry and fluorescence assorted cell sorting. Lentivirus transduced the pericytes with approximately 40% efficiency with addition of 3.6 x 10^5 functional units. These promising preliminary findings take us a step closer to grafting RFP tagged pericytes into the stroke lesioned motor cortex in order to observe both the therapeutic efficiency and migration status of the grafted pericytes. Our approach could make a significant contribution to brain vascular regeneration and possibly pave the way for autologous patient specific cell therapy.
De-subjugating Knowledge: A Critical Framework for Analysing Power within Academia

Aidan Gnoth
(National Centre for Peace and Conflict Studies, University of Otago)

Over the past two decades, international peacebuilding efforts have undergone a foundational shift in the type of peace they seek to achieve – from a liberal, to a hybrid, and now a post-liberal peace. These transitions were originally greeted with enthusiasm by scholars and practitioners alike, as they were believed to increase the local ownership of peace processes leading to a more durable and sustainable peace in post conflict states. More recently, an increasingly prominent body of literature has emerged which critiques these assertions given the seemingly rhetorical way that changes have manifested in practice.

This paper builds on critiques against the post-liberal peace by laying out a new approach to analysing power within academia. Inversing the methodology used by critical theorists who advocated for the post-liberal peace, and drawing on Foucauldian and Gramscian understandings of power and knowledge, a conceptual framework is constructed to identify how power circulates through academic and policy-making circles, shaping both research and policy outputs. Such a framework is useful not only for increasing the understanding of peacebuilding’s post-liberal turn and desirability, but also to better understand the way in which critical theorists attempt to disrupt and displace orthodox discourses of peacebuilding.

Sex and Stress: Is Cortisol a Mediator of Sex Change in Fish?

Alexander Goikoetxea-Pérez de Mendiola & Erica Todd
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Simon Muncaster (Toi Ohomai Institute of Technology)
Mark Lokman (Department of Zoology, University of Otago)
Jodi Thomas, Hui Liu & Neil Gemmell
(Department of Anatomy, University of Otago)

Sex change occurs as a usual part of the life cycle for many teleost fish. Changing sex is known to enhance the lifetime reproductive success of these fish and the modifications involved (behavioral, gonadal, morphological) are well studied. However, the exact mechanism behind the transduction of the
environmental signals into the molecular cascade that underlies this singular transformation remains largely unknown. Cortisol is the main glucocorticoid in fish and the hormone most directly associated with stress. Recent research suggests that this hormone may act as a key factor linking social environmental stimuli and the onset of sex reversal by initiating a shift in steroidogenesis from estrogens to androgens. In this study, we aim to elucidate the role of cortisol in mediating sex change of a protogynous (female-to-male) hermaphrodite, the endemic New Zealand spotty wrasse (Notolabrus celidotus). We implanted slow-release cortisol pellets into female spotty wrasses to promote sex reversal under inhibitory conditions. We monitored each female daily for behavioral and morphological signs of sex change. To track the interrenal hormonal changes across the process of sex reversal, we collected blood samples fortnightly. We also obtained brain, pituitary and gonadal tissue to create a histological time series and to conduct transcriptome-wide expression analysis. We anticipate that this study will enhance our understanding of the role of cortisol in the initial stages of sex change, improve our understanding of sex determination and differentiation across vertebrates, and may lead to new tools to control fish sex ratios in aquaculture.

Defining Macedonian Offices

Serena Gold (Classics Department, University of Otago)

Following the death of Alexander the Great in 323 BC, the Macedonian Empire was left without an obvious successor. Therefore, his prominent generals met to discuss how his immense empire should be administered; this is commonly referred to as the Babylonian Settlement. At this settlement, they distributed several important Macedonian offices to a select few of the more influential men. The terminology used for these offices implies a mixture of military and administrative roles, the exact nature of which requires further examination. By examining how these terms are used throughout the ancient sources we can gain a fuller understanding of what these positions were believed to entail. This allows us to gain a clearer picture of the balances of power following Alexander’s death. Furthermore, by examining the military and administrative structure of the Macedonians and those whom they ruled, it is possible to establish how these offices developed over time. In this talk I will be focusing on the administrative structure that was in place and how this helps us understand terms such as prostasia and epimeletes, which have been hotly debated by scholars. This will help to further our understanding of how the
ancient Macedonian world functioned and clarify the structure that was in place during the particularly confusing period of Alexander’s Successors.

‘Opening up’ the Underworld: Enlarging the Study of Ancient Eschatology

Joel Gordon (Classics, University of Otago)

Hades, the underworld of the ancient Greeks, is a realm which has captured the human imagination since our earliest literary records. The Odyssey of Homer, for example, is famous for its lengthy description of Odysseus’ katabasis (a heroic descent to the underworld), as are other descriptions of this realm provided by prominent literary figures throughout antiquity (e.g. the comic playwright Aristophanes, the philosopher Plato, and the later Roman poet Virgil).

Contemporary studies of ancient eschatology (i.e. ideas and beliefs regarding the afterlife) tend to approach this subject matter broadly, primarily focusing upon the realm as described by these prominent figures – to the exclusion of ‘lesser’ authors or fragmentary evidence. Further, underworld topography is often glanced over in preference for other ‘more significant’ eschatological topics such as the doctrine of the soul.

Thus, this paper seeks to challenge the predominant paradigm within contemporary scholarship regarding the study of classical eschatology. This will be achieved via two particular objectives: (1) the presentation of a selection of literary evidence which is presently overlooked in the study of Hades’ topography; (2) a demonstration of how such evidence is vital for ‘filling in’ the gaps between the giants of Homer, Aristophanes, and Plato when surveying the eschatology of the ancient Greeks.
Investigating the Anti-invasive role of Dexamethasone in Triple Negative Breast Cancer

Joshua Harris (Department of Pathology, Dunedin School of Medicine, University of Otago)
Amy Stone (Translational Genomics Research Institute (TGen), Phoenix, AZ)
Heather Cunliffe (Department of Pathology, Dunedin School of Medicine, University of Otago)

Triple-negative breast cancer (TNBC) is a highly aggressive and invasive type of breast cancer with no targeted drugs currently available for treatment. A protein called Fn14 is overproduced on the surface of TNBC cells but not in healthy breast tissue (1), making Fn14 an attractive target for treatment of TNBC. Fn14 overproduction and inflammatory signalling have shown to be linked to cancer cell invasion through a positive feedback loop (1, 2). Given the anti-inflammatory action of glucocorticoids, we hypothesised that a glucocorticoid, named dexamethasone (DEX), may be effective to reduce the invasiveness of TNBC cells by suppressing production of Fn14 and inflammatory mechanisms. By treating TNBC cells for 24h with DEX, we observed a 50% reduction in both Fn14 protein and cancer cell invasion. However, not all types of TNBC cells exhibit the same response. We further investigated this observation by looking for changes in inflammatory signalling after treatment with DEX. We found that selected inflammatory molecules measurably shifted their location in a cell, consistent with a reduction in inflammatory activity. This was further supported by a 20% increase in the level of a well-known anti-inflammatory protein. Interestingly, we found that DEX treatment might suppress its own anti-inflammatory efficacy. Although this did not affect the ability of DEX to reduce Fn14 levels and invasion in our experiments, we are uncertain of what implications this may introduce with extended treatment. While overproduction of Fn14 in TNBC cells provides a selective target for reducing cancer cell invasion, the possible reduction in the effectiveness of DEX due to auto-suppression, questions the long-term efficacy of glucocorticoids in the treatment of invasive TNBC.

Aspects of Self in Individuals at High Risk for Developing Schizophrenia

Hadar Hazan (Department of Psychology, University of Otago)

Schizophrenia was associated with the loss and destruction of the self, from the early days of its conceptualization. The pioneers of schizophrenia research have often used terms such as orchestra without a conductor, loss of self, loss of inner unity, to describe what they perceived as the underlying feature of the disease. Today the public still repeatedly regards schizophrenia as synonymous with madness, involving a complete loss of touch with reality and who one is. Indeed, studies have shown that more than any other psychotic disorder, schizophrenia is closely related to a disturbance in layers of the self, from disturbance in the basic sense of self to an impairment in the more complex structure of the narrative self. Given the role of self in both mental health and mental illness, I hypothesize that those at high psychometric risk for developing schizophrenia, namely schizotypes, will present specific and different characteristics of selfhood structure, as compared with the normal population. The main hypotheses are that (1) there would be difference in aspects of the basic sense of self between the schizotypy and the control group; (2) there would be difference in aspects of the narrative sense of self between the schizotypy and the control group; (3) the levels of maturation of the basic and narrative sense of self would predict the levels overall adjustment to university life. Methods include both objective and subjective measures for assessing basic and narrative aspects of self. Preliminary findings provide some possible answer to these hypotheses.

Improving Regional Innovation Systems Performance Through Absorptive Capacity

Alistair Hill (Department of Management, University of Otago, Dunedin)

Introduced by Cohen and Levinthal (1990), Absorptive Capacity referred initially to one of a firm’s fundamental learning processes: its ability to identify, assimilate, and exploit knowledge. This explored not only the ability to imitate other firms’ products or processes, but also the ability to exploit less commercially focused knowledge, such as scientific research. Uotila et al. (2006) adapted the concept of Absorptive Capacity to be used in the context of Regional Innovation Systems.
The thesis uses the idea of the Absorptive Capacity of a Regional Innovation System described in two components: Potential Absorptive Capacity and Realised Absorptive Capacity. These in turn are expressed in terms of a number of elements: Knowledge Acquisition, Knowledge Assimilation, Knowledge Diffusion (Potential Absorptive Capacity) and Knowledge Anchoring, Knowledge Conversion, Knowledge Exploitation (Realised Absorptive Capacity).

The research methodology involved examining a number of proxy measures for each of the above elements, some of which are evaluated through published data and some through a series of face-to-face interviews. Using values gathered across four chosen city/regions (Dunedin (NZ), Dundee (UK), Oulu (Finland) and Boulder (Colorado, USA)), the elements that make up Absorptive Capacity can be relatively scored and the effect on Regional Innovation System performance (using total factor productivity) can be compared.

This provides, at element level, indicators of where differences in performance affect overall Regional Innovation System performance and where addressing regional weaknesses can benefit performance.


**Lysosome-associated Apoptotic Pathway Mediates the Cleavage of Antiviral Host Factor HDAC6 in Influenza Virus Infected Cells**

*Mazhar Hussain & Matloob Husain*  
*(Department of Microbiology and Immunology, University of Otago)*

Influenza A virus (IAV) is the causative agent of acute febrile human respiratory disease commonly known as flu. IAV has caused five pandemics in last 100 years, and it regularly causes seasonal epidemics all over the globe every year. There is no universal IAV vaccine available and anti-IAV drugs are not fully effective. Therefore, a thorough understanding of IAV-host interactions is required to develop adequate and long-lasting anti-IAV strategies. Our lab has discovered that host histone deacetylase 6 (HDAC6) is a novel anti-IAV factor that restricts IAV infection by down regulating the trafficking of viral components to the site of IAV assembly. Viruses are known to antagonize
antiviral host factors to replicate efficiently in host cells. The aim of my PhD is to determine the mechanisms IAV employs to circumvent the anti-viral function of HDAC6. So far, I have found that IAV downregulates HDAC6 expression in human lung epithelial cells both at mRNA (>95% after 24 hours) and polypeptide (~75% after 24 hours) levels in a dose-dependent manner. A further time-course kinetic analysis revealed that HDAC6 mRNA and polypeptide levels decrease gradually over the course of infection. In addition, HDAC6 polypeptide is also cleaved in infected cells into two smaller fragments of ~90 and ~125 kDa. The perturbation of lysosomal, proteasomal and apoptotic pathways (the main pathways that degrade proteins in mammalian cells) revealed that a lysosome-associated apoptotic pathway sequentially cleaves HDAC6 polypeptide in infected cells. A further investigation will elucidate the mechanism and significance of the cleavage of HDAC6 polypeptide in IAV infection.

**Profiling Human Innate-like T Cell Populations in Cancer**

*Ellie-May Jarvis (Pathology & Molecular Medicine and Wellington School of Medicine, University of Otago, Wellington; Malaghan Institute of Medical Research, Wellington)*

*Shaun Collings (Wellington School of Medicine, University of Otago, Wellington)*

*Astrid-Authier-Hall (Malaghan Institute of Medical Research, Wellington)*

*Brendan Luey (Wellington Blood and Cancer Centre, Capital and Coast District Health Board, Wellington)*

*John Nacey (Malaghan Institute of Medical Research, Wellington; Wellington School of Medicine, University of Otago, Wellington)*

*Brett Delahunt (Pathology & Molecular Medicine, and Wellington School of Medicine, University of Otago, Wellington)*

*Olivier Gasser (Malaghan Institute of Medical Research, Wellington)*

*Ian Hermans (Malaghan Institute of Medical Research, Wellington; Victoria University, Wellington)*

*Robert Weinkove (Pathology & Molecular Medicine, University of Otago, Wellington; Malaghan Institute of Medical Research, Wellington; Wellington Blood and Cancer Centre, Capital and Coast District Health Board, Wellington)*

Innate-like T cells (ILTs) are a subset of immune cells that express stereotyped receptors specific for non-peptide molecules. They rapidly produce signalling molecules and interact with other immune cells to influence immune responses, such as those involved in cancer. For this reason, ILTs are being
targeted for the treatment of cancer in a number of clinical trials. However, the function of existing ILT populations in patients with cancer, and the impact of emerging cancer therapies on ILTs, remains to be fully defined.

This project aims to profile three ILT populations; invariant Natural Killer T (iNKT) cells, Mucosal Associated Invariant T (MAIT) cells and T cells expressing $V\gamma 9V\delta 2$ TCRs ($V\gamma 9V\delta 2$ T cells), in patients with cancer. We have developed and validated a suite of assays to comprehensively profile the frequency and function of human iNKT, MAIT and $V\gamma 9V\delta 2$ T cells in blood samples. These assays have been applied to blood samples from men with prostate cancer and from healthy age- and sex-matched controls.

These findings will inform the rational application of ILT cell-targeted treatments, in terms of both patient selection and sequencing alongside other existing and emerging treatments.

Chronic Pain and Advanced MRI Techniques

Sharon Jay & Tracy Melzer (Department of Medicine, Christchurch School of Medicine University of Otago)
Deborah Snell (Department of Orthopaedic Surgery and Musculoskeletal Medicine, University of Otago)

Chronic Pain is a difficult entity to define and treat. The usual definition is that of pain that persists beyond expected healing period of three to six months. The pathophysiology, in particular changing neural connections, are still not widely agreed on. In recent years neuroimaging has shown evidence of structural reorganization and change. These new developments can further improve understanding of the brains plasticity and potentially new strategies to either help identify those experiencing acute pain at risk of transition to chronic pain, but also as a potential target for therapy.

The study population of 67 patients includes: a group of 26 selected from a pain management service and a group of 41 normal controls. The participants were matched on age, gender and ethnicity. Each patient has undergone structural and diffusion-weighted MRI scans. Voxel based morphometry was used to investigate differences in grey matter volumes between the groups, as well as to investigate correlations with neurocognitive outcomes. Cortical thickness was also calculated. Tract-based spatial statistics were used to
investigate differences and correlation with neurocognitive outcomes between diffusion metrics (fractional anisotropy, mean diffusivity).

The chronic pain group showed smaller cerebellar grey matter volume relative to healthy controls. There was no difference in cortical thickness observed. Furthermore, those experiencing chronic pain exhibited significantly decreased fractional anisotropy and increased mean diffusivity in multiple white matter tracts, relative to controls.

These findings suggest that cerebellar atrophy maybe involved in chronic pain.

Cryo-electron Microscopy Investigation of a Novel Oncolytic Virus-receptor Complex

Nadishka Jayawardena & Laura Burga (Department of Microbiology and Immunology, Otago School of Medical Sciences, University of Otago)

Richard Easingwood (Otago Centre for Electron Microscopy, Otago School of Medical Sciences, University of Otago)

Mihnea Bostina (Department of Microbiology and Immunology, and Otago Centre for Electron Microscopy, Otago School of Medical Sciences, University of Otago)

This study is focused on investigating the receptor interaction of Seneca Valley Virus (SVV) using cryo-electron microscopy. SVV is a replication-competent, positive-strand RNA virus belonging to the family Picornaviridae. The genome of SVV is packed inside a non-enveloped icosahedral capsid composed of VP1, VP2, VP3 and VP4 structural proteins. SVV is widely recognized as an oncolytic virus that selectively infects cancers with neuroendocrine features, thereby eradicating tumors without causing any off-target effects on normal tissues. The inherent tumor selectivity of SVV has encouraged the investigation of this virus for the systemic treatment of metastatic cancers with neuroendocrine properties such as neuroblastoma and small-cell lung cancer, and has currently progressed to Phase I and Phase II clinical trials. Despite the therapeutic potential of SVV, there is no available literature on receptors mediating the selective tropism of SVV for cancer cells. Recently, in conjunction with our collaborators, we have identified the Anthrax Toxin Receptor 1 (ANTXR1) as a high-affinity cellular receptor for SVV. In the present study, we carried out the binding of ANTXR1 to SVV in vitro, followed by plunge freezing of samples in Leica KF80 for cryo-EM. The samples were visualized on JEM-2200FS cryo-TEM coupled with a DE-20 direct electron detector. The images were processed on
RELION for single-particle reconstruction. The 3-D reconstruction from our study is in agreement with the current atomic model of the SVV and depicts the arrangement of VP1 around the five-fold axis and VP2 and VP3 alternating around the three-fold axis. Furthermore, this model demonstrates a radially distributed ANTXR1 density localized around the five-fold symmetry axis of the capsid. Future studies will focus on obtaining a 3-D reconstruction of the capsid-receptor complex at a higher resolution to identify the key residues on the capsid responsible for ANTXR1 binding.

**Mental Illness and Discrimination in Employment: Does the Human Rights Act 1993 Provide Adequate Protection?**

*Ruth Jeffery (Faculty of Law, University of Otago)*

As a result of mental illness, such as depression, an employee may perform poorly at work. An employer, providing they follow a fair process, may justifiably (legally) dismiss an employee for poor performance. However, under the Human Rights Act 1993, it is unlawful discrimination to dismiss an employee ‘by reason of’ disability (which includes mental illness).

The aim of this research is to establish if an otherwise justified dismissal on performance grounds could be considered discrimination, if the employee’s poor performance is caused by a mental health disability.

Through a process of statutory interpretation and case analysis, this research examines the discrimination in employment provisions of the Human Rights Act 1993, focusing particularly on the provisions that deal with the employer’s obligation to reasonably accommodate the mentally disabled in employment. The purpose is both to clarify the law in this area, and to establish if New Zealand is meeting its obligations under the United Nations Convention on the Rights of Disabled Persons (UNCRPD).

This study concludes that New Zealand’s legislation does not impose a positive duty on employers to accommodate disabled employees. Instead, the ‘reasonable accommodation’ provisions of the Human Rights Act merely provide a defence against a claim of discrimination brought by an employee. As a consequence of this lack of a positive duty to accommodate the disabled, the dismissal of a mentally disabled employee on performance grounds may not be discrimination. As a corollary, it will be argued, New Zealand legislation provides inadequate protection against discrimination in employment on the
ground of mental disability, and fails to meet our obligations under the UNCRPD.


I Am What I Do: Detecting Behavioural Patterns in Student Spatiotemporal Data

Senorita John & Russell Butson
(Higher Education Development Centre, University of Otago)
Rachel Spronken-Smith (Graduate Research School and Higher Education Development Centre, University of Otago)

The life of an undergraduate student is typically portrayed as one of studying, attending classes, and socialising. However, these types of depictions tend to mask the complexities associated with student life/learning. This study aims to investigate the degree to which the repetitive, mundane, and seemingly insignificant actions that define student daily life shape their academic development. In this talk we present a more holistic perspective of the students’ educational experience grounded in daily student action.

Drawing on the theoretical forms and concepts of Space-Event-Movement articulated by Bernard Tschumi (1976) in his book The Manhattan Transcripts, we went about transcribing a) the spaces in which students spend their time, b) the activities (events) they undertake in these spaces, and c) the movements or connectors that bind these spaces. Rather than following the traditional approach within higher education research of asking people questions, we experimented with new advances in digital data capture methods (e.g., reality mining through wearable sensor--based devices). This allowed us to harvest students’ continuous naturally-occurring behavioural data – what they were actually doing – rather than their perceptions, or what they say they did (e.g., Sim & Butson, 2014).
Given the changing nature of higher education (e.g., a recent report by the New Zealand Productivity Commission (2017)), it seems essential that we explore new and innovative ways to examine and probe the academic development of our undergraduate students. In this way, we hope the findings of this study will act as a catalyst to raise the profile of behaviour-centric research in shaping our understanding of student experience, development and wellbeing.

This oral presentation will elaborate on the data capture methods employed, the challenges experienced and share some preliminary findings.


**The Role of DNA Hypomethylation in Zebrafish Cell Reprogramming During Tail Fin Regeneration**

*Morgan Jones, Caroline Beck & Tim Hore*  
*(Department of Anatomy, University of Otago)*

Epigenetic modification of DNA helps cells with identical genetic information to differentiate themselves from each other and take on specialised functions. DNA methylation is a prevalent epigenetic process in vertebrates and predominantly targets cytosine nucleotides when in the CG dinucleotide context (i.e. cytosine followed by a guanine). CG methylation at gene promoters is associated with transcription silencing and is essential during early development.

In humans and mice, all somatic tissues show high levels (70-85%)\(^1\) of CG dinucleotide methylation. In contrast, naive pluripotent stem cells and some cells of the germline are relatively hypomethylated (5-30%)\(^2\), a trait potentially responsible for their developmental potency. Although the positive correlation between CG methylation and cellular commitment is well established in rodents and primates, it has barely been examined in other taxa. We used low-coverage bisulfite sequencing to accurately quantify CG methylation levels in somatic tissue samples from a range of vertebrate species and uncovered
generally high CG methylation levels (65-80%), in agreement with that found in humans and mice.

A further aim of this project was to examine if stem cells present in regenerating tissue undergo genome-wide demethylation like their embryonic counterparts. Regenerating zebrafish caudal fins contain ‘blastema’ stem cells surrounded by a protective epithelial cap layer. Blastema, but not the epithelial cap, has been claimed to undergo significant hypomethylation of DNA3, however, these experiments were performed in a technically-limited and semi-quantitative fashion. We show that in bulk, regenerating tail fin in zebrafish does not undergo DNA demethylation as assessed by low-coverage bisulfite sequencing. Currently, we are optimising the extraction of blastema from regenerating zebrafish tail fins using cryosectioning and laser capture microscopy. This will allow comprehensive testing of demethylation in the blastema of regenerative tissue, and potentially, new understanding about how DNA methylation defines developmental potential in non-mammalian vertebrates.


Hirose, K., Shimoda, N., & Kikuchi, Y. (2013). Transient reduction of 5-methylcytosine and 5-hydroxymethylcytosine is associated with active DNA demethylation during regeneration of zebrafish fin. Epigenetics, 8(9), 899-906.

The Impact of International Experiences on Women’s Career Development: A Narrative Study

Salmah Kassim (Higher Education Development Centre, University of Otago)

Malaysia, like other ‘developing’ countries, has invested significant funding in international education, through programmes such as the Special Twinning Degree Programme (STDP). This programme involved sending selected educators abroad with a view to producing knowledgeable, trained and skilled human resources, particularly in the education sector. Many of these educators were women, but no research has explored the progress of STDP women
educators and their career development. To date, little empirical literature has explored women’s careers outside western contexts.

This qualitative study involved 16 women educators with diverse backgrounds and positions from various educational institutions of the Malaysian Ministry of Education. These women obtained their bachelors degree through the STDP, a collaboration between the Malaysian Ministry of Education and the University of Otago, New Zealand from 1995 to 1998. This study aims to better understand the impact of international experiences on women’s careers, how STDP women made choices about their careers, and how they define ‘success’ and ‘career’ in their own terms.

In this study, I use narrative inquiry as a framework for understanding the research participants’ accounts and the interview data. I conducted the interviews using photo-elicitation and am using narrative analysis to explore how STDP women presented and explained their experiences and understood the meanings of these experiences.

The study is expected to provide meaningful insights into the types of activities, influences, and experiences that enable women educators to develop knowledge, skills, and competencies in their careers, with implications for policy and practice in Malaysia, and in other ‘developing’ countries.

Patients’ Perspectives of the Outcome of Anterior Cruciate Ligament (ACL) Reconstruction Surgery

Mandeep Kaur & Daniel Cury Ribeiro (Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago)
Jean-Claude Theis (Department of Surgical Sciences, University of Otago)
Kate Webster (School of Allied Health, La Trobe University, Victoria, Australia)
Gisela Sole (Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago)

Approximately one-third of participants with anterior cruciate ligament reconstruction (ACLR) demonstrate post-traumatic osteoarthritis around 10 years following surgery1. Understanding the individual patient’s perspectives of outcomes of ACLR is critical when considering patient-centered care. The aim of this study was to explore the patients’ perspectives of experiences of ACLR in relation to physical activity, sports, occupation and quality of life outcomes.
Participants were recruited from the local community via advertisements for a larger study exploring outcomes of ACLR. Ten participants who were 2-10 years following ACLR (7 female; aged 20 to 52 years), completed patient-reported outcome measures [Tegner Activity Scale, Knee Outcome and Osteoarthritis Score (KOOS), Sports Confidence scale, and Short-form Health Survey-12 (SF-12)] and participated in individual face-to-face semi-structured interviews. The interviews were recorded and transcribed verbatim. The general inductive approach was used for data analysis, and patient-reported outcomes were analysed descriptively.

Participants had reported good knee function in activities of daily living (median KOOS ADL= 99/100), yet scored low for the quality of life scale (KOOS QoL = 53/100, SF-12= Physical component score- 55.50, Mental component score 44.80/100). Sports Confidence scores indicated lack of confidence and fear of re-injury. Three overlapping themes were identified from the interviews: ‘Continuum of fear of re-injury and confidence’, ‘live life normally’ and ‘need of reassurance and the maintenance of knee health’.

Participants perceived their quality of life to be low. Anterior cruciate ligament reconstruction appear to lead to long-term fear of injury and behavioural manifestations, with fluctuating levels of confidence during sports. Their professional lives were no longer affected by the knee. Participants were concerned about the future risk of re-injury or osteoarthritis. Health professionals should include long term individual-specific strategies as part of rehabilitation following ACLR to minimise such risk and to improve confidence.


“To put thee in remembrance of my death”:
Mnemonic Emblems and Spectacular Violent Revenge

*Paramjeet Kaur (English Department, University of Otago)*

Anchored in the genre of early modern revenge tragedies, my research aims to understand how jarring spectacular representations of theatrical violence fuelled an aggrieved revenger’s vengeance and desire for retributive justice. Mangled bodies on the early modern English stage, more often than not, stood as spectres of the hero’s violated past—haunting him with memories of the
pain and humiliation his family members had to undergo at the hands of corrupt aristocratic villains. Protagonists like Hieronimo and Hamlet (from Thomas Kyd’s The Spanish Tragedy and William Shakespeare’s Hamlet), for instance, are unable to disassociate themselves from the hauntings of the past and, as the play progresses, their revenge takes the shape of a backward looking mnemonic art that creatively and vividly calls upon the emphatic visual illustrations of the actual violence meted out to their dear ones. The mnemonic associations with the past that accompany the revenger are intrinsically shaped by the manner in which the horrifying spectacle of their family’s violent killings unfolds in front of them. A powerful spectacle that captures the harm done in its most heinous form is likely to produce sharper memories and fiercer revenge. As these memories accumulate and thicken, they come to play a crucial role in enhancing and directing the force of vengeance with which Hieronimo and Hamlet eventually seek revenge. But as these graphic illustrations of death and decay manifest themselves into the dynamics of the final act of personal justice, they steer the interactions between the psychology and ecology of both the revengers in The Spanish Tragedy and Hamlet.


The Molecular Basis of Bulbing and Flowering in Onion:
Unique and Conserved Mechanisms

Jiffinvir Khosa & Robyn Lee (Department of Biochemistry, University of Otago)
John McCallum & Richard Macknight (Department of Biochemistry, University of Otago and New Zealand Institute for Plant and Food Research, Christchurch)

To adapt in different environments, plants exhibit high levels of developmental, physiological and molecular diversity. Genomic studies have shown that gene duplication followed by neo-functionalisation and sub-functionalisation plays a major role in adaptive evolution of plants. Our lab is interested in how bulbing and flowering is controlled in onion. Onion is a biennial plant that forms bulbs in the first year and flowers in the second year. FLOWERING LOCUS T (FT) encodes a mobile signalling protein that in many plants is produced under increasing day length of spring. The FT protein moves to the apex where it activate the APETELLA1 (AP1) gene to trigger flowering. We used RNA
sequencing to discover the genes involved in onion bulbing and flowering. Further we studied their relative expression patterns to understand how they regulate bulbing and flowering. We have discovered that in onion gene duplication and neo-functionalisation leads to the FTs and AP1 genes being evolved to regulate bulbing and flowering in response to day length and vernalization, respectively. This knowledge provides a framework to understanding how onions have become adapted to grow in latitudes with differing seasonal changes in day lengths and temperature.

**How do Clients Transition from Hospital to the Community within a Regional Forensic Psychiatric Service?**

*Penelope Kinney*  
*(Department of Sociology, Gender and Social Work, University of Otago)*

Transition is regarded as the psychological adaptation process undergone in response to a significant event. Moving to the community after significant periods of time in forensic psychiatric hospitals is a transition undergone by clients within the service. It is challenging for the majority of those making this transition. Those in forensic services would count their time in hospital in years rather than weeks or months. Leaving the support and structure of a ward, managing budgets, adapting to new accommodation and finding meaningful occupations to engage in are just a few of the challenges those leaving hospital have to overcome. Those being discharged must often also negotiate communities that may prove unwelcoming. The purpose of this Constructivist Grounded Theory study was to explore how clients’ moving out of one New Zealand forensic psychiatric hospital adapt to living in the community. Both clients and staff were invited into the project. Six client participants were interviewed a total of three times each in a mixture of walking and face to face interviews. The walking interviews enabled insights into the connections the client participants were developing with the communities they were now living in. Eight staff participants were interviewed once using face to face interviews only. All interviews were recorded, transcribed and returned to the participants for member checking. The results of this study provide insights into the multiple factors that influence a person’s adaption to life in the community after significant time in hospital. Understanding these allows health professionals who are developing the transition plans and supporting those in the community, to ensure they cater for the needs of each individual and engage them in the transition process to ensure the success of these moves. This in turn will benefit the person, and the communities they are returning to.
Perception of Homeopathy by Homeopathy Users in New Zealand

Manon Knapen & Fabien Medvecky
(Centre for Science Communication, University of Otago)

The efficacy of homeopathy is subject to controversies. While the scientific community says that homeopathic remedies are not scientifically proven to work, there is an increasing number of users worldwide. Homeopathy users have been studied in many countries including Australia, the US and France. Following the different surveys, homeopathy users have been described as predominantly educated women with higher income. As far as New Zealand is concerned, there is not a lot of information available about homeopathy users. A survey has been designed to get insight into who uses homeopathic remedies in New Zealand and why they use it. The survey also looked at the perceived efficacy of both homeopathy and conventional medicine. Intercept street surveys were undertaken in Dunedin, Christchurch, Wellington and Auckland during May and June 2016. The survey has also been shared online via New Zealand-based health forums.

This poster presents the preliminary results about homeopathy users’ perception of homeopathy, from its effectiveness to its application as well as respondent’s perception of homeopathic remedies as being scientifically supported, or not.

Effectiveness of Spinal Manipulation in Eliciting Changes in Biochemical Markers – A Systematic Review and Meta-analysis

Kesava Kovanur-Sampath, Ramakrishnan Mani & Angela Gisselman
(School of Physiotherapy, University of Otago)
Jim Cotter
(School of Physical Education, Sports and Exercise Science, University of Otago)
Steve Tumilty (School of Physiotherapy, University of Otago)

Spinal manipulation, a common therapeutic technique used by physiotherapists may have widespread effects on various biochemical markers such as pain markers, inflammatory markers and endocrine markers. The aim of this systematic review was to determine the effectiveness of spinal manipulation in influencing various biochemical markers in healthy and or symptomatic population.
Various databases (n=10) were searched (from inception until September 2016). Two authors independently extracted and assessed the risk of bias in included studies. Outcome measure data were synthesized using standard mean differences and meta-analysis for the primary outcome of pain and physical function for two post-intervention time points (immediate and short-term). The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) was used for assessing the quality of the body of evidence for each outcome of interest.

Eight clinical trials (325 participants) that met the inclusion criteria were included in the meta-analysis. There was moderate quality evidence of significant difference that spinal manipulation is better (SMD -0.46, 95% CI -0.93 to 0) than control in eliciting changes in cortisol levels immediately post-intervention. There was also a low quality evidence that spinal manipulation is better than control at post-intervention in increasing substance-P (SMD -0.48, 95%CI -0.87 to -0.1), neurotensin (SMD -1.8, 95% CI -2.56 to -1.04) and oxytocin levels (SMD -2.61, 95%CI -3.5 to -1.72). However, low quality evidence indicated that spinal manipulation did not change epinephrine (SMD 0.1, 95%CI 0.56 to 0.75) or nor-epinephrine levels (SMD -0.06, 95%CI 0.71 to 0.6).

Spinal manipulation increases substance-P, neurotensin, oxytocin and interleukin levels and can influence cortisol levels post-intervention. The clinical relevance of such changes may be of interest for future studies.

Differences in the Effector Functions of MR1- and Cytokine Stimulated MAIT Cells

Rajesh Lamichhane, Joanna Kirman and James Ussher
(Department of Microbiology and Immunology, University of Otago)

Mucosal associated invariant T-cells (MAIT cells) are a recently recognised innate-like T-cell subset, which express a semi-invariant T-cell receptor (Vα7.2-Jα12/20/33) and are restricted to antigen presented by evolutionary conserved, non-polymorphic MHC class I related protein, MR1. MR1 presents unstable pyrimidine intermediate derived from precursor of riboflavin triggering MAIT cell activation via their T-cell receptor. Riboflavin biosynthesis occurs in many bacteria and MAIT cells are shown to be activated by cells infected with a diverse range of bacteria, including *Mycobacterium tuberculosis*, *Escherichia coli*, *Salmonella enterica* subsp. *enterica* serovar *Typhimurium* etc. They can also be activated via their cytokine receptors mainly
by IL-12 and IL-18, thus bridging the two arms of immune system; innate and adaptive immunity. MAIT cells secrete a broad range of cytokines such as interferon-γ (IFN-γ), tumour necrosis factor-α (TNFα), interleukin-17 (IL-17) etc and cytotoxic molecules granzymes upon activation. However, it is unclear how the effector functions of human MAIT cells differ in response to different stimuli. We observed rapid activation of human MAIT cells and significant cytokine production against formaldehyde fixed *E. coli*, soluble ligand (5-A-RU) and cytokines (IL-12+IL-18). The maximum MAIT cell activation time-points against bacteria and cytokines were determined at both protein and transcriptomic level by flow cytometry and real-time reverse transcriptase polymerase chain reaction (RT-PCR) respectively. Interestingly, when MAIT cells were activated via their cytokine receptors, the activated population was predominated by IFN-γ single positive MAIT cells, whereas, significant numbers of TNF-α and IFN-γ single positive MAIT cells were observed when activated via their TCR by *E. coli* or 5-A-RU. To explore the effector functions of activated MAIT cells and further outline the differences between two modes of activation, RNA sequencing has been performed on MAIT cells stimulated with *E. coli*, 5-A-RU or IL-12+IL-18; results will be presented at the symposium.

**Effect of Glucose on Enhancing Maturation of Heart Muscle Cells**

*Scott Lee & Rajesh Katare (Department of Physiology, University of Otago)*

Billions of cells in the heart are lost within few hours of a heart attack, thereby making heart disease the leading cause of mortality. While the remarkable advances have reduced the mortality rate, they do not address the loss of heart muscle cells (cardiomyocytes) or form new blood vessels. Stem cells therapy is gaining momentum as the treatment of choice for patients who are resistant to conventional treatment options due to their ability to regenerate the cardiomyocytes therefore restoring the heart function. Among them pluripotent stem cells are gaining popularity due to their ability to proliferate indefinitely and differentiate into specialized cell types including cardiomyocytes. Dramatic maturational changes occur in cardiac energy metabolism during differentiation of pluripotent stem cells into cardiomyocytes. The fetal cardiomyocytes utilize glycolysis as the prime energy metabolic pathway, whereas neonatal cardiomyocytes depend on mitochondrial oxidative phosphorylation. This is primarily due to the low energy demand for fetal cardiomyocytes and high energy requirement of neonatal cardiomyocytes. Considering the above background, it is important to
understand if the shift in metabolic substrate would enhance the maturation of fetal cardiomyocytes to neonatal cardiomyocytes. Therefore, the current study aims to investigate the effect of glucose concentration in enhancing the maturation of embryonic cardiomyocytes into neonatal cardiomyocytes. We hypothesize that low glucose concentration will improve embryonic cardiomyocytes maturation into neonatal cardiomyocytes, which will be confirmed by gene expression (RT-PCR) and protein expression (flow cytometry and immunostaining) studies.


Claudia Leong (Department of Human Nutrition, University of Otago)
Rachael Taylor (Department of Medicine, & Microbiome Otago, University of Otago)
Gerald Tannock (Department of Microbiology & Immunology, & Microbiome Otago, University of Otago)
Jill Haszard (Department of Human Nutrition, University of Otago)
Blair Lawley (Department of Microbiology & Immunology, University of Otago)
Ewa Szymlek-Gay (Institute of Physical Activity and Nutrition, Deakin University, Australia)
Anne-Louise Heath (Department of Human Nutrition, & Microbiome Otago, University of Otago)

Recently, there has been an increasing interest in gut microbiota and its influence on human health. However, little research has investigated the influence of the largest change in diet that humans experience – the transition from a milk-based diet to solid foods – on the gut microbiota.

This study aimed to investigate the influence of a ‘baby-led’ approach to complementary feeding - BLISS (Baby-Led Introduction to SolidS) - on the gut microbiota of infants. In this randomised controlled trial, 206 New Zealand infants were randomised before birth to either BLISS (introduction of solids at 6 months of age, followed by self-feeding of family foods) or Control (standard care). Faecal samples (n=37 from each group) and 3-day weighed dietary records were collected at 7 and 12 months of age. The composition of the microbiota of faecal samples was determined by sequencing 16S rRNA genes amplified from DNA extracted from the faecal samples. Dietary data were used
to estimate dietary fibre intake, fibre variety scores, and intake of nine food groups.

At 12 months, the BLISS group faecal microbiota had a lesser complexity (lower alpha diversity; mean±SD 176±58 OTUs) than the Control group (mean±SD 203±58 OTUs) (mean difference: 31 OTUs; 95% CI: 3.4 – 58.5 OTUs; \(p=0.028\)). No significant association was found at 12 months between dietary fibre intake, or fibre variety score, and alpha diversity. However, there was an association between breast milk intake, sweet foods intake, parity, and alpha diversity. Further dietary and microbiota data will be discussed.

**Simulations and Clinical: ‘Like Chalk and Cheese’**

*Raewyn Lesa & Ben Daniel*

*(Higher Education Development Centre, University of Otago)*

There is a growing body of literature suggesting that simulated learning environments can be substituted for learning in clinical environments settings (Hayden et al., 2014; Richardson et al., 2014).

However, the simulation and clinical environment are different. Learning in simulations is designed to attain specific outcomes, while learning in clinical practice is often informal and unstructured due to the unpredictable nature of the environment. Further, learning in simulated environments occur within a set time-frame and predefined scenarios. However, many aspects of the clinical environment such as interpersonal relationships and the patient’s response to interventions are spontaneous.

This Ph.D. research utilised an exploratory qualitative case study aimed at answering two research questions. What are undergraduate nursing students’ experiences of learning with simulations? To what extent does the learning context influence students’ experiences of developing clinical judgment skills in a simulated learning environment? The study involved 12 third-year nursing students in an undergraduate nursing program in New Zealand. Data included observations, interviews, clinical stories and documents associated with the simulation program. Key findings suggest participants’ experiences in simulated and clinical environments differ significantly. Participants’ experiences are by large shaped by the nature of simulations, personal attributes, and the learning content. These findings have wider implications for learning and teaching in simulated learning environments.
Measuring the Activity of Cancer Using Targeted Gold Nanoparticles and MARS-CT Imaging

Chiara Lowe, Aamir Raja, Nigel Anderson & Anthony Butler
(Radiology, University of Otago, Christchurch)

Advances in nanotechnology and imaging show tremendous potential for the development of novel strategies in terms of theranostics. The term theranostics was coined to define the combination of diagnostic and therapeutic capabilities in a single modality. Medipix All Resolution System (MARS) spectral CT is a new X-ray based imaging technology, capable of highly specific 3D imaging at high resolution (Anderson & Butler, 2014). Properties of the photon-processing detector within the MARS spectral CT allow for identification and quantification of multiple materials. Nanoparticles labelled with high-Z metal can be used in conjunction with MARS spectral CT to provide measurements of cellular markers, drug penetration and immune response to cancer, removing the need for invasive biopsies. In addition, personalised cancer treatment will become possible when the amount of drug entering a tumour can be measured, and the response to treatment is assessed non-invasively. There are many challenges to overcome before MARS spectral imaging can be introduced into clinical medicine, including identifying which biomarkers are most relevant to the disease in question. In this talk, I will propose research that aims to investigate measuring the activity of cancer using targeted nanoparticles and MARS spectral imaging. It is anticipated that the most suitable gold nanoparticles in terms of size and concentration for cancerous cell uptake will be determined. In the future, this research will contribute to the development of targeted therapeutic nanoparticles where attached drugs are delivered to cancerous cells, reducing potential side effects.

In the current world of medicine there is little ambiguity surrounding the autonomy of adults and the respect afforded to the decisions they make for their own medical treatment.

Practically this has resulted in a high level of involvement in decision making, and in the field of bioethics that respect for autonomy has become a key concern.

However, this is not the case for adolescents, who can have important medical decisions made for them even when they can prove a reasonable standard of intellectual and emotional maturity.

The goal of this project is to clarify some of the inconsistencies in current clinical and legal practice. Through in-depth analysis of contemporary clinical and legal cases, its aim is to explore when it can be appropriate to override adolescent autonomy.

The primary approach is an ethical analysis involving critical interpretation of how key ethical concepts, such as autonomy and best interests, are employed in discussions of these contemporary cases. This ethical analysis will be supplemented by additionally considering analysis of legal precedents and new information offered by the field of neuroscience.

In summary, there are inconsistencies in practice when it comes to adolescent autonomy. This project aims to begin to address this gap through a combined philosophical, legal and scientific analysis. Ultimately such work will have clear value for both clinicians, who need guidelines to work within, and for patients who need to have their right to autonomy protected while still ensuring that treatments are in the best interests of the child.
Is the Ross Ice Shelf Melting or Dissolving, and Why Does it Matter?

Alena Malyarenko (Department of Physics, University of Otago; NIWA)
Natalie Robinson (NIWA)
Pat Langhorne (Department of Physics, University of Otago)
Mike Williams (NIWA)

Over the past 3 decades the thermodynamic ice - ocean interaction at the base of Antarctica’s ice shelves has been assumed to have been driven by melting or freezing using the 3-equation model. However, it has been shown that ice shelves at temperatures below 0°C dissolve rather than melt and phase change is governed by the transfer of solute to the ice-water interface (Woods, 1992). Dissolution rates are typically significantly smaller than melting rates. This suggests assuming ice shelves are melting when ocean temperatures are colder than 0°C may lead to overestimation of basal mass loss from ice shelves. Here we use direct observations of ice shelf basal ablation rates (the rate of mass loss independent of process) to assess different representations of ablation in ice shelf-ocean modelling. Preliminary results show that commonly used parameterizations of turbulent heat and salt transfer through the oceanic boundary layer may lead to overestimation of ablation in cold cavity ice shelves, such as the Ross Ice Shelf. In turn this can lead to overestimation of the demise of the Antarctic ice shelf.


Risk Factors for Falls in Older Adult with Knee Osteoarthritis: A Systematic Review

Donald Manlapaz, Gisela Sole, Prasath Jayakaran & Cathy Chapple
(Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago)

Falls are often reported by adults with knee osteoarthritis (OA). Despite this increased number of falls, the mechanisms and contributors underlying the occurrence of falls in individuals with knee OA are poorly understood. The objective of this research was to identify the evidence of risk factors for falls in older adults with knee osteoarthritis (OA).
A systematic literature search was performed in nine electronic databases from inception to July 2016. Two reviewers screened articles using set inclusion and exclusion criteria. Observational study designs that included participants with knee OA and history of falls were considered. Results reported as odds ratios, relative risks, prevalence ratios or hazard ratios were extracted to identify the potential risk factors for falls. Included articles were assessed for methodological quality and level of evidence.

The electronic data search yielded 4382 studies related to falls and knee OA. A total of 11 studies were identified to be relevant in this review. Pain showed strong evidence as a risk factor for falls, while muscle weakness, impaired balance, presence of comorbidities and increasing number of symptomatic joint had moderate evidence. Knee instability and decrease proprioception were identified as risk factors for falls; however, the strength of evidence was conflicting due to the inconsistency of the findings. Decreased level of physical function, and use of walking aids had limited evidence.

Identification of modifiable risk factors for falls in individuals with knee OA can be valuable information for clinicians and fall prevention program developers. Although high to moderate quality studies are included in this review, further studies are warranted to examine risk factors of falls in a knee OA population.

Engaging Secondary Students with Science Communication

Kaitlyn Martin & Lloyd Davis
(Centre for Science Communication, University of Otago)
Susan Sandretto (College of Education, University of Otago)

Interest in science by adolescents is decreasing around the world and in New Zealand according to international surveys. Given the increasingly integral part that science and technology will play in their lives, it is crucial to establish an interest in science early in our youth so that they may participate in scientific arguments as they relate to public policy, health, conservation, and research. This project is proceeding in two phases that will: (i) establish the current levels of science interest for students in years 7-10 in Otago, and (ii) test the effectiveness of a science communication-based teaching intervention. We are in the process of investigating Otago students’ experiences with school science, the scientific topics they enjoy, and the types of citizen projects they would like to participate in within their communities. This survey will establish the base
level of interest in science and topic areas that students enjoy. We will also be asking students about their access to technology, as we find that today’s adolescents are adept at the kind of digital storytelling that accompanies picture and video applications on mobile devices. Next year, as part of the second phase, we will test a teaching intervention that encourages engagement with science topics by co-opting adolescent students’ tendencies to engage with mobile devices and video. We will determine whether in the designing, editing, and making of science videos there exists an untapped learning experience for students. By teaching students to make their own science films, we hypothesize they may become active science communicators engaged in the interpretation, understanding, and presentation of scientific information through filming science stories.

Keeping Complexity Appropriately Complex: A Critical Realist Approach to Evaluating Rehabilitation Interventions

Rachelle Martin, Fiona Graham, Will Taylor & William Levack  
(Rehabilitation Teaching and Research Unit, Department of Medicine, University of Otago, Wellington)  
Lois Surgenor (Department of Psychological Medicine, Department of Medicine, University of Otago, Christchurch)

The use of experimental group designs has been advocated to rigorously demonstrate intervention effectiveness; however, problems with this approach have been identified within the evaluation of complex rehabilitation interventions. Reducing the intervention complexities to variables that can be measured in such a way that linear causality can be guaranteed with greater confidence, can result in difficulties translating the findings back to ‘real world’ practice where complexity is the norm. Critical realist approaches offer an alternative approach to evaluating intervention effectiveness,

This presentation aims to overview how a critical realist framework is being used to evaluate how, and to what extent, a therapeutic horse riding intervention may work, for typical participants who access this. Within a mixed methods framework, a three-phase research design is being used to explore the context, mechanisms and outcomes of a therapeutic horse riding intervention, providing a comprehensive account of intervention effectiveness. Adopting a critical realist approach involves attaining knowledge about underlying causal mechanisms for events of interest, and not just measuring empirically observable events themselves. A key concern of critical realism is
whether the knowledge gained about context, mechanisms and outcomes can be generalised, thereby giving attention to the utility of knowledge gained from the outset of the research process. Evaluations of the effectiveness of complex rehabilitation interventions need to provide more than yes/no answers. Adopting a critical realist framework allows for an ideographic focus on the ways that people benefit (or not) from rehabilitation interventions, and the ways those interventions may be optimised to promote outcomes.

Whole Genome Insight into Kea’s Alpine Lifestyle

Denise Martini & Michael Knapp
(Department of Anatomy, University of Otago)

Kea and Kaka are both native threatened parrot species in New Zealand. The two species are thought to have evolved about 5 million years ago, when the uplifting of the Southern Alps created a new alpine niche that allowed for their ecological differentiation. While the Kaka remained a forest specialist, the Kea is the only alpine parrot in the world and as such is particularly exposed to the effects that the current climate change scenario might have on its preferred habitat. Given the relatedness of the two species and the high degree of conservation in avian genomes in general, it is possible to investigate the Kea’s adaptations to an alpine lifestyle through a genome comparison with Kaka.

Using Next-Generation Sequencing techniques for this study, we sequenced and constructed a Kaka whole genome assembly. We used it in conjunction with the already available resources for the Kea\(^1\) to identify the genomic differences between the two species. This whole genome approach enables us to recognize neutral and adaptive variation and to find potential candidate genes that might explain how this species copes with such different habitat and resources. The functional variation identified will offer an insight on the Kea’s resilience to the warming climate and may help to inform management decisions for the future conservation of this and other species linked to the alpine environment.

Adolescent idiopathic scoliosis (AIS), a 3-dimensional rotational curvature of the spine affects 1-4% of the population with onset typically coinciding with puberty. A key characteristic of AIS is an overwhelming sex-bias; 90% of severely progressive cases are female with no known explanation. Genome wide association studies have recently identified a transcription factor gene, \textit{Lbx1}, as a candidate gene for AIS. \textit{Lbx1} has well-characterised roles in embryonic development, responsible for patterning the interneurons of the dorsal horn within the spinal cord, and muscle cell precursor migration. The gene association with \textit{Lbx1} is the only consistently replicated finding in individuals with AIS across multiple ethnic groups. However, its role in AIS susceptibility and subsequent progression in females is unknown.

We propose a sex-specific interaction between genetic susceptibility to AIS and female-specific hormonal changes occurring through puberty. RNA-sequencing was initially conducted to identify significantly differentially expressed gene between juvenile and adult mice. RNA-sequencing revealed 382 differentially expressed genes. Ten genes of interest were selected (previously identified as targets of \textit{Lbx1} through ChIP-sequencing), and RT-qPCR was used to determine their relative expression in male and female mice before and after puberty. Subsequent studies into sex-specific interactions occurring across puberty were examined in gonadectomy experiments, with and without hormonal replacement. Results from hormonal experiments indicate a responsiveness of \textit{Lbx1} to sex-steroid hormones, with downstream gene expression changing significantly in the presence and absence of sex-specific hormones.

Future steps will involve determining the function of \textit{Lbx1} in the juvenile mouse spinal cord and the generation of a mouse model of AIS (not currently available) using CRISPR-Cas9 gene editing. Further, the interactions between sex-specific hormones and \textit{Lbx1} expression both \textit{in vivo} and \textit{in vitro} need to be refined to determine the female-specific causes of adolescent idiopathic scoliosis.
Evaluating the Effectiveness of a Life Skills Programme with Elite Athletes

Adam Miles & Ken Hodge
(School of Physical Education, Sport and Exercise Sciences, University of Otago)

Researchers have acknowledged the need for elite athletes to pursue both performance excellence and personal excellence during their careers in elite sport (Miller & Kerr, 2002). Central to the pursuit of personal excellence is a focus on developing skills that are of life long value and transferrable across life domains. Life skills programmes teach skills such as goal setting and emotional control that can be developed in sport and transferred for use in non-sport settings (Gould & Carson, 2008). To date, few researchers have evaluated the effectiveness of life skills programmes with elite athletes. The purpose of this study was to evaluate the effectiveness of a life skills programme for promoting performance and personal excellence in a group of elite cricketers. The performance and personal excellence programme (PPEP) was delivered to seven male elite cricketers ($M_{\text{age}} = 22.00\text{yrs}; M_{\text{elite experience}} = 2.14\text{yrs}$). These cricketers participated in six group workshops and completed nine online take-home tasks over a 12-week period. We used a series of ABA single-case designs, with minimal meaningful harm and benefit criteria and Standard Mean Difference ($\text{SMD}^\text{all}$) effect sizes, to evaluate the PPEP effects on life skills acquisition and basic need satisfaction (Balanced Measure of Psychological Needs scale; Sheldon & Hilpert, 2012). Preliminary analysis of the data revealed no meaningful harm from participating in the programme. $\text{SMD}^\text{all}$ effect sizes demonstrated that the programme had a positive effect on life skills acquisition for five of the seven participants. Data from social validation interviews revealed that the PPEP was an enjoyable and valuable experience, with the taught life skills being utilized in both sport and non-sport contexts. Adopting a scientist-practitioner approach, practical recommendations are offered for evaluating a life skills programme with elite athletes.

Capturing Crimes on Camera: The Effect of Photo-taking on Confidence in Eyewitness Testimony

Andrew Mills & Rachel Zajac
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In recent years, digital cameras and smartphones have made photographing our experiences easier than ever before. There has been some indication in the scientific literature, however, that photographing an event could compromise the very memories that we are trying to preserve. One recent study by Henkel (2014) found that participants taking photos on a tour of an art museum recognised fewer objects from the tour that they had photographed, compared to objects they had merely observed. Our replication of this original study in a different museum setting found no evidence of the photo-taking impairment effect described in the literature. A subsequent meta-analysis of our results alongside a series of other empirical studies has found this effect to be either non-existent or at least very small.

Despite these findings, it is possible that photo-taking could influence other aspects of people’s memory reports. For example, it could lead people to be over-confident about what they saw—even those aspects of an event that weren’t captured. This question is particularly interesting when we consider the increasing number of eyewitnesses who capture crimes on their cameras. If photo-taking leads these witnesses to be over-confident, they might be less likely to answer questions with “I don’t know” and more susceptible to misleading post-event information. The present study tested these hypotheses by having participants take photos during a videoed crime. After a delay, we asked participants about what they could remember from the video, and investigated whether photo-taking affected the confidence participants had in their memories.

Proteomic Analysis of 4-phenylbutyrate Treated HepG2 Cells Stably Expressing ATP-binding Cassette Transporter A1 (ABCA1) Mutants

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Torsten Kleffmann (Centre for Protein Research, University of Otago, Dunedin)
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The ATP-binding cassette A1 (ABCA1) transporter is a cellular membrane protein that exports cellular cholesterol to form high density lipoprotein (HDL) and protect against cardiovascular disease (CVD). Many mutations in ABCA1 disrupt trafficking to the plasma membrane and reduce its function. We previously showed that the chemical chaperone, 4-phenylbutyrate (4-PBA) can restore membrane localisation and increase the cholesterol efflux function of mutant ABCA1s. The aim of this study was to identify proteins regulated by 4-PBA that restores ABCA1 localisation. Two ABCA1 mutants (p.T1512M and p.N1800H) expressed in stably transfected HepG2 cells were subject to 4-PBA treatment. The cell lysates were prepared from 4-PBA treated and untreated samples and differentially regulated proteins were analysed by mass spectrometric (MS) technique known as sequential window acquisition of all theoretical fragment ion spectra-MS (SWATH-MS). Proteins showing a >2 fold change were subject to bioinformatic analysis using STRING and Panther software packages to investigate the potential association of differentially regulated proteins. The bioinformatic study helped to map the potential functional interaction between differential dataset of proteins and ABCA1. This analysis identified a number of trafficking proteins that could assist ABCA1 in restoring its plasma membrane localisation. These proteins warrant further characterisation for their potential to rescue ABCA1 localisation.

Foreignness: An Illumination in a Bleak Path for Emerging Market Small Medium Enterprises?

Karishma Nagre (Management Department, University of Otago)

Foreign firms entering new host country markets, face additional costs of doing business abroad and encounter unfamiliar experiences known as Liabilities and Assets of Foreignness (LOFs & AOFs). Foreignness is not always a liability, as overseas firms receive additional support from the host institutions and governments to operate effectively in the new environment. Thus, benefits of being international and the accumulated global experiences of the firms may act as an asset to counter the negative effects of foreignness. The existing
literature mostly examines the LOFs/AOFs of multinationals (global & ≥500 employees), with a limited emphasis on small medium enterprises (≤500 employees). Moreover, due to overlapping concepts such as Liabilities and Assets of Foreignness/Newness/Origin/Outsidership, the actual liabilities and advantages as well as firm’s strategic dealings with these remain under-examined. The thesis seeks to examine the challenges and benefits experienced by Indian small medium enterprises by amalgamating LOFs and AOFs. The findings will provide managerial implications for smaller firms to conduct a balanced post-internationalization strategy and theoretical contribution to the international business literature by diverting attention from multinationals, thereby providing a clearer representation of LOFs/AOFs from the perspective of smaller firms.

Paper 1 (Conceptual): “What are the additional costs incurred by emerging market small medium enterprises in overseas market and how do they differ from the costs encountered by multinational enterprises?”

Paper 2 (Survey and Interview): “What are the actual liabilities and how do emerging market small medium enterprises effectively deal with these liabilities in the host country?” & “What are the actual assets/advantages of foreignness and how do emerging market small medium enterprises benefit from these advantages to mitigate LOFs”

Paper 3 (Case Studies): “What were the lessons learned by small medium enterprises in one host country that served as an advantage in another host country and to what extent did it reduce the LOFs or CDBA?”

Can the ‘Hunger Hormone’ get a Leg Up on Critical Limb Ischaemia?

Joshua Neale, Rajesh Katare & Daryl Schwenke (Department of Physiology, HeartOtago, School of Biomedical Sciences, University of Otago)

Impaired blood flow to the limbs (critical limb ischaemia; CLI) is associated with chronic rest pain, skin ulcerations and, ultimately, gangrene. Unfortunately, surgical treatment of CLI is the only effective strategy, although 50% of CLI patients do not meet the eligible criteria for surgery. Angiogenesis is the growth and proliferation of blood vessels from an existing vasculature structure. Importantly, artificially stimulating angiogenesis has emerged as a promising novel, non-invasive treatment for ‘no-option’ CLI patients. However, current angiogenic agents for the treatment of CLI have limited success, with
few clinical trials reporting clinically significant results. Our lab has recently shown ghrelin, commonly known as the ‘hunger hormone’, to induce therapeutic angiogenesis in an animal model of CLI when administered ‘exogenously’ at therapeutic doses. In this study, we aim to elucidate the role of ‘endogenous’ ghrelin in the angiogenic pathways in an experimental model of CLI. CLI was induced in ghrelin knockout mice and their wild-type littermates by left femoral artery ligation. Paw blood flow was measured in both the ischaemic paw (left) and contralateral ‘control’ paw (right), using laser Doppler perfusion imaging before and at repeated intervals following CLI surgery. Ambulatory impairment was assessed based on their ability to walk normally. Morphological assessment of hindlimb vasculature was measured using micro-computed tomography. Subsequently, gastrocnemius muscles were collected for molecular and histological analysis. Following 14 days of CLI, preliminary data suggests ghrelin knockout mice have an impaired limb perfusion recovery, evident by a reduced vascular volume, impaired paw blood flow, and an increased ambulatory impairment. Taken together, our preliminary results highlight the importance of endogenous ghrelin for effective angiogenesis following CLI, and further advocates the use of exogenous ghrelin as a potential novel and exciting therapeutic agent for ‘no-option’ CLI patients.

Comparison of Immune Cell Infiltrate Between Subcutaneous Melanoma and Colon Carcinoma Mouse Models

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Sarah Hook (School of Pharmacy, University of Otago)
Roslyn Kemp (Department of Microbiology and Immunology, School of Biomedical Sciences, University of Otago)

Cancer vaccines modulate the host’s anti-tumour immune response and represent an area of emerging immunotherapy research for the treatment of cancer, including colorectal cancer (CRC). Murine subcutaneous injections of tumour cell lines are used to test cancer vaccines for the treatment of CRC. We aimed to determine the baseline immune response to subcutaneous injection of a colorectal cell line, CT26, compared to a melanoma cell line, B16-OVA, to investigate whether the tumour cell type would affect local and systemic immune responses.
CT26 adenocarcinoma cells were subcutaneously injected into mice. Control mice received B16-OVA melanoma cells or saline. The immune cells: dendritic cells, macrophages, T cells, (CD4+ and CD8+), and B cells were identified via flow cytometry at the tumour site (local immune response) and in the spleen (systemic immune response).

The systemic immune response to CT26 tumours was characterized by a higher frequency of dendritic cells, a lower frequency of T cells, and twice the proportion of CD4+ to CD8+ T cells, compared to mice given B16-OVA tumours (n = 14 (mice given B16-OVA tumours)-15 (mice given CT26 tumours), Mann Whitney, $P = 0.0016$, $P = 0.0366$, $P = 0.0001$). The intra-tumoural immune response to CT26 tumours had a reduced macrophage and T cell infiltrate compared to B16-OVA tumours (n = 14, Mann Whitney, $P = 0.0233$, $P = 0.0185$).

These data represent a baseline immune response to B16-OVA and CT26 tumours that will be used to investigate modulation caused by a therapeutic CRC vaccine. We have also identified immune cell populations likely to be involved in CRC compared to melanoma; these cells have also been shown to be important in human CRC. This work will help link animal models and human data, and help translate cancer therapeutics into treatments for human patients.

**Intermittent Hypoxia in Preterm and Term Infants in the First Year of Life: Effects on Growth and Measures of Heart Rate Variability**

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Angela Campbell (WellSleep, Department of Medicine, University of Otago, Wellington)  
Peter Larsen (Department of Surgery and Anaesthesia, University of Otago, Wellington)  
Dawn Elder (Department of Paediatrics and Child Health, University of Otago, Wellington)

Intermittent hypoxia (IH) is common in preterm infants who appear otherwise healthy and ready for neonatal discharge and have a normal mean oxygen saturation. Advanced oximeter technology facilitates documentation of IH with measurement of the desaturation index (DSI), the number of times the oxygen saturation drops by a nominated degree (e.g., at least 3% or 4%) per hour. We previously documented 24-hour oximetry in preterm infants before discharge
and found high DSI3% and DSI4% levels in these infants. Evidence from animal and human studies suggests that IH is associated with poorer weight gain, delayed development, and changes in heart rate variability. Episodes of IH appear to decrease in frequency by one month post discharge for preterm infants, and from one to three months of age in term infants. However, it is unclear whether this improvement plateaus to a level that can be considered normal as compared to healthy term infants. Also unknown is whether there are perinatal factors that can predict an increased risk of persistent IH.

The aim of this study is to determine the range, risk factors for and natural progression of IH in preterm infants during their hospital course, prior to discharge and throughout the first year of life and compare these data with oximetry from a group of healthy term infants.

The design is a multi-centre (Wellington, Hutt, and Hastings hospitals) longitudinal observational study. Data will be obtained via overnight oximetry measurements during hospitalisation for preterm infants, and at home throughout the first year of life for both preterm and term infants. ECG will be obtained for measures of HRV. Growth data will be obtained from WellChild records and the Ages and States Questionnaire will record developmental progress at one year. Recruitment will be targeted to ensure a mix of Māori and Pakeha infants.

Financial Adequacy in Retirement: a New Zealand Perspective

Jelita Noviarini & Helen Roberts
(Accountancy and Finance Department, University of Otago)
Andrew Coleman (Economics Department, University of Otago)
Rosalind Whiting (Accountancy and Finance Department, University of Otago)

This study investigates financial adequacy of older people in New Zealand. My analysis uses an income replacement rate method for panel data from the Survey of Family, Income, and Employment for the period 2002-2009. This research is the first to examine the effect of different housing treatments, rent imputation and asset liquidity on financial adequacy. The liquidation of residential housing is particularly important because of the large proportion of wealth invested by New Zealanders in housing (St John, 2007). The favourable tax treatment afforded to housing compared to other assets has made it a preferred form of investment. I use an income replacement rate method to assess financial adequacy and apply an adequate replacement rate of 70%,
within the range suggested by Scholz and Seshadri (2009). A comparison of full-liquidation, downsizing, and reverse mortgage housing liquidation treatments identifies a significant difference in financial adequacy. The inclusion of imputed rent highlights significant demographic differences (gender, race, region, living arrangements) and greater financial adequacy for homeowners compared to renters. Overall the analysis shows that the proportion of women who are financially adequate is greater than that of men. There are statistically significant differences between ethnicities. New Zealand Europeans and Asians have the greatest proportion of financially adequate individuals. Meanwhile Māori and Pasifika are the two ethnicities with the lowest proportion of financially adequate individuals. Individuals in the South Island, Waikato and the region “Rest of North Island” fare better than those in Auckland and Wellington for financial adequacy assuming downsizing or reverse mortgage scenarios. This difference becomes significant when imputed rent is included. The group that is most likely to be financially inadequate in retirement are those male individuals of Māori or Pasifika origins who rent multiple-dweller houses in Auckland or Wellington.


Third Molar Surgery Outcomes: A Choice Between Intravenous Sedation and General Anaesthetic

Soo-Wee Ong (Oral Diagnostics and Surgical Sciences, Faculty of Dentistry, University of Otago)

To research objective was to compare intravenous (IV) sedation and general anaesthesia (GA) for third molar surgery in terms of patient recovery, oral-health-related quality of life (OHRQoL), anxiety, patient choice and patient satisfaction.

A quasi-experimental study design was used, with a clinical convenience sample of patients requiring the removal of two mandibular third molar teeth (and aged between 16 and 35 years of age). Each participant consulted a
consultant oral and maxillofacial surgeon or one of their surgical trainees, and they were given a free choice between IV sedation and GA for their operation. Participants completed a questionnaire before surgery and again 10-14 days afterwards. Data collected before surgery included baseline sociodemographic characteristics, OHRQoL, anxiety, aspects of personality (positive and negative emotionality) and history of pain. Data collected after surgery included the severity of pain, time taken for recovery, OHRQoL, anxiety, and satisfaction with the surgery.

Of the 142 patients, 73 (51.4%) chose to have the operation under IV sedation and 69 (49.4%) underwent GA. Patients opting for GA scored more highly at baseline on negative affectivity and dental anxiety. After surgery, they reported taking more days off before returning to normal activities, as well as a higher incidence of sore throat and nausea.

Patients with negative affectivity and higher anxiety opt for third molar surgery carried out under GA but this results in more post-operative side-effects and days off.

‘You Can’t Hate Yourself Thin’

Katrin Ottley (Department of Psychological Medicine/National Addiction Centre, University of Otago)

Obesity is a major public health concern in the developed world. While our scientific understanding of the addictive component of excessive food intake and subsequent obesity is increasing rapidly, transference of these new insights into everyday clinical practice is still limited (Fraser et al., 2014). In light of this discrepancy research exploring the experience of food addiction recovery may be of benefit to researchers and health care providers alike.

Literature on obesity shows a prominence of relational concepts including self-concepts in people’s experience of recovery from obesity (Adams et al., 2013). Exploration of such concepts, for instance the notion of self-compassion and its role in food addiction, might further our understanding of the complex interactions of factors involved in recovery from food addiction.

Kia Akina is an obesity recovery programme providing addiction-orientated psychosocial support (Sellman et al., 2013). The notion of self-compassion is emphasised within some of the programme’s components.
This observational study aims at exploring the following questions in qualitative interviews:

- How do people with obesity experience their journey of recovery from obesity, and what, if anything, does Kia Akina add to this journey?
- Do perceptions of self-compassion change during participation in the Kia Akina program, and if so, how?

In addition, these quantitative questions will be explored:

- Do levels of self-compassion change throughout the recovery process?
- Is there an association between changing levels of self-compassion and weight loss during participation in the Kia Akina program?

Changes in levels of self-compassion will be determined using repeated measures t-test, and the relationship between weight-loss and self-compassion will be explored using regression statistics.

The presentation will focus on preliminary findings of the qualitative interviews, and emerging themes of obesity recovery as well as with regard to self-compassion will be discussed. Quantitative findings will be indicated.


**Leisure Activities and Well-being in Residential Care Centres**

*Myunik Panthi, Amanda Barusch & Bryndl Hohmann-Marriott (Department of Sociology, Gender and Social Work, University of Otago)*

The institutional placement of frail older adults often limits the opportunities for meaningful leisure opportunities and these adults are at the risk of loneliness, depression, boredom, passivity, isolation and decline in later life. The situation is often challenging to frail older adults with the high demand for care. Many studies have highlighted leisure activity as an important component of successful ageing. However, little has been done to explore the leisure life of older people in residential care centres.
This research aims to explore the leisure activities and well-being of older adults in residential care centres through a qualitative approach.

Triangulation was used, collecting the information from three components: participant observation, in-depth interviews and key informant interviews. The first set of interviews was with 24 residents and the second set of interviews was with 10 professionals responsible for activity planning, and finally, one-day observation in six different residential care facilities in Dunedin City.

The results suggest best practices for the design and implementation of leisure activities in different care facilities. Furthermore, they also highlight the reasons for participation and non-participation among the residents, importance of families, social ties and companionship in enhancing the social and emotional well-being.

This research contributes to an expansion of opportunities for older adults in residential care by exploring the individual story and guides policy makers, as well as the staff and managers of residential care facilities on developing leisure opportunities as per their interest and capacities.

**Blood Will Tell: Circulating Tumour DNA as a Clinical Diagnostic and Surveillance Tool for Cancer Patients in New Zealand**

*Sarah Parackal, Donghui Zou, Robert Day & Parry Guilford*

*(Department of Biochemistry, School of Biomedical Science, Centre for Translational Cancer Research, University of Otago)*

Cancer has one of the highest mortality and morbidity rates worldwide, with 8.2 million associated deaths in a single year and an expected two-fold increase in the number of new cancer cases in the following twenty years. This places a considerable strain on specialist health care services available to cancer patients such as PET/CT scans. Current research in precision medicine is being expanded for cancer diagnosis and surveillance through biological markers present in bodily fluids. Circulating tumour DNA (ctDNA) is one such biomarker and consists of short DNA fragments that are released from the primary tumour into the blood stream following cell death. Circulating DNA exists in all individuals as Cell Free DNA (cfDNA), the difference being ctDNA contains identical cancer mutations found in the primary tumour. Therefore, ctDNA provides molecular information on the tumour itself and the ability to detect cancer mutations directly from a routine blood sample. Regular examination of
the biomarker’s levels and mutation profile in a cancer patient would be indicative of the tumour’s response (or lack of) to specialised therapy. The overall aim of this research is to develop a standardised validated protocol for the analysis of ctDNA as a diagnostic and surveillance tool for cancer patients in the New Zealand setting. Cancer patients are currently being recruited and whole blood samples and archived tumour tissues are being collected. Circulating DNA is extracted from the plasma using a commercially available extraction kit and quantified to determine its concentration. Tumour tissue are profiled for the presence of specific cancer related mutations and these mutations are monitored in ctDNA blood samples using techniques such as Next Generation Sequencing and Droplet Digital PCR. Potential future applications of this technique include early stage cancer diagnosis, monitoring of treatment response and identification of metastatic relapse.

**SLC2A9 and Hyperuricemia: Identification of Population-specific Genetic Variants in New Zealand Māori and Pacific (Polynesian) People.**

*Padmini Parthasarathy & Tony Merriman*

*(Department of Biochemistry, University of Otago)*

Hyperuricemia (HU), elevated levels of serum urate, is a prerequisite for gouty arthritis. The *SLC2A9* gene that encodes a urate transporter tops the list of hyperuricemic genes [1]. It is a key genetic determinant of serum uric acid (SUA) levels and explains about 3% of SUA variance [2]. The *SLC2A9* locus was resequenced in approximately 800 individuals comprising hyperuricemic cases and normouricemic controls. Based on self-reported ancestry, the cohort was split into two subsets (Polynesian, n=440 and European, n=368). All Polynesians were from NZ while Europeans were from NZ and the United States. Association analysis was carried out to identify non-synonymous risk variants within the *SLC2A9* locus that confer risk for HU. Multiple adjusted logistic regression analysis was carried out using R. A total of 3964 variants were identified within the *SLC2A9* locus. Over a hundred variants were found to be significant in the Polynesian population (OR=0.10[0.01;0.88]-5.43[1.93;15.33], P<0.00028-0.049, MAF<sub>controls</sub>=0.014-0.535, MAF<sub>cases</sub>=0.002-0.546). Twenty five of these variants were found to be Polynesian-specific, eleven known and fourteen novel. These Polynesian-specific variants will be further analysed, annotated, and genotyped in a larger cohort as a continuation of this study.
These findings will aid in the identification of penetrant variants that could be applied in precision medicine and public health genomics.


Understanding Heart Rate Generation in Type 2 Diabetes

Sajida Parveen, Regis Lamberts & Peter Jones (Department of Physiology, School of Biomedical Sciences, HeartOtago, University of Otago)

Type 2 diabetic patients present an incompetence in heart rate regulation increasing their risk of life threatening arrhythmias. We recently found in vivo heart rate was comparable between type 2 diabetic rats and non-diabetic controls; however, intrinsic heart rate (i.e. rate without neuronal control) was decreased in diabetic animals. Why the intrinsic heart rate is different remains unknown.

Heart rate originates in the sinoatrial nodal cardiomyocytes located in the right atria, and is initiated by rhythmic oscillations in Ca\(^{2+}\) and other ions. Transient changes in these ions give rise to what are termed the Ca\(^{2+}\) and membrane clocks which combined set the heart rate. The Ca\(^{2+}\) clock primarily involves the intracellular Ca\(^{2+}\) store, the sarcoplasmic reticulum, and is mediated by a collection of ‘Ca\(^{2+}\)-handling’ proteins. The membrane clock involves various cell membrane ion transporters, enabling respective ion flux across the cell membrane. Heart rate is propagated to the rest of the heart via proteins known as connexins.

The aim of this study was to investigate whether a reduced intrinsic heart rate in diabetes is due to changes in the Ca\(^{2+}\) and/ or membrane clocks.

To this end, right atrial tissue has been isolated, fixed and sectioned. Martius scarlet blue histology stain was used to locate the sinoatrial node. Sinoatrial nodal cells stain purple and are embedded in blue connective tissue. Confirmation of sinoatrial node identification was performed using immunofluorescence. This was achieved by labelling a nodal specific ion channel as a positive marker and observing the lack of connexin 43 as a negative marker. To date, all Ca\(^{2+}\) clock and membrane clock proteins have
been optimised for immuno-fluorescence but no comparisons between diabetic and non-diabetic rats have been made. Presently in vivo and intrinsic heart rate recordings are being taken in diabetic and non-diabetic rats prior to atrial tissue isolation.

**Is The Hearing of Whales and Dolphins Fully Developed at Birth?: An Investigation of the Odontocete Inner Ear**

*Tiffany Plencner (Department of Marine Science, University of Otago)*

Sound is an essential component of toothed whale and dolphin (odontocete) biology. At the instant of birth, a dolphin must be prepared to navigate and communicate in order to reach the surface to breathe, find their mother to feed, and to avoid getting lost in their new environment. The advanced hearing-dependent activities of precocial calves lead us to believe that hearing is fully developed by birth, if not earlier. Nevertheless, there are few studies that have investigated cetacean ears from a developmental perspective. This thesis investigates the odontocete ear region (bones of the Tympanoperiotic Complex, TPC), with emphasis on the organ of hearing (cochlea) in the inner ear. We used X-rays and micro-CT scans to construct 3D cochlear models for four life stages (i.e. foetal, neonate, juvenile and adult) from four ecologically divergent species found in New Zealand waters, i.e. Hector’s dolphins (*Cephalorhynchus hectori*), bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), and Gray’s beaked whales (*Mesoplodon grayi*). Individuals from newborns to adults showed minimal differences in the size and shape of their cochlear canal. The only change in TPCs as a whole was a slight increase in earbone length with age. X-rayed early-term foetuses did not show a bony ossified ear region, but one late-term pilot whale foetus did have a bony TPC and cochlear canal of similar size and shape to the three other age groups. These results suggest rapid prenatal development of hearing structures and support the hypothesis that calves have full and complete hearing abilities at birth. Confirmed early and rapid development of the inner ear make cetaceans particularly vulnerable to noise disturbances. With noise pollution as a rising issue in modern oceans, the results of this study underscore how acoustic disturbance can impact even the youngest of individuals.
The Pathophysiological Role of MicroRNAs in Diabetic Cardiac Stem Cells

Nima Purvis, Rajesh Katare & Andrew Bahn (Department of Physiology, Otago School of Medical Sciences, University of Otago)

Cardiac stem cells (CSCs) have been implicated as the most suitable source of stem cells in regenerating the diseased heart. However, diabetes is known to cause a progressive loss in the number and functional efficacy of CSCs, thus posing a threat to the effectiveness of CSCs in stem cell therapy. The mechanism behind this loss is not clear, however some studies have shown that molecular regulators such as microRNAs may be involved in this process. MicroRNAs (miRs) are small, non-coding RNA molecules that regulate gene expression at the post-transcriptional level.

The aim of this study was to investigate whether CSC-derived miRs are differentially expressed in type-2 diabetic mice. RNA was extracted from CSCs which were isolated from type-2 diabetic (n=5) and non-diabetic (n=5) db/db mice. An nCounter miR expression assay (Nanostring Technologies) was performed to evaluate the expression of miRs within the CSCs. Among 601 miRs evaluated, the expression profiles of sixteen CSC-derived miRs were significantly altered (14 upregulated, 2 downregulated) in the diabetic condition. Compared to non-diabetic CSCs, miRs-329, -376c and -495 were significantly upregulated in diabetic CSCs by fold changes of 3.4 ± 0.6 (P=0.02), 3.9 ± 0.7 (P=0.01) and 2.3 ± 0.4 (P=0.02), respectively, while miR-30c was significantly downregulated in diabetic CSCs by a fold change of 0.4 ± 0.1 (P=0.02). The differential expression of these four miRs were validated with RT-PCR and western blots. Moreover, a luciferase assay showed that CDK6 and VDAC1 were direct targets for these miRs. The online tool, miRPath revealed that these miRs are involved in signalling pathways associated with cell proliferation, which correlated with their expression in diabetes. Our results suggest that altered miR expression may contribute to the reduced functional efficacy of CSCs in the diabetic heart by regulating cell proliferation.
Footwear and Running-Related Injuries: A Systematic Review of Current Footwear Assessment Methods

Codi Ramsey, David Baxter & Mandeep Kaur (Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago)
Peter Lamb (School of Physical Education, Recreation and Exercise Science, University of Otago)
Daniel Cury Ribeiro (Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago)

Footwear has played a dominant role in strategies to prevent overuse running-related injuries. These strategies have included the addition of thick cushioned midsoles, motion control devices, and a retreat to shoes with high flexibility and minimal cushioning. However, regardless of such approaches, injury rates have yet to recede; in fact they are increasing [1], despite running footwear being equipped with advanced technology. Previous studies have accentuated the need for consistent footwear reporting [2, 3] to provide comprehensive assessments of the effects of footwear on injury. This systematic review evaluates how footwear characteristics are assessed in studies of running-related injuries.

Five online databases (EMBASE, Medline, Science Direct, Scopus and Web of Science) were searched from inception to September 15, 2016 using any combination of the keywords and MeSH terms, run*, footwear, shoe*. The methodological quality of included articles was independently assessed by two raters using a modified Downs and Black checklist. Data were extracted regarding study and participant characteristics, footwear assessment tools used, footwear characteristics, and injury or pain outcomes reported in each article.

An initial search revealed 5813 articles. A total of 25 articles were included for qualitative synthesis in this review. Low risk of bias was determined for 12 (48%) of the included studies. Footwear characteristics were described in 68 instances across all studies. Among these, 50% (34) involved general shoe characteristics, such as fit, age, type, and materials. Fifteen different footwear assessments were found among included studies. Three assessments had been described by previous research. No studies included validity or reliability of the footwear assessments used.

Despite the range of footwear assessment tools reported in the literature, studies lacked consistent reporting of footwear characteristics. Additionally,
specific characteristics such as wear patterns and midsole hardness are reported less frequently than general footwear characteristics.


**Development of a Xenograft from Bovine Cancellous Bone**

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*(Department of Anatomy, University of Otago)*

*Michael Mucalo (Department of Chemistry, University of Waikato)*

*George Dias (Department of Anatomy, University of Otago)*

Two million bone-grafting procedures are performed worldwide annually. Although autografts still represent the gold standard, the donor site morbidity and the inherent limited availability are the main limitations. Allografts bear the risk of disease transmission. As alternatives, xenografts are widely used in the surgical field. The aim of this research is to develop a xenograft material (bovine hydroxyapatite) from New Zealand sourced bovine cancellous bone.

A variety of defatting and deproteination procedures was used to remove the organics from the bovine bone matrix. Chemical, physical, structural and thermal properties of the developed bone graft was characterised using different analytical techniques.

Fourier transform infrared spectroscopy confirmed the removal of organic matter from the bone matrix. X-ray diffraction analysis suggested that the processed bone corresponds characteristically to hydroxyapatite (HA). The bovine hydroxyapatite xenograft was porous and showed an interconnected porous architecture. Furthermore, the bovine hydroxyapatite scaffold showed excellent chemical and structural stability. The Ca/P mole ratio of the BHA was 1.58, which is comparable with commercially available natural hydroxyapatite-Endobon®. *In vitro* studies showed the bovine hydroxyapatite was biocompatible and supported the proliferative growth of Saos-2 osteoblast cells.
An easy, cost effective, and reproducible approach was used to develop a highly porous xenograft material from New Zealand sourced bovine cancellous bone, which has a potential as a scaffold material for bone replacement.

**On the Two Bodies of the Buddha in the Supreme Patriarch Pussadeva (Sa)’s *Pathamasambodhi: Interpretation and Devotion***

*Phra Akbordin Rattana*

*(Department of Theology and Religion, University of Otago)*

The *Pathamasambodhi* is an important Buddha biography, a live narrative popular in mainland Southeast Asia, and an inspiration behind South-east Asian art. In addition, the Supreme Patriarch Pussadeva (Sa) (1813-1899)’s *Pathamasambodhi* is a special version of the *Pathamasambodhi* texts because it is used as a sermonic text in Vesak ceremony, for commemorating the Buddha’s birth, enlightenment, and *Parinibbāna* (the final release from the round of rebirth), by Buddhist temples affiliated with *Dharmayuttika Nikāya*, a Thai Buddhist sect founded by King Rama IV (1804-1868) in the nineteenth century. Furthermore, the 10-Chapter edition of Pussadeva’s *Pathamasambodhi* is used in Thailand for teaching Buddhist laypeople who study at the elementary, intermediate, and advanced levels of Dhamma Study curriculum (T. หลักสูตรธรรมศึกษา) as well as Buddhist monks and novices who study at the elementary, intermediate, and advanced levels of Buddhist Scholar curriculum (T. หลักสูตรนักธรรม). Despite its importance, there are only a few scholarly works that mention Pussadeva’s *Pathamasambodhi*. Furthermore, Pussadeva’s *Pathamasambodhi*, which is written in Thai, has never been translated into English. This research in progress aims to offer the first English translation from Thai of the Jāti-*kathā* (the Nativity), the first chapter of the 10-Chapter edition of Pussadeva’s *Pathamasambodhi*.


Mapping Seasonal Snowpack with Drone Photogrammetry

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Pascal Sirguey (School of Surveying, University of Otago)

Nicolas Cullen & Sean Fitzsimons (Department of Geography, University of Otago)

Seasonal snow is highly variable in time and space. In New Zealand, persistent seasonal snow cover is largely confined to remote alpine areas, complicating ongoing in-situ measurement and characterisation of seasonal snow. The remote sensing age has seen significant progress in mapping of seasonal snow from space, yet satellite remote sensing approaches suffer from compromises in spatial and/or temporal resolution. Snow depth, which is beneficial for accurately determining snow water equivalent cannot be retrieved from optical satellite imagery. The potential of a remotely piloted aircraft system (RPAS) photogrammetry to address some of these limitations has been explored in a study basin located in the Pisa Range, Central Otago. Photogrammetric processing of captured imagery provided RGB ortho-mosaics and digital surface models (DSM) at 0.05 and 0.15 m spatial resolution respectively. Data acquired in autumn, when the study area was largely snow-free, provides a reference DSM, and subtracting this from winter (02/08/2016) and spring (10/09/2016) DSMs provides maps of snow depth for each epoch at 0.15 m spatial resolution. A vertical accuracy of ±~0.09 m (95% confidence level) was achieved for RPAS measured snow depths for both epochs. Validation of RPAS derived snow depth for spring was facilitated by a reference dataset of in situ snow probe measurements. Accuracy assessment and validation revealed the influence of geo-location uncertainty and vegetation-snowpack interactions on snow depth uncertainty and bias. While highlighting some of the limitations that accompany RPAS photogrammetry for surface and volume change analysis, this study demonstrates a repeatable means to produce accurate, spatially continuous, high resolution maps of snow depth for an entire hydrological basin. Insights into seasonal snow processes can now be provided at an unprecedented level of detail, contributing to improved understanding of controls on the spatial and temporal distribution of seasonal snow.
Conservation of New Zealand’s White-chinned Petrels: a Numbers and Distribution Story

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Graham Parker (Parker Conservation, Dunedin)
David Thompson (NIWA, Wellington)
Jon Waters & Bruce Robertson (Department of Zoology, University of Otago)

Globally, white-chinned petrels are the seabirds most affected by incidental mortality in fisheries. Three of their eight breeding islands are in New Zealand’s subantarctic, but information about New Zealand’s white-chinned petrel populations is almost completely lacking. Since this species remains a major part of fisheries bycatch in New Zealand waters, the information gaps pose serious challenges to conservation management. I focus on two main areas: estimating white-chinned petrel numbers in our region, and describing their at-sea distribution. We quantified the number of breeding birds in the Campbell and Auckland Island groups via whole-island surveys, habitat sampling and analyses that explicitly account for the problem of detection in dense subantarctic vegetation. White-chinned petrels from both island groups were tracked using 70 light-based archival loggers, deployed for at least a year. We produce the first quantitative population size estimates for the Auckland Island and Campbell Island breeding populations, establishing baselines for future monitoring. We show that New Zealand supports a larger proportion of the world’s white-chinned petrels than suspected. Tracking data from Auckland and Antipodes white-chinned petrels show that they mainly forage in New Zealand waters during the summer breeding season, then migrate 8–9,000 km to spend the winter in Peruvian, Chilean and international waters off South America. We show that these populations mostly segregate at sea, and thus each is exposed to different fisheries and fishing effort. These research areas are linked to discuss how small on-land studies can contribute to management of at-sea threats, in our back yard and internationally.
Obstructive sleep apnoea (OSA) affects 4% of adult males and 2% of females and is directly linked to diseases of lifestyle. The association between physical inactivity and OSA severity is well established, as are benefits of physical activity for health improvement. However, little is known about specific activity levels and barriers to activity in this population. The study aim was to determine physical activity levels in patients at risk of obstructive sleep apnoea.

Sixty participants were recruited from referrals to Dunedin Hospital Sleep Clinic; adults with an Epworth Sleepiness Scale score of ≥11 and other symptoms of obstructive sleep apnoea hypopnoea syndrome, awaiting an overnight sleep study to confirm a diagnosis of OSA. Each participant attended an individual appointment; anthropometric measurements were taken and standardised questionnaires completed. Data analysis entailed simple comparative and multivariate statistics, and direct comparison with World Health Organization physical activity guidelines.

Complete data sets were obtained for all participants. N=22 did not meet World Health Organization (WHO) guidelines for weekly physical activity and n=48 did not walk or bike for at least 10 minutes to get somewhere in a typical week. This physically inactive group demonstrated higher rates of hypertension, type 2 diabetes and obesity, and higher levels of sedentary behaviour. Of the total cohort, n=47 lacked motivation to exercise yet nearly all n=53 reported wanting to be more physically active.

Low levels of physical activity represent an additional risk factor in those at risk of OSA. WHO recommendations for physical activity levels were not met by over a third of participants. There was recognition of the benefits of being active but lack of motivation was a barrier. A need exists to support those at risk of OSA, through motivation and provision of physical activity programmes, to reduce cardiovascular and metabolic risk factors in this population.
The movie “Groundhog Day” is the best known example of a fictional representation of a repetitive situation. This movie has been thought to have certain ethical implications and has received a reasonable amount of public comment and at least a small amount of academic scrutiny in this regard. ¹ My interest was in why people should act differently if the circumstances are the same.

Repetitive situations in fiction and reality pose a problem for our view of the world and motivations to act, for a number of different reasons:

- Psychologically a common belief is that our level of motivation may be reduced repeated identical situations
- Metaphysically, as to whether such situations are physically and actually possible
- Epistemologically, in terms of when we should believe we are in such a situation
- Ethically as to how we and others should act in such a situation.

My research method has been to study fictional examples of repetitive situations in terms of what people have predicted would happen and contrast this against our documented knowledge of the physical world as to what would actually happen.

In order to make such predictions I have used accounts of conditions such as Transient Global Amnesia, which is where an otherwise healthy person suddenly develops amnesia with no known cause and begins repeating their statements and questions as they don’t remember having already made them.

I will focus on some findings of my research that have an impact on our physical understanding of the world.

¹ Abad Diana, Groundhog Day and the Good Life, Film-Philosophy 16.1, (2012)
Innate Lymphoid Cell Response to Vaccination Against Tuberculosis in Mice

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Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, remains a major threat to global health, claiming more lives annually than any other infectious disease. Though the attenuated strain of *Mycobacterium bovis* used to vaccinate neonates (Bacillus Calmette-Guérin; BCG) protects against the systemic forms of TB common in childhood, the vaccine is poorly protective against pulmonary TB in adults. Interestingly, BCG can protect against unrelated pathogens, and has been found to reduce neonatal all-cause mortality. These findings, together with the recent advances in our understanding of the memory-like properties induced in trained monocytes and NK cells in response to BCG, suggest that BCG is able to act on innate cells to mediate broad protection against pathogens. In light of failures to develop an improved vaccine against TB by targeting antigen-specific adaptive immune responses, it is important to understand how BCG activates innate immune responses. Using a mouse model of BCG vaccination, we found that in addition to natural killer cells, non-cytotoxic innate lymphoid cells (ILCs) increased in number in the lungs after vaccination, and were activated to produce IFN-γ spontaneously. The magnitude of ILC accumulation and number of ILCs producing cytokine depended on route of administration; intranasal vaccination resulted in a 5-fold increase of ILC1s and ILC3s in the lung at the height of immune response. By contrast intradermal BCG administration did not induce greater numbers of lung ILCs. We have developed a multi-colour cytometry panel to sort and further characterise BCG-induced lung ILCs, in order to determine whether these cells acquire memory-like properties after BCG vaccination and whether they contribute to protection against pulmonary mycobacterial infection.
Towards More Effective Alcohol Warning Labels: Applying Lessons from the Tobacco Evidence

Rahul Argha Sen, Kirsten Robertson & Leah Watkins
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Excessive alcohol consumption is a pressing public health problem that contributes significantly to the global burden of disease and injury. To address the overall burden of alcohol-related harm, there has been a substantial growth of prevention measures. One such strategy that offers a cost-effective way of reducing the negative consequences of drinking is the implementation of warning labels on alcoholic beverage containers. However, researchers have pointed out that alcohol warning labels are ineffective in their current form, and have suggested applying lessons from the tobacco health warnings literature to develop more effective alcohol warning labels. The success of graphic tobacco warnings is largely attributable to the fact that their message content is consistent with the recommendations of the fear appeal literature (Strahan et al., 2002), which suggest that fear appeals should highlight a significant and relevant threat, and a recommended action to reduce the threat, that is both effective and easy to accomplish (Witte & Allen, 2000). Moreover, warning labels on their own are likely to have only limited effects, and need to be supported by targeted integrated campaigns. Based on these recommendations, the present research is divided into three main studies that attempt to identify: (a) the perceived negative consequences of alcohol consumption that are relevant to beverage consumer subgroups, such as beer drinkers and wine drinkers; (b) The perceived efficacy of switching to lower alcohol beverages in order to avoid the salient negative consequences; (c) The psychographic characteristics (human values and personality traits) of these beverage consumer subgroups, to inform the development of targeted campaigns that may support warning labels. The first and third studies have identified novel insights using data from the 2013 New Zealand consumer lifestyles survey. The second study aims to use of a combination of surveys and focus group interviews to inform the efficacy component of alcohol warning messages.


The marine ecosystem is very diverse and its many interdependent life forms can have significant effects on both regional and global climate. Most importantly, phytoplankton, that forms the base of the marine food web, consumes CO$_2$ and affects the carbon cycle and global climate (Arrigo et al., 2008). These important oceanic microorganisms require major nutrients such as nitrogen, carbon, and phosphorus, as well as micronutrients (Bruland et al., 1991). These micronutrients are often trace metals, such as iron, manganese, zinc, copper, cobalt, nickel and cadmium, which can be toxic at high levels, but at low levels, are a biolimiting factor for phytoplankton growth (Bruland et al., 1991), notably in the Southern Ocean. Due to the different nutrient requirements of different phytoplankton species, trace metal levels can control both the amount of primary production as well as the species composition of the phytoplankton community (Bruland et al., 1991). This research focuses on determining the concentrations and distributions of trace metals in the Bellingshausen Sea, which is located in one of the regions that is effected most by climate change (Stammerjohn et al., 2012), in order to better understand the processes that drive or limit primary productivity in the climatically important Southern Ocean. The trace metal concentration in seawater is determined using a High Resolution Sector Field Inductively Coupled Mass Spectrometer (SF-ICP-MS) based multi-element method. The preliminary results on trace metal concentrations will be presented and discussed.


Association of Genetic Variants in Alpha1-Antitrypsin Encoded SERPINA1 Gene with Gout Risk in European and Polynesian Ancestral Groups

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Nicola Dalbeth (Department of Medicine, University of Auckland)  
Lisa Stamp (Department of Medicine, University of Otago, Christchurch)  
Tony Merriman (Department of Biochemistry, University of Otago, Dunedin)

Gout is an auto-inflammatory arthritis caused by deposition of crystallized monosodium urate in and around joints as a consequence of elevated serum urate levels (hyperuricemia). However, there are other factors that control progression from hyperuricemia to gout. Alpha-1 antitrypsin (AAT) encoded by serine protease inhibitor A1 (SERPINA1) gene is an abundant protease inhibitor in human. This is a hepatic acute phase protein whose expression increases dramatically in response to inflammation. In a recent study, reduced inflammation in an animal model of gout was observed after injection with AAT-IgG1-Fc. Previous genome wide association studies in Japanese and Swiss cohorts reported a significant correlation between SERPINA1 polymorphisms and AAT levels. The aim of our study was to test for association of these polymorphisms (rs12884390, rs28929474, rs11621961, rs4905197) with gout in Europeans and Polynesians. A total of 6268 clinically-ascertained gout cases and 14459 controls of seven populations of European ancestry including NZ Caucasian and NZ Māori/Pacific (Polynesian) ancestry were utilised. Taqman® genotyping was carried out, followed by multivariate-adjusted association analysis in R 3.2.2 with gout as the outcome. The T-allele of rs12884390 exhibited a significant association with gout in European (OR=0.912, P_{OR}=4.01×10^{-4}). However, the NZ Polynesian group did not show significant association of the rs12884390 T-allele with gout (OR= 0.99, P_{OR}=0.86). The rs11621961 minor allele also conferred a nominal association with gout in Polynesian (OR= 0.87, P_{OR}=0.05). This suggests a potential role for the SERPINA1 gene in the inflammatory process that leads to the development of gout.


**Teacherpreneurship: A Paradigm Shift Within the Digital Landscape of Higher Education**

*Farah Shawkat, Ben Daniel & Russell Butson*  
*(Higher Education Development Centre, University of Otago)*

The purpose of the study is to identify emerging innovative approaches to teaching in higher education in 21-st century in order to develop a new pedagogical concept: teacherpreneurship (Berry, 2011; Berry, Byrd, & Wieder, 2013). The changing role of university academics and their alignment with the contemporary concept of ‘knowledge workers’ (Davenport, 2008) offers an ideal opportunity to explore innovation within higher education. In this study, lecturers’ perceptions of pedagogical innovations will be aligned with the concept of teacherpreneurism. Perceptions of lecturers from research-led universities will be surveyed to investigate types of existing and futuristic methods of teaching such as the concept of teacherpreneurship and its relevance to the dynamic digital context of higher education. Different teaching scenarios will be evaluated in order to identify how lecturers are currently approaching teaching. Subsequently, these responses will be compared against the concept of teacherpreneurism to create better understanding of the changing digital ecosystem of higher education.


**Challenges of Nation Building in Indonesia**

*Budi Annisa Sidi (Department of Politics, University of Otago)*

Indonesia is one of the most diverse multicultural countries in the world. According to a national census in 2010, Indonesia is host to 1.128 ethnic groups with over 700 local languages and dialects within a territory spanning 5.120 km
from West to East. Indonesia’s national motto “Bhinneka Tunggal Ika”, written in ancient Sankrit, translates into “Unity in Diversity”.

Throughout history Indonesia has undergone several transformations from a Dutch colony to an independent state, from a federation to a unitary state, oscillating between democracy and authoritarianism. National identity in Indonesia keeps transforming along with this development. In the 1920s Indonesia seemed to be united against its colonisers, yet ideological, regional and religious conflicts continue to take place to the present day. Maintaining the balance between national unity and cultural diversity becomes a delicate task for Indonesia’s political leaders. Therefore it is important to examine the factors that contribute towards the maintenance of unity and those which challenge it. This is done using qualitative methods on historical sources such as political speeches, legislations, as well as buildings and monuments.

Initial findings show that despite continuous challenges towards nation building in Indonesia, respect for diversity, shared historical experience, the existence of a common threat, the perception of a common destiny and strong leadership have all contributed towards unity.

**Discovery World: Redevelopment Views from Staff**

*Daniel Solis (Centre for Science Communication and The Dodd-Walls Centre for Photonic and Quantum Technologies, Physics, University of Otago; Unidad Profesional Interdisciplinaria de Ingeniería Campus Zacatecas, Instituto Politécnico Nacional)*

*Nancy Longnecker (Centre for Science Communication, University of Otago)*

*David Hutchinson (The Dodd-Walls Centre for Photonic and Quantum Technologies, Physics, University of Otago)*

Discovery World, the science outreach centre at the Otago Museum, is undergoing a major redevelopment in 2017. My PhD is examining visitors’ science engagement and physics understanding in Discovery World. Special attention is paid to Discovery World’s Light Zone, a section sponsored by the Dodd-Walls Research Centre that is dedicated to the physics related to light and electromagnetism. Effectiveness of engagement and learning in the redeveloped Discovery World is likely to be related to how the redevelopment and new operation are visualized by staff (Dicks, 2013). The research discussed here focuses on views of staff behind the redevelopment and the running of Discovery World. To determine staff views about the redevelopment, I will
conduct semi-structured interviews (Seidman, 2013) in June 2017 with six to ten staff involved in the redevelopment (decision makers and designers), and six staff in contact with visitors (science communicators). Interviews will be audio-recorded and transcribed, which allows analysis through manual or software based coding (Saldaña, 2016). I will investigate whether staff share a vision of why, how and what to redevelop, as well as how they view science and science outreach. I will conduct follow-up interviews after the opening of the redeveloped Discovery World. Analysis of staff views will be compared with analysis of visitor experience. Preliminary results from staff interviews before the redevelopment of Discovery World will be discussed during this presentation.


Whānau Experiences of Adverse Perinatal Events

Kendall Stevenson (Department of Obstetrics and Gynaecology, University of Otago, Wellington)

Māori pregnant women and their children are more likely to be harmed and die than NZ European whānau (family). Compared to non-Māori babies, Māori babies are twice as likely to have a potentially preventable perinatal death (PMMRC, 2016). In 2014, the proportion of potentially avoidable perinatal deaths was higher for Māori, at a rate of 22% (PMMRC, 2016). In addition to death, Māori babies are admitted to a neonatal intensive care unit or special care neonatal unit more often. These disparities are unacceptable and contribute to life-long disabilities in physical, social and emotional well-being. Interventions to reduce these disparities are required to understand the lived realities of these young women. My current PhD project aims to work with whānau and build a platform of mātauranga Māori around childbirth, whānau wellbeing and health care in order to reduce the number of poor health outcomes our pēpi (babies) and whānau experience. The voices of whānau who go through the harm or loss of their baby need to be listened to so that their experiences can inform health system transformation. Interviews with ten whānau have been completed and the stories and experiences shared have
been collated and shared throughout the realms of the maternal-infant continuum. This presentation will share some of the common themes and findings within each realm, and outline how we can learn from these lived experiences to contribute towards improving the maternal healthcare system in Aotearoa New Zealand.


**Novel Bioactive Peptides from Sheep Cheese Whey Beta-lactoglobulin**

*Hannah Sunde & Alan Carne (Department of Biochemistry, University of Otago)*

Sheep cheese whey is an underutilised by-product of the cheese making process. Beta-lactoglobulin (β-Lg) comprises ~50% of the total whey protein and is reported to resist hydrolysis in the gut. Enriched β-Lg was obtained by ion exchange chromatography (Pilbrow et al., 2016). Hydrolysis of β-Lg with novel non-gut FDA approved proteases from fungal, plant and bacterial origin, generated varying patterns of protein hydrolysis. Hydrolysis of bovine β-Lg has been shown previously to generate bioactive peptides that have potential for use in food fortification. Differences in the amino acid sequence of ovine β-Lg compared to bovine, and the use of non-gut proteases with different hydrolytic specificities provides the potential for the generation of novel bioactive peptides from sheep β-Lg. Following hydrolysis of a protein, many of the bioactive peptides generated are typically short amino acid sequences that exhibit health promoting properties.

Incubation of ovine β-Lg with one of the fungal protease preparations caused extensive hydrolysis of the protein into peptides of 20 residues or smaller. Separation of the hydrolysate by RP-HPLC indicated fractions that had higher antioxidant bioactivity than others. Mass spectrometry analysis of peptide fractions and bioactive peptide information from the literature highlighting key sequences led to the selection of specific peptide sequences for synthesis, with the aim of correlating specific antioxidant and antihypertensive bioactivities with peptides of specific amino acid sequence.

Synthetic peptides were analysed for free radical scavenging antioxidant capability using an oxygen radical absorbance capacity (ORAC) assay (Davalos et al., 2004). Bioactivity analysis also included an anti-hypertensive (angiotensin converting enzyme, ACE inhibitor) assay (Jimsheena and Gowda,
This approach has identified novel peptide sequences exhibiting bioactivity and contributes further to understanding peptide sequence relationship to bioactivity. There is considerable potential to develop the use of β-Lg hydrolysates in food fortification especially health promoting applications.


From the Non-English Speaking Background Student Perspective: The Relevance of Completing a Bridging Program for Future Academic Success in Mainstream Academia

Jacqueline Tagg (Department of Education, University of Otago)

International students are important for Dunedin and the University Of Otago. Quality programs that are responsive to international students’ needs, therefore, are an extremely important factor when these students are choosing their study destination.

The University of Otago Language Centre offers an English for Academic Purposes bridging program called ‘English for Otago’ designed specifically for Non-English Speaking Background students who wish to enter mainstream academic studies at the University of Otago. The course content covers a variety of academic skills considered necessary for these students to succeed in their academic studies within a New Zealand tertiary arena.

The aim of this research is to look at Non English Speaking Background students’ perceptions of the English for Otago bridging program course content in relation to their first year academic studies at Otago, to find out which aspects of the course students find most useful and how they make sense of the academic skills they have learnt. There will be two phases for data gathering. Phase 1 will involve data gathering from research participants whilst they are enrolled in the English for Otago course. Phase 2 will follow the same research participants through to their first year of academic studies.
It is hoped that this research will inform educators’ understanding of Non English Speaking Background tertiary students’ experiences of teaching and learning at the University of Otago and facilitate improved learning outcomes for students within Otago’s bridging courses and mainstream academic programs.

The Terminal Patterning Gene Torso-like is an Essential Component of the Vitelline Membrane in the Wasp *Nasonia vitripennis*

*Shannon Taylor & Peter Dearden*  
*(Department of Biochemistry, University of Otago)*

All organisms turn their genetic material into mRNA molecules, which are then used as instructions to make proteins. In insects, early embryos have their body plans specified by a combination of maternally-provided RNAs and existing proteins. In the fruit fly *Drosophila melanogaster*, the ends of the embryo are specified using the protein Torso-like. In other insects, such as the honeybee (*Apis mellifera*) and the parasitic wasp (*Nasonia vitripennis*), maternal mRNAs are used instead. Interestingly, however, both the honeybee and parasitic wasp still have the gene for torso-like in their genomes despite not using it to determine where the ends of the embryo are, as is the case for the fruit fly.

Therefore, this research aims to determine the function of torso-like in *Nasonia*. To achieve this, Torso-like protein production was inhibited by RNA interference. mRNA expression distribution in *Nasonia* ovaries was examined in situ hybridisation. Protein expression in the embryos was imaged as they developed, using an antibody stain. Embryos with Torso-like production inhibited failed to develop beyond ~3 hours.

These developing embryos had poor eggshell integrity, as demonstrated by neutral red assay. Torso-like expression in ovaries is consistent with the protein being incorporated into the vitelline membrane, the innermost part of the eggshell. Therefore, my research suggests that torso-like is essential for vitelline membrane integrity in parasitic wasps, and its absence causes early embryo death.

A selective insecticide is being developed to target this gene's behaviour, to allow targeting of pest populations without harming organisms such as the honeybee. Better understanding the function of torso-like in insects such as *Nasonia* will ensure the pesticide is more effective and safe.
Microbial contamination of drinking-water supplies pose serious public health concerns and the enteric pathogens responsible are frequently detected in surface waters in New Zealand and overseas. Biomolecule-modified latex or silica particles provide a unique approach to safely assessing the transport behaviors and filtration removal of these pathogens through drinking-water treatment systems by mimicking pathogen surface properties.

The team from the Institute of Environmental Science and Research has previously developed surrogates that specifically mimic Cryptosporidium, rotavirus, and adenovirus. In this project, the Cryptosporidium surrogate is being trialed at a pilot-scale drinking-water treatment plant in Invercargill that uses rapid sand filtration - a common method for protozoan removal in NZ. Various filter media used by, or available to, water treatment plants are being tested for their efficiencies in removing Cryptosporidium. Additionally, a novel norovirus surrogate is currently being developed and validated. The viruses and their respective surrogates will be used to investigate efficiencies of virus removal in point-of-use filters commonly used in rural communities. A test rig was designed and built, and filter cartridges of different materials and pore sizes will be assessed for their effectiveness in virus removal.

This research will demonstrate the practicality and cost effectiveness of this surrogate technology, as well as make recommendations to implement preventive measures to reduce the risk of waterborne disease outbreaks in networked and non-networked drinking-water supplies.
Roberson Bay is a protected embayment west of Cape Adare on the northern Victoria Land margin. In 2015 the Korea Polar Research Institute collected a 573cm sediment core, GC57, from Robertson Bay at a water depth of 355 meters. Here, we present paleomagnetic results, pilot bulk sediment geochemistry, and initial diatom assemblage-based interpretations of Robertson Bay sea surface conditions since the mid-Holocene. GC57 is characterized by a diverse assemblage of well-preserved diatoms, predominantly sea ice affiliated species such as Fragilariopsis curta, F. obliquecostata, Thalassiosira tumida, and Actinocyclus actinochilus. Whole-core magnetic susceptibility averages 135 (SI x 10^-5) in the upper portion of the core, increasing to an average susceptibility of 175 below 471m cmbsf. Using diatom assemblages, sediment geochemistry, and the magnetic properties of GC57 to reconstruct the paleoenvironment, we aim to explore the relationship between sea ice, primary productivity, ocean stratification and circulation, and seasonality at the interface between the East Antarctic Ice Sheet, the Ross Sea, and the Southern Ocean. When complete, this reconstruction of Holocene paleoenvironmental change will be integrated with results from an international group of collaborators as part of a broader project to identify drivers of Antarctic climate dynamics during intervals of rapid change.
There are many stories buried in the dark corners of Aotearoa New Zealand’s history where the practice of solving the social ‘problem’ of illegitimacy saw approximately 80,000 children (Griffith, 1998) given up for adoption during the ‘closed stranger’ adoption period 1955-1985 (Else, 1991). These adoptions have caused much joy as well as much heartache for all involved in the adoption experience. Adoption affects all members of all families in this act, the birth parents, the adopting parents and their respective wider family members of siblings, aunties, uncles, grandparents and of course the child.

Many of these children were indigenous to Aotearoa and could claim Māori ancestry through at least one of their birth parents. When these children’s birth records were sealed, all evidence that may have connected them to their ancestral family was removed. This work aims to share the unique experiences of Māori adoptees and their children, whose life journeys were shaped by the act of adoption and their quest to connect or not to connect with their cultural heritage.

These stories and journeys will be heard and listened to and will be considered as life long events that began at birth and have continued on well into parent and grand-parenthood. Consideration will be made of the next generation/s, by including their voices in these stories, as the act of adoption has been intergenerational, where adoptees may have sought the cultural education of one’s self and identity as Māori.

A qualitative methodology and Māori-centered approach is being used to carry out this work with kanohi ki te kanohi (face to face) in-depth interviews to gather information and stories from Māori adoptees, and, where possible, their children and grandchildren.


In the twenty-first century, political actors aim to shape the meaning of the international order. This process can be described as a battle of narratives, where state and non-state actors share and contest ideas of order, identity and policy issues. The rise of the BRICS powers, comprising of Brazil, Russia, India, China and South Africa, brought significant impulse to the battle. The BRICS group institutionalized their cooperation in 2009 despite the differences between these emerging market economies. Since then, these rising powers are actively engaged in horizontal cooperation to foster a more democratic and just multipolar world order. The theoretical concept strategic narratives explores the intersection between international relations and communication and illuminates how political actors give meaning to events about the past, present and the future to shape behavior of domestic and international audiences. This presentation evaluates how the strategic narratives of the BRICS make sense by adopting a documentary analysis of BRICS joint communiqués. These political texts contain aspirations and objectives about global governance, peace, and international development amongst others. The narrative inquiry contains a three-step model: first it examines the narrative components (context); second it identifies strategic narratives and emplotment (assembly of events into a narrative and plot); and third it critically analyzes the findings by using a narrative grammar (to answer the how question). The evidence from this study suggests that the BRICS grouping failed to form coherent and persuasive narratives.
Social Change and its Impact on Health at the Late Iron Age Site of Non Ban Jak, Northeast Thailand

Stacey Ward, Sian Halcrow & Hallie Buckley (Department of Anatomy, School of Biomedical Sciences, University of Otago)

Charles Higham (Department of Anthropology and Archaeology, University of Otago)

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A recent reassessment of the timing of social and technological developments in northeast Thailand has revealed that these changes occurred rapidly and relatively late in the region. In particular, major social changes including a shift to a hierarchical mode of social organisation and the putative development of social inequality, have been identified within the Iron Age (500 BCE – 500 CE). Multidisciplinary research conducted elsewhere in the world has demonstrated the negative health effects resulting from the development of social inequality, but the impact that this change had on the health of prehistoric people of northeast Thailand is as yet poorly understood. This paper outlines the preliminary findings of PhD research being conducted on the human skeletal remains from Non Ban Jak in northeast Thailand. This research is part of a larger interdisciplinary study on this late Iron Age site and aims to identify and qualify social change and its effects on physiological stress and health from a biocultural theoretical perspective. Physiological stress is investigated through analyses of long bone length and dental enamel defects in a sample of 196 adults and subadults. Geographic Information System analyses of the spatial patterning of burials and archaeological analyses of mortuary goods are used to identify different social groups within the site. It is expected that there will be variation in stress levels and the type of material culture associated with each group, indicating social inequality. In particular, it is predicted that the prestige value of the mortuary goods variations will correlate with variations in skeletal stress, and this relationship is predicted to fluctuate over time. These fluctuations may represent the shifting social status of each group within a flexible form of hierarchy.
Talking About It

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Suicide has been, and continues to be, a critical matter in Aotearoa. Literature and statistics share a consistent and disturbing theme regarding youth suicide in Aotearoa/New Zealand, this being that our youth are killing themselves at high rates. A further disturbing and consistent theme shows that suicide rates for Māori have, since the mid 1990s, surpassed that of non-Māori. Research in the area of suicide with Māori, particularly Rangatahi (Māori young people), requires a shift in methodological focus. It requires an approach that allows true narratives to emerge through asking the hard questions and listening to the hard answers. A narrative enquiry of Rangatahi and whanau (family/extended family) was the scope of a research project undertaken in Otepoti (Dunedin), Aotearoa/New Zealand where interviews were conducted with those who had attempted suicide or who were whanau bereaved by suicide. The aim of the study was to hear perceptions of why Rangatahi engage with suicide and to hear whanau perceptions of what could be response strategies to aid in alleviating youth suicide. Integral to the research was the obligation to realistically address whanau and Rangatahi needs. How do whanau take up the wero (challenge) of alleviating youth suicide? Findings suggest that intersecting oppressions play a role in both whanau perceptions of why Rangatahi engage with suicide and whanau perceptions of response strategies at a whanau grassroots level. Alleviation of suicide with Māori requires a recognition of the diversity of being Māori, alternative research/approaches to alleviating suicide with Māori, and a paradigm shift in regards to open dialogue around.

Divided Together: Civilizations and Alignment in World Politics

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Are countries that share a civilization more or less likely to align with each other? Contrary to expectations, preliminary results of standard quantitative modelling are that civilizational match has a negative and only moderately significant effect on the probability of political alignment between countries. After controlling for other classic explanations of alliance formation, there is no
evidence that civilizational match is determinative of political alignment. Further, when decomposed into constituent characteristics (shared language, shared religion), civilizational factors remain insignificant. These quantitative findings are discussed in detail and then buttressed by a brief description of intra-Islamic fissures in the Middle East. Here, the focus is on the fault-lines of the Sunni-Shia conflict: Iraq, Syria, Bahrain, Yemen, and Lebanon. My discussion of the Middle East emphasizes the division rather than the coalescence of countries that fall under the same civilizational – Islamic – rubric. The idea that countries which share civilizational traits, though intuitively appealing, comes up short in empirical testing. These findings when set alongside the work of other scholars reveal a reality on the ground at odds with the ‘kin rallying’ phenomena popularized in Huntingdon’s ‘clash of civilization’ thesis.

**Association of Earthquake Stressors with Stress Sensitivity and Schizotypy**

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New Zealand’s recent earthquake history has prompted concern about the impact of natural disasters on health and wellbeing. Post-traumatic psychopathology is common among earthquake survivors, with stress sensitisation proposed to play a role in the development of these disorders. Increased stress sensitivity is also associated with schizotypy and schizophrenia risk, and has more recently emerged as a mediator between schizotypy and known risk factors. Schizotypy is a latent psychological organisation, with varying levels of severity and persistence across a range of symptoms, thought to represent schizophrenia risk. To investigate the relationship between earthquake exposure and schizotypy, undergraduate psychology students (n = 268) reported general demographics and earthquake exposure, and completed a series of questionnaires measuring schizotypy and stress sensitivity. As predicted, higher levels of self-reported distress as the result of an earthquake, and exposure to a greater number of objective earthquake-related stressors, were associated with higher scores on measures of schizotypy. This relationship was strongest for cognitive-perceptual schizotypy, and was mediated by an increased sensitivity to stressors across all subscales. These findings add to the growing body of research surrounding the relationship between schizotypy and stress sensitivity. Implications for earthquake exposed individuals, and those involved with rebuild and recovery efforts are discussed.
Growth Attenuation Therapy for Children with Severe Physical and Cognitive Disability: Practice & Perspectives of New Zealand Paediatricians

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In 2006, a girl with severe disability in the United States of America was treated with growth attenuation therapy (GAT) so that she would stay at a size at which family activities remained possible; since then over 100 children worldwide have received GAT. GAT generally involves the administration of supraphysiological amounts of oestrogen to cause premature maturation of growth plates, resulting in a degree of reduced final adult height. There are currently no official guidelines concerning the administration of GAT for children with both severe physical and cognitive disability in New Zealand (NZ). This study aimed to explore the attitudes of paediatricians towards GAT and the frequency of requests and initiation of GAT in NZ. The study involved undertaking an online survey of NZ paediatricians. Survey questions covered both clinical experience with GAT and attitudes towards it.

Overall the response rate was 55% (173/317) with 162 complete responses. Around 25% of respondents (41/166) reported enquiries about GAT. Five had personally prescribed GAT; in total six NZ children have undergone GAT. Around 77% of respondents either believed GAT is appropriate or were neutral on the subject, but only 18% thought GAT should be routinely offered for children with severe disability. The majority of responders (59%) believed ethical approval should be obtained as part of preparation for GAT.

This is the first study to investigate attitudes and practices of NZ paediatricians regarding GAT for severely disabled children. Results indicate a range of views but suggest that family requests for GAT do occur and that the majority of paediatricians are not opposed to GAT in the appropriate ethical and clinical context. The development of practice guidelines for administration of GAT is much needed and may lead to a more informed decision-making process about GAT for families and paediatricians.
Despite the fact that many advances have been made in ovarian cancer (OC) research and therapy, OC remains one of the deadliest gynaecological malignancies worldwide. The majority of OC patients are diagnosed in the late stages (III or IV) of the disease, when the five-year survival rate falls below 20%. A common hallmark of established disease is the build up of ascitic fluid in the patients’ peritoneal cavity. This excess accumulation of extracellular fluid is associated with tumour progression and peritoneal spread of OC cells. One of the most constitutively activated pathways in OC is the Janus Kinase (JAK) and Signal Transducer and Activator of Transcription (STAT) pathway (Wen et al., 2014). It has been suggested that interleukin-6 (IL-6) mediated activation of STAT3 (IL-6/JAK/STAT3) is a primary pathway activated during ovarian tumorigenesis (Kumar et al., 2014). In this project, we aim to investigate the effects of small molecule JAK inhibitor (Ruxolitinib) on ovarian cancer cell growth and invasion using in vitro and in vivo studies. In preliminary studies, we used immunohistochemistry to demonstrate the expression of JAKs (JAK1, JAK2, JAK3 and TYK2), STAT3 and its activated form (pSTAT3) in ovarian tumour and normal ovarian tissue in the presence and absence of ascites. In addition, we used immunohistochemistry to examine JAK/STAT protein expression in four OC cell lines (SKOV3, OVCAR5, OVCAR8 and ID8). Qualitative assessment showed differential expression of JAKs in the OC cell lines studied. Ongoing studies will investigate targeted inhibition of the JAK/STAT pathway using 3D cell culture experiments and animal models.


Numerous studies have examined media portrayals of Muslim women in the western news media. Among these studies, very few have examined the representation of feminist Muslim women, particularly women in Islamic nations. This study explores one such form of feminism – Islamic feminism. This paper aims to critically analyse the online Malaysian media reporting of the case of a fatwa (religious doctrine) against the Sisters in Islam (SIS), for supposedly deviating from the teaching of Islam and the Malaysian religious council. The SIS are a prominent Islamic feminist organisation, who profess religious liberalism and pluralism, and they, as can be expected, have challenged this fatwa and filed for a judicial review in the high court of Malaysia. The ongoing court case has brought about wide online news media coverage in both the vernacular and the English press. This paper employs a qualitative narrative analysis to examine this coverage, specifically narratives related to Islam and gender. Two seemingly contradicting narratives emerged in my analysis. First, in the vernacular press, the SIS are framed through narratives of the religious traitor. They are constructed as a threat to Islamic fundamentalism. Second, in the English press, a form of the narrative of the heroine emerges. Here the SIS are constructed as champions of Muslim women’s rights, but in a measured form. The English news media does not endorse the fatwa against SIS explicitly, however, it also does not challenge the voice of fundamentalist religious power. The narrative analysis thus reveals that even though measured support for the Sisters in Islam can be found, Islamic fundamentalism remains, profoundly and worryingly, untouched.

Chinese Swordsman Poetry Nurtured by Confucianism, Taoism, and Mohism

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Chinese swordsmen (Xia), as poetic and fictional figures, enjoy everlasting popularity among Chinese readers. They were not only frequently depicted as chivalrous heroes in traditional poetry and fiction, but also became independent genres of China’s contemporary popular literature and films. In
some idealist minds, swordsmen are upholders of justice. However, such “justice” differs greatly from the justice in a legal sense. In fact, swordsmen, majorly originated from two schools, Confucians (Ru Xia) and Mohists (Mo Xia), had long been denounced a major cause of social disorders by Legalist philosophers since the 3rd century BC, and finally they were virtually eliminated as a social class by Feudalist rulers in about the 2nd century AD. Being a self-contrasting combination, swordsmen have made contradictory impressions on readers of Chinese literature and on those of ancient Chinese history, and the contradiction tends to cause confusion when readers try to sort out the literary figures from the historical and societal prototypes. Therefore, while analysing and interpreting specific Chinese swordsman poems, this paper attempts to disclose possible hidden threads connecting the two ends — from swordsmen as “vermin” (Han Feizi, d. 233BCE) to swordsmen as poetic heroes idealised and glamorised. This is done by revealing class tensions between the rulers and the commons in Feudalist China, both in times of stability and during social turmoil, and by retrieving the philosophical and moral origins of swordsmen virtues, like Confucian “to give up life for righteousness”, Mohist “Jian Ai (‘impartial caring’ or ‘universal love’)” and Zhuangzi’s “Xiao Yao (carefree wandering)” and “to forget one another in the rivers and lakes”.

**Mindfulness for Advanced Cancer**

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Supportive care for people affected by cancer is recognized as a priority for research but there is little solid evidence of effectiveness of psychological treatments for those with advanced cancer. The literature suggests that mindfulness-based interventions may be acceptable and beneficial for this population. This study aims to develop a mindfulness intervention to provide emotional support for the population with advanced cancer. The treatment package includes mindfulness meditation, developing an acceptance attitude and reflections on meaning in life.

This study design is a one-group pre-post test with a mixed methods approach. Participants are recruited through public and private hospitals in Christchurch.
Quantitative measures are The Acceptance and Action Questionnaire II, Mindful Coping Scale and, the Meaning in Life Questionnaire.

Qualitative semi-structured interviews enquire about emotional support before and after the diagnosis, participants’ thoughts about meaning in life, expectations and reflections on the mindfulness training. Qualitative data will be analysed using thematic analysis.

Treatment consists of one to one 30 minute sessions weekly for 4 weeks using a pre-recorded CD/podcast of the mindfulness training.

This project is currently underway. The presenter will provide preliminary data on the acceptability of the mindfulness training package being delivered to participants along with the recruitment strategies. We anticipate that this novel treatment used as a self-management tool will reduce psychological distress and enable better coping for patients with advanced cancer.
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