5th Griffith University ECR Cross-Institute Symposium

BUILDING BRIDGES IN SCIENCE AND HEALTH

Wed 16th April 2025
9:00 am – 5:30 pm

Griffith University
Gold Coast Campus G40 (Level 5) Theatre
Parklands Dr, Southport, Queensland,
Australia

Information about Griffith University ECR Cross-Institute Symposium and the program booklet is available at www.gcisymp.org

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ACKNOWLEDGEMENTS

Griffith University acknowledges the Traditional Custodians of the land on which we are meeting and pays respect to the Elders, past and present, and extends that respect to all Aboriginal and Torres Strait Islander people.

The 5th Griffith University Early Career Researcher Cross-Institute Symposium organising committee would like to extend their thanks to the Griffith staff and students for their participation and willingness to showcase their work as well as to the judges for their fair and careful analyses of the research presented throughout the day – thank you.

Finally, we would like to take a moment to acknowledge and extend our thanks to Satorius, John Morris Group, Miltenyi Biotec, PragonCare LabGear, Pathtech, AGRF, and Millennium Science, who have kindly provided financial support for this event. We would like to thank Griffith University for providing the venue.

We are extremely grateful for all the support received. Without your support, we would not be able to host the event and provide lunches, tea breaks, awards and post-event celebrations.

THANK YOU

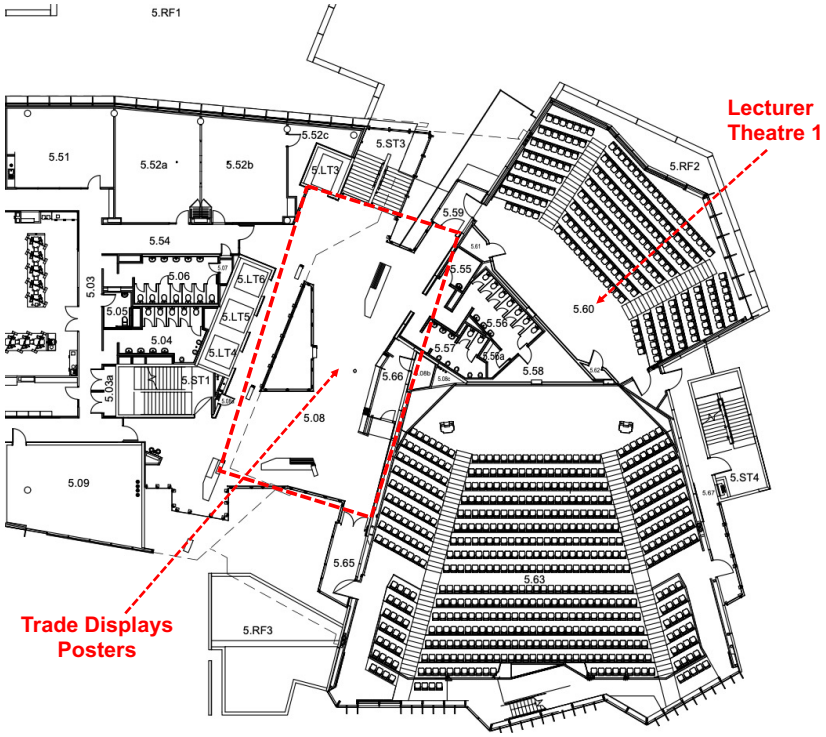
THE ORGANISING COMMITTE

- Dr Yun Shi (IBG): y.shi@griffith.edu.au
- Dr Miaomiao Liu (Sciences): miaomiao.liu@griffith.edu.au
- Dr Megha Mohan (IBG): m.mohan@griffith.edu.au
- Dr Xiaying Qi (Health): xiaying.qi@griffith.edu.au
- Dr Biswa Prasanna Mishra (IBG): b.mishra@griffith.edu.au
- Dr Haotian Cha (Sciences): h.cha@griffith.edu.au
- Dr Ju Jin (IBG): ju.jin@griffith.edu.au
- Dr Yuqing Mu (Health): yuqing.mu@griffith.edu.au
- Dr Jamila Iqbal (IBG): j.iqbal@griffith.edu.au
- Mr Patrick Tang (Health): patrickchunhean.tang@griffith.edu.au
- Ms Jiaying Liu (Health): jiaying.liu3@griffithuni.edu.au

MAP

BUILDING

VENUE



Program

8:30 - 9:00	***Registration***	
9:00 - 9:10	***Opening and Introduction***	
Session 1	***Chairs: Dr Megha Mohan and A/Prof Adele Pavlidis***	
9:10 - 9:45	**Keynote Lecture** Dr Courtney McDonald The Ritchie Centre, Hudson Institute of Medical Research, Monash University Email: courtney.mcdonald@hudson.org.au	Umbilical cord blood cells for perinatal neuroprotection: Bench-to-bedside and back to bench
9:45 - 10:00	**Oral #1** Dr Jessie Mitchell The Hopkins Centre Email: jessie.mitchell@griffith.edu.au	Personalised pathways to sustained employment: Perspectives of employees with acquired brain or spinal cord injury and other relevant stakeholders
10:00 - 10:15	**Oral #2** Dr Hannah Adler Humanities, Languages, and Social Science Email: h.adler@griffith.edu.au	Working in interdisciplinary teams: The value of collaboration for research impact
10:15 - 10:30	**Oral #3** Dr Henry-James Meiring Griffith Centre for Social and Cultural Research Email: h.meiring@griffith.edu.au	Piratical Knowledge in the Age of Darwin
10:30 - 11:00	***Morning tea***	
Session 2	***Chairs: Dr Ju Jin and Mr Patrick Tang***	
11:00 - 11:15	**Oral #4** Dr Kiran Thapaliya National Centre for Neuroimmunology and Emerging Diseases Email: k.thapaliya@griffith.edu.au	COVID-19's Lasting Impact: Brain Changes Revealed by Multi-Modal MRI
11:15 - 11:30	**Oral #5** Dr Kelsey Chapman School of Health Science and Social Work, Inclusive Futures Email: k.chapman@griffith.edu.au	Co-designing a dignity model: Enhancing healthcare experiences for people with disability
11:30 - 11:45	**Oral #6** Dr Jyotsna Rimal School of Medicine and Dentistry Email: j.rimal@griffith.edu.au	Addressing social accountability of medical programs in Australia and Nepal: Report from case studies
11:45 - 12:00	**Oral #7** Dr Yady Senayda Garcia Castillo Institute for Biomedicine and Glycomics Email: y.garciacastillo@griffith.edu.au	Structural and ion dynamics study of interfaces formed in solid-state electrolyte composites of an organic plastic crystal and polymer nanoparticles
12:00 - 12:15	**Oral #8** A/Prof. Claudio Pizzolato Australian Centre for Precision Health and Technology (PRECISE) Email: c.pizzolato@griffith.edu.au	BioSpine: non-invasive digital twin controlled BCI-FES-VR leg-cycling ergometer intervention recovers sensorimotor function in individuals with complete spinal cord injury.
12:15 – 13:45	***Group Photo, Lunch, and Poster session 1 Poster #1 – Poster #10***	

Session 3	***Chairs: Dr Ailin Lepletier and Dr Biswa Prasanna Mishra***	
13:45 - 14:00	**Oral #9** Mr Erwan Bremaud Institute for Biomedicine and Glycomics Email: erwan.bremaud@griffithuni.edu.au	Calcium-Phosphate Bridges Support Protein-Complex Formation during HIV Assembly
14:00 - 14:15	**Oral #10** Mx Madeleine Rogers Institute for Biomedicine and Glycomics Email: maddy.rogers@griffith.edu.au	Cracking the egg: Discovery and characterisation of distinct nonvesicular extracellular particles from Schistosoma mansoni eggs
14:15 - 14:30	**Oral #11** Dr Michael Norwood The Hopkins Centre Email: m.norwood@griffith.edu.au	How Your Environment Impacts Mental Health, Behaviour, and Learning in Schools, Hospitals, and Beyond: Introducing the Brain and Enriched Environment Lab (BEEhive)
14:30 - 14:45	**Oral #12** Mr Plabon Das Institute for Biomedicine and Glycomics Email: plabon.das@griffithuni.edu.au	Unveiling host glycome remodelling upon parainfluenza virus infection using Mass spectrometry
14:45 - 15:00	**Oral #13** Dr Natalie Eaton-Fitch National Centre for Neuroimmunology and Emerging Diseases Email: n.eaton-fitch@griffith.edu.au	Immune Exhaustion in Australians with Gulf War Illness
15:00 – 15:45	***Afternoon Tea and Poster Session 2*** ***Poster #11 – Poster #20***	
Session 4	***Chairs: Dr Miaomiao Liu and Dr Yun Shi***	
15:45 - 16:00	**Oral #14** Ms Akansha Bhatt Institute for Biomedicine and Glycomics Email: akansha.bhatt@griffithuni.edu.au	Structural basis of NMNAT2 degradation in axons
16:00 - 16:15	**Oral #15** Dr Audra Shadforth School of Environment and Science Email: a.shadforth@griffith.edu.au	Towards the creation of a bioengineered choroid for new treatments of macular degeneration
16:15 - 16:30	**Oral #16** Dr Sarah McAtamney Office for Research Email: s.mcatamney@griffith.edu.au	Research Infrastructure: an essential partner in your research success at Griffith
16:30 - 17:15	***Career Development Forum*** Host: Dr Yun Shi Panel guests: Dr Courtney McDonald, Dr Sarah McAtamney, Dr William Gee, A/Prof Claudio Pizzolato	
17:15 – 17:30	***Closing and Prizes***	
17:30 – 20:00	***Social networking (Uni Bar)***	

Poster presentations

P1 - Seeing is Believing: Bridging Cognition and CNNs for Contrastive Concept Explanation with Axiomatic Foundations
Mr Ugochukwu Akpudo
School of Engineering and Built Environment
ugochukwu.akpudo@griffithuni.edu.au

P2 - Engineered airborne particles via electrospray for pulmonary drug delivery
Mr Hoai Duc Wu
School of Engineering and Built Environment
duc.vu2@griffithuni.edu.au

P3 - Whole Genome Analysis Sheds Light on the Jewish Diaspora
Ms Alexandra Bubniak
School of Environment and Science
alexandra.bubniak@griffithuni.edu.au

P4 - Anthocyanins in Asthma: Targeting Chronic Inflammation and Airway Remodeling
Ms Madiha Ajaz
School of Pharmacy and Medical Sciences
madiha.ajaz@griffithuni.edu.au

P5 - Strengthening Indigenous Children: Developing a Novel Multi-Component Engineered OMV-Based Vaccine for the Prevention of Ear Infections
Ms Ayesha Zahid
Institute for Biomedicine and Glycomics
a.zahid@griffith.edu.au

P6 - Development of a High-Resolution, Automated Method for Spatial Glycoproteomics Mapping
Mrs Habeebah Olufe Owolabi
Institute for Biomedicine and Glycomics
habeebah.owolabi@griffithuni.edu.au

P7 - The effect of TRPM3 ion channel dysfunction on organelle Ca^{2+} signalling in natural killer cells of people with Mylagic Encephalomyelitis/Chronic Fatigue Syndrome
Ms Chandi T Magawa
National Centre for Neuroimmunology and Emerging Diseases
c.magawa@griffith.edu.au

P8 - Using One Stone to Kill Three Birds: RNAi technology showed Promising Anti-viral Activity Against Respiratory Viruses of Pandemic Potential
Mr Victor Baba Oti
Institute for Biomedicine and Glycomics/School of Pharmacy and Medical Sciences
victor.oti@griffithuni.edu.au

P9 - Hyperspectral imaging predicts macadamia nut-in-shell and kernel moisture using machine vision and learning tools
Dr Michael Farrar
School of Environment and Science
m.farrar@griffith.edu.au

P10 - A Simulation Game of Climate and Mosquito-Borne Diseases
Mr Sebastian Bernal-Garcia
School of Engineering and Built Environment
sebastian.bernalgarcia@griffithuni.edu.au

P11 - Natural killer cell cytotoxicity function in Gulf war illness patients: a longitudinal investigation
Ms Jessica Dwyer
School of Pharmacy and Medical Sciences
jessica.dwyer@griffith.edu.au

P12 - Mapping the Future of Sustainable Construction: A Review on Digitalization and Life Cycle Assessment Trends
Mrs Evelyn Liew Fui Lau
School of Engineering and Built Environment
evelyn.liew@griffithuni.edu.au

P13 - Bacterial bodyguards: Characterising the virus-repressing effect of Wolbachia in Drosophila melanogaster using NMR-based metabolomics
Ms Sarah Walsh
Institute for Biomedicine and Glycomics
sarah.walsh3@griffithuni.edu.au

P14 - Quinacrine an Anti-Prion Drug Targeting Prion-like p53 in Breast Cancer
Mrs Memoona Zahra
School of Pharmacy and Medical Sciences
mehmoona.zahra@griffithuni.edu.au

P15 - Analysing BOLD signal intensities in Long COVID-19 patients using 7T MRI
Ms Maira Inderyas
School of Pharmacy and Medical Sciences
maira.inderyas@griffithuni.edu.au

P16 - Health behaviours are significant predictors of psychosomatic symptoms among adolescents: Insights from school-based surveys in 47 countries
Mr Satyajit Kundu
School of Medicine and Dentistry
satyajit.kundu@griffithuni.edu.au

P17 - The Promising Role of an Immunotherapeutic Cancer Vaccine Against Non-Small Cell Lung Carcinoma
Ms Muneera Anwer
School of Pharmacy and Medical Sciences
m.anwer@griffith.edu.au

P18 - Implantable flexible silicon carbide electrode for long-term cancer cells sensing and stimulation applications
Mr Minh Anh Huynh
School of Engineering and Built Environment
minhanh.huynh@griffithuni.edu.au

P19 - Discovery of *Mycobacterium smegmatis* IspD Ligands from Natural Products by A Collision-Induced Affinity Selection Mass Spectrometry Approach
Ms Chloe Camille Gros
Institute for Biomedicine and Glycomics
c.gros@griffith.edu.au

P20 - Low-dose Naltrexone treatment restored TRPM3 ion channel function in NK cells from Long COVID patients
Mrs Etianne Martini Sasso
National Centre for Neuroimmunology anf Emerging Sciences
e.martinisasso@griffith.edu.au

FOOD ALLERGEN STATEMENT

Please note that food provided at this symposium may contain traces of milk, eggs, crustacean shellfish, tree nuts, peanuts, wheat and soybeans amongst other known allergens. Consumption is at your own risk and Griffith University cannot be held responsible for adverse reactions.

There may be options for vegetarian, free of gluten, lactose, dairy, nuts, passion fruit, ham, mushroom or seafood. There may also be Halal options available.

ORAL PRESENTATIONS

Keynote

Umbilical cord blood cells for perinatal neuroprotection: Bench-to-bedside and back to bench

Dr Courtney McDonald
The Ritchie Centre, Hudson Institute of Medical Research

ABSTRACT: The developing brain is highly sensitive to insult and injury during this period can result in lifelong conditions such as cerebral palsy or neurodevelopmental delays. Over 50% of infants born extremely preterm (babies born <28 weeks) will have a developmental delay at school age. We have shown that umbilical cord blood cell (UCBC) therapy effectively reduces perinatal brain injury.

Using small and large models of perinatal brain injury, we have made mechanistic and functional discoveries to reveal the anti-inflammatory, neuroprotective, anti-apoptotic and pro-angiogenic properties of UCBCs. We have demonstrated the sooner you can treat after birth the better the outcomes. In addition, we have shown that administration of multiple doses of UCBCs has significantly greater long-term benefits on brain development and behaviour. We recently completed a Phase 1 clinical trial (CORD-SAFE) and showed that UCBC therapy was safe and feasible for extremely preterm infants. However, we did identify that >30% of extremely preterm infants did not have enough cells available for therapy. To overcome this, we have developed a method to expand UCBCs (increase the number of cells; eUCBCs) and have shown they are neuroprotective in vitro. We are now undertaking new studies to optimise their benefit for the brain and test their efficacy in large animal models of preterm brain injury.

We have shown that UCBCs are an exciting and effective therapy for perinatal brain injury in preclinical studies, and we are about to undertake a large multi-national randomised control trial to assess their efficacy in extremely preterm infants. In addition, eUCBCs are a promising treatment for perinatal brain injury and may overcome many of the current obstacles with standard UCBC therapy. We hope that UCBC therapy will improve the outcomes for preterm infants and give them the best possible start to life.

BIOGRAPHY: Dr Courtney McDonald is an NHMRC EL2 Investigator and leads the Cell Therapies and Neuroinflammation Research Group at The Ritchie Centre, Hudson Institute of Medical Research. Dr McDonald's research has generated new knowledge in how cell therapies work to reduce brain injury. Dr McDonald has shown that different stem cells, including mesenchymal stem cells, umbilical cord blood (UCB) and amnion epithelial cells (AECs) are effective therapies for brain injury in small and large animal models of perinatal brain injury, multiple sclerosis and spinal disc repair. Dr McDonald's preclinical research has been the basis for 4 ongoing clinical trials at Monash Health using umbilical cord blood cells highlighting the translational impact of her research.

Oral #1

Personalised pathways to sustained employment: Perspectives of employees with acquired brain or spinal cord injury and other relevant stakeholders

Jessie Mitchell[1], Chelsea Marsh[1], Kerrin Watter[1,2], Melissa Kendall[1,2], Emily Bray[1], Christy Hogan[1], Knut Schneider[1], Tamara Ownsworth[1,3]

[1]The Hopkins Centre, Griffith University, Queensland, Australia
[2]Metro South Health Hospital and Health Service, Princess Alexandra Hospital, Queensland, Australia
[3]School of Applied Psychology, Griffith University, Queensland, Australia.

Background and Objectives: Returning to work after neurological injury is associated with better economic stability, psychological adjustment, social connection and quality of life. While factors predicting return to work following neurological injury have been extensively investigated, initial return to work does not necessarily equate to sustained employment. This study aimed to gain in-depth insight into real-life journeys and enablers to sustained employment (i.e., continuous for ≥ 12 months with the same employer) after neurological injury.

Method: Qualitative case-study methodology was used to develop a holistic, interdisciplinary perspective of the employment journeys of 12 people with acquired brain injury (ABI) or spinal cord injury (SCI). One-on-one semi-structured interviews were conducted with people with ABI (n = 6; 83% male; 1-9 years at work post-injury) or SCI (n = 6; 83% male; 4-23 years at work post-injury) who had been employed for ≥12 months with the same employer post-injury, and a nominated service provider (n = 2), employer (n = 6), or colleague and/or close other (n = 3). Data were thematically analysed using a hybrid deductive-inductive approach, with journey mapping used to visually represent individuals' experiences over time.

Results: An overarching theme of personalised pathways to sustained employment represented variations in participants' return to work pathways after ABI or SCI. These pathways were characterised by flexibility and change in how people thought about and participated in work and the enabling resources to support them to do so. Flexibility and change reflected growing awareness of injury-related changes, their impact on an individual's career choices, and reasonable accommodations to support work participation. Enabling resources encompassed personal psychosocial resources and professional expertise, access to rehabilitation and employment services, and workplace support.

Conclusions: Enablers of sustained employment following neurological injury span personal-, social-, organisational-, service-, and system-level resources. The optimal timing of these enabling resources varies as an individual's personal readiness and career-related needs change over time. Clinically, early intervention to support individuals to explore employment possibilities and ongoing support tailored to their changing needs is important to enable fulfilling long-term employment following neurological injury.

Oral #2

Working in interdisciplinary teams: The value of collaboration for research impact

Hannah Adler[1]

[1]Griffith University Center for Social and Cultural Research

This presentation canvasses my research to date as an early career interdisciplinary researcher working across health communication and health sociology. Utilising mixed and novel research methods, I will canvass projects on topics such as medicinal cannabis, psilocybin, and endometriosis, presenting my research findings from these projects and the subsequent research impact. For instance, I have recently conducted a project on healthcare professionals' opinions on the use of psilocybin for existential distress in cancer patients. These findings, as explored through a qualitative approach, aim to answer important questions on how we can integrate novel treatments into cancer care, the barriers to this, and the role of further clinical research. At the same time, my work is often interdisciplinary, as I work in groups that include experts such as basic science researchers, clinical researchers, gynaecologists, oncologists, and myself as a social scientist. My presentation will not only explain my research impact, but detail how we can collaborate across disciplines, the benefits to this, and the impact this can have both on policy, and the communities we wish to research.

Oral #3

Piratical Knowledge in the Age of Darwin

Henry-James Meiring[1]

[1]Griffith Centre for Social and Cultural Research, Griffith University

This paper explores the category of piratical knowledge in nineteenth-century science by examining the role of the American print industry in the global circulation of Charles Darwin's evolutionary ideas. Focused on Darwin's seminal work, Descent of Man (1871), the study traces the book from its birth in John Murray's London publishing house to New York, and its subsequent mass reprinting at the hands of print pirates during America's Gilded Age. Between 1871 and 1900, more than a dozen American publishers engaged in the unauthorised printing of Darwin's book in various shapes and sizes. These inexpensive pirated copies reached new and diverse readerships across the country and in turn were—legally as well as illegally—exported all over the world. Moreover, Descent of Man became entangled in the Cheap Books Movement and legal disputes over international copyright laws between Britain and America. By viewing Descent of Man's reception through its movement as both a material object and cross-cultural transaction, I show that piracy was not peripheral to the "Darwinian Revolution" but rather a central force in the dissemination of Darwinism across the globe. The study of piratical knowledge, therefore, enlarges our picture of the development of science, by fundamentally altering our understanding of how scientific knowledge was produced and consumed on a global scale.

Oral #4

COVID-19's Lasting Impact: Brain Changes Revealed by Multi-Modal MRI

Kiran Thapaliya[1], Sonya Marshall-Gradisnik[1], Maira Inderyas[1], Leighton Barnden[1]

[1]National Centre for Neuroimmunology and Emerging Diseases, Griffith University, Australia

Synopsis
Motivation: To study brain impairment in COVID- 19-recovered healthy controls using multi-modal MRI. Goal: Our goal was to investigate whether COVID-19-recovered healthy controls have brain impairment compared to healthy controls with no previous COVID-19 infection.
Introduction:
Recently, SARS-CoV-2, the virus responsible for COVID-19, has infected over 760 million people worldwide, leading to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) syndrome1. Studies have shown that individuals with COVID-19 may experience brain dysfunction2. Some COVID-19 recovered individuals (HC-COVIDrec) report symptoms such as brain fog and memory problems, suggesting that the brain may be affected by the virus even after recovery3.

Therefore, the specific aim of this study was to investigate brain impairment in COVID-19-recovered healthy controls (HC-COVIDrec) compared to healthy controls with no previous COVID-19 infection (HC-NoCOVID) using a multi-modal MRI approach, including T1-weighted, T2-weighted, diffusion tensor imaging (DTI), and magnetic resonance spectroscopy (MRS).

Methods and Materials:
The study was approved by the Griffith University Human Research Ethics Committee (ID: 2022/666). All the methods were carried out in accordance with the relevant guidelines and regulations adhering to the Helsinki Declaration. Written informed consent was obtained from all participants, and we recruited 12 HC-COVIDrec and 16 HC-NoCOVID.
All the MRI data for all participants were acquired using a 3T Prisma MRI scanner (Siemens Healthcare, Erlangen, Germany) with a 64-channel receive head coil. MRI data were preprocessed using neuroimaging software including SPM12 and Osprey
Multivariate general linear model (GLM) statistical analysis was performed to test for neurochemical level differences between COVID-19 recovered healthy controls and healthy controls with no previous COVID-19 infection using SPSS version 29. Age and sex were included as nuisance covariates for group comparison.

Results
T1w/T2w: HC-NoCOVID vs HC-COVIDrec
The brain regions posterior cingulate ($p=0.004$) and middle frontal gyrus ($p=0.001$) were significantly higher in HC-COVIDrec compared to HC-NoCOVID.

DTI: HC-NoCOVID vs HC-COVIDrec
Axial, mean, and radial diffusivity were significantly lower in the caudate (AD: $p=0.001$; MD: $pfdr=0.005$; RD: $pfdr=0.020$) in HC-COVIDrec compared to HC-NoCOVID.

MRS: HC-NoCOVID vs HC-COVIDrec
The combined choline compound level (phosphorylcholine, glycerophosphorylcholine) was significantly higher ($p=0.042$) in the posterior cingulate cortex of HC-NoCOVID (2.244 ± 0.129) compared to HC-COVIDrec (2.093 ± 0.090).

Discussion:
Increased T1w/T2w signal intensity and altered diffusion parameters, such as MD, may reflect changes in tissue microstructure, including myelin and iron content4. The increased level of choline compound may be involved in the maintenance and formation of myelin sheath5.

Conclusion:
This study provides evidence that COVID-19 can lead to persistent brain alterations, highlighting the need for long-term neurological monitoring of recovered individuals.

References:
1. WHO Coronavirus (COVID-19) Dashboard. https://covid19.who.int.
2. Capelli, S. et al. MRI evidence of olfactory system alterations in patients with COVID-19 and neurological symptoms. J. Neurol. (2023) doi:10.1007/s00415-023-11561-0.
3. Braga, J. et al. Neuroinflammation After COVID-19 With Persistent Depressive and Cognitive Symptoms. JAMA Psychiatry 80, 787–795 (2023).
4. Thapaliya, K., Marshall-Gradisnik, S., Staines, D. & Barnden, L. Diffusion tensor imaging reveals neuronal microstructural changes in myalgic encephalomyelitis/chronic fatigue syndrome. Eur. J. Neurosci. 54, 6214–6228 (2021).
5. Skripuletz, T. et al. Pivotal role of choline metabolites in remyelination. Brain 138, 398–413 (2015).

Oral #5

Co-designing a dignity model: Enhancing healthcare experiences for people with disability

Kelsey Chapman[1], Alexandra Dixon[1], Elizabeth Kendall[1]

[1]Inclusive Futures, Griffith University

Background and aims: Dignity is a critical focus in healthcare and disability research, recognized as a key determinant of patient experience and quality of care. A WHO survey across 41 countries found dignity to be the second most important non-clinical aspect of quality care. Dignified treatment enhances patient satisfaction, adherence to treatment, and personalisation of care, while undignified care can lead to feelings of humiliation, withdrawal, and mistrust in healthcare systems. These challenges are often magnified in rehabilitation settings, especially for people with disability. This study aimed to co-design a model of dignified care for people with disability in a Australian health service.

Methods: To ensure dignity in the research process, lived experience was prioritised at all stages. The research team included members with personal lived experience of disability, ensuring inclusivity. Using a mixed-methods approach, the study employed a generative co-design framework over three phases: pre-design, co-design, and post-design. Semi structured interviews were conducted with staff (n=21) and people with disability (n=18) exploring dignity experiences. Two workshops were held to generate solutions for delivering dignified care and develop a dignity model.

Results: Four key components were identified as protecting and enhancing dignity: (1) delivering human rights, with emphasis on autonomy and privacy; (2) maximizing accessibility through flexible policies; (3) addressing gaps in service access and transparency; and (4) creating responsive system interfaces that align with disability-aware, respectful care. These components could enhance dignity and care experiences.

Conclusion: The co-designed model offers a framework for enhancing dignity in healthcare for people with disability, acknowledging the complexity of individual experiences, institutional policies, and care environments. Implementing this model could foster more equitable and dignified care, improving outcomes and experiences. Ongoing efforts to apply and refine the model aim to promote inclusive, responsive healthcare systems.

Oral #6

Addressing social accountability of medical programs in Australia and Nepal: Report from case studies

Jyotsna Rimal[1], Alfred Lam[1], Elizabth Cardel[2], Stephen Billett[3]

[1]School of Medicine and Dentistry, Griffith University, Gold Coast Campus
[2]School of Health and Medical Sciences, University of Southern Queensland, Ipswich
[3]School of Education and Professional Studies, Griffith University, Mount Gravatt Campus

Background: Being accountable to the people we serve, is a global responsibility. Social Accountability (SA) in health professions education is a practice of engaging with communities that the health training institute is mandated to serve, anticipating, and responding to their current and future priority health needs and societal challenges. SA of medical education was defined as “medical schools have the obligation to direct their education, research, and service activities towards addressing the priority health concerns of the community, region, and/or nation they have a mandate to serve”. SA mandates for developed and emerging economies varies contextually due to differences in resource and governance systems. The aim of this research was to conduct case studies for exploration of current practices and perspectives of SA of medical schools in Australia and Nepal.

Methodology: Pragmatic Paradigm mixed method with concurrent triangulation design and cross institutional and international comparative case study approach was adopted. The key informant interviews were one of the data collection methods and was conducted among the students, academic staff and patients (consumers).

Result: In this presentation, results of key informant interviews is shared. A total of 22 interviews were conducted as a part of key informant interview and students expressed that they are involved social and community service projects. Academic staffs' main concerns were around creating a conducive learning environment and engaging students in community activities and placements. Patient interviews showed their support for students learning with their supervisors and also felt that their communication was better with students than doctors.

Conclusion: Social accountability is a responsibility all the stakeholders have to fulfil in order to address the priority health concerns of the society.

Oral #7

Structural and ion dynamics study of interfaces formed in solid-state electrolyte composites of an organic plastic crystal and polymer nanoparticles

Yady García[1,5], Luca Porcarelli[1,2], Colin Kang[1], Haijin Zhu[1,4], D. Mecerreyes[2,3], Maria Forsyth[123], Luke A. O'Dell[1]

[1]Institute for Frontier Materials and the ARC Centre of Excellence for Electromaterials Science, Deakin University, Geelong, VIC 3216, Australia
[1]POLYMAT University of the Basque Country UPV/EHU, Joxe Mari Korta Center, 20018 Donostia−San Sebastian, Spain
[3]Ikerbasque, Basque Foundation for Science, Bilbao, Spain
[4]Guangdong Provincial Key Laboratory of Materials and Technologies for Energy Conversion, Guangdong Technion—Israel Institute of Technology, Guangdong 515063, P. R. China
[5]Griffith Institute for Drug Discovery, Griffith University, Nathan, Queensland, Australia.

The development of rechargeable lithium-ion batteries in solid-state requires designing energy storage materials and comprehending the thermal processes, morphology changes, and ionic transport that occur in their electrolytes. They can be inorganic or organic like organic ionic plastic crystals (OIPCs), polymers, and composites between them. Composites between OIPCs and polymers have recently been of interest because they combine the non-flammability and plasticity of OIPCs, while the polymer offers mechanical stability. The thermal and ion transport properties of composites lie in structural changes at the bulk and local levels and the formation of interfacial regions that serve as pathways for ions.

Here we studied the properties of composites between the OIPC hexamethylguanidinium bis(fluorosulfonyl)imide (HMGFSI) and polymer nanoparticles functionalised with lithium. The composites were prepared following the solvent casting method and their properties were studied using different characterization techniques to correlate bulk and local properties. For example, the morphology and thermal changes are observed using optical microscopy and differential scanning calorimetry. Solid-state NMR is implemented to study the structural changes and ions dynamics which is correlated with electrochemical impedance spectroscopy. An enhancement in ionic conductivity of 3 orders of magnitude as well as increased lithium and OIPC cation and anion dynamics were observed in the composite as prepared with 40 v% of polymer nanoparticles with respect to the pure OIPC at 50 °C. This was attributed to the increased overall structural disorder as a result of the formation of disordered interfacial regions, which were evidenced by solid-state NMR spectroscopy. This study will help to understand the mechanisms that are taking place in the interfacial regions of the composite and how they modify the ions transport, and thermal behavior which will boost the design of solid-state electrolyte composites for the next generation of Li-ion batteries.

Oral #8

BioSpine: non-invasive digital twin controlled BCI-FES-VR leg-cycling ergometer intervention recovers sensorimotor function in individuals with complete spinal cord injury.

Claudio Pizzolato[1], Dinesh B. Palipana[1], Kyle Mulholland[1], Alastair R. J. Quinn[1], Yana Salchak[1], Malik M. N. Mannan[1], Kelly Clanchy[2], Claire B. Crossley[1], Evan Jurd[1], Surendran Sabapathy[3], Leanne Bisset[2], Belinda Beck[2], Ana C. C. de Sousa[4], Yang D. Teng[5], David G. Lloyd[1]

[1]Australian Centre for Precision Health and Technology (PRECISE) and the School of Health Sciences and Social Work
[2]The Hopkins Centre, Griffith University, Australia.
[3]School of Health Sciences and Social Work, Griffith University, Australia.
[4]Research Centre for Biomedical Engineering at the Universitat Politècnica de Catalunya, Barcelona, Spain.
[5]Department of Physical Medicine & Rehabilitation, Spaulding Rehabilitation Hospital, Mass General Brigham, and Harvard Medical School, Boston, MA, USA

Spinal cord injury (SCI) disrupts communication between high brain centers and the peripheral neuromusculoskeletal system, resulting in debilitating sensorimotor impairment, autonomic dysfunction, and musculoskeletal degeneration. To repair these concurrent deficits, we developed a multimodal rehabilitation system comprising a brain-computer interface (BCI), lower limbs functional electrical stimulation (FES), and virtual reality (VR) feedback. The apparatus, devised on a motorised semi-recumbent cycling ergometer, is controlled by a real-time digital twin of the user. Four individuals with chronic complete SCI have finished our year-1 study. While all participants gained discernible sensory, autonomic, muscular, and bone mineral density improvements, two of them additionally attained significant somatomotor benefits and recovered ability to voluntary contract previously paralysed muscles.

Oral #9

Calcium-Phosphate Bridges Support Protein-Complex Formation during HIV Assembly

Erwan Bremaud[1], Biswa Prasanna Mishra[1], Ablikim Bake[1], Veronika Masic[1], Thibaut Flipo[1], Arun Everest-Dass[1], Lauren Hartley-Tassell[1], Thomas Ve[1], Belinda L Spillings[1], Johnson Mak[1]

[1]Institute for Biomedicine & Glycomics, Griffith University, Gold Coast, QLD Australia

Intracellular calcium (Ca^{2+}) dynamics are regulated by Ca^{2+} sparks whereby subcellular local release of Ca^{2+} from storage compartments (>100 μM) resulting in an intracellular gradient. Using HIV as a case-study, we previously reported viral proteins leveraging this intracellular Ca^{2+} gradient to facilitate the formation of virological synapses. This uropod targeting of HIV assembly is mediated by direct Ca^{2+} interaction through p6Gag acidic side chain amino acids. Interestingly, HIV p6Gag also harbours multiple highly conserved residues that structurally mimic Ca^{2+} binding amino acids upon phosphorylation.

Here, we first employed phospho-proteomic mass spectrometry on cell-free HIV particles to unearth multiple novel phosphorylation sites in HIV p6Gag and p6Pol. Combination of biophysical (SPR), structural (NMR), molecular (site directed mutagenesis), ultrastructural (TEM) and virological (functional) analyses have shown that Ca^{2+}-Phosphate bridges stabilise distinct types of protein complexes during HIV assembly and release. Specifics include phosphorylating the PTAP domain to support ESCRT Tsg101 binding and packaging; modulating the interaction between Gag and GagPol for virion enzyme packaging; impairing Gag-Gag interactions leading to defects in viral infectivity without affecting particle formation; and the potential to influence the dimerization of GagPol during virion maturation.

Our work shows that Ca^{2+}-Phosphate bridges are critical interactions to stabilise protein complexes during HIV assembly. The conservation of acidic side chain amino acids and/or residues with putative phosphorylation across all known ESCRT protein binding motifs implies that Ca^{2+}-Phosphate bridges may represent an unknown mechanism in regulating the formation of protein complexes across a broad spectrum of biological events.

Oral #10

Cracking the egg: Discovery and characterisation of distinct nonvesicular extracellular particles from Schistosoma mansoni eggs

Madeleine J. Rogers[1,2,3,4,#], Athena Andreosso[4], Jagan Billakanti[5], Mary G. Duke[2], Yan Lu[4], Natasha Collinson[3], Jian Tan[6,7], Laurence Macia[6,7], Na'ama Koifman[8], Matthias Floetenmeyer[8], Malcolm K. Jones[4,9], Catherine A. Gordon[1,3], Severine Navarro[1,4,10,#]

[1]Faculty of Medicine, University of Queensland, Brisbane, Australia
[2]Molecular Parasitology Group, QIMR Berghofer, Brisbane, Australia
[3]Applied Tropical and Molecular Parasitology Group, QIMR Berghofer, Brisbane, Australia
[4]Mucosal Immunology Group, QIMR Berghofer, Brisbane, Australia
[5]ANZ Genomic Workflow Development Leader, Cytiva, Brisbane, Australia
[6]Charles Perkins Centre, University of Sydney, NSW, Australia
[7]School of Medical Sciences, Faculty of Medicine and Health, University of Sydney, Sydney, NSW, Australia
[8]Centre for Microscopy and Microanalysis, University of Queensland, Brisbane, QLD, Australia
[9]School of Veterinary Science, Faculty of Science, University of Queensland, Gatton, QLD, Australia
[10]Centre for Childhood Nutrition Research, Faculty of Health, Queensland University of Technology, Brisbane, QLD, Australia

Extracellular particles (EPs) derived from helminths are emerging as promising immunomodulatory agents, yet their heterogeneity challenges reproducible purification and characterisation. This study focused on purifying and characterising extracellular particles (EPs) from Schistosoma mansoni eggs using tangential flow filtration (TFF) and differential ultracentrifugation (dUC). Contrary to expectations, cryogenic transmission electron microscopy (cryoTEM) revealed that egg-derived EPs are nonvesicular (5 – 30 nm) nanoparticles (eggNPs) rather than membrane-bound extracellular vesicles. TFF demonstrated superior performance over dUC, yielding higher recovery (76.19% vs. 38.90%), greater purity, and lower endotoxin contamination. Despite limitations in standard protein quantification methods, enriched protein profiles and detection of S. mansoni tetraspanin-2 in eggNPs highlights their distinct molecular signatures. The study also identified contaminants in cryopreservation buffers, underscoring the need for optimised storage conditions. Compared to dUC, TFF preserved particle integrity, with cryoTEM images showing fewer aggregates and distinct EggNP morphology. This work proposes TFF as a scalable and reproducible method for isolating S. mansoni-derived eggNPs, providing a foundation for their exploration as immunomodulatory agents. These findings not only expand the understanding of helminth EPs but also emphasize their therapeutic potential, particularly in inflammatory and immune-dysregulation disorders.

Oral #11

How Your Environment Impacts Mental Health, Behaviour, and Learning in Schools, Hospitals, and Beyond: Introducing The Brain and Enriched Environment Lab (BEEhive)

Michael Norwood[1]

[1]The Hopkins Centre, Griffith University

The BEEhive lab explores the critical role the environments around us play in our lives. This presentation will first provide an overview of environmental research and then highlight the impact of environmental adjustments in various contexts, including schools, hospitals, and community settings. We will focus on how, in collaboration with our clinical partners at Gold Coast and Logan, we study the effects of enriched environments on rehabilitation following neurotrauma. The session will also discuss how different learning environments influence student behaviour and engagement in schools, as well as the importance of creating accessible environments in the community.

Oral #12

Unveiling host glycome remodelling upon parainfluenza virus infection using Mass spectrometry

Plabon Kumar Das[1], Larissa Dirr[1], Patrice Guillon[1], Arun Everest-Dass[1], & Mark von Itzstein[1]

[1]Institute for Biomedicine and Glycomics, Griffith University, Queensland, Australia

Human parainfluenza virus type 3 (HPIV-3) remains to be one of the major causes of respiratory illness particularly in young children, the elderly and immunocompromised people. Despite the significant efforts in designing therapeutics, there is neither an effective antiviral nor a vaccine available against HPIV-3.

Cellular glycosylations are known to play a pivotal role in HPIV-3 biology. Glycans like sialic acid (N-Acetylneuraminic acid) have been identified as cellular receptors for HPIV and utilised as a molecular template for structure-based drug design. However, dynamics of the host glycome upon HPIV-3 infection has never been studied. Herein, we profile host glycome (N-, O-, glycosphingolipids glycans) remodelling following HPIV-3 infection in both immortalized and primary nasal epithelial cells using state-of-the-art mass spectrometry techniques and instruments.

We observed a significantly higher expression of oligomannose type N-glycans at the surface of HPIV-3 infected cells when compared to their mock-infected control, with correspondingly lower expression of sialylated N-glycans. Unique O- and glycosphingolipids glycosylation features were also found on infected cells when compared to their mock-infected counterpart. A bulk RNA-Seq analysis of infected and mock-infected cells has identified major players behind host glycosylation changes in response to viral infection. Furthermore, using small molecule inhibitor to viral hemagglutinin-neuraminidase (HN) protein has enabled us to uncover potential role of viral neuraminidase in host glycome remodelling. Our study has, for the first time, uncovered global alteration of host glycome upon HPIV-3 infection. By examining the glycan modifications and cellular processes involved in HPIV-3 infection induced glycan remodelling, our research will open new avenues for further exploration, potentially leading to diagnostic methods or innovative treatments to better manage HPIV-3 infections.

Oral #13

Immune Exhaustion in Australians with Gulf War Illness

Natalie Eaton-Fitch[1,2], Etianne M Sasso[1,2], and Sonya Marshall-Gradisnik[1,2]

[1] National Centre for Neuroimmunology and Emerging Diseases, Health Group, Griffith University, Gold Coast, Australia
[2] Consortium Health International for Myalgic Encephalomyelitis, Griffith University, Gold Coast, Australia

Background
Gulf War Illness (GWI) is a chronic multisystemic illness found in one-third of Gulf War Veterans. The aetiology of GWI is elusive; however, is strongly associated with exposure to multiple toxic agents, environmental exposures, and prophylactic medications or vaccinations. Immune dysregulation has been reported in research on GWI pathomechanisms. Therefore, this study aimed to investigate gene expression profiles associated with immune exhaustion in veterans with GWI.
Method
Ribonucleic acid (RNA) was extracted from peripheral blood mononuclear cells (PBMCs) isolated from n=20 GWI, and n=15 healthy control (HC) participants. GWI participants were defined according to the Kansas Criteria and definition for Chronic Multisymptom Illness. RNA was quantified using the NanoString nCounter Immune Exhaustion gene expression panel and analysed using Rosalind Bio and IPA. Comparisons between groups were performed for immune cell profiling and associated pathways using parametric and non-parametric t-tests depending on normality using GraphPad Prism. Differential expression data are presented as log2 fold change and adjusted p values, while pathway scores are presented as global significance score (GSS).
Results
Thirty-three differentially expressed genes were identified, of which 21 were upregulated and 12 were downregulated. Upregulated genes were associated with metabolic and cellular stress responses, while downregulated genes were associated with T cell receptor regions and humoral immune responses. Gene set analysis revealed association between gene expression and type I interferon signalling, natural killer receptors, T cell receptors, and tumour necrosis factor signalling. Pathway analysis revealed the role of differentially expressed genes in neutrophile signalling and degranulation, toll-like receptor cascades, and the role of lipids/lipid rafts in infection.
Conclusion
This investigation elucidates the intricate role of immune dysregulation underlying GWI, emphasising the potential importance of immune exhaustion pathways in disease progression. Targeting these pathways in a larger cohort may identify potential markers for further investigation and screening.

Oral #14

Structural Basis of NMNAT2 Degradation in Axons

Akansha Bhatt[1,2], Veronika Masik[1], Yun Shi[1], Santosh Rudrawar[1,2,] Thomas Ve[1]

[1]Institute for Biomedicine and Glycomics, Griffith University, Gold Coast Campus, QLD, Australia
[2] School of Pharmacy and Medical Sciences, Griffith University, Gold Coast Campus, QLD, Australia

Introduction: Axon degeneration is a hallmark of many neurodegenerative diseases. The NAD+ (nicotinamide adenine dinucleotide) cleaving enzyme SARM1 is a key executioner of axon degeneration and is kept inactive in healthy axons through a continuous supply of the axonal survival factor and NAD+ synthesizing enzyme NMNAT2. Two pathways control NMNAT2 protein turnover: palmitoylated NMNAT2 undergoes degradation via MAPK signalling, while non-palmitoylated NMNAT2 is ubiquitinated by the E3 ligase PAM, recruited through interactions with Skp1 and Fbxo45. However, the molecular basis for how PAM interacts with Skp1 and Fbxo45, and how these proteins facilitate NMNAT2 recruitment is poorly understood.

Materials and Methods: Using AlphaFold multimer, I have made a model of the ternary PAM/Fbxo45/Skp1 complex. Based on this model, the constructs have been designed, cloned, produced, and purified by IMAC and gel filtration chromatography. Next, I validate and characterize the interactions between the complex and NMNAT2 using crystallography and biophysical assays such as SPR, ITC, MALS, and mass photometry.
Results: The predicted model of the ternary complex consisting of the FBD1 domain of PAM, Skp1, and Fbxo45 suggested that the C-terminal tail of Fbxo45 is crucial for its interaction with the FBD1 domain of PAM, while Skp1 interacts specifically with the F-box domain of Fbxo45. Both PAM FBD1 and Skp1 were successfully expressed and purified to homogeneity (>95% purity) through a combination of IMAC and gel filtration, enabling further structural and functional studies of this complex.

Conclusion: This research will improve the mechanistic understanding of NMNAT2 degradation in axons and may provide new strategies to block axonal degeneration in neurodegenerative disease.

Oral #15

Towards the creation of a bioengineered choroid for new treatments of macular degeneration

Audra Shadforth[1], Anastasia Brandon[1], Damien Harkin[2]

[1]School of Environment and Science, Griffith University
[2]School of Biomedical Science, QUT

Age-related macular degeneration (henceforth, macular degeneration) is the leading cause of legal blindness and visual impairment in Australia with significant burdens to patients, families, the health care system, and society. A healthy macula is responsible for our high-resolution central vision and is therefore vital for reading, writing, driving, and recognising faces. With over 170,000 people over the age of 80 affected by late-stage macular degeneration, and one in seven Australians over the age of 50 (1.29 million) showing signs of early macular degeneration, new research directions are critical to reduce the impact of this devastating disease.

Age-related degenerative structural changes develop in the outer retina over a long period of time, which can lead to vision loss arising from central macular damage. Clinically, late-stage macular degeneration is classified into two forms: a so-called 'dry' form which features atrophy of the retinal pigment epithelium (RPE), and degeneration of adjacent light-sensitive photoreceptors as the outer retina is starved of nourishment from the underlying choroidal vasculature; and a 'wet' or exudative form which is additionally characterised by leaky extensions of the choroidal vasculature resulting in fluid accumulation and cell layer disruption. In both clinical forms, a loss of capillary vasculature precedes clinically obvious cell death throughout the rest of the outer retina. Little is known about the events that occur prior to this microvascular dysfunction and the contribution of the choroidal stroma and its resident cell populations, including fibroblasts and macrophages. Despite the key role of fibrotic scarring in macular degeneration vision impairment, little research has been conducted on these cell types.

My research group has examined the gene expression of an enriched fibroblast cell population from the human choroid at single-cell resolution and utilized mass spectrometry to study the ECM produced by these cells. We will use this new knowledge in the creation of a bioengineered choroid tissue model. Our bioengineered choroid will allow manipulation of the microenvironment to model tissue-specific responses, with a capacity to expand our model to encompass the entire outer retina. We envision that our research will produce an entirely new therapeutic rationale for tackling the onset of macular degeneration in Australia, with an ex vivo testing platform ready to evaluate cell-based therapies for regenerative healing in the eye.

Oral #16

Research Infrastructure: an essential partner in your research success at Griffith

Sarah McAtamney[1]

[1]Office for Research, Griffith University

Impactful research is not a solo endeavour, and it really does take a village! One of the most important collaborative partners for many Griffith researchers, is research infrastructure.

Research infrastructure encompasses the specialised facilities, equipment and professional expertise available to our researchers. Recognising the essential roles these resources play in accelerating impactful research outcomes, Griffith has been working on a number of initiatives over the last 5 years to ensure that our researchers have equitable access to high quality, state-of-the-art and collaborative research infrastructure.

Join me to learn more about research infrastructure at Griffith, and beyond, that can help drive your research career to the next level, including specialised core facilities, digital tools and funding opportunities for research equipment and access.

POSTER PRESENTATIONS

Poster #1

Seeing is Believing: Bridging Cognition and CNNs for Contrastive Concept Explanation with Axiomatic Foundations

Ugochukwu Ejike Akpudo[1], Yongsheng Gao[1], Jun Zhou[1], Andrew Lewis[1]

[1]Institute for Integrated and Intelligent Systems, School of Engineering and Built Environment, Griffith University

The intersection of cognitive science and deep learning has opened new frontiers in explainable artificial intelligence (XAI). While convolutional neural networks (CNNs) excel in visual recognition tasks, their black-box nature limits interpretability. Human cognition, on the other hand, relies on structured, concept-based reasoning. This paper introduces a novel framework that integrates cognitive principles with CNN architectures to enhance concept-based explanations. By aligning feature representations with human-understandable concepts, we improve interpretability without sacrificing model performance, revealing what the "CNN sees and humans perceive" and not where it looked. We formalize interpretability axioms to ensure explanations remain consistent, relevant, and coherent. Experimental results demonstrate that our approach outperforms conventional methods in providing meaningful and structured insights into CNN decision-making. This work paves the way for more transparent AI systems, bridging the gap between machine learning and human cognitive understanding.

Poster #2

Engineered airborne particles via electrospray for pulmonary drug delivery

Hoai Duc Vu[1], Dr Van Dau[1], Assoc. Prof. Yong Zhu[1], Prof. Dzung Dao[1]

[1]Griffith University

Electrohydrodynamic techniques, including electrospinning and electrospray, enable the fabrication of nanostructured polymeric materials. The core objective of this research project is to develop a one-step pulmonary drug delivery platform that utilizes electrohydrodynamic atomization (EHDA) to generate reduced-charge particles. Overcoming the challenges with high charge levels would enable low-charge EHDA to be a promising platform, not only for the drug delivery field but also for other environmental and biomedical applications. The project comprises several phases: firstly, the comprehensive examination of generating low-charge particles with AC electrospray configurations will be conducted. Secondly, the aerosol and particle generation potential from several biomaterials with drug-carry ability will be investigated. Lastly, rigorous evaluation through standard testing of inhalation devices will be carried out to investigate and confirm the technique's potential in practical applications.

Poster #3

Whole Genome Analysis Sheds Light on the Jewish Diaspora

Alexandra Bubniak[1], Carney Matheson[1], Sally Wasef[1], Ido Bar[1], Bastien Lamas[1]

[1]School of Science and Environment, Griffith University

Since Homo sapiens have migrated out of Africa, they have come to populate the world. In doing so, distinct populations were formed, languages were created and thus rose civilizations. However, much is still unknown about certain ethnic groups and civilizations. Here, a 2,000-year-old sample from a tomb in Jerusalem has been used to reconstruct the genome of an individual, who is believed to be a member of the pre-diaspora Jewish population before the destruction of the second temple (70 C.E.). Construction of the genome began with extraction of DNA from a tooth sample, using the Rohland and Hofreiter method. A genome library was constructed, followed by NextGen target capture. The EAGER with Nextflow pipeline was used for the quality assessment of the data. The tools used within EAGER included FastQC, DamageProfiler, Qualimap and SexDetErrmine. For Haplogroup analysis, Genius and Haplogrep 3 were employed. The haplogroup of this individual was identified as HV2a. This suggests that the small number of individuals present within Jewish populations of Europe, those with mtDNA haplogroup HV2a, may not be due to recent Middle Eastern admixture but may be due to the dispersal of Jewish individuals with this haplogroup from around Jerusalem at the time of the first century diaspora. Although this data is of low quality due to preservation and low DNA recovery, this analyses, included the authentication of human aDNA, with no evidence of contamination. It also confirmed that this individual is male, consistent with previous analysis of this sample.

Poster #4

Anthocyanins in Asthma: Targeting Chronic Inflammation and Airway Remodeling

Madiha Ajaz[1]*, Indu Singh[1], Lada Vugic[1], Rati Jani[2], Natalie J. Colson[1]

[1] School of Pharmacy and Medical Sciences, Griffith University, Gold Coast, Queensland, Australia.
[2] School of Health Sciences and Social Work, Griffith University, Gold Coast, Queensland, Australia.

Background: Asthma is a chronic inflammatory disease characterized by airway remodeling and exacerbations, with oxidative stress and inflammation playing a central role in disease progression. The plasminogen activator inhibitor-1 (PAI-1) signaling pathway is implicated in airway remodeling, and its elevated levels are associated with worsened asthma outcomes. Bioactive compounds, particularly anthocyanins (ACNs), have demonstrated anti-inflammatory and antioxidant properties, making them potential therapeutic agents for asthma management. This study integrates a systematic review, narrative review, in vitro study, and feasibility trial to assess the role of ACNs in asthma.

Methods:
1. Systematic Review: A comprehensive literature search of databases including Scopus, MEDLINE, EMBASE, CINAHL, PsycINFO, and the Cochrane Airway Group's register was conducted to evaluate the impact of plant-based antioxidants on asthma-related inflammation and clinical outcomes.
2. Narrative Review: Focused analysis of anthocyanins' effects on airway inflammation and remodeling, particularly their interaction with inflammatory pathways and potential regulation of PAI-1 levels.
3. In Vitro Study: Investigation of anthocyanins' effect on TNF-α-induced PAI-1 expression in BEAS-2B human bronchial epithelial cells to assess their potential role in airway remodeling.
4. Feasibility Trial: A preliminary human study assessing the effects of ACN supplementation compared to placebo on asthma symptoms, inflammatory markers, and lung function.

Results:
• Systematic Review: Evidence suggests that plant-based antioxidants, especially polyphenols and flavonoids, can reduce airway inflammation, improve lung function, and modulate inflammatory markers, though clinical studies remain limited.
• Narrative Review: Anthocyanins exhibit anti-inflammatory effects by modulating NF-κB and JAK-STAT pathways, reducing oxidative stress, and potentially influencing PAI-1 levels, which are implicated in airway remodeling. However, direct asthma-specific evidence is scarce. Initial findings indicate that ACNs may regulate PAI-1 expression, suggesting a possible role in mitigating airway remodeling, though further mechanistic studies are needed.
• In Vitro Study, Feasibility Trial: Ongoing; expected to provide insights into whether dietary anthocyanins improve asthma symptoms and inflammatory biomarkers in human subjects.

Conclusion: Emerging evidence supports the potential of anthocyanins as adjunctive therapies in asthma, particularly for reducing inflammation and airway remodeling. However, robust human interventional studies are necessary to establish their clinical efficacy. This research will help bridge the gap between preclinical data and human trials, offering new insights into dietary interventions for asthma management.

Poster #5

Strengthening Indigenous Children: Developing a Novel Multi-Component Engineered OMV-Based Vaccine for the Prevention of Ear Infections

Ayesha Zahid[1,2], Jennifer C. Wilson[2], I. Darren Grice[1,2] and Ian R. Peak[1,2]

[1]Institute for Biomedicine and Glycomics, Griffith University, Gold Coast, QLD, Australia,
[2]School of Pharmacy and Medical Science, Griffith University, Gold Coast, QLD, Australia

Middle ear infection (otitis media) remains the most common childhood disease diagnosed among Australian Indigenous children. Despite extensive antibiotic usage, it persists as a significant health concern, characterized by substantial morbidity and economic burden. Streptococcus pneumoniae, non-typeable Haemophilus influenzae, and Moraxella catarrhalis are the most common culprits for acute otitis media. Currently, pneumococcal and influenza vaccines are utilized as a preventive measure against otitis media. However, their efficacy is limited to prevent carriage and/or illness induced by non-vaccine serotypes. Otitis media stemming from non-vaccine serotype pneumococci, non-typeable H. influenzae, and M. catarrhalis pose significant healthcare challenges.

Given the expansive heterogeneity of pathogens involved in otitis media, a multicomponent vaccine is essential for adequate protection. This study is focused on devising a novel multicomponent vaccine targeting two major etiological agents, H. influenzae, and M. catarrhalis. Our vaccine formulation features novel protein antigens derived from M. catarrhalis, non-typeable H. influenzae, and genetically modified outer-membrane vesicles (OMVs) from M. catarrhalis. We have successfully expressed and purified recombinant protein antigens from NTHi and M. catarrhalis using E. coli expression system and immobilized metal affinity chromatography. We have also generated knockout mutants of M. catarrhalis lacking targeted immunodominant strain-variable proteins. These mutants are currently being used to purify OMVs. Preclinical investigations will encompass rigorous evaluation of vaccine immunogenicity and cross-reactivity against heterologous strains in mice.

By combining novel protein antigens with genetically modified outer-membrane vesicles, this study aims to overcome the limitations of current vaccine approaches. Forthcoming preclinical evaluations will provide critical insights into its immunogenicity and cross-reactivity, paving the way for future advancements in otitis media prevention.

Poster #6

Development of a High-Resolution, Automated Method for Spatial Glycoproteomics Mapping

Habeebah Olufe Owolabi[1], Andrea Maggioni[1], Tom Litfin[1], Mark von Itzstein[1], Arun Everest-Dass[1]

[1]Institute for Biomedicine and Glycomics, Griffith University, Gold Coast Campus, QLD, Australia

The spatial organisation of proteins and glycans within tissues plays a key role in understanding cancer progression. Traditional methods for spatial proteomics face limitations in resolution, throughput, and complexity, which hinder their utility in clinical settings. Recent advances have introduced innovative techniques that integrate mass spectrometry with high-resolution imaging to overcome these challenges. However, these methods rely on labour-intensive sample preparation steps and often work at a resolution that may obscure finer spatial details. In this study, we aim to develop an improved method for high-resolution spatial glyco-proteomics. Building on established protocols, our approach involves preparing tissue sections, followed by enzymatic digestion directly on the slides, then using laser microdissection to excise specific regions of interest, and finally, transferring the dissected samples to 384-well plates for direct mass spectrometry analysis to profile peptides and glycans. By working at 50 µm spatial resolution, we aim to derive more detailed insights into the tissue microenvironment. The method's automation and high-resolution capabilities are designed to streamline tissue analysis workflows, reducing the time and complexity associated with traditional techniques. This innovation holds significant potential for the discovery of novel biomarkers by offering a detailed spatial map of the proteome that can inform cancer diagnosis and treatment. The ultimate goal is to integrate this method into clinical practice, where it could enhance the accuracy of cancer diagnostics, facilitate the identification of personalised therapeutic targets, and contribute to improved patient outcomes.

Poster #7

The effect of TRPM3 ion channel dysfunction on organelle Ca2+ signalling in natural killer cells of people with Mylagic Encephalomyelitis/Chronic Fatigue Syndrome

Chandi T Magawa[1]

National Centre for Neuroimmunology and Emerging Diseases (NCNED), School of Pharmacy and Medicine, Griffith University

Introduction

Ion channels and transport proteins play a vital role in regulating intracellular signalling, cell physiology and gene expression within the immune system. Therefore, their dysfunction can lead to severe consequences, including immunodeficiencies and disease progression. Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is a multisystemic illness and commonly associated with dysregulation of the immune system and post-exertional neuroimmune exhaustion. The aetiology of ME/CFS remains unknown however, reduced cytotoxic activity by natural killer (NK) cells has been a consistent finding. NK cells contribute to the first line of defence against infection and malignancy. To effectively exert cytotoxic functions against target cells, NK cells rely on a stable supply of calcium (Ca^{2+}) ions through various ion channels including transient receptor potential (TRP) ion channels. In addition, previous studies have also reported transient receptor potential melastatin (TRPM3) ion channel impairment associated with reduced Ca^{2+} mobilisation in NK cells isolated from ME/CFS patients. Given the key role of Ca^{2+} in the regulation of immune cells, we examined the role of TRPM3 ion channel during intracellular Ca^{2+} mobilisation in NK cells isolated from ME/CFS patients. To further explore the pathomechanisms involved in this disease, fluorescent live cell imaging was used to examine the movement of calcium (Ca^{2+}) in response to TRPM3 modulation across the cytoplasm and mitochondrial network in NK cells.

Method

In the present work, NK cells were isolated from cohorts of (n=5) ME/CFS and (n=5) healthy participants. A live cell imaging method was optimized and used to investigate mobilisation of Ca^{2+} in NK cells stained with different Ca^{2+} indicators, Fluo-8 and Rhod-2. To monitor cytoplasmic and mitochondrial Ca^{2+} levels in real time, pharmacological agonist pregnenolone sulfate (PregS) and antagonist ononetin were used to determine the effect of TRPM3 modulation on Ca^{2+} mobilisation. Changes in Ca^{2+} mobilisation across the cytoplasm and mitochondrial network was quantified using fluorescence intensity profiles and analysed using CellSens, Origin software, SPSS, and Graph Pad.

Results

Statistical significance ($p < 0.05$) among groups was determined using the independent t-test, and data are presented as mean ± standard error of the mean (SEM). Preliminary results demonstrate a significantly higher ($p < 0.05$) cytosolic and mitochondrial Ca^{2+} influx in (n=5) HC compared to (n=5) ME/CFS patients. In addition, stimulation of TRPM3 on NK cells by PregS triggers an increase in cytosolic and mitochondrial Ca^{2+} levels.

Conclusion

Immune cells rely on a stable Ca^{2+} signalling process to function effectively. Ion channel dysfunction and impaired Ca^{2+} mobilisation can contribute to dysregulation of the immune system and play a role in several immune related diseases. Preliminary data analysed demonstrated that impaired TRPM3 dysfunction may contribute to impaired cytosolic and mitochondrial calcium mobilisation in ME/CFS condition. Thus, contributing to impaired NK cell cytotoxicity reported in the literature and underpin organelle dysfunction of mitochondria.

Poster #8

Using One Stone to Kill Three Birds: RNAi technology showed Promising Anti-viral Activity Against Respiratory Viruses of Pandemic Potential

Victor B. Oti[1], Dhruba Acharya[1], Adi Idris[2], Nigel McMillan[1]

[1]Institute for Biomedicine & Glycomics/School of Pharmacy & Medical Sciences, Griffith University, Gold Coast, QLD Australia
[2]Centre for Immunology and Infection Control, School of Biomedical Sciences, Queensland University of Technology, Brisbane, QLD, Australia

Respiratory viral infections such as COVID-19, respiratory syncytial virus (RSV) and influenza A virus (IAV) are still global public health challenges due to their ability to cause annual epidemics and instigate global pandemics. We explored the use of RNA interference (siRNA) technology as a therapeutic approach to target and repress pandemic potential respiratory viruses, including IAV, RSV, and SARS-CoV-2. SiRNAs were designed to bind ultra-conserved viral genome regions of the respective viruses to prevent viral escape through mutations. siRNAs targeting essential viral genes were transfected into cell lines infected with each virus, with Lipofectamine 3000. The study evaluated single, double, and triple combinations of siRNAs for their antiviral effects using an immunoplaque assay (iPA). Results showed that single siRNA treatments reduced viral replication, while double and triple siRNA combinations significantly enhanced antiviral activity across all tested viruses. In triple siRNA treatments, the reduction in viral plaque formation was substantial across RSV, IAV, and SARS-CoV-2, indicating a broad-spectrum antiviral response. This multiplexing strategy demonstrates the potential for developing siRNA-based therapies against diverse respiratory viruses by targeting multiple viral genes or conserved host interactions. The findings suggest that siRNA cocktails may provide a robust, adaptable tool in antiviral therapy, though challenges remain in refining target specificity, ensuring effective delivery, and accommodating viral diversity to optimize this approach for clinical use.

Poster #9

Hyperspectral imaging predicts macadamia nut-in-shell and kernel moisture using machine vision and learning tools

Michael B. Farrar[1], Reza Omidvar[2], Joel Nichols[1], Daniele Pelliccia[3], Suhad Lateef AlKhafaji[4], Iman Tahmasbian[1,5], Nimanie Hapuarachchi[1], Shahla Hosseini Bai[1]

[1] School of Environment and Science, Griffith University, Nathan, QLD, 4111, Australia
[2] School of Engineering and Built Environment, Griffith University, Nathan, QLD, 4111, Australia
[3] Instruments & Data Tools Pty Ltd, Rowville, VIC, 3178, Australia
[4] School of Information and Communication Technology, Griffith University, Nathan, 4111, Australia
[5] Department of Agriculture and Fisheries, Queensland Government, Toowoomba, QLD, 4350, Australia

Tree nuts are a convenient and nutritious food source and recently considerable attention has been placed on quality assessment to provide high quality nuts and improve consumer satisfaction. Moisture is a critical parameter for tree nut quality and is routinely monitored throughout post-harvest processing. However, current direct methods to assess nut moisture are based on using limited numbers of representative sub-sets and are destructive. This study aimed to use hyperspectral imaging and machine learning (ML) to predict moisture of individual macadamia nuts during post-harvest processing. Specifically, we aimed to compare data extraction methods (automatic vs. manual) and nut orientation (base-up, base-down and combined orientations) during imaging in predicting moisture for nut-in-shell and kernels. We also explored minimum wavelength numbers to predict moisture. Spectra were obtained from images of nuts in two orientations and extracted using manual and automatic methods prior to development of partial least squares (PLSR), artificial neural network (ANN), support vector machine (SVM) and Gaussian process regression (GPR) models. Kernel moisture prediction was more accurate using automatically extracted spectra, whereas nut-in-shell moisture prediction accuracy was similar for either method. For kernels, combining the spectra from two images of nuts in base-up and base-down orientations provided similar prediction accuracy (RMSET = 0.308 %), compared with spectra from one image (RMSET ≥ 0.341 %), and for nut-in-shell, using spectra from one image also provided similar accuracy (RMSET ≈ 1.2 %) as using both images combined. PLSR models predicted moisture with very high accuracy for both nut-in-shell (R2T = 0.96, RMSET = 1.20 %, RPD = 5.15) and kernels (R2 T = 0.99, RMSET = 0.308 %, RPD = 11.05) following selection of ten important wavelength bands between 760 and 967 nm. ANN and GPR also achieved equivalent (R2T = 0.99) highest accuracy predictions for kernels, however, all wavelengths were required, which would increase computational processing time for high volume applications. The important wavelength bands required to develop accurate models for macadamia moisture prediction are consistent with other food and nut products and prediction accuracies are possible for process control applications using only 10 wavelength bands. Several ML models including PLSR, ANN and GPR are suitable for use with Vis/NIR hyperspectral images to predict macadamia moisture, however, for industrial applications where high volume through-put is required, using PLSR with limited selected wavelength bands is recommended. Overall, hyperspectral imaging combined with computer vision software and ML models showed significant potential to predict moisture concentration of macadamia during post-harvest processing.

Poster #10

A Simulation Game of Climate and Mosquito-Borne Diseases

Sebastian Bernal-Garcia[1], Oz Sahin[1], Brian McIntosh[2], Russell Richards[3]

[1]School of Engineering and Built Environment
[2]School of Environment and Science, Griffith University
[3]Business School, The University of Queensland

Climate change is altering disease dynamics and challenging health systems worldwide, particularly through the expansion of mosquito-borne diseases such as dengue and malaria. This proposal outlines the development of a simulation game designed to support the creation of a climate-smart health workforce. The game will be built on a process-based model that integrates climatic, epidemiological, and socio-economic variables to simulate the transmission dynamics of mosquito-borne diseases. Using tools like Stella Architect and Vensim PLE, the project aims to develop a dynamic model that capture the complex interactions driving disease spread under varying climate scenarios.

A mixed-methods approach will guide the project, involving participatory co-design workshops with health professionals and students to iteratively refine game mechanics and user interface. The proposal details plan for pilot testing and gameplay sessions, which will inform subsequent refinements. Through this immersive educational tool, the project seeks to provide an innovative framework for enhancing knowledge and strategic decision-making in the context of climate-driven health challenges. Ultimately, the simulation game is intended as a forward-looking proposal to bridge research, training, and practice in climate and health, empowering future professionals to manage emerging public health risks effectively.

Poster #11

Natural killer cell cytotoxicity function in Gulf war illness patients: a longitudinal investigation

J. Dwyer[1,2], N. Eaton-Fitch[1], S. Marshall-Gradisnik[1]

1National Centre for Neuroimmunology and Emerging Diseases, Menzies Health Institute Queensland, Griffith University, Gold Coast campus, Australia
2School of Pharmacy and Medical Sciences, Griffith University, Gold Coast campus, Australia

Introduction
Gulf War illness (GWI) is a multifactorial disease affecting veterans of the 1990-1991 Persian Gulf War. GWI encompasses many debilitating symptoms such as post-exertional fatigue, cognitive impairment, and musculoskeletal pain. The aetiology of GWI has not been confirmed. Still, it is hypothesised that it is associated with the multiple physical and psychological stressors encountered during active duty. At present, there are no biomarkers or diagnostic tests available for GWI. However, GWI has been linked to significant changes in immune function. Previous research has documented altered cytokine signalling, the presence of autoantibodies, and loss of T-cell function. Recently, ion channel disturbances were reported in natural killer (NK) cells of people with GWI compared with healthy controls. There is limited research on the implications of NK cells in GWI. Therefore, this research aims to explore NK cell dysfunction in GWI compared with healthy controls using flow cytometry.

Methods
GWI participants (n=27) fulfilled both the Center for Disease Control and Prevention (CDC) and the Kansas case definition. Sex-matched healthy controls were recruited and reported an absence of disease. NK cells were isolated from whole blood using negative immunomagnetic selection by commercially available kits. Flow cytometry is being used to analyse the cytotoxic activity of isolated NK cells of people with GWI and health controls against the target cells, K562 cells. Cells are labelled using Annexin V and 7-amino-actinomycin (7-ADD) to determine apoptosis and assess cytotoxic activity. Baseline data has been collected, and data collection will continue at 12-months for follow-up.

Results
The current data shows a significant reduction in NK cell cytotoxicity in GWI participants compared to health control participants ($p<0.05$). The statistical analyses are performed using IBM SPSS and GraphPad Prism.

Conclusions
The preliminary data suggest that the decline in immune function in veterans with GWI may be associated with NK cell's cytotoxic dysfunction. Therefore, this current research focuses on distinguishing the pathophysiology of GWI with a healthy general population. Further research is ongoing to investigate potential aberrations in NK cell phenotypes, lytic protein production, and degranulation.

Poster #12

Mapping the Future of Sustainable Construction: A Review on Digitalization and Life Cycle Assessment Trends

Evelyn Liew Fui Yau[1], Assoc. Prof. Dominic Ong[2], Dr Irfaan Peerun[3]

[1]School of Engineering and Built Environment, Griffith University, Nathan Campus, QLD 4111, Australia
[2]Griffith Sciences Group, Office of the Pro Vice Chancellor, Griffith University, Australia
[3]School of Engineering and Built Environment, Cities Research Institute, Griffith University, Nathan Campus, QLD 4111, Australia

The construction industry's significant environmental impact on climate change underscores the pressing need for sustainable practices. Integrating Life Cycle Assessment (LCA) with digital technologies such as Building Information Modelling (BIM), Digital Twin (DT), and the Internet of Things (IoT) offers a promising approach to improve environmental performance across construction lifecycles. These technologies enable explicit knowledge representation, informed decision-making, and actionable insights to reduce carbon emissions and enhance infrastructure resilience. Recent research has advanced theoretical frameworks for combining Life Cycle Assessment (LCA) with digital technology, but it mainly focused on technical issues. The perspectives of industry stakeholders on adopting these digital tools to support sustainable practices remain largely unexplored. This study aims to bridge the gap by presenting and evaluating key datasets and factual information derived from bibliometric reviews that focus on (1) the current state of affairs of LCA and digital technologies applications in sustainable construction and (2) the current awareness levels of stakeholders and their perceptions on digital technologies and sustainable practices.

The findings reveal a recognized potential for these technologies to facilitate decarbonization and reduce embedded carbon in construction practices. However, practical implementation in the industry remains underdeveloped. A statistically significant correlation is observed between stakeholder awareness and their perceived importance for sustainable practices, highlighting the critical role of engineering informatics in bridging this gap. This research advances engineering informatics by providing novel insights into the integration of LCA and digital technologies, emphasizing the importance of seamless data integration and information exchange among stakeholders. It highlights the critical need for global collaboration and knowledge-sharing to bridge existing gaps and foster balanced progress in sustainable construction practices.

Poster #13

Bacterial bodyguards: Characterising the virus-repressing effect of Wolbachia in Drosophila melanogaster using NMR-based metabolomics

Sarah M. Walsh[1,2],Tyson Thomson[3], Karyn N. Johnson[3], Jeremy C. Brownlie[1], Horst Joachim Schirra[1,2,4]

[1]School of Environment and Science, Griffith University, Brisbane, QLD, Australia
[2]Institute for Biomedicine and Glycomics, Griffith University, Brisbane, QLD, Australia
[3]School of the Environment, The University of Queensland, Brisbane, QLD, Australia
[4]Centre for Advanced Imaging, The University of Queensland, Brisbane, QLD, Australia

Wolbachia, an intracellular bacterial symbiont, exhibits antiviral effects in insects and has been employed to limit the spread of arboviruses. However, the mechanisms underlying this interference are not consistently understood. Our study employs nuclear magnetic resonance (NMR)-based metabolomics to characterise the bi- and tripartite host-Wolbachia-virus interactions using the model insect Drosophila melanogaster, the protective Wolbachia strain wMel and the pathogenic Drosophila C virus (DCV).

The findings reveal that wMel-infected flies showed increased simple carbohydrate catabolism and elevated purine metabolite levels relative to uninfected Drosophila. DCV infection perturbed nucleotide synthesis and nucleotide abundance in Drosophila compared to uninfected Drosophila, driving metabolism to likely meet the viral replication demands imposed on the host. Notably, co-infected Drosophila exhibited a metabolic profile more similar to wMel-infected flies than DCV-infected flies, suggesting wMel generates a metabolic environment where there is competition for host metabolites between wMel and DCV inhibiting viral replication. The study also suggests that wMel competes with the host for oxygen, creating a hypoxic environment that generates reactive oxygen species (ROS). ROS are effector molecules well known to trigger specific immune pathways that have been previously proven to contribute to Wolbachia-mediated antiviral protection.

We therefore propose that Wolbachia-mediated antiviral protection should be viewed as a multimodal response resulting from wMel's influence on host metabolism, rather than a single mechanism. Results suggest that wMel drives metabolism in a direction that at least temporarily inhibits DCV replication and is metabolically similar to single wMel infections; in doing so, it concomitantly triggers immune pathways that contribute towards Wolbachia-mediated pathogen blocking. This perspective may guide future research and contribute to the continued success of Wolbachia-based vector control strategies against RNA arboviruses, potentially leading to novel approaches for defending against such pathogens and improving vector control strategies.

Poster #14

Quinacrine an Anti-Prion Drug Targeting Prion-like p53 in Breast Cancer

Memoona Zahra[1], Adi Idris[2], Ming Wei[1], Nigel McMillan[1], Alan Munn[1]

[1]School of Pharmacy and Medical Sciences, Griffith University, Gold Coast, Queensland, Australia
[2]Centre for Immunology and Infection Control, Queensland University of Technology, Australia

Introduction
Prions are normal cellular proteins that undergo a stable 3-dimensional structural switch to an amyloid form and can confer cytoplasmic inheritance of cellular phenotypes (known as "protein-only inheritance"). p53 has seen in the amyloid form in different cancer cells.

Aim
The purpose of this study is to demonstrate the role of Quinacrine in targeting amyloid Prion-like P53 in Breast cancer.

Methods
MDA-MB-231, MCF-7 and MCF-10A cell lines have been used. Western blot was done to confirm the expression of the Proteins. Anti-prion drug quinacrine treated cells were stained with amyloid-specific dye thioflavin T and amyloids were visualised under confocal microscope to see the difference between untreated and Quinacrine treated cells. MTT assays was performed on cells pre-treated with Quinacrine to assess the effect of sensitivity towards anti-cancer drug after curing amyloids, qPCR, cell migration assay, and Cycloheximide assays were also performed on quinacrine treated and untreated cells.

Results
Our studies represent the presence of amyloid p53 in breast cancer and these amyloids are having transferrable properties (cytoplasmic inheritance). qPCR results indicate the overexpression of one of the isoforms of p53(Δ40p53) in MDA-MB-231 that went back to normal after quinacrine treatment. Quinacrine treated cells were more sensitive to anticancer treatment. Cell migration and cell survival was also decreased after quinacrine treatment. Immunofluorescence assay indicated less amyloids after treating with Quinacrine.

Conclusion
Our current studies show the presence of p53 amyloids in breast cancer cell lines, which were having prion-like (transferrable) properties. Quinacrine treatment is decreasing amyloid, also making cells more sensitive towards the anti-cancer treatments as well as decreasing cell survival and cell migration. These data pave the way for studies to find the role of prions in cancer and how is it helpful in curing cancer.

Poster #15

Analysing BOLD signal intensities in Long COVID-19 patients using 7T MRI

Maira Inderyas[1], Kiran Thapaliya[1], Sonya Marshall-Gradisnik[1], Leighton Barnden[1]

[1]National Centre for Neuroimmunology and Emerging Diseases, Griffith University, Southport, QLD, Australia

Introduction: Blood oxygenation level-dependent (BOLD) functional magnetic resonance imaging (fMRI) can probe brain functions by measuring haemodynamic responses to neuronal oscillations (Hillman, 2014). Long COVID is a chronic condition characterised by fatigue, light-headedness, and neurocognitive symptoms, of which the exact underlying mechanism is yet to be identified. We investigated BOLD differences between long COVID-19 and COVID-19 recovered healthy individuals (HC-R) using 7 Tesla (7T) fMRI.

Methods: We recruited 19 long COVID patients, and 12 COVID-19 recovered healthy controls were included in the study. All participants were asked to perform a Stroop colour-word task. We acquired 80 sagittal slices with 225 volumes of fMRI data on a multiband EPI pulse sequence (Inderyas et al., 2024). The acquisition parameters were repetition time (TR) = 2000ms, echo time (TE) = 22.4ms, flip angle = 70o, multi-slice mode = Interleaved, acquisition matrix 192X192 and voxel size = 1.25mm3. Sagittal T1-weighted data was acquired using a Magnetization Prepared 2 Rapid Acquisition Gradient Echo Sequence with TR = 4,300ms, TE = 2.45ms, first inversion time (TI1) = 840ms, second inversion time (TI2) = 2,370ms, first flip angle (FA1) = 5o, second flip angle (FA2) = 6o, and resolution = 0.75mm3 with matrix size = 256X300X320. MRI data were pre-processed using SPM12 (SPM - Statistical Parametric Mapping) for realignment and unwarping, slice time correction, and co-registration to anatomical images (Friston et al., 1994). Resampling was performed at isotropic 1mm, followed by normalisation in MNI space. Smoothing was performed at 5mm FWHM. Functional MRI model specifications and estimations were performed while regressing for motion correction and framewise displacement measures, White matter and cerebrospinal fluid time series for whole-brain voxel analysis. Results: We found significantly lower BOLD activation in the anterior cingulate gyrus ($p=0.002$, cluster size= 650, Z-value=4.67) and precuneus ($p=<0.001$, cluster size=1893, Z-value=4.67) for long COVID patients compared with HC-R (see Figure 1).

Conclusion: BOLD fMRI signal responses to the Stroop test were significantly lower in long COVID patients than in COVID-19-recovered HC. Decreased BOLD signals in the anterior cingulate gyrus, and precuneus cortex regions may explain altered cognition and metabolic and mentally stimulating operations. This complex interplay between the BOLD signal, changes in cerebral blood volume, cerebral blood flow, and metabolic activity could be associated with underlying inflammation and its pathophysiology.

Poster #16

Health behaviours are significant predictors of psychosomatic symptoms among adolescents: Insights from school-based surveys in 47 countries

Satyajit Kundu[1]

[1]School of Medicine and Dentistry, Griffith University, Gold Coast, QLD 4222, Australia

Background: Psychosomatic symptoms can greatly affect the psychosocial development of young people, making them a key concern in public health. However, the evidence on health behaviours as determinants of psychosomatic symptoms among adolescents is limited globally. Therefore, we aimed to investigate the association between various health behaviours- including dietary behaviours, physical activity, smoking and alcohol consumption- and psychosomatic symptoms in adolescence.

Methods: We utilised data from 146,745 adolescents (50.7% girls), aged 10–16 years (mean [SD]: 13.5 [1.6]) across 47 European and North American countries, using the 2017–2018 Health Behaviour in School-Aged Children survey. Psychosomatic symptoms were assessed through an eight-item checklist covering headache, stomach ache, backache, feeling low or depressed, being irritable or bad-tempered, being nervous, sleeping difficulties, or dizziness over the past six months. A proxy scale with a range of 0–32 was constructed, with higher scores indicating more frequent and co-occurring symptoms. Mixed-effect linear regression was employed to examine the association while adjusting for body mass index and sociodemographic variables.

Results: The mean (SD) psychosomatic symptom score was 8.7 (6.8), with higher scores among females compared to males (9.9 vs 7.4, $p<0.001$). Unhealthy dietary behaviours, including daily soft drinks (coefficient [β]: 0.43, 95% confidence interval [CI]: 0.33, 0.52) and sweet consumption (β: 0.94, 95% CI: 0.86, 1.02), and skipping breakfast (β: 1.96, 95% CI: 1.93, 2.06) were positively associated with psychosomatic symptoms. Additionally, smoking (β: 2.39, 95% CI: 2.25, 2.52) and alcohol intake (β: 1.64, 95% CI: 1.55, 1.73) in the past 30 days were also linked to higher psychosomatic symptom scores. Conversely, healthy behaviours, including daily fruit (β: -0.34, 95% CI: -0.41, -0.26) and vegetable intake (β: -0.09, 95% CI: -0.16, -0.02), and sufficient physical activity (β: -0.41, 95% CI: -0.49, -0.32) were associated with lower psychosomatic symptom scores.

Conclusions: Public health interventions should prioritize promoting healthier lifestyle choices among adolescents to mitigate psychosomatic distress and enhance overall well-being.

Poster #17

The Promising Role of an Immunotherapeutic Cancer Vaccine Against Non-Small Cell Lung Carcinoma

Muneera Anwer[1], Alan Mun[1], Ming Q Wei[1]

[1]Menzies Health Institute Queensland and School of Medical Science, Griffith University, Gold Coast Campus, Parklands Drive, Southport, QLD, 4215, Australia

Non-small cell lung cancer (NSCLC) is a commonly occurring cancer worldwide, causing high mortality in both male and female. Traditional treatment therapies have severe side effects and relapses. Therefore, an advanced therapeutic approach has become a significant area of research. Immunotherapeutic cancer vaccines have emerged as a promising strategy for cancer treatment, harnessing the power of the immune system to recognize and kill tumor cells while causing minimal damage to healthy tissue and additionally providing systemic immunity. Bacterial ghosts (BGs), a novel platform in cancer vaccination, have made them suitable for personalized and effective immunotherapeutic interventions. Bacterial ghosts are immune stimulators that are generated through a controlled lysis process. The current study focuses on the design and development of a bacterial ghost-based cancer vaccine to treat NSCLC with enhanced anti-tumor immunity, resulting in a novel vaccine production. The present study has successfully developed a bacterial ghost capable of eliciting an immune response. The *in-vitro* immune activation has confirmed the production of pro-inflammatory cytokines and gene expression has been analysed. The *in-vivo* lung cancer mouse model investigates the potential of the prepared vaccine. The study concludes bacterial ghost to be a novel immune stimulator and may have potential to be used as an immunotherapeutic cancer vaccine. Further studies can confirm the mechanism of action, and tumor specificity.

Keywords: Immunotherapy, Bacterial ghost, Therapeutic vaccine, Preventative vaccine, NSCLC

Poster #18

Implantable flexble silicon carbide electrode for long-term cancer cells sensing and stimulation applications

Minh Anh Huynh[1], Tuan-Khoa Nguyen[1], Nam-Trung Nguyen[1]

[1]Quantum and Advanced Technologies Research Institute (QUATRI), Griffith University, 170 Kessels Road, Nathan, Queensland 4111, Australia

Silicon carbide (SiC) is an advanced semiconductor material with exceptional biocompatibility, stable electrical properties, and long-term reliability. It is a promising candidate for bioelectronic devices designed to monitor and stimulate cancer cells over extended periods. This study introduces high-quality Griffith University-grown SiC and presents the first wafer-level microfabrication process for a flexible, implantable, wide-bandgap SiC electronic device. The electrochemical performance of the fabricated SiC devices was evaluated *in vitro* using the human breast cancer cell line MDA-MB-231. The results demonstrate that the proposed SiC electronics enable real-time, highly sensitive cancer cell monitoring via electric cell-substrate impedance sensing (ECIS) and effectively eradicate cancer cells through irreversible electroporation (IRE). The SiC electrodes exhibit excellent biocompatibility, facilitating seamless integration with bioelectronic interfaces for cancer treatment and diagnostics. Furthermore, the electrodes demonstrate remarkable mechanical flexibility while maintaining stable electrical performance, essential for long-term bioelectronic applications. With superior corrosion resistance, SiC-based implants have the potential to function reliably for decades in physiological environments. These findings highlight the transformative potential of SiC as a durable, biocompatible, and high-performance material for long-term cancer cell sensing and stimulation, paving the way for innovative cancer diagnosis and treatment strategies.

Keywords: bioelectronics; microfabrication; flexible electronics; implantable device; long-term electrical stimulation; cancer cell sensing; cell stimulation

Poster #19

Discovery of *Mycobacterium smegmatis* IspD Ligands from Natural Products by A Collision-Induced Affinity Selection Mass Spectrometry Approach

Chloe Gros [1, 2], Xinru Xue[1] and Miaomiao Liu[1]*

[1]Institute for Biomedicine and Glycomics, Griffith University, Australia
[2]University of Pharmaceuticals Sciences of Nantes, France

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, remains one of the most pressing global infectious health challenges. The emergence of drug-resistant strains underscores the urgent need for new therapeutic strategies and drug targets.

The enzyme IspD, which catalyses the third step in the methylerythritol phosphate (MEP) pathway for isoprenoid biosynthesis, is essential for bacterial viability and is absent in mammals, making it an attractive and selective target for anti-mycobacterial drug development. *M. smegmatis* shares this pathway with *M. tuberculosis*, offering a safer model system for early-stage screening. To date, no small molecule inhibitors of IspD have been identified.

Collision-Induced Affinity Selection Mass Spectrometry (CIAS-MS) is a powerful, high-throughput screening technique capable of identifying protein binders from large compound libraries in a single injection[1-4]. The method involves quadrupole mass selection of protein-ligand complexes, dissociation of ligands via collision-induced dissociation (CID), and selective detection of released ligands via time-of-flight mass spectrometry.

In this study, CIAS-MS was applied to screen a subset of over 2,000 natural products derived from Australia's unique biodiversity for novel IspD-binding compounds. Compounds were screened in a pooled format, with 200 compounds per pool at 0.5 µM each. The results demonstrate the capability of CIAS-MS as a rapid, sensitive, and effective platform for early-stage drug discovery from complex ligand mixtures.

References:

1. Tin Mak, Jamie Rossjohn, Dene R. Littler, Miaomiao Liu* and Ronald J Quinn*. Collision-induced affinity selection mass spectrometry for identification of ligands. ACS Bio&Med Chem. 2022, 2, 5, 450–455
2. Ronald J. Quinn, Tin Mak, Dene R. Littler, Jamie Rossjohn, and Miaomiao Liu*. Discovery of Anti- SARS-CoV-2 Nsp9 Binders from Natural Products by a Native Mass Spectrometry Approach. J. Nat. Prod. 2023, 86, 12, 2630–2637
3. Yushu Gu, Miaomiao Liu, Linlin Ma, and Ronald J Quinn*. Identification of Ligands for Ion Channels: TRPM2. ChemBioChem 2024, e202300790
4. Yushu Gu, Miaomiao Liu, Linlin Ma, and Ronald J Quinn*. Advancing Kir4.2 Channel Ligand Identification through Collision-Induced Affinity Selection Mass Spectrometry. ACS Chem. Biol. 2024, 19, 3, 763-773

Poster #20

Low-dose Naltrexone treatment restored TRPM3 ion channel function in NK cells from Long COVID patients

E.M. Sasso[1, 2, 3], N. Eaton-Fitch[1, 2], P. Smith[2, 4], K. Muraki[2, 5], S. Marshall-Gradisnik[1, 2]

[1]The National Centre for Neuroimmunology and Emerging Diseases, Griffith University, Gold Coast, QLD, Australia.
[2] Consortium Health International for Myalgic Encephalomyelitis, National Centre for Neuroimmunology and Emerging Diseases, Griffith University, Gold Coast, QLD, Australia.
[3] School of Pharmacy and Medical Sciences, Griffith University, Gold Coast, QLD, Australia.
[4] Queensland Allergy Services, Gold Coast, Australia.
[5] Laboratory of Cellular Pharmacology, School of Pharmacy, Aichi-Gakuin University, Nagoya, Japan.

Background: It is estimated that 10% of people infected with SARS-CoV-2 develop Long COVID (LC), constituting a public health challenge that currently has no universal treatment[1,2]. Although the pathomechanism of LC remains inconclusive, the dysfunctional Transient Receptor Potential Melastatin 3 (TRPM3) ion channel was reported in LC patients[3], similar to previous results identified in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS)[4]. TRPM3 is permeable to calcium (Ca^{2+}), which is essential in numerous intracellular pathways and to ensure cellular homeostasis[5,6]. Recent results indicated *in vitro* treatment with naltrexone, μ-opioid receptor antagonist, restored TRPM3 function in NK cells from LC and ME/CFS patients[7,8], and studies have demonstrated the benefits of low-dose naltrexone (LDN) treatment for LC patients[9-11].

Aims: This study aimed to investigate the effect of LDN treatment on TRPM3 ion channel function in NK cells from LC patients.

Methods: Whole-cell patch-clamp technique was performed on freshly isolated NK cells from 9 LC, 9 healthy controls (HC) and 9 LC taking LDN to evaluate TRPM3 ion channel function modulated with 100 μM pregnenolone sulfate (PregS) and 10 μM ononetin. Statistical comparison was performed using Kruskal-Wallis and Fisher's exact test.

Results: There were significant reductions in PregS-induced ($p<0.0001$) and ononetin ($p=0.0021$) TRPM3 current amplitudes in LC compared with HC. The number of NK cells sensitive to ononetin ($p<0.0001$) was significantly reduced in people with LC compared with HC. In contrast, no significant difference was found comparing TRPM3 currents from LC taking LDN with HC, specifically PregS-evoked and ononetin amplitudes, as well as the number of cells sensitive to ononetin (all parameters $p>0.9999$). NK cells from LC patients (not routinely administering LDN) had a significant reduction in PregS-induced TRPM3 amplitude ($p<0.0001$), ononetin amplitude ($p=0.0005$) and the sensitivity to ononetin ($p<0.0001$) compared with LC taking LDN.

Conclusion: This study provided novel findings of the potential benefits of LDN to restore TRPM3 ion channel function in NK cells from LC patients. Consequently, TRPM3 restoration reestablishes TRPM3-dependent Ca^{2+} influx in NK cells, which facilitates physiological homeostasis. Moreover, these data validate TRPM3 dysfunction in people with LC and report that TRPM3 ion channel function was significantly restored in NK cells from people with LC on treatment with LDN, suggesting TRPM3 as a significant biomarker and therapeutic target for LC.

1. The Lancet. Long COVID: 3 years in. Lancet. 2023 Mar 11;401(10379):795. doi: 10.1016/S0140-6736(23)00493-2.

2. PHOSP-COVID Collaborative Group. Clinical characteristics with inflammation profiling of long COVID and association with 1-year recovery following hospitalisation in the UK: a prospective observational study. Lancet Respir Med. (2022) 10(8):761-75. doi: 10.1016/S2213-2600(22)00127-8

3. Sasso EM, Muraki K, Eaton-Fitch N, Smith P, Lesslar OL, Deed G, Marshall-Gradisnik S. Transient receptor potential melastatin 3 dysfunction in post COVID-19 condition and myalgic encephalomyelitis/chronic fatigue syndrome patients. Mol Med. 2022 Aug 19;28(1):98. doi: 10.1186/s10020-022-00528-y

4. Cabanas H, Muraki K, Eaton N, Balinas C, Staines D, Marshall-Gradisnik S. Loss of Transient Receptor Potential Melastatin 3 ion channel function in natural killer cells from Chronic Fatigue Syndrome/Myalgic Encephalomyelitis patients. Mol Med. 2018;24(1):44.

5. Clapham DE. Calcium signaling. Cell. 2007;131(6):1047-58.

6. Schwarz EC, Qu B, Hoth M. Calcium, cancer and killing: the role of calcium in killing cancer cells by cytotoxic T lymphocytes and natural killer cells. Biochim Biophys Acta. 2013;1833(7):1603-11.

7. Sasso EM, Muraki K, Eaton-Fitch N, Smith P, Jeremijenko A, Griffin P, Marshall-Gradisnik S. Investigation into the restoration of TRPM3 ion channel activity in post-COVID-19 condition: a potential pharmacotherapeutic target. Front Immunol. 2024 May 3;15:1264702. doi: 10.3389/fimmu.2024.1264702.

8. Cabanas H, Muraki K, Staines D, Marshall-Gradisnik S. Naltrexone Restores Impaired Transient Receptor Potential Melastatin 3 Ion Channel Function in Natural Killer Cells from Myalgic Encephalomyelitis/Chronic Fatigue Syndrome Patients. Front Immunol. 2019 Oct 31;10:2545. doi: 10.3389/fimmu.2019.02545.

9. O'Kelly B, Vidal L, McHugh T, Woo J, Avramovic G, Lambert JS. Safety and efficacy of low dose naltrexone in a long covid cohort; an interventional pre-post study. Brain Behav Immun Health. 2022 Oct;24:100485. doi: 10.1016/j.bbih.2022.100485.

10. Hurt RT, Yadav S, Schroeder DR, Croghan IT, Mueller MR, Grach SL, Aakre CA, Gilman EA, Stephenson CR, Overgaard J, Collins NM, Lawson DK, Thompson AM, Natividad LT, Mohamed Elfadil O, Ganesh R. Longitudinal Progression of Patients with Long COVID Treated in a Post-COVID Clinic: A Cross-Sectional Survey. J Prim Care Community Health. 2024 Jan-Dec;15:21501319241258671. doi: 10.1177/21501319241258671.

11. Bonilla H, Tian L, Marconi VC, Shafer R, McComsey GA, Miglis M, Yang P, Bonilla A, Eggert L, Geng LN. Low-dose naltrexone use for the management of post-acute sequelae of COVID-19. Int Immunopharmacol. 2023 Nov;124(Pt B):110966. doi: 10.1016/j.intimp.2023.110966.