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The Queen Elizabeth Hospital Research Expo 2023

Thursday 19 and Friday 20 October
Program & Abstracts

Basil Hetzel Institute, TQEH
Ground Floor Seminar Rooms
37a Woodville Road, Woodville South

basilhetzelinstitute.com.au

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32nd TQEH Research Expo
Thursday 19 & Friday 20 October 2023

Basil Hetzel Institute, Ground Floor Seminar Rooms, 37a Woodville Road

Thursday:	**Presentations**
1:00pm	Mini-Oral Presentations
3:10pm	Afternoon Tea
3:30pm	Clinical Research Trainees

Friday:	**Presentations & Plenary Lecture**
8:15am	Honours Students
9:15am	Junior Laboratory Research
10:15am	Morning Tea & Trade Displays
10:45am	Senior Laboratory Research
12:00pm	**Plenary Lecture: Dr Leanna Read**
	"Research and Health Care – bottom up or top down?"
1:00pm	Lunch & Trade Displays
2:00pm	Junior Clinical Research
3:00pm	Senior Clinical Research
4:00pm	3MT® & Award Presentations. Refreshments to follow.

Zoom links & more information will be available at http://bit.ly/TQEHexpo

Major sponsors of the 32nd TQEH Research Expo

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TQEH Research Expo 2023

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TQEH Research Expo 2023

Welcome to the 32nd TQEH Research Expo. The organising committee is delighted to be able to present a stellar program showcasing the translational research being conducted at the Basil Hetzel Institute of Translational Health Research (BHI), The Queen Elizabeth Hospital (TQEH). TQEH Research Expo is a major event in our research calendar and showcases the breadth and depth of the high-quality research conducted by our research trainees. TQEH Expo plays an important role in the professional development of our emerging researchers so please make time to support the presenters at all the sessions. Your time and thoughtful questions are important for the success of this event.

This year, the Committee received 44 Abstracts. 18 students will take part in the mini-oral presentation session held on the afternoon of Thursday 19 October, alongside 4 presentations from the broader Central Adelaide Local Health Network (CALHN) for the CALHN Clinical Trainee session. On Friday 20 October, 20 students will give their oral presentations, and 3 students will present their work in a lay-person format through the 3MT® and Falling Walls Laboratory presentation formats.

On Friday we are honoured to be joined by Dr Leanna Read who will explore connections between health service delivery and research as part of the Plenary Lecture. We look forward to welcoming Dr Read to TQEH.

Friday's presentations will be followed by the Award Presentations, with generous prizes on offer courtesy of our sponsors. The support of the health and medical research community and our corporate sponsors is greatly appreciated.

Many people have contributed to the success of the 32nd TQEH Research Expo in 2023 and we would like to thank all those involved. In particular, we thank:

- Our Major Sponsor, The Hospital Research Foundation Group
- Other University, Hospital and Corporate Sponsors whose logos are acknowledged in this booklet and who have sponsored prizes and the catering
- Our Plenary Speaker, Dr Leanna Read
- Chairs of the sessions

  Clementine Labrosciano
  Adrian Abdo
  Danny Liew
  Amanda Page
  Cher-Rin Chong
  Tania Crotty
  Guy Maddern
  Renuka Visvanathan
  John Beltrame

- Abstract judges and judges for Mini-Oral and Oral presentations

Adrian Abdo
Adrian Abdo
Alice Day
Amanda Townsend
Betty Sallustio
Bill Liapis
Carlee Ruediger
Cher-Rin Chong
Chris Zeitz
Clare Cooksley
Gabby Cehic
Gohar Shaghayegh
Guy Maddern
Joanne Bowen
John Beltrame
John Horowitz
Joy Rathjen
Katharina Richter
Kevin Fenix
Leonie Heilbronn
Lorraine Mackenzie
Mak Masavuli
Markus Trochsler
Nicole Wittwer
Pallave Dasari
Peter Zalewski
PJ Wormald
Renuka Visvanathan
Rob Bryant
Robert Fitridge
Scott Clarke
Sue Lester
Sha Liu
Tania Crotti
Tharshy Pasupathy
Tiffany Gill
Tim Price
Tuli Jannatul
Virgine Gaget
Wendy Ingman

- Members of the Research Expo Organising Committee for the work they have put in throughout the year in planning the 32nd TQEH Research Expo.

Adrian Abdo
Betty Sallustio
Clementine Labrosciano
Emma Bradshaw
Eric Smith
Imogen Ball
Katharina Richter
Sha Liu
Sue Lester
Yuliy Chirkov

We hope that you enjoy our 32nd TQEH Research Expo and find it a valuable and worthwhile activity. If you have any comments on this year's program or any ideas for the future, do not hesitate to speak to myself or any one of the members of the Organising Committee.

Good luck to all our presenters!

Ms Carmela Sergi

Chair,

TQEH Reseach Expo Organising Committee

32nd TQEH Research Expo Plenary Lecture
12 pm Friday 20 October
Session Chair: Prof Guy Maddern

"Research and Health Care – bottom up or top down?"

Dr Leanna Read BAgSc(Hons) PhD FAIC, FTSE

Chair, Carina Biotech Pty Ltd, TekCyte Pty Ltd and Health Translation SA

Leanna has extensive recognition for service and leadership in technology transfer and commercialisation. Her current roles include chair of biotechnology companies, Carina Biotech Ltd and TekCyte Ltd, established as spin-outs from the CRC for Cell Therapy Manufacturing, which she led as CEO and Chair. She is also chair of Health Translation SA and board member of Uniseed Venture Capital and Biosensis Pty Ltd. Leanna recently joined the Federal Government National Research Infrastructure Advisory Group.

Leanna completed a four-year term as Chief Scientist for South Australia in 2018 and served on the SA Economic Development Board for over ten years. Other past positions include chair of the SA Government AgTech Advisory Group, and membership of the Federal Government Biomedical Translation Fund Committee, Commercialisation Australia board and the Industry Research & Development Board. In 2001, she founded the successful biotechnology company, TGR BioSciences Pty Ltd, and served as Managing Director until 2012.

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TQEH Research Expo 2023

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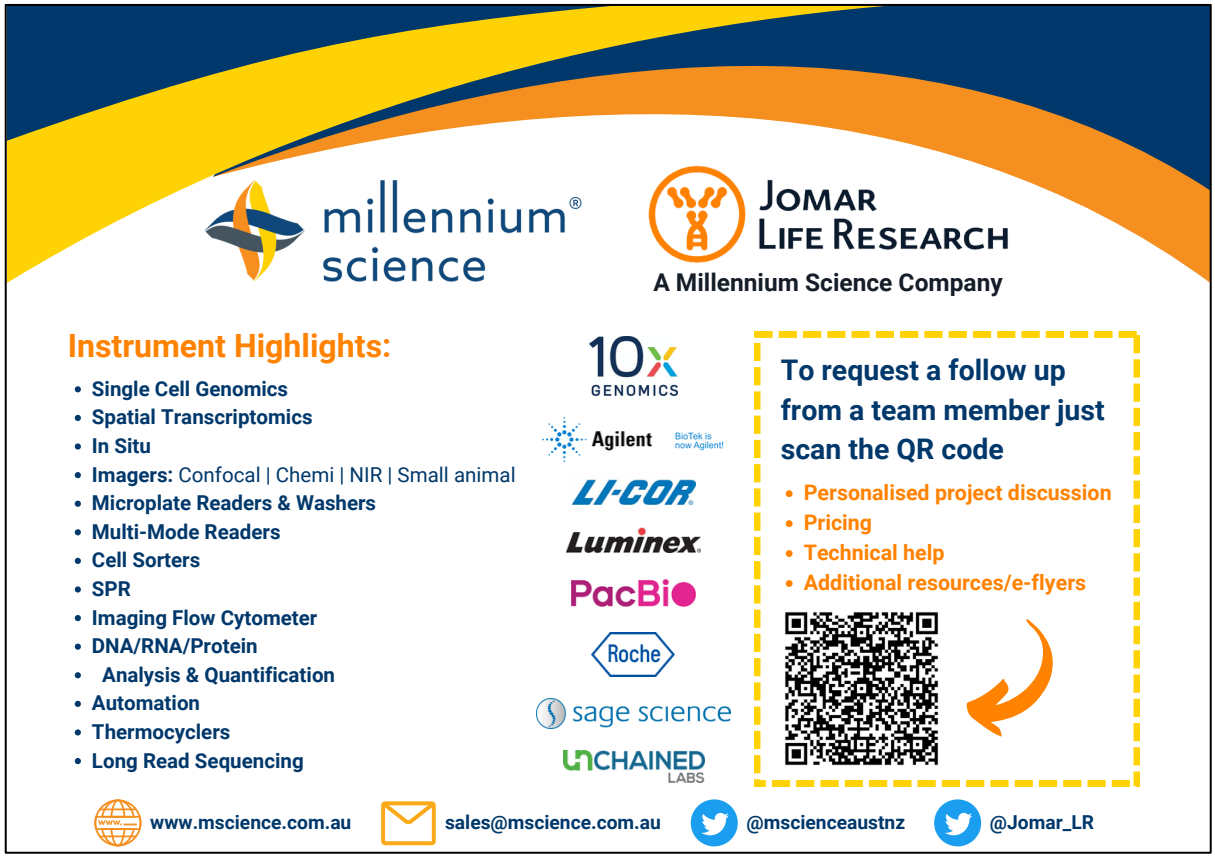

TQEH Research Expo 2023 Sponsors

Thursday 19 October

1.00 – 3.00pm: Mini-Oral Presentations

Chairs: Dr Clementine Labrosciano and Dr Adrian Abdo

Abstract 1
1.00pm: Al-Delfi Z, Masavuli MG, Mekonnen ZA, Yeow AEL, Turville SG, Bull RA, Wang X, Zhao C-X, Gowans EJ, Grubor-Bauk B
Elevating protection against covid19 with intranasal mrna vaccines

Abstract 5
1.06pm: Bastian J, Barnett D, Bhattacharjya R, Daniel D, Kanhere A, Ruszkiewicz A, Bhattacharjya S
Using the entero-insular axis as a marker of abdominal organ function during ex vivo machine perfusion in a large animal model

Abstract 12
1.12pm: Cooling H, Richter K
Antimicrobial efficacy and non-toxicity of a UV medical device

Abstract 13
1.18pm: Daniel D, Bhattacharjya R, Bastian J, Kanhere A, Barnett D, Ruszkiewicz A, Bhattacharjya S
Histological Comparison Of Pancreas Preserved By Isothermic (Room Temperature) Machine Perfusion As Compared To Static Cold Storage And Normothermic Machine Preservation

Abstract 16
1.24pm: Herath M, Martin J, Kulas S, Treloar E, Bradshaw E, Edwards S, Bruening M, Maddern G
How do we behave on camera? A systematic review and meta-analysis examining video recorder impact in clinical research

Abstract 31
1.30pm: Ong G-J, Jalili F, Chirkov YY, Horowitz JD
Early coronary microvascular dysfunction: correlation with early impairment of left ventricular function in patients with takotsubo syndrome (TTS)

Abstract 21
1.36pm: Kalyanasundaram K, Liu S, Vreugde S, Psaltis A, Wormald PJ
Safety and efficacy of a personalised phage treatment against phage resistant Staphylococcus aureus infection

Abstract 22
1.42pm: Kanhere A, Bhattacharjya R, Bastian J, Daniel D, Ruszkiewicz A, Barnett D, Bhattacharjya S
Is Machine Preservation At Room Temperature With An Acellular Oxygenated Perfusate Inferior To Normothermic Machine Preservation And Static Cold Storage For Deceased Donor Livers?

Thursday 19 October

Abstract 25
1.48pm: La S, Tavella R, Pasupathy S, Beltrame JF
Are We Overlooking NOCA Patients in South Australia?

Short Break (15 min)

Abstract 26
2.10pm: Lam L, Jiang M, Bacchi S, Kovoor J, Inglis J, Shakib S, Yuson C, Smith W
Prevalence of trimethoprim-sulfamethoxazole adverse reaction mislabelling in Australia

Abstract 27
2.16pm: Lawrie IAJ, Chirkov YY, Stafford I, Chong C-R, Horowitz JD
Ageing of anti-aggregatory autacoid signalling : "normal" fluctuations and variability in TakoTsubo Syndrome (TTS)

Abstract 28
2.22pm: Li R, Yeo K, Wu F, Kianpour Rad S, Hewett P, Maddern GJ, Young J, Tomita Y, Townsend A, Fenix K, Price T, Smith E
Single cell RNA-seq analysis reveals the heterogeneity and plasticity of cancer-associated fibroblasts in MMRd and MMRp colorectal cancer tumour microenvironment

Abstract 29
2.28pm: Lim JW, Liu S, Hon K, Shearwin KE, Vreugde S
Investigating phage adherence to mucus in the nasal mucosa to screen for potential phage to develop phage-based nasal vaccines

Abstract 23
2.34pm: Kianpour Rad S, Yeo K, Li R, Liu S, Wu F, Fenix K, Young J, Tomita Y, Price T, Ingman W, Townsend A, and Smith E
Bacopaside II: overcoming ABCC3-mediated chemotherapy resistance and enhancing doxorubicin accumulation in triple negative breast cancer

Abstract 36
2.40pm: Smyth J, Dollard J, Archibald M, Visvanathan R
Emergency physicians' perspectives of frailty

Abstract 39
2.46pm: Tan S, Vuong A, Kovoor J, Gupta A, Chan W, Umapathysivam M, Wong B, Gluck S, Gilbert T, Bacchi S
Beware of little expenses: Low-value endocrinological blood tests in geriatric medical inpatients

Abstract 40
2.52pm: Treloar E, Herath M, Bradshaw E, Bruening M, Maddern G
The Sterile Cockpit – What can we learn from aviation?

Abstract 20
2.58pm: Jiang M, Lam L, Kovoor J, Inglis JM, Shakib S, Yuson C, Ali S, Bacchi S, Sidhu S, Smith S
Drug reaction with eosinophilia and systemic symptoms (DRESS) in the electronic medical record (EMR)

Thursday 19 October

3.10 – 3.30pm: Afternoon Tea

3.30 - 4.30pm: Senior Clinical Research (CALHN Clinical Trainees)
Chair: Prof Danny Liew

Abstract 3
3.30pm: Bacchi S, Kovoor JG, Gupta AK, Kleinig OS, Ittimani M, Stretton B, Fabian J, Tan S, Ng JS, Gluck S, Chan WO, Gilbert T
Emergency Department Patient Journey Prediction with Machine Learning

Abstract 37
3.45pm: Stolz N, Kour K, Thiruvenkatarajan V
Environmental and financial costs of volatile anaesthesia at the Queen Elizabeth Hospital and the Royal Adelaide Hospital

Abstract 15
4.00pm: Han S, Mathias R, Alice D, Samra J, Sim K, Bryant R
Exploring patient experiences and satisfaction with upadacitinib, an oral advanced therapy for ulcerative colitis: a consumer survey study

Abstract 18
4.15pm: Huilgol K, Cranna M, Harford P, Macintyre P, Flint S, Van Wijk, Thiruvenkatarajan V
Preoperative opioid use prior to elective total knee replacement surgery – a single centre five-year retrospective study

Friday 20 October
Oral Presentations & Plenary Lecture

8.15 - 9.15am: Honours & Summer Students

Chair: Assoc Prof Amanda Page

Abstract 7
8.15am: Bhattacharjya R, Barnett D, Bastian J, Kanhere A, Daniel D, Ruszkiewicz A, Bhattacharjya S
Designing a Low-Volume Membrane Oxygenator for Normothermic Preservation of Organs Requiring Less than 400ml/min Blood Flow

Abstract 19
8.30am: Jessop C, Liu S, McMillan N, Fitridge R, Vreugde S
Diabetic foot ulcer infection: time for a smart phage cocktail therapy?

Abstract 32
8.45am: Portmann L, Bryant R, Raja S, Rayner C, Telfer K, Day A
The Diet of Australians with Ulcerative Colitis Differs to Recommended Dietary Guidelines: A Cross-sectional Study

Abstract 35
9.00am: Skinner M, Hope C, Masavuli M, Raith E, Plummer M, Grubor-Bauk B
Examining the immunological phenotype of immunocompetent and immunosuppressed patients acutely ill with severe COVID-19

9.15 - 10.15am: Junior Laboratory Research

Chair: Dr Cher-Rin Chong

Abstract 4
9.15am: Barnett DR, Bhattacharjya R, Bastian J, Daniel D, Kanhere A, Bhattacharjya S
Short-term machine preservation with acellular oxygenated perfusate at room temperature is not inferior to static cold storage for deceased donor kidneys

Abstract 8
9.30am: Bouras G, Yeo KK, Wormald P-J, Psaltis AJ, Vreugde S, Fenix K
Low intra-tumoural bacterial load is associated mesenchymal phenotype and increased mortality in human papilloma virus negative head and neck squamous cell carcinomas

Friday 20 October

Abstract 2
9.45am: Ambachew S, Ramezanpour M, Cooksley CM, Fenix KA, Psaltis AJ, Vreugde S
Staphylococcus aureus but not s. Epidermidis or s.lugdunensis isolated from the same niche induces nasal epithelial cell barrier disruption, cytotoxicity and inflammation

Abstract 41
10.00am: Wu F, Yeo KKL, Li R, Kianpour Rad S, Licari J, Vreudge S, Townsend A, Price T, Tomita Y, Fenix K, Smith E
Exploring the potential of perhexiline, an anti-anginal drug, for the treatment of head and neck squamous cell carcinoma

10.15 - 10.45am: Morning Tea and Trade Displays

10.45 - 11.45am: Senior Laboratory Research
Chair: Prof Tania Crotti

Abstract 11
10.45am: Connell JT, Bouras G, Yeo K, Bassiouni A, Fenix K, Cooksley C, Vreugde S, Wormald PJ, Psaltis AJ
The Microbiological Profile of Fungal Rhinosinusitis

Abstract 17
11.00am: Heydarlou H, Smith E, Ingman W
The role of toll-like receptors in mammographic density and breast cancer risk

Abstract 34
11.15am: Santos RN, Mekonnen ZA, Masavuli MG, Kelei A, Yeow AEL, Whelan DM, Al-Delfi ZNS, Gowans EJ, Grubor-Bauk B
Designing and evaluating a novel multiantigenic zika virus dna vaccine.

Abstract 42
11.30am: Yeo K, Li R, Wu F, Bouras G, Mai LTH, Smith E, Wormald P-J, Valentine R, Psaltis AJ, Vreugde S, Fenix K
Identification of consensus head and neck cancer-associated microbiota signatures: a meta-analysis of 16S rRNA and The Cancer Microbiome Atlas datasets.

Friday 20 October

12 – 1pm Friday 21 October

TQEH Research Expo Plenary Lecture

Dr Leanna Read

Chair, Carina Biotech Pty Ltd, TekCyte Pty Ltd and Health Translation SA

Research and Health Care – bottom up or top down?

Chair: Prof Guy Maddern

1 – 2pm Lunch and Trade Displays

2.00 - 3.00pm: Junior Clinical Research
Chair: Prof Renuka Visvanathan

Abstract 10
2.00pm: Chu MKW, Day AS, Mathias R, Direen T, Broad L, Lynch K, Bryant RV
Exclusive enteral nutrition induces transmural healing in adults with active Crohn's disease

Abstract 30
2.15pm: Mathias RM, Day AS, Edwards S, Pathi R, Prowse SJB, Bryant RVB
Sonographic examination and assessment of ulcerative colitis associated constipation: interim results from the SEE UCAC study

Abstract 33
2.30pm: Russell O, Lester S, Black R, Lassere M, Barrett C, March L, Lynch T, Buchbinder R, Hill C
The impact of area-level socioeconomic status (SES) on visits to general practitioners (GPs) and specialist physicians by inflammatory arthritis (IA) patients: an australian rheumatology association database (ARAD), Medicare (MBS) and Pharmaceutical Benefits Schedule (PBS) claims data linkage analysis

Abstract 38
2.45pm: Stretton B, Booth AEC, Kovoor J, Bacchi S, Gupta A, Edwards S, Hugh TJ, Maddison J, Talley NJ, Verghese S, Meyer E, Gilbert T, Barreto G, Padbury R, Plummer M, Horowitz
Impact of Malnutrition, Frailty and Socioeconomic Status on Perioperative Outcomes

Friday 20 October

3.00 - 4.00pm: Senior Clinical Research
Chair: Prof John Beltrame

Abstract 6
3.00pm: Bhattacharjee A, Walsh D, Hodson LJ, White SJ, Turnbull D, Ingman WV
Impact of breast density notification in women

Abstract 9
3.15pm: Bryant MJ, Black RJ, Munt R, Lester S, Hill CL
Charting a path to better care quality for patients: report on the adaptation and validation of a patient reported experience measure (PREM) in Australian outpatient rheumatology care

Abstract 14
3.30pm: Girolamo O, Tavella R, Pham M, Clarke N, Beltrame J, Zeitz C
Delayed recognition of STEMI in females drives persistent treatment delays

Abstract 24
3.45pm: Kovoor J, Bacchi S, Gupta A, Stretton B, Malycha J, Reddi B, Liew D, O'Callaghan G, Beltrame J, Zannettino A, Jones K, Horowitz M, Dobbins C, Hewett P, Trochsler M, Maddern G
The Adelaide Score: An Artificial Intelligence Measure of Readiness for Discharge after General Surgery

4.00pm: 3MT® Presentations

Chair: Professor Guy Maddern

Followed by Awards
Presented by
Hon Chris Picton Minister for Health and Wellbeing

ABSTRACT 1

ELEVATING PROTECTION AGAINST COVID19 WITH INTRANASAL mRNA VACCINES

Zahraa Al-Delfi*, Makutiro G. Masavuli*, Zelalem A. Mekonnen*, Arthur Eng Lip Yeow*, **Stuart G.Turville,*** Rowena A. Bull, Xing Wang****, Chun-Xia Zhao**** Eric J. Gowans*, Branka Grubor-Bauk*
*Viral Immunology Group, Adelaide Medical School, The University of Adelaide and Basil Hetzel Institute for Translational Health Research, Adelaide, SA, Australia; **The Kirby Institute, The University of New South Wales, Sydney, New South Wales, Australia; ***School of Medical Sciences, Faculty of Medicine, UNSW Australia, Sydney, NSW, Australia; ****Faculty of Sciences, Engineering and Technology, The University of Adelaide, Adelaide, SA, Australia

Current COVID-19 vaccines reduce mortality and severe disease, but the emergence of virus variants and waning of immunity resulted in reduced vaccine efficacy and increased rates of reinfection. About ~10% of mild cases develop long COVID, a multi-system illness post- infection. There is a major unmet need for vaccines that can block virus transmission, prevent breakthrough infections, and induce durable immunity, highlighting the need for development of intranasal vaccines (IN) to induce mucosal immunity. Intramuscular mRNA COVID-19 vaccines (Pfizer and Moderna), fail to induce strong mucosal immunity in the lung. The objective of this study was to develop mRNA version of our Omicron RBD COVID-19 DNA vaccine, which is in Phase 1 clinical trials to be delivered intranasally. RBD COVID-19 DNA vaccine was evaluated in Balb/c mice and induced strong antibody and T cell responses and vaccine elicited antibodies neutralised ancestral and variant strains of SARS-CoV-2.
For mRNA vaccine development, pseudouridine (Ψ) modified Luciferase mRNA was used as model antigen to develop LNPs and assess their ability to deliver mRNA to the mucosa of vaccinated mice. LNPs were formulated using a microfluidic mixing system and their size, charge, polydispersity index and encapsulation efficiency were evaluated by Dynamic Light Scattering (DLS). Tissue distribution of Luciferase mRNA encapsulated in two different formulations LNP1 and LNP2 was assessed by In Vivo Imaging System post-vaccination. Only luciferase mRNA encapsulated in LNP1 showed strong luciferase expression in the nasal cavity and lungs 6- and 24-hours post-delivery, demonstrating superiority of LNP1 to LNP2 in delivering mRNA to the mucosa. Next Ψ-modified omicron RBD mRNA vaccine was developed and encapsulated in LNP1. RBD-mRNA-LNP1 formulation was characterised by DLS, electron microscopy and validated in vitro. Experiments are underway to evaluate its ability to elicit strong mucosal immunity by IN delivery to mice.

LAY DESCRIPTION

Current COVID-19 vaccines contain viral Spike protein, which constantly mutates and weakens the vaccine's effectiveness. This, combined with the decline of vaccine-induced immunity over time, increases the rate of reinfection and incidence of debilitating long-COVID. The advantage of intranasal vaccines vs currently approved ones, is that the nasal mucosa is the site of infection and robust immunity at this site can prevent virus from replicating and stop virus transmission. This project will develop a novel intranasal mRNA COVID-19 vaccine to induce effective and long-lasting mucosal immunity that can reduce or prevent viral transmission.

ABSTRACT 2

STAPHYLOCOCCUS AUREUS BUT NOT S. EPIDERMIDIS OR S. LUGDUNENSIS ISOLATED FROM THE SAME NICHE INDUCES NASAL EPITHELIAL CELL BARRIER DISRUPTION, CYTOTOXICITY AND INFLAMMATION

Sintayehu Ambachew1,2, Mahnaz Ramezanpour1,2, Clare M. Cooksley1,2, Kevin Aaron Fenix1,2, Alkis J. Psaltis1,2, Sarah Vreugde1,2
1Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, South Australia, Australia; 2Department of Otorhinolaryngology–Head and Neck Surgery, Basil Hetzel Institute for Translational Health Research, Central Adelaide Local Health Network, Woodville South, South Australia 5011, Australia

Introduction: The influence of the microbiome on chronic rhinosinusitis (CRS) pathophysiology is still under inquiry. S. aureus contributes to the recalcitrant forms of CRS in some cases. In addition, coagulase negative Staphylococcus (CoNS) are frequently isolated from the sinonasal cavity of CRS patients. However, the contribution of the various Staphylococcus species on the inflammatory process remains unclear.
Aim: The aim of this study was to investigate the effect of these bacterial species exoproteins on the mucosal barrier.
Methods: Various Staphylococci species isolated from the same sino-nasal niche in CRS patients were grown in planktonic and biofilm forms, followed by extraction of exoproteins. Primary human nasal epithelial cells (HNECs) from CRS patients were cultured at an air-liquid interface (ALI) and challenged with exoproteins or control. Barrier disruption and cytotoxicity were measured by evaluating the transepithelial electrical resistance (TEER), passage of fluorescein labelled dextrans and measuring lactate dehydrogenase (LDH).
Results: A total of 31 Staphylococcus species (15 S. aureus, 10 S. epidermidis and 6 S. lugdunensis) were isolated from 15 CRS patients. Exoproteins (20µg/ml) obtained from both planktonic and biofilm forms of S. aureus had detrimental effects on HNEC-ALI cultures, triggered cytotoxicity and paracellular permeability ($p < 0.005$) in 11/15 isolates in 3 hours after application. However, application of exoproteins (20µg/ml) obtained from S. epidermidis and S. lugdunensis strains had mild or no effect on HNECs barrier, cell cytotoxicity and paracellular permeability.
Conclusion: This study differentiated the various Staphylococcus spp in induction of barrier disruption. Unlike that of S. epidermidis and S. lugdunensis strains, various strains of S. aureus induce wide varied nasal epithelial cell barrier disruption and cell toxicity.

LAY DESCRIPTION

Chronic rhinosinusitis is a common disorder supposed to be caused by inflammatory infection. Though various Staphylococcus spp are frequently isolated from the sinonasal cavity, to what extent variability is a function of differences in the pathogenic bacterial species is still uncertain. This study investigated the extent of damaging effect of S. aureus, S. epidermidis and S. lugdunensis bacterium on sino-nasal epithelium. We found that S. aureus has sino-nasal barrier damaging and cell killing effect as compared to S. epidermidis and S. lugdunensis strains.

ABSTRACT 3

EMERGENCY DEPARTMENT PATIENT JOURNEY PREDICTION WITH MACHINE LEARNING

Stephen Bacchi (1,2,3), Joshua G. Kovoor (1,2,4), Aashray K. Gupta (5,6), Oliver S. Kleinig (5), Mana Ittimani (7), Brandon Stretton (1,2,5), Jack Fabian (2), Sheryn Tan (5), Jeng Swen Ng (5), Samuel Gluck (8), WengOnn Chan (1,2,5), Toby Gilbert (5,8), Ja
1. Queen Elizabeth Hospital, Adelaide, South Australia, Australia 2. Royal Adelaide Hospital, Adelaide, South Australia, Australia 3. Flinders University, Bedford Park, Adelaide, South Australia, Australia 4. Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital, Woodville South, South Australia, Australia 5. University of Adelaide, Adelaide, South Australia, Australia 6. Gold Coast University Hospital, Gold Coast, Queensland, Australia 7. Royal Prince Alfred Hospital, Sydney, New South Wales, Australia 8. Lyell McEwin Hospital, Elizabeth Vale, Adelaide, South Australia, Australia 9. Flinders Medical Centre, Adelaide, South Australia, Australia

Introduction: With increasing healthcare system demands and instances of access block, strategies to optimise the patient flow through emergency departments (EDs) are critically required. Machine learning (ML) may be able to effectively predict aspects of the patient journey through ED.
Aim: This study aimed to conduct a pilot evaluation of the feasibility of using ML and data available at the time of ED triage to predict ED length of stay (LOS), the receipt of a chest X-ray in ED, and ED disposition (inpatient admission vs discharge).
Method: A study was conducted in which data available at the time of ED triage, namely a sample of ED triage notes and accompanying demographic information, were used to develop models to predict which patients received a chest X-ray, experienced prolonged ED length of stay (LOS ≥8 hours) or required inpatient admission. Models were developed on a training dataset, prior to performance evaluation on a holdout test dataset. The algorithms employed were XGBoost models, random forest models, and logistic regression models.
Results: In a sample of 50,000 unique ED visits from the Queen Elizabeth Hospital and Royal Adelaide Hospital, the XGBoost model had the highest performance in the three prespecified tasks. In the prediction of ED LOS ≥8 hours, the XGBoost model returned an area under the receiver operator characteristic (AUROC) of 0.78 (95% confidence interval [CI] 0.77-0.80). In the prediction of whether a chest X-ray would be performed, the XGBoost model achieved an AUROC of 0.88 (95%CI 0.87-0.89). In the prediction of inpatient admission, the XGBoost provided an AUROC of 0.86 (95%CI 0.85-0.87).
Conclusions: Components of the patient journey through ED can be predicted with a moderate level of performance using machine learning.

LAY DESCRIPTION

With hospital systems under increasing strain, optimising the movement of patients through emergency departments (ED) is a high priority. This study was conducted to evaluate if it is feasible to use machine learning (ML) to predict key aspects of a patients journey through ED, using data available near their time of ED arrival. In a cohort of 50,000 ED visits, ML models were developed and then had their performance evaluated. ML models demonstrated moderate performance predicting how long patients would be in ED, whether patients would receive a chest x-ray in ED, and whether patients would require admission to hospital.

ABSTRACT 4

SHORT-TERM MACHINE PRESERVATION WITH ACELLULAR OXYGENATED PERFUSATE AT ROOM TEMPERATURE IS NOT INFERIOR TO STATIC COLD STORAGE FOR DECEASED DONOR KIDNEYS

Dylan R. Barnett (1, 2), Rohan Bhattacharjya (1), Jake Bastian (1), David Daniel (1), Akshay Kanhere (1), Shantanu Bhattacharjya (1,2)
(1) Department of Surgery, University of Adelaide, Adelaide, South Australia, Australia (2) Central and Northern Adelaide Renal and Transplantation Service (CNARTS), Central Adelaide Local Health Network, Adelaide, South Australia, Australia

Introduction: Preservation of organs using oxygenated machine perfusion (MP) offers the ability for assessment, resuscitation and addressing the cumulative oxygen debt that occurs prior to transplantation1. Static cold storage (SCS) remains the gold standard in renal preservation. Normothermic preservation while feasible has not gained popularity due to technical complexity and cost barriers. Tissue ATP measurement mirrors mitochondrial function in an allograft and can be used to assess preservation quality.
Aims: The aim of this study was to establish whether short-term machine preservation with acellular oxygenated perfusate at room temperature (IMP) is inferior to SCS for deceased donor kidneys in a large animal model.
Methods: Following local ethics approval, organs were retrieved from 10 adult female Landrace pigs (mean weight 74.6kg) using a novel en-bloc technique. 8 kidneys were preserved with SCS and 8 with IMP for 5 hours. Core biopsies were taken at 90-minute intervals, snap frozen and stored at -80°C. ATP from core biopsies was extracted using a validated boiling water extraction method2 and measured using a luciferase bioluminescent assay (FLAA, Sigma-Aldrich) with a TD-20/20 luminometer (Turner Designs). A two-way ANOVA test was conducted with significance set at $p<0.05$.
Results: Baseline ATP levels were $3.21\times10^{(-10)}$ mol in the SCS group, compared to $1.58\times10^{(-10)}$ mol for IMP. During preservation the ATP concentration rose in the IMP group to $2.49\times10^{(-10)}$ mol. The ATP levels in SCS remained relatively stable during preservation reaching $3.96\times10^{(-10)}$ mol after 5 hours. A two-way ANOVA test of ATP levels after preservation was conducted, yielding a P-value of 0.37, indicating no significant statistical difference, thus implying non-inferiority.
Conclusions: IMP is non-inferior in preserving cellular ATP levels compared with SCS. More work is required to demonstrate if this finding correlates to improved organ function during preservation and following transplant.

LAY DESCRIPTION

Organs need to be kept alive and healthy despite being outside the body following retrieval from a donor and before transplantation. Typically, this involves the organs being stored in ice surrounded by special fluid. Organs preserved in this way are starved of oxygen which is required by all living cells to produce energy from foods. If energy levels in cells falls below critical levels it leads to cells dying and organs not functioning well after transplant. We wanted to determine if preserving organs with a machine pumping oxygen-rich fluid at room temperature could maintain energy levels during preservation and improve organ health.

ABSTRACT 5

USING THE ENTERO-INSULAR AXIS AS A MARKER OF ABDOMINAL ORGAN FUNCTION DURING EX VIVO MACHINE PERFUSION IN A LARGE ANIMAL MODEL

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Introduction: There are practical models for isolated ex vivo small bowel and pancreas preservation by oxygenated machine perfusion (MP) with blood at normothermia1,2. While reliable, there are cost and complexity considerations to this preservation method. MP offers study into respective organ physiology, pharmacology and transplantation. In an abdominal en-bloc MP model, the glucose tolerance test can be modified to assess the hormonal interplay between small bowel and pancreas, providing indication of organ function.
Aims: To determine the role of the entero-insular axis as a marker of ex vivo small bowel and pancreas function under different MP conditions.
Methods: Eight large white pigs were procured ethically before random assignment to either normothermic blood MP (n = 4) or isothermic acellular MP (n = 4) groups. Power analysis was done to ensure sufficient volume of data for statistical analysis. Abdominal blocks were surgically removed and integrated into the MP rig. The proximal small bowel lumen was cannulated and a glucose bolus injected at two and four hours into preservation. Serial venous glucose, GLP-1 and insulin readings were taken following stimulation.
Results: Active function of the small bowel was demonstrated in both MP models by GLP-1 and glucose data. At two hours of normothermic preservation, mean GLP-1 increased from 54.98 pg/ml at one minute post infusion to 94.07 pg/ml at 30 minutes post infusion. Mean GLP-1 post infusion for isothermic acellular MP was 122.4 pg/ml compared to normothermic blood MP at 82.14 pg/ml. Arterial – venous glucose differentials demonstrated homeostatic changes, while insulin data supported a stress response.
Conclusions: From a small bowel perspective, active secretory and absorptive function was shown in isothermic acellular MP and normothermic blood MP models. Interpretation of pancreatic function with insulin readings was difficult due to its flow rate susceptibility, a limitation of the en-bloc model.

LAY DESCRIPTION

In organ transplantation, there is a period between taking the organ out of the donor and putting it in the recipient. This is called the preservation period and there are different methods of preserving organs. One way is pumping blood at body temperature so the cells can function as they would in the body. However, blood contains substances which can damage cells after a period without oxygen. The cost and complexity of this method can be reduced by using oxygen-rich fluid at room temperature rather than blood. We are comparing these conditions by testing how well the small bowel can absorb sugar and signal the pancreas to release insulin.

ABSTRACT 6

IMPACT OF BREAST DENSITY NOTIFICATION IN WOMEN

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Introduction: Breast density is a common and independent risk factor for breast cancer. Recently, Breastscreen South Australia started notifying women about breast density as part of their screening program. However, there continues to be debate about whether breast density notification can increase subjective distress.
Research question/Aim: To assess the psychological impact of breast density notification in women.
Methods: A cross sectional study is being conducted on participants who indicated they wanted to know their own breast density in a previous study conducted in The Queen Elizabeth Hospital Breast/Endocrine Clinic outpatient department. The participants are notified of their breast density by letter, and then receive a questionnaire within 7 days to evaluate the psychological impact of the letter. The questionnaire uses the Impact of Event scale -Revised (IES-R) and State and Trait Anxiety scale (STAI). The IES-R assesses functional post-traumatic stress disorder (PTSD) and STAI assesses state anxiety (anxiety in last 7 days after receiving breast density information) and trait anxiety (general anxiety).
Results: To date, 80 women have been invited to participate and 70 have responded (88% response rate). Mean age of the participants is 61 years (range: 40-79). State anxiety score has a strong positive correlation with trait anxiety score (Pearson correlation coefficient: 0.771; $p \leq 0.01$) and a medium positive correlation with IES-R score (Pearson correlation coefficient: 0.319; $p \leq 0.01$). Paired mean comparison between state and trait anxiety shows that state anxiety is not elevated above trait anxiety after breast density notification. Three out of 70 had functional PTSD (4.29%) and this is comparable to the Australian population PTSD proportion ($p=0.29$; 95% CI: 0.0045,0.0905).
Conclusion: Results to date suggest breast density notification does not appear to increase subjective distress although this research is ongoing. Women who want more information about their breast density have the opportunity to attend a consultation with a breast surgeon to investigate surgeon-patient conversations about breast density.

LAY DESCRIPTION

Breast density is a common and independent risk factor for breast cancer. Recently, Breastscreen South Australia started notifying women about breast density as part of their screening program. However, there continues to be debate about whether breast density notification can increase subjective distress. We have assessed the stress and anxiety of women after breast density notification. We have utilised two well recognised psychological tools in this purpose. Interestingly, we observed that breast density notification with current approach did not escalate the subjective distress of women.

ABSTRACT 7

DESIGNING A LOW-VOLUME MEMBRANE OXYGENATOR FOR NORMOTHERMIC PRESERVATION OF ORGANS REQUIRING LESS THAN 400ML/MIN BLOOD FLOW

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Introduction: There is increasing interest in normothermic preservation using modified cardiopulmonary bypass circuits. Whilst suitable for organs requiring large blood flow, they are not suitable for smaller organs (Elliott et al, 2021; Weissenbacher et al., 2022). Machines used for small organs are complex, expensive and have a learning curve.
Aim: To assess whether a continuous veno-venous haemofiltration (CVVH) machine can be converted to a normothermic organ preservation rig by modifying the dialysis cartridge into a liquid membrane oxygenator.
Methods: Ethical approval was obtained from the AEC (SAM 22-089). 12 Yorkshire pigs measuring 70-80kg underwent laparotomy. The aorta was cannulated to collect a mean 3 blood bags after which an organ block comprising of the liver, kidneys, pancreas, and small bowel was retrieved. This was cold flushed with University of WisconsinTM Solution and placed transported upon ice. CVVH was performed on a Baxter PrismaflexTM Dialysis System. A Fresenius K3 Smartbag was reconstituted and enriched with carbogen (BOL) using a proprietary oxygenator from Organ Recovery Systems Adelaide. Blood flow was maintained at 395ml/min and dialysate flow at 1500ml/hr. Serial blood gases were used to assess blood oxygenation, and oxygen consumption was calculated to assess organ preservation. The system was tested over 40 hours through 12 trials. A 2-way ANOVA test was performed to assess for significance ($p<0.05$).
Results: The liquid membrane oxygenator achieved significantly higher PaO2 compared to room air oxygenation($p<0.05$). Perfused organ blocks showed evidence of O2 consumption with initial peaks followed by gradual declines to a base level approximately 3 times that of normal tissue O2 consumption.
Conclusions: A CVVH machine was successfully converted. The liquid membrane oxygenator was effective, and the organ block remained viable through the perfusion period. Given the ubiquitous nature of CVVH devices in hospitals, this represents a low-cost alternative to machine perfusion of small organs.
References: Elliott et al. 2021. Normothermic kidney perfusion: An overview of protocols and strategies. Am J Transplant, 21, 1382-1390; Weissenbacher et al. 2022. Forty-eight hours of normothermic kidney preservation applying urine recirculation. Artificial Organs, 46, 710-714.

LAY DESCRIPTION

Organs come in many different shapes and sizes. Some organs are smaller than others. At the moment, keeping these organs alive outside of the body is done either by putting them in ice, or by connecting them to a pump. The pumps used are very strong and work well for large organs that need a lot of blood, however, in small organs, they can cause damage. They are also very expensive and hard to use. The aim of this experiment was to see if a machine already used a lot in hospitals could be changed so that it could be used to keep small organs alive. If this works, keeping more organs alive becomes a lot easier, allowing for more transplants.

ABSTRACT 8

LOW INTRA-TUMOURAL BACTERIAL LOAD IS ASSOCIATED MESENCHYMAL PHENOTYPE AND INCREASED MORTALITY IN HUMAN PAPILLOMA VIRUS NEGATIVE HEAD AND NECK SQUAMOUS CELL CARCINOMAS

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Introduction: Head and neck squamous cell carcinoma (HNSCC) is the 7th most common cancer type, leading to 450,000 deaths annually. Prior studies have shown it is possible to extract intra-tumoural microbiome signatures from whole genome sequencing (WGS) data. However, such studies have been focused at the meta-cancer level and have not made use of multi-omic data such as transcriptomics and proteomics generated on the same patients for HNSCC.
Aims: To determine whether intra-tumoural bacterial load is related to patient prognosis, survival and tumour phenotype in HNSCC.
Methods: Data from 118 Human Papilloma Virus (HPV) negative HNSCC patients from the Cancer Genome Atlas (TCGA) and 110 HPV negative patients from the Clinical Proteomic Tumor Analysis Consortium (CPTAC) were analysed by taxonomically classifying tumour WGS sequencing reads that did not map to the human genome. Likely contaminant species were removed due to batch effects. Bacterial load was calculated as the proportion of bacterial reads to total library read depth and was integrated with transcriptomic, proteomic and survival datasets using machine and deep learning methods. Microbiome signatures in 15 top TCGA bacterial load patients were verified by generating metagenome assembled genomes (MAGs).
Results: Low bacterial load was associated with mesenchymal tumours and was negatively associated with patient survival. High bacteria load tumours were characterised by oral microbes Fusobacteria, Treponema, Prevotella, Streptococcus, were more likely to be keratinised and 'epithelial-like' and were associated with significantly better survival.
61 medium and high quality MAGs were generated, showing good concordance with bacterial abundance. These are to our knowledge the first HNSCC tumour associated MAGs ever generated.
Conclusion: HNSCC bacterial load may be a valuable prognostic indicator of tumour phenotype and drive disease progression. More work needs to be done to determine the mechanism behind this.

LAY DESCRIPTION

Head and neck cancer is the 7th most common type cancer, leading to 450,000 annual deaths. Studies have shown that head and neck tumours can contain bacteria, but relationship between the amount of bacteria, patient survival and cancer development is unknown. Using 'big data' and 'deep learning' methods, we show that patients with lots of bacteria inside their tumours have better survival rates and more 'skin-like' tumours. Patients with few or no bacteria have worse survival rates. More work now needs to be done to determine how we can use this finding to better treat head and neck cancer.

ABSTRACT 9

CHARTING A PATH TO BETTER CARE QUALITY FOR PATIENTS: REPORT ON THE ADAPTATION AND VALIDATION OF A PATIENT REPORTED EXPERIENCE MEASURE (PREM) IN AUSTRALIAN OUTPATIENT RHEUMATOLOGY CARE

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Background: There is no accepted Patient Reported Experience Measure (PREM) in routine use in Australian rheumatology outpatient clinics.

AIM: Evaluate the reliability and validity of an adapted version of the Commissioning for Quality in Rheumatoid Arthritis-PREM (CQRA-PREM) for use in an Australian mixed rheumatology patient cohort.

Methods: Individual interviews (n=8) were performed to check the language, relevance and completion time of the original CQRA-PREM, which was then modified.

Participants of the Australian Rheumatology Association Database (ARAD) completed Australian-CQRA PREM (22 items, scored 1-5, 4 domains), a disease activity measure (RAPID-3 or BASDAI) and Australian Quality of Life (AQOL-6) index. Responses were linked to Rheumatic Diseases Comorbidity Index (RDCI). Item correlation was assessed by Exploratory Factor Analysis (EFA). Divergent validity was assessed by partial correlation of A-CQRA-PREM with disease activity, adjusted for AQOL-6 and RDCI.

Results: Survey response was 707/1124 (63%); (65% Rheumatoid Arthritis, 19% Psoriatic Arthritis, 16% Ankylosing Spondylitis). Patient characteristics: 67% female, mean age 62 years, mean disease duration 22 years. Median completion time (feasibility) 299 seconds (IQR 130). EFA extracted 5 factors. All items loaded similarly onto factor 1, indicating validity of an averaged, overall score. Partial correlation between A-CQRA-PREM score and standardised disease activity was not significant (rho=0.03, p=0.45), indicating divergent validity. There was no floor/ceiling effect for average score. Reliability of average score was comparable across disease subgroups (Cronbach's ⍰ >0.94). Mean average score (4.1, sd 0.6), did not differ by disease subgroup (p=0.73).

Conclusions: The A-CQRA-PREM may be interpreted as an average overall score, and is a valid and reliable instrument to measure self-reported care experience in Australian rheumatology patients. It is therefore a novel application for monitoring care quality.

LAY DESCRIPTION

The Rheumatology research group at the Basil Hetzel Institute and Queen Elizabeth Hospital are seeking ways to build patient experiences of care into how our clinics are designed and how our services are delivered. To do this, we need a purpose-built survey to gather information from patients: a Patient Reported Experience Measure (PREM). We have performed the statistical work on an adapted PREM to ensure it asks the right questions and is reliable when used with Australian patient. This research reports on the testing and performance of our proposed PREM, for future use in rheumatology clinics across Australia.

ABSTRACT 10

EXCLUSIVE ENTERAL NUTRITION INDUCES TRANSMURAL HEALING IN ADULTS WITH ACTIVE CROHN'S DISEASE

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Introduction: Exclusive enteral nutrition (EEN) is a diet therapy for active Crohn's Disease (CD). Transmural healing (TH) is a novel therapeutic paradigm in CD, holding benefits beyond endoscopic mucosal healing. There is limited data exploring EEN and TH in CD.
Hypothesis/Aims: We aimed to examine the effects of EEN on TH and hypothesized that EEN therapy will induce TH.
Methods: This was a prospective, multi-centre cohort study. Adults ≥18 years with active CD were enrolled between March to September 2022. Eligible, consenting participants were assessed by a specialised IBD dietitian and prescribed 6 weeks of EEN therapy. A 1.5kcal/mL polymeric, low lactose, fibre-free formula was prescribed to provide 25-30kcal/kg of calories and 1.2-1.5g/kg of protein per day. Patients were allowed concurrent tapering corticosteroid and biological therapy. Clinical disease activity was evaluated at weeks 0, 3 and 6 by the Harvey Bradshaw Index (HBI) and TH was assessed by IUS at weeks 0 and 6. Clinical response was defined as a HBI reduction >2 points from baseline and clinical remission was defined as HBI <4 points. Transmural response (TR) was defined by ≥25% bowel wall thickness (BWT) reduction from baseline on IUS. TH was defined as BWT ≤3mm, Doppler signal score ≤1, normal wall stratification, and absence of inflammatory fat on IUS.
Results: Fourteen consecutive patients were enrolled and completed the EEN therapy. Nine were female (64.3%) and mean age was 44.4 years. Ten patients had ileal disease (L1), 4 had ileocolonic (L3) and predominant phenotype was inflammatory (B1, 7/14) and stricturing (B2, 6/14) disease. At week 6, 11/14 (78.6%) of patients achieved clinical remission and 12/14 (85.7%) displayed clinical response. TR was achieved in 8 patients (57.1%) and TH was reached in 2 (14.3%) patients.
Conclusions: EEN was identified to induce early transmural response and healing in patients with active CD. Further studies are required to evaluate the capacity for EEN to induce TH.

LAY DESCRIPTION

Crohn's disease is a disease that causes swelling and damage to the digestive tract, leading to symptoms such as abdominal pain and diarrhea. Improving symptoms is desired, but therapies that also reduce digestive tract swelling lead to better patient health outcomes. Exclusive enteral nutrition (EEN) is a liquid diet used to treat Crohn's disease. EEN improves symptoms but it is unclear if it reduces digestive tract swelling. In this study, 14 patients had EEN for 6 weeks. We used ultrasound to monitor the amount of digestive tract swelling. We found that EEN significantly reduces digestive tract swelling in patients with Crohn's disease.

ABSTRACT 11

THE MICROBIOLOGICAL PROFILE OF FUNGAL RHINOSINUSITIS

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Introduction: Allergic Fungal Sinusitis (AFS) is a severe phenotype of chronic rhinosinusitis (CRS) characterised by nasal polyposis, tenacious mucin, and diminished quality of life. It is highly recalcitrant, typically necessitating multiple surgeries and lifelong medical therapy. While fungal allergy and type 2 inflammation are considered core pathophysiological mechanisms, the direct and synergistic role of bacteria in disease propagation has been a pervasive hypothesis.
Research Question: We set out to define the microbiome of AFS compared with other CRS subtypes. Our aim was to identify virulent organisms that may be implicated in the pathophysiology of AFS.
Methods: We undertook a cross-sectional study of 31 AFS and 30 non-fungal (NF) CRS patients. Nasal swabs were used to isolate pathogens and to extract DNA followed by fungal ITS, short read 16S rRNA and long read 16S rRNA sequencing.
Results: Staphylococcus aureus was the dominant organism cultured and sequenced in both groups with no significant difference in mean relative abundance (AFS 24.9%; NF 22.1%; p=0.56). Streptococcus pneumoniae (AFS 12.7%; NF 0.9%; p=0.02) and Haemophilus influenzae (AFS 15.6%; NF 0.2%; p=0.003) were significantly more abundant in the AFS group. Bacterial diversity was lower in the fungal group. Malassezia was the dominant fungi and was in comparable abundance for both groups (AFS 43.6%; NF 39.2%; p=0.37). Aspergillus was identified exclusively in the fungal group (AFS 14.3%; NF 0%; p=0.03).
Conclusion: A low diversity, dysbiotic environment dominated by Staphylococcus aureus, Streptococcus pneumoniae and Haemophilus influenzae characterised the microbiome of AFS. While Staphylococcus aureus has been implicated in AFS through enterotoxin and superantigen potential, the latter two virulent organisms are a novel finding that warrant further investigation of alternate cross kingdom pathophysiological mechanisms.

LAY DESCRIPTION

The sinuses are a unique frontier for human-fungal interactions, as we inhale millions of fungal spores daily. For most, this is inconsequential, with fungi residing passively. Yet in a subset of individuals fungi provokes an exaggerated immune response, causing severe symptoms, impaired quality of life and resistance to traditional therapies. While the underlying mechanisms remain elusive, a prevailing theory is that resident bacteria create a perfect environment for fungal overgrowth, overwhelming the immune system. We applied new gene sequencing techniques to define the dominant bacteria in fungal sinus disease, to guide future therapies.

ABSTRACT 12

ANTIMICROBIAL EFFICACY AND NON-TOXICITY OF A UV MEDICAL DEVICE

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Background: Superbugs, or antimicrobial-resistant bacteria, are one of the biggest threats to public health, predicted to kill 10 million people a year by 2050. Subsequently, the spread of superbugs urgently calls for novel methods to kill them. UV light at 245-450nm has been used for decades to disinfect surfaces, however, toxic effects limit its use in humans.
Hypothesis/Aims: I hypothesised that 213nm UV laser light is powerful enough to effectively kill Escherichia coli without causing cell death in human cells. My aim was to establish the laser treatment parameters needed to effectively destroy E. coli bacteria and biofilms and demonstrate non-toxicity in vitro.
Methods: Planktonic E. coli OP50 (1.5x108 CFU/mL) was laser-treated for varying times (5ns-15min) on Tryptone Soya Agar (TSA). After overnight incubation, bacterial growth inhibition was measured. For biofilm assays, E. coli OP50 ($1.5x10^6$ CFU/ml) was grown on TSA for 24h followed by laser exposure and CFU extraction to determine antibiofilm activity. Cell viability of Human Keratinocytes and Human Dermal Fibroblasts exposed to the laser was assessed using CellTiter-GLO.
Statistical analysis used student t-tests and one-way ANOVA with significance determined at $P<0.05$.
Results: Significant killing of planktonic bacteria was already seen after 5ns of laser exposure ($P = 0.0026$) with a growth inhibition zone of 9.3 mm. The diameter increased to 20.8 mm for 30s of exposure. Longer exposure times did not further increase the bacterial killing. Antibiofilm activity has been inconclusive, however, early data (n=1) suggested that biofilm killing successfully occurred at 10min of laser exposure. Human skin cells remained viable after 120min of laser exposure with no toxicity measured 24h post-exposure.
Conclusions: 213nm laser light successfully killed planktonic E. coli after 5ns and showed no toxic effects in human cells. Future work will determine how promising 213nm laser light is as a new antimicrobial medical device.

LAY DESCRIPTION

Surgical site infections are the most common surgical complication, linked to high healthcare costs, long hospital stays, and debilitating medical issues. Antibiotic resistance makes treating these infections more difficult as our go-to medications stop working. Because of this, we desperately need new tools to kill bacteria, particularly for surgical site infections. I investigated the bacterial-killing-effects of an ultraviolet laser that successfully destroyed bacteria without harming human cells. Future experiments will determine how we can leverage these effects to better fight superbugs and improve healthcare after surgery.

ABSTRACT 13

HISTOLOGICAL COMPARISON OF PANCREAS PRESERVED BY ISOTHERMIC (ROOM TEMPERATURE) MACHINE PERFUSION AS COMPARED TO STATIC COLD STORAGE AND NORMOTHERMIC MACHINE PRESERVATION

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Background: The growing shortage of donor pancreata for transplant has led to the usage of extended criteria donor organs (ECD). Static Cold Storage (SCS) is the gold standard for pancreas preservation, however is suboptimal for preservation of ECD organs. Oxygenated machine Preservation (MP) can potentially address some of the shortcomings. Isothermic machine preservation (IMP) at room temperature, if feasible is novel and potentially offers a simpler method compared to normothermic (NMP).
Aims: To use histological analysis of SCS, NMP and IMP preserved porcine pancreata to assess whether IMP produces comparable results.
Methods: Ethics approval was granted, and organs were retrieved from 12 adult female pigs. 4 multiorgan blocks were preserved using SCS, 4 using NMP and 4 using IMP. Ex-vivo preservation was for maintained for 5 hours, during which tissue samples were taken at retrieval (A), post preservation (F) and post reperfusion (H). Core biopsies were obtained using an 18-gauge BardTM automated biopsy gun and were stored in formalin at room temperature. Blinded histological analysis of H&E stains were performed by an experienced histopathologist for each sample and they were scored based off an objective histological scoring system. Each tissue sample was graded from 0-3 (0-absent, 1- mild, 2- extensive, 3- very extensive) on the following individual categories: acinar cell autolysis, fat necrosis, duct epithelium damage and islet cell damage. A composite score for each sample was attained by adding the individual scores, which was used for analysis. Total scores were averaged for each organ at each time point (A, F and H) and compared using a two- way ANOVA test, with significance set at $p<0.05$.
Results: Comparison of the total averages and a P value of 0.22 represented no statistical difference between all 3 groups.
Conclusions: For a 5 hour ex-vivo preservation in a large porcine model, IMP is feasible and is non-inferior in pancreas preservation as compared to NMP and SCS.

LAY DESCRIPTION

With respect to the pancreas, SCS is the current standard of preservation for organ transplant surgery. Although cost effective, the SCS method causes a degree of damage to the organ. In comparison, machine preservation is an emerging area of research due to its potential for superior preservation. Machine preservation has multiple components, including temperature and preservation fluid used. Our research will be a novel study investigating isothermic (room temperature) machine preservation of the pancreas using an acellular preservation fluid. Non-inferior histological results for IMP preserved pancreata compared to SCS suggest viability.

ABSTRACT 14

DELAYED RECOGNITION OF STEMI IN FEMALES DRIVES PERSISTENT TREATMENT DELAYS

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Introduction: Female gender has previously been shown to be associated with delayed presentation and delayed treatment of acute ST elevation myocardial infarction (STEMI) when compared to male gender. Although there has been awareness of this disparity for some time, it is uncertain whether simple awareness has been sufficient to bridge this gap. Furthermore, the specific drivers of disparity have not previously been fully elucidated.
Aim: To compare the impact of gender on treatment times in STEMI patients.
Methods: We studied 559 consecutive STEMI cases presenting to our health network with two 24/7 interventional sites over a three-year period (2019-2022, inclusive). Patients who developed STEMI after presentation to hospital or who were transferred from another institution were excluded from this analysis. Only patients proceeding to percutaneous intervention of the culprit lesion were included. First medical contact (FMC) is either hospital door time or time of ambulance paramedic arrival at patient. Electrocardiograph (ECG) time reflects first recorded ECG, either by ambulance paramedic or hospital emergency department.
Results: Females patients with STEMI were older, more likely to arrive via ambulance, with longer symptom duration at presentation (all $p<0.001$), but had similar FMC to ECG times and extent of ST elevation. Despite this, almost the entire treatment delay was driven by delayed recognition and activation of Code STEMI. Code STEMI to wire across lesion was the same regardless of gender.
Conclusion: Strategies to improve management of STEMI in female patients should target improved recognition and diagnosis to bridge the persisting management gap. Such efforts must be driven by better engagement with emergency departments and ambulance paramedics by the cardiology community to highlight persisting disparities and facilitate system improvements.

LAY DESCRIPTION

A heart attack is a common medical emergency, where survival depends on the patient quickly receiving a diagnosis and treatment in hospital. We looked at over 500 heart attack patients and found that unlike males, female patients take longer to come to the hospital, and have major delays in receiving life-saving treatment. This tells us that we need to improve how female patients having a heart attack are treated in hospital; we need to put greater efforts towards identifying when a female is having a heart attack, and quickly diagnosing them to ensure that they are not disadvantaged.

ABSTRACT 15

EXPLORING PATIENT EXPERIENCES AND SATISFACTION WITH UPADACITINIB, AN ORAL ADVANCED THERAPY FOR ULCERATIVE COLITIS: A CONSUMER SURVEY STUDY

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Introduction: The introduction of upadacitinib (UPA), an oral Janus kinase inhibitor, has expanded the treatment choice for ulcerative colitis (UC) in Australia. UPA is administered orally allowing for more convenience than most subcutaneous and intravenous advanced therapies.
Aim: To evaluate patient satisfaction with UPA in those patients with UC previously exposed to other forms of advanced therapies.
Method: All patients with UC receiving UPA as a part of a Product Familiarisation Program (PFP) at a tertiary Inflammatory Bowel Disease Service (IBD-S) were surveyed online to assess their satisfaction with the therapy. It consisted of 11 questions with Likert scale, multiple choice or descriptive responses addressing treatment logistics (convenience, administration, and non-live zoster vaccination), efficacy (symptom response), safety (side effects) and overall satisfaction (level of support).
Results: All invited patients (n=14) with UC receiving UPA completed the survey; 36% female, mean age 46 years (±15), Montreal classification E1 21%, E2 43%, E3 36%. Most found oral administration very convenient (85.7%). Clinical symptom improvement was rapid: 2 patients (14.3%) reported within days, 2 (14.3%) within 1 week, and 7 (50%) within 2-3 weeks. Almost all, 13 (92.9%), considered UPA to be an effective therapy, with an average recommendation score of 8.9/10. Mild side effects were experienced by 6 patients (42.9%), with shortness of breath and acne being most common. Most patients (12 (85.7%)), felt satisfied with support from IBD-S and PFP. Patient feedback emphasised the convenience of oral administration compared to hospital visits. The non-live zoster vaccine was deemed expensive (10 (71.4%)), yet almost all patients (13 (92.9%)) received the vaccine.
Conclusion: Surveyed patients with UC report high levels of satisfaction with UPA as a newly available oral advanced therapy, citing key attributes as both clinical efficacy and the convenience of oral administration.

LAY DESCRIPTION

Upadacitinib (UPA) is a newly available oral advanced therapy for ulcerative colitis (UC). It offers more convenience than other advanced therapies, usually given by injection or infusion. A study was conducted to survey patients with UC taking UPA. The survey asked about patients' satisfaction with the orally administered treatment. The survey found oral administration to be convenient and reported rapid symptom improvement with few side effects. Surveyed patients with UC report high levels of satisfaction with UPA, citing key attributes as both clinical efficacy and the convenience of oral administration.

ABSTRACT 16

HOW DO WE BEHAVE ON CAMERA? A SYSTEMATIC REVIEW AND META-ANALYSIS EXAMINING VIDEO RECORDER IMPACT IN CLINICAL RESEARCH

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Introduction: On the cusp of the great depression the Western Electric Company in Hawthorne Illinois conducted an experiment and found that productivity increased when workers aware of close observation. This phenomenon of behavioural change associated with awareness of being observed became known as The Hawthorne Effect. The existence of this effect has been extensively debated in the literature and evidence is conflicting.
Research Question and Hypothesis: With small video recording devices becoming common in research, we aimed to conduct a systematic review of the literature to determine if video recording devices cause behavioural change. We hypothesise that video cameras do not alter participant behaviour.
Methods: In consultation with our senior reference library team search terms were defined and the following databases were searched: Medline, Embase, Emcare, Psychinfo, CINAHL, and Google Scholar. No filters were set. The study was prospectively registered (CRD42022370498). Two reviewers independently conducted article screening and conflicts were resolved by a third reviewer. Risk of Bias was performed by two reviewers using the Newcastle Ottawa Scale.
Results: 1728 results were identified from primary searches and 28 studies were included in the final analysis. Results were reported inconsistently and only two papers reported objective data. Three endpoints were appropriate for quantitative analysis: The proportion of participants who noticed the camera was 48% (n=7, 95% CI: 22-75); participants reporting concerns about the camera was 19% (n=6, 95% CI: 6-32); and, participants reporting behavioural change was 18% (n=8, 95% CI: 9-27).
Conclusion: The results suggest the possibility of the existence of The Hawthorne Effect. These findings need to take into consideration the low quality of these studies. To answer the study question comprehensively a tool that can objectively quantify the Hawthorne Effect is required and higher quality studies need to be conducted.

LAY DESCRIPTION

Cameras are everywhere in modern society. Their use is also becoming more common in clinical research. They provide an advantage over a human as they can objectively record an event without prejudice or influence. Despite these advantages there is always a question of people 'performing for the camera'. If participants on camera do change their behaviour because they are aware of being observed then the results from the study may not be 100% valid. This research project comprehensively searches published literature to define the scope of this issue and determines if this phenomenon is fact or fiction.

ABSTRACT 17

THE ROLE OF TOLL-LIKE RECEPTORS IN MAMMOGRAPHIC DENSITY AND BREAST CANCER RISK

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Introduction: High mammographic density is associated with an increased risk of breast cancer [1]. The biological basis for this association is not well understood however chronic low level inflammation has been identified as a driver of mammographic density-associated breast cancer risk [2-4]. Inflammation is considered a hallmark of cancer and is associated with a poor prognosis [5]. Little is known about the drivers that initiate inflammation in high mammographic density, however, innate immune signalling components such as Toll-Like Receptors (TLRs) may play a key role. In response to exogenous and endogenous stimuli, TLRs trigger inflammation through activation of myeloid differentiation primary response 88 (MyD88) and nuclear factor kappa B (NF-κB) [6, 7].
Aim: We aim to investigate the inflammatory signalling pathways that lead to high mammographic density.
Methods and Results: Immunohistochemistry was conducted on paired breast tissue samples of high and low-mammographic density (n=16) to detect TLR4, MyD88, NF-κB. Increased TLR4 expression was observed in the epithelium ($p > 0.001$) and stroma ($p = 0.02$) in high mammographic density compared to low density tissue. This was accompanied by increased expression of both Myd88 ($p = 0.01$) and NFkB ($p = 0.008$) in the epithelium. No significant differences in My88 or NFkB were observed in the stoma. Immunofluorescence staining was performed to determine the cell type expressing TLR4, demonstrating that TLR4 is primarily expressed by basal-type epithelial cells.
Conclusions: Increased expression and activation of TLR4 is associated with high mammographic density and may lead to the increased inflammation in mammographic density observed in previous studies. Further research will investigate the potential endogenous and exogenous triggers of inflammation mediated by TLR4 that lead to increased breast cancer risk.

LAY DESCRIPTION

Breast density refers to how much of the breast is gland and tissue versus fat and around half of women have dense breasts. Women with dense breasts have an increased risk for developing breast cancer but we don't know why. We conducted research to examine high and low density human breast tissue. We found that inflammatory proteins are more activate in dense tissue and this could put dense breast tissue at risk of developing cancer. Identifying the causes of inflammation and targeting them could lead to potential new treatments to reduce the risk of developing breast cancer.

ABSTRACT 18

PREOPERATIVE OPIOID USE PRIOR TO ELECTIVE TOTAL KNEE REPLACEMENT SURGERY – A SINGLE CENTRE FIVE-YEAR RETROSPECTIVE STUDY

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Introduction: Opioid use prior to elective joint replacement surgery has been established as a risk factor for multiple complications such as: infection, increased hospital stay, revision of procedures and continuation of opioid use on discharge1,2. In the United States 1 in 2 patients are prescribed opioids in the year leading up to total knee replacement (TKR) surgery3. A South Australian study across 15,000 patients between 2001 to 2012, showed that the prevalence rose from 37% to 49% (defined as opioids prescribed within a year of surgery)4. Whereas, a New South Wales study between 2018-19 revealed a prevalence of only 13% across 381 patients who underwent TKR (defined as patient self-reported use and/or prescription)5.
Aims/ Hypothesis: To conduct a retrospective study to assess the prevalence of preoperative opioid use prior to TKR. We hypothesised that the prevalence of opioid use would be less than our international counterparts.
Methods: Acute pain service figures and our electronic medical records were used to retrieve our data. Demographics, the type of operation (primary or revision), the type of medications including type of opioid; its route, dose, frequency and indication, were collected. All opioid dosing was converted into oMEDD (oral morphine equivalent daily dose)6. The results were tested for normality and presented appropriately.
Results/ Discussion: Out of the 709 eligible patients, 660/709 (93.1%) underwent a primary TKR and 49 underwent a revision procedure. Within the primary TKR group, a 35% (231/660) prevalence of preoperative opioid use was established. Oxycodone was the most common regular opioid, followed by buprenorphine and tramadol, with median oMEDD of 40mg. In the 49 patients who underwent revision procedures, 49% (24/49) took opioids preoperatively.
Conclusions: Our study found that 1 in 3 patients took opioids prior to their TKR. We advocate that further efforts should be made towards improving opioid stewardship in the years to come.

LAY DESCRIPTION

Osteoarthritis is an ever-growing concern affecting our population. Before an operation, opioid medications may be incorrectly used. This can lead to complications such as infection, revision procedures and ongoing opioid use on discharge. In the United States, 1 in 2 patients take opioids before their operation, whereas in Australia, the data is conflicting. We looked at our hospital site over a five-year period and found that 1 in 3 patients took opioids before their knee replacement surgery, which was higher than expected. With the worsening opioid crisis, it is essential that we aim to reduce opioid use to improve patient outcomes.

ABSTRACT 19

DIABETIC FOOT ULCER INFECTION: TIME FOR A SMART PHAGE COCKTAIL THERAPY?

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Introduction: Diabetic Foot Infections (DFIs) are a serious complication with high morbidity and mortality. The microbiome of DFIs and the antibiotic susceptibility including multidrug resistant (MDR) rates of the pathogens that cause non-closure of these wounds are poorly understood. Bacteriophage are viruses that specifically kill bacteria, including MDR ones. However, the rate of susceptibility to phage is not well understood.
Aims: To identify the most prevalent pathogenic bacteria from DFIs and evaluate their antimicrobial and phage susceptibility in vitro.
Methods: Microbiome and bacterial swabs were collected from patients with DFIs. Bacteria were cultured and microbiota was analysed through 16SrRNA long read sequencing. The isolated pathogenic bacteria's antimicrobial susceptibility was assessed by using a disk diffusion test for commonly used antibiotics. Phage susceptibility was performed by double layer plaque assays.
Results: A total of 44 isolates were collected from 15 patients with DFIs across multiple time points. The most frequently isolated bacterium was P. aeruginosa, observed at 12 different time points, followed by S. aureus and P. Mirabilis at 9, S. lugdunensis at 8, and E. hormaechei at 6. Of these isolates, 24 out of 44 were identified as MDR, with 100% of P. Mirabilis and E. hormaechei strains in this category, along with 66% of S. aureus strains.
Notably, 100% of S. aureus, 84% of P. aeruginosa, and 50% of S. lugdunensis strains were susceptible to phage. Combining the results from 16S rRNA long-read sequencing can further confirm the abundance of bacteria within DFIs.
Conclusion: These findings indicate that MDR bacteria in DFIs could be addressed using phage therapy as an alternative treatment. Further investigation of the microbiome is crucial to identify the specific bacteria to target with phage. Testing additional phage targeting different phage receptors may expand the range of bacterial strains that can be effectively treated.

LAY DESCRIPTION

Diabetic Foot Ulcers, a wound that can occur on diabetics, can become colonised by bacteria which cannot be killed by multiple types of antibiotics making these infections difficult to cure. This could lead to further complications such as reoccurring infection or amputation however, an alternative treatment using viruses that specifically infect bacteria could be a new solution to curing these wounds. By understanding which bacteria are found within these wounds we can design a 'cocktail' of these viruses to target the bacteria which are causing the infection improving patient quality of life.

ABSTRACT 20

DRUG REACTION WITH EOSINOPHILIA AND SYSTEMIC SYMPTOMS (DRESS) IN THE ELECTRONIC MEDICAL RECORD (EMR)

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Introduction: Drug reaction with eosinophilia and systemic symptoms (DRESS) is a rare severe cutaneous adverse reaction (SCAR), which can be life threatening.(1)
Aims: To identify patients with described history of DRESS in the EMR, to determine the prevalence, associated causative agents, AR label documentation practices, and RegiSCAR scores.
Methods: A dual ascertainment strategy was employed in this multi-centre, retrospective study. Part 1 involved data collection from a 2.5-year cohort of consecutive inpatient admissions. Patients with an adverse reaction (AR) label of DRESS, eosinophilia or severe rash were identified. Part 2 involved evaluating the AR label documentation for patients from an independently derived list of confirmed DRESS cases from an immunology department register. Case note review was undertaken for all possible cases of DRESS identified.
Results: Of the 135,080 inpatients from Part 1, there were 17 patients (prevalence 12.59 per 100,000) with at least possible DRESS (RegiSCAR > 2). The prevalence of patients with a RegiSCAR score consistent with probable or definite DRESS was 6.66 per 100,000 individuals. In Part 2 of the study, 16 confirmed DRESS cases were identified from an Immunology department register over a period of 8 years. In total, there were 31 patients with at least possible DRESS identified, with two cases (6.45%) of false negative AR documentation, and one case (3.23%) of false positive AR documentation. The most common drug culprits were vancomycin (n = 11, 29.7%), penicillin-based antibiotics (n = 9, 24.3%), and carbamazepine (n = 3, 8.1%).
Conclusion: The prevalence of EMR-documented DRESS syndrome in South Australia is higher than seen in other studies. Most DRESS was caused by antibiotics. The majority of patients were documented correctly in the EMR as far as can be determined. A large proportion of patients were overlabelled with multiple possible drug culprits, suggesting the need for validated diagnostic tools to improve medication access for patients with DRESS.

LAY DESCRIPTION

Drug reaction with eosinophilia and systemic symptoms (DRESS) is a rare, potentially life-threatening skin reaction triggered by certain drugs. This study found that 6.66 in every 100,000 inpatients in South Australian Hospitals likely had DRESS syndrome. Antibiotics and anti-seizure drugs were the most likely triggers. Many patients were labelled with DRESS to multiple drugs which were possibly associated, as it was unclear which drug truly caused the reaction. Better diagnostic tools are required to pinpoint the exact trigger, preventing unnecessary avoidance of potentially life-saving medications like penicillins.

ABSTRACT 21

SAFETY AND EFFICACY OF A PERSONALISED PHAGE TREATMENT AGAINST PHAGE RESISTANT STAPHYLOCOCCUS AUREUS INFECTION

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Introduction: Staphylococcus aureus is heavily implicated in chronic rhinosinusitis (CRS). The prevalence of antibiotic resistance in S. aureus is increasing among CRS patients worldwide causing problems with effective treatment, leading to prolonged morbidity. Use of bacteriophage (virus targeting bacteria) as a treatment for CRS shows promise but it cannot be used against phage resistant strains. Previous findings show that phages generated in the presence of subinhibitory antibiotics and phage resistant S. aureus in vitro (termed exit phage), can kill the originally phage-resistant parent strain.
Aim: To test the safety and efficacy of personalised exit phage in vivo to develop a therapeutic protocol.
Methods: The susceptibility of S. aureus clinical isolates to phage APTC-SA2 were tested to identify a phage resistant strain. Exit phage was generated by combining phage resistant S. aureus with APTC-SA2 phage and subinhibitory clindamycin. The safety and efficacy of the generated phage was tested in an rat model of sinusitis infected with the phage resistant S. aureus.
Results: For the safety study (n=12), rat nasal and peripheral organ tissue were harvested after application of 109 plaque-forming units (PFU) exit phage intranasally daily for 21 days. Low phage titres of <70 PFU/ml were detected in peripheral organs and nasal cavity. Histology results pending. Rats (n=32) were infected with phage resistant S. aureus (108 Colony forming units (CFU)) or control (saline) and randomised to receive 2 concentrations of Phage or control in twice daily intranasal applications for up to 7 days. A significant difference in the CFU at day 3 was seen between the control group and both phage groups ($p<0.05$). Day 5 and Day 7 show similar trends.
Conclusion: Preliminary results are promising and if in vivo proof-of-concept can be provided, the exit phage therapy has the potential to transform the treatment of patients with CRS infected by antibiotic and phage resistant S. aureus.

LAY DESCRIPTION

Antibiotic resistance is a major problem in treating Chronic sinus infections, leading to prolonged illness and suffering for patients. Using a virus (known as phage) to kill antibiotic-resistant bacteria without harming human cells could be a solution. However, some bacteria can also be resistant to phage and patients infected with these bacteria have limited treatment options. This project focuses on a modified phage that can kill phage resistant bacteria and is created when combining phage with low antibiotic concentrations. The goal is to test the safety and effectiveness of these modified phages in rats prior to human clinical trials.

ABSTRACT 22

IS MACHINE PRESERVATION AT ROOM TEMPERATURE WITH AN ACELLULAR OXYGENATED PERFUSATE INFERIOR TO NORMOTHERMIC MACHINE PRESERVATION AND STATIC COLD STORAGE FOR DECEASED DONOR LIVERS?

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Introduction: Normothermic machine preservation (NMP) is an emerging technique of liver preservation, but is not widely used due to complexity, cost and lack of data (1). Oxygenated machine perfusion at room temperature with an acellular perfusate (IMP) is a novel method that can utilise the benefits of NMP without the associated complexity or costs.
Aims: The aim of this pilot study was to determine if IMP was possible, and if so, inferior to SCS and NMP for deceased donor livers in a porcine model.
Methods: Ethics approval was obtained and organs were retrieved from 12 Yorkshire pigs (mean weight 74.6kg). Pigs were randomised to three groups (n=4). Preservation lasted 5 hours. Metabolic activity was assessed by comparing arterial blood glucose (AGL) to hepatic venous glucose (VGL), and tissue ATP levels. H&E histology was scored by a blinded senior histopathologist, with a composite liver injury score determined by assessing Hepatocytes, Bile duct epithelium, Portal vessel endothelium, Neutrophils and Sinusoidal dilatation.
Results: Mean VGL was 4.1 mmol/L greater than Mean AGL in IMP at 1-hour of preservation. By the end of preservation, AGL was 0.10 mmol/L higher than VGL, indicating conversion from anerobic glycolytic pathways to glycogenotic pathways by oxidative metabolism in the liver. NMP had higher venous glucose throughout, indicating persistent anaerobic metabolism and glycogen breakdown. Mean ATP at retrieval was 5.12x10^-11 mol/mm^3 tissue in SCS, 3.04x10^-11 in IMP, and 6.49x10^-13 in NMP. At 5-hours, ATP was 7.88x10^-11 in SCS compared to 7.52x10^-11 in IMP and 8.89x10^-14 in NMP. Whilst the mean ATP increased in IMP compared to a decrease in SCS, 2-way ANOVA analysis suggested non-inferiority, with a P-value of 0.966 indicating no statistically significant difference. On comparing composite histological scores between the groups by 2-way ANOVA, non-inferiority was observed.
Conclusions: IMP is possible and non-inferior to SCS and NMP in liver preservation.

LAY DESCRIPTION

In organ transplant, following retrieval from the donor, livers are preserved outside the body in ice and preservation fluid in a method known as static cold storage. Organs need to stay as healthy as possible when outside the body, and this method deprives them of oxygen. To counter this, groups have tested preservation with a modified heart and lung machines that imitate our body conditions. It is effective, but expensive and hard to implement. This study looks to determine if a machine pumping oxygen-rich fluid at room temperature is effective in preserving an organ.

ABSTRACT 23

BACOPASIDE II: OVERCOMING ABCC3-MEDIATED CHEMOTHERAPY RESISTANCE AND ENHANCING DOXORUBICIN ACCUMULATION IN TRIPLE NEGATIVE BREAST CANCER

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Introduction: Triple negative breast cancer (TNBC) is commonly treated with chemotherapy, but resistance and side effects pose challenges. Chemo-resistance is tied to over-expression of ABC drug transporter genes, including ABCC3. Bacopaside II, from Bacopa monnieri, holds potential against breast cancer, but its role in TNBC drug resistance remains unknown.
Aim: To explore if Bacopaside II counters ABCC3-related chemo-resistance in TNBC by increasing doxorubicin accumulation, potentially improving treatment outcomes.
Methods: Expression of ABC transporter genes (ABCC3, ABCB1, ABCC1, and ABCG2) were quantified in TNBC cell lines (DU4475, HCC1143, MDA-MB-231, and MDA-MB-453) were assessed using TaqMan qRT-PCR. Drug impact was assessed for growth inhibition, apoptosis, and membrane integrity alterations. Chemo-resistance was induced in MDA-MB-231 via 3D-culture, and the effect of Bacopaside II and cyclosporine A (CsA) in doxorubicin accumulation was measured.
Results: ABCC3 was notably higher in MDA-MB-231 than HCC1143 (2.7-fold) cells and MDA-MB-453 cells (2.4-fold) and was undetectable in DU4475 cells. ABCC3 correlated with doxorubicin accumulation and sensitivity. Bacopaside II showed varying IC50: DU4475 (23.7µM), HCC1143 (20.7µM), MDA-MB-231 (13.5µM), MDA-MB-453 (19.0µM). Bacopaside II induced apoptosis ≥15µM in HCC1143 and both apoptosis and damage (≥15µM) in MDA-MB-231. Bacopaside II and CsA increased doxorubicin accumulation. Molecular docking suggested strong ABCC3 binding. MDA-MB-231 3D-culture increased ABCC3, reduced doxorubicin accumulation, and heightened resistance; combining bacopaside II and doxorubicin improved growth inhibition.
Conclusion: Bacopaside II shows promise in overcoming ABCC3-related chemo-resistance, enhancing doxorubicin accumulation, and improving the efficacy of doxorubicin in the treatment of in TNBC. Further research into Bacopaside II's potential to improve doxorubicin treatment for TNBC is essential.

LAY DESCRIPTION

Treating breast cancer with chemotherapy is challenging due to resistance and side effects. Bacopaside II from Bacopa monnieri might offer a solution. This study investigates Bacopaside II's ability to combat resistance in TNBC, aiming to enhance chemotherapy's effectiveness by boosting drug levels within cancer cells. Our findings indicate that Bacopaside II increased drug concentrations in various TNBC, potentially enhancing treatment. This research proposes Bacopaside II as a potential aid for TNBC patients, although further study is required.

ABSTRACT 24

THE ADELAIDE SCORE: AN ARTIFICIAL INTELLIGENCE MEASURE OF READINESS FOR DISCHARGE AFTER GENERAL SURGERY

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Introduction: This study aimed to examine the performance of machine learning algorithms for the prediction of discharge within 12 and 24 hours to produce a measure of readiness for discharge after general surgery.
Research Question: What is the accuracy associated with the use of artificial intelligence algorithms (generating the Adelaide Score) incorporating vital signs and laboratory test data to predict general surgery patient discharge within 12 and 24 hours?
Methods: Consecutive general surgery patients at two tertiary hospitals, over a two-year period, were included. Observation and laboratory parameter data were stratified into training, testing, and validation datasets. Random forest, XGBoost, and logistic regression models were evaluated. Each ward round note time was taken as a different event. Primary outcome was classification accuracy of the algorithmic model able to predict discharge within the next 12 hours on the validation dataset.
Results: 42,572 ward round note timings were included from 8,826 general surgery patients. Discharge occurred within 12 hours for 8,800 times (20.7%), and within 24 hours for 9,885 (23.2%). For predicting discharge within 12 hours, model classification accuracies for derivation and validation datasets were: 0.84 and 0.85 random forest, 0.84 and 0.83 XGBoost, 0.80 and 0.81 logistic regression. For predicting discharge within 24 hours, model classification accuracies for derivation and validation datasets were: 0.83 and 0.84 random forest, 0.82 and 0.81 XGBoost, 0.78 and 0.79 logistic regression. Algorithms generated a continuous number between 0 and 1 (or 0 and 100), representing readiness for discharge after general surgery.
Conclusions: A derived artificial intelligence measure (the Adelaide Score) successfully predicts discharge within the next 12 and 24 hours in general surgery patients. The Adelaide Score may be useful for both treating teams and allied health staff within surgical systems in South Australia and abroad.

LAY DESCRIPTION

After surgery, it is challenging to know when patients have recovered to be safely sent home, or discharged, from hospital. This study investigated the use of artificial intelligence (AI) to predict discharge within 12 and 24 hours for patients who had undergone general surgery. Vital sign and blood test information from 8,826 general surgery patients across two South Australian hospitals was used to create the AI algorithms. These algorithms were used to create the Adelaide Score, a number between 0 and 100 that demonstrated over 80% accuracy for predicting a patient's likelihood of upcoming discharge.

ABSTRACT 25

ARE WE OVERLOOKING NOCA PATIENTS IN SOUTH AUSTRALIA?

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Background: Whether patients with NOCA (Non-Obstructive Coronary Arteries, <50% stenosis) present chronically (ANOCA-Angina with NOCA) or acutely (MINOCA-Myocardial Infarction with NOCA), they are often mislabelled as a 'non-cardiac' presentation. However, ischaemic mechanisms such as coronary vasomotor disorders (CVMD) can be implicated. NOCA presentations benefit from further diagnostic workup namely (i) functional angiography in ANOCA to investigate CVMD and (ii) cardiac MRI in MINOCA to confirm an infarct and exclude MINOCA 'mimickers'.
Aims: To investigate the prevalence of further diagnostic investigation in NOCA and describe the 3-year outcomes of ANOCA and MINOCA presentations with an ischaemic diagnosis on investigation.
Methods: Consecutive ANOCA (n=2,245) and MINOCA (n=1,288) presentations in the CADOSA (Coronary Angiogram Database of South Australia) Registry between 2012-2018 were included.
Results: In the ANOCA cohort, 170 had a documented CVMD diagnosis where only 6% of ANOCA patients underwent functional angiography. Only 18% of MINOCA patients received a cardiac MRI, changing the diagnosis of 57% patients, and diagnosing 28 patients with an infarct (confirmed MINOCA). ANOCA with CVMD and confirmed MINOCA patients were similar in (i) age (58±11 vs.61 ±11, p>0.05), (ii) predominance in women (57% vs.71%, p>0.05) and (iii) prevalence of cardiovascular risk factors. Over 3 years, ANOCA with CVMD and confirmed MINOCA had a low prevalence of adverse events (mortality, stroke and heart failure), but a high burden of chest pain presentation to the emergency department (38% vs.36%, p>0.05).
Conclusion: NOCA patients are significantly under investigated despite the utility of functional angiography and cardiac MRI. Clinical awareness and education underscoring a working diagnosis approach in NOCA is needed in South Australia which can support (i) initiating cause-targeted therapies and (ii) therapeutic studies addressing the high symptom burden in patients.

LAY DESCRIPTION

Patients with chest pain or heart attack but without cholesterol blockages can have heart spasm or heart damage which needs special testing for diagnosis. My study looked at over 3000 chest pain and heart attack patients without blockages in South Australia. These patients were around 60 years and mostly women. Only 1/20 patients had a test to detect heart spasm and 1/5 had a scan to confirm heart damage. During 3-years of follow-up, nearly 40% of patients in both groups came back to the hospital for chest pain. In South Australia, more special tests on patients without blockages are needed so we can improve their concerning ongoing symptoms.

ABSTRACT 26

PREVALENCE OF TRIMETHOPRIM-SULFAMETHOXAZOLE ADVERSE REACTION MISLABELLING IN AUSTRALIA

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Introduction: Trimethoprim-sulfamethoxazole (TMP-SMX) is an important antibiotic, with the most compelling indications for Pneumocystis jirovecii pneumonia prophylaxis and methicillin-resistant Staphylococcus aureus treatment. Previous adverse reactions (AR) to TMP-SMX may limit the usability of TMP-SMX. Electronic medical record (EMR) recording of AR for other antibiotics has previously been shown to be inaccurate; however, the extent to which this occurs for TMP-SMX is unknown.
Methods: A multi-centre retrospective observational study was conducted for consecutive inpatient admissions over a 2.5-year period commencing 2020. Adverse reactions to TMP-SMX recorded in the EMR were collected and reviewed by two independent medical officers using a pre-defined expert criteria for the classification of allergies and intolerances.
Results: TMP-SMX AR were present in the EMR of 759 individuals (prevalence 0.6%). The majority were labelled as allergy (725, 95.5%) rather than intolerance (34, 4.5%). Most common AR were rash, vomiting, and swelling. When classified against the gold-standard expert criteria, there were 437 allergies (57.6%) and 159 intolerances (21.0%). Overall, the number of incorrect EMR AR labels was 133/759 (17.5%). Both medical and surgical specialties had significant numbers of patients with TMP-SMX AR labels and incorrectly classified EMR AR labels.
Conclusion: TMP-SMX AR labels affect inpatients admitted under multiple specialty units. The user-entered categorisation as allergy or intolerance labels in EMRs are frequently used incorrectly. These incorrect labels may inappropriately contraindicate the use of TMP-SMX, and formal evaluation of TMP-SMX ARs with immunologic assessment and relabelling where appropriate may increase use of this agent.

LAY DESCRIPTION

This study aims to determine the prevalence of trimethoprim-sulfamethoxazole (TMP-SMX) adverse reactions (AR) in hospital inpatients, evaluate which hospital services have the highest numbers of patients with AR and determine the accuracy of existing allergy/intolerance labels for TMP-SMX as recorded in the electronic medical record (EMR). This study demonstrated that up to 17.5% of allergy/intolerance labels applied in the EMR are incorrectly classified. Inappropriate or incorrectly classified TMP-SMX AR labels may prevent prescribing of this antibiotic, which could be remedied with immunologic evaluation and relabelling where appropriate.

ABSTRACT 27

AGEING OF ANTI-AGGREGATORY AUTACOID SIGNALLING: "NORMAL" FLUCTUATIONS AND VARIABILITY IN TAKOTSUBO SYNDROME (TTS)

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Introduction: It is well-established that advanced age is an independent risk factor for ischaemic heart disease, including acute myocardial infarction. However, the basis for this propensity remains uncertain. Our previous studies have established that platelet responsiveness to the anti-aggregatory autacoid nitric oxide (NO) diminishes with age in normal subjects, but that NO responses are exaggerated overall in patients with TakoTsubo Syndrome (TTS), which mainly affects elderly women.
Hypothesis/Aims: We seek to test the following (null) hypotheses: (1) Age-related fluctuation in platelet responsiveness to NO will extend to and parallel that in prostacyclin (PGI2), which is a more important vasomotor modulator than NO in the elderly. (2) Changes with age will be identical in TTS and control ageing subjects. (3) Age-related changes in platelet responsiveness to NO and PGI2 parallel those in concentrations of anti-ageing proteins.*
Methods: Patients: Post TTS (n=40), without TTS or AMI (n=60). Venesection for platelet aggregometry in whole blood, stimulated with ADP. Statistics: Univariate: non-paired t-tests, correlation coefficients. Multivariate: Two-way ANOVA with repeated measures. Analyses include ratio of PGI2: NO responses with age.
Results: to date): (1) Non-TTS (n=19; age 75±12 years): Mean responses: NO 29±24%; PGI2 44±26%; PGI2: NO response ratio tends to increase with age (r=0.18,p=NS). (2) TTS (n=4: age 76±2 years) NO response 0.25±16%; PGI2 response 16±4%.
Conclusions/translational impact: (1) These interim data suggest that PGI2 anti-aggregatory responses may be more robust in the elderly than NO responses. This would emphasise the risks inherent in routine administration of aspiring in the elderly. (2) Comparison of TTS/non-TTS groups require substantial additional numbers.
*Assays not yet performed.

LAY DESCRIPTION

Evidence suggests that "heart attacks" occur most commonly in the elderly, possibly resulting from decreased nitric oxide and prostacyclin effects. TakoTsubo ("broken heart") Syndrome (TTS) occurs mainly in elderly women. While the symptoms are like heart attacks, coronary arteries are inflamed rather than clotted. This study compares anti-clotting responses to nitric oxide and prostacyclin against ageing between TTS and non-TTS patients. This is important as Aspirin is commonly given after a heart attack to prevent further clotting. However, it limits prostacyclin formation, making clots more likely to form, especially in TTS patients.

ABSTRACT 28

SINGLE CELL RNA-seq ANALYSIS REVEALS THE HETEROGENEITY AND PLASTICITY OF CANCER-ASSOCIATED FIBROBLASTS IN MMRd AND MMRp COLORECTAL CANCER TUMOUR MICROENVIRONMENT

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Background and Aim: Colorectal cancer (CRC) exhibits diverse immune responsiveness; mismatch repair-deficient (MMRd) CRC with high mutational loads respond well to immune checkpoint blockade, while mismatch repair-proficient (MMRp) tumours are immunotherapy-resistant. Aberrant Wnt signalling is prominent in CRC. Cancer-associated fibroblasts (CAFs) in the CRC microenvironment, being primary Wnt ligand sources, have pivotal roles in matrix dynamics, reciprocal signalling with cancer cells, and interactions with infiltrating leukocytes. CAFs present potential targets for enhancing cancer treatment. This research aims to discern distinct CAF phenotypes within MMRd and MMRp CRC tumour microenvironments (TMEs), probe their heterogeneity and plasticity.
Methodology and Results: Leveraging single cell RNA-sequencing datasets from multiple studies, we analysed the MMRd and MMRp CRC TME, defining eight CAF phenotypes at single-cell precision. Normal tissue displayed three fibroblast types: crypt-top (CTF), stem cell niche, and CCL8+. In tumour tissue, five CAF types emerged: MMP3+, CXCL14+, GREM1+, stem niche-like, and CCL8+. Notably, stem niche-like and CCL8+ CAFs were unique to MMRp CRC. MMP3+, CXCL14+, and GREM1+ CAFs occurred in both MMRd and MMRp CRC, with MMP3+ CAFs prevailing in MMRd and CXCL14+ CAFs in MMRp. Pseudotime analysis indicated activation trajectory of these CAF types. Stem niche-like CAFs originated from stem cell niche fibroblasts. Both expressed high SFRPs, which are Wnt ligand antagonists. Conversely, MMP3+, CXCL14+, and GREM1+ CAFs arose from CTFs. They highly expressed Wnt ligands, pro-inflammatory factors, and exhibited elevated pro-angiogenic and immunomodulation-related gene expression.
Conclusion: This comprehensive study delineates commonalities and dynamics of CAFs in CRC, underlining their heterogeneity and adaptability in MMRd and MMRp CRC. Ultimately, this insight presents novel possibilities for enhancing immunotherapeutic approaches to treat CRC.

LAY DESCRIPTION

Different types of bowel cancer have varied responses to treatments that improve immune defence. In this study, we looked at cancer-associated fibroblasts (CAFs), a type of cell found within the tumour. These cells are important because they play a role in changing immune defences to the cancer, ultimately changing the cancer outcome. We found that there are different types of CAFs depending on the type of bowel cancer. These differences are key to the patient's responses to treatments that improves their immune defense. Understanding these can help us develop new treatments or select the right bowel cancer patients for specific treatments.

ABSTRACT 29

INVESTIGATING PHAGE ADHERENCE TO MUCUS IN THE NASAL MUCOSA TO SCREEN FOR POTENTIAL PHAGE TO DEVELOP PHAGE-BASED NASAL VACCINES

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Introduction: Bacteriophages (phages) are viruses that infect and replicate within bacteria. Phages have been shown to encode Ig-like domains on their Highly antigenic outer capsid (Hoc) proteins that mediate their binding to the mucin glycoproteins of mucus. As nasal mucosa is the main entry point for pathogens transmitted through the air, the ability of phage to adhere to mucus makes them a potential tool for developing phage-based nasal vaccines.
Hypothesis: Phages differ in their potential for adherence to mucus produced by human nasal epithelial cells.
Aims: To investigate the binding affinity of Escherichia coli and Staphylococcus aureus phages to mucin, determine their localisation on primary human nasal epithelial cells (HNECs) and assess the genetic basis for mediating their adherence to mucin.
Methods: The mucin-binding affinity of 5 S. aureus phages (SA 4, SA 6, SA 8, SA 9, and SA 12) and 2 E. coli phages (EC 2326-1 and EC 2340-1) were assessed using plaque assays on agar plates coated with 1% (wt/vol) mucin or PBS. Next, the mucin-binding affinity and localisation of selected phages will be validated on air-liquid interface (ALI) cultures of HNECs using plaque assays and, confocal laser scanning and transmission electron microscopy respectively. Phages will be sequenced, annotated, and assessed by genome-wide association studies to link mucin-binding affinity of phages with genetic variation of Ig-like domains.
Results: There were higher number of phages that adhered to 1% mucin-coated agar than PBS-coated agar for all tested phages ($P<0.0001$). Among the S. aureus phages, SA 9 had a higher mucin-binding affinity compared to SA 6 ($P<0.0019$), SA 8, SA 4, and SA 12 ($P<0.0001$). Among the E. coli phages, EC 2340-1 had a higher mucin-binding affinity compared to EC 2326-1 ($p<0.0001$) and was higher than SA 9 ($p<0.0150$).
Conclusions: Phage EC 2340-1 and SA 9 showed significantly higher mucin-binding affinity to mucin in vitro and will be validated in HNEC-ALI cultures.

LAY DESCRIPTION

Bacteriophages (phages) are viruses that kill bacteria. Phages are found mostly in mucosal environment. They have proteins that allow them to adhere to mucus. Mucosal surfaces of the nasal cavity are a main entry point for pathogens that spread through the air. Hence, the ability of phage to adhere to mucus makes them a great tool for developing nasal vaccines. In this study, we will determine the adherence of a range of Staphylococcus aureus and Escherichia coli phages to mucin. Genes of phages with the strongest adherence to mucin will be assessed. With this information, phage can be proven to be used as a tool to develop nasal vaccines.

ABSTRACT 30

SONOGRAPHIC EXAMINATION AND ASSESSMENT OF ULCERATIVE COLITIS ASSOCIATED CONSTIPATION: INTERIM RESULTS FROM THE SEE UCAC STUDY

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Background: Ulcerative colitis (UC) associated constipation (UCAC) is a phenomenon in which colonic inflammation leads to stasis of faeces and ultimately constipation. This leads to symptoms such as pain and bloating. Despite resolution of inflammation, UCAC may persist in up to 45% of patients. Conventional assessment involves history taking or physical exam and harmful ionising radiation exposure through x-ray or CT scan. Furthermore, symptoms may lead to inappropriate investigations or escalation of treatment such as steroids. Intestinal ultrasound (IUS) is a cost effective, safe imaging modality validated for diagnosis and monitoring of UC but its use in assessing colonic contents is lacking. The aim of this study is to validate IUS as a safe, accurate diagnostic tool in the assessment of UCAC when compared against the current diagnostic gold standard, CT.
Methods: Adult patients with UC and no contraindications to CT, referred for IUS as part of routine care were prospectively recruited. If faecal loading (FL) was detected based on pre-defined IUS parameters, patients undergo a non-contrast CT scan to confirm the presence of FL. FL is treated with polyethylene glycol alongside standard dietary advice for constipation management. A second IUS 6 weeks after the index scan was performed to assess changes in IUS parameters.
Results: 20 patients underwent both IUS and CT. There was no significant difference in bowel diameters of patients with FL in IUS and CT parameters ($p = 0.35$). Posterior acoustic shadowing confirmed FL compared with CT in 100% of patients without a statistically significant difference ($p=0.48$). There was no significant difference the description of colonic contents between IUS and CT ($p=0.15$).
Conclusion: IUS is accurate in diagnosing FL patients with UC when compared against CT scan. Further prospective, blinded and controlled studies are required to fully evaluate the role of IUS in managing patients with functional gastrointestinal disorders.

LAY DESCRIPTION

Ulcerative colitis (UC) is a chronic inflammatory disease of the large intestine that causes pain, diarrhoea and rectal bleeding, affecting over 100,000 Australians. Constipation is a symptom in both well and poorly controlled disease. Confusion of symptoms due to constipation alone can lead to prescribing medication unnecessarily such as steroids. X-ray and CT scan are objective ways to assess constipation but involve radiation. Ultrasound (US) is a safe way to assess UC and shows promise in diagnosing constipation. This study compares the accuracy of US to CT, possibly reducing the need for invasive tests or immunosuppressive medication.

ABSTRACT 31

EARLY CORONARY MICROVASCULAR DYSFUNCTION: CORRELATION WITH EARLY IMPAIRMENT OF LEFT VENTRICULAR FUNCTION IN PATIENTS WITH TAKOTSUBO SYNDROME (TTS)

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Introduction: TakoTsubo Syndrome (TTS) is a condition often developing in elderly women after emotional stress (hence "broken heart syndrome"). Patients usually experience chest pain, without coronary occlusion but with acute coronary flow retardation, together with evidence of impairment of left ventricular (LV) function. It is not yet known whether these two anomalies are causally linked or to what extent they each contribute to TTS-associated hypotension.
Hypothesis/Aims: We hypothesised that: (1) extents of acute coronary flow retardation and of LV dysfunction are inter-related in TTS patients (2) the extent of acute hypotension is correlated with that of coronary flow retardation.
Methods: We performed retrospective analyses of data from TTS patients (n=284) admitted to SA Acute hospitals from 2008 onwards. Coronary flow rate (CFR) was measured as corrected TIMI frame count, while echocardiographic global longitudinal strain (GLS) was prospectively chosen as the most reproducible and sensitive index of LV systolic function. All data were analysed by univariate correlations followed by multivariate analyses.
Results: There was a significant and direct correlation on univariate analysis between TIMI frame count (flow retardation) and extent of GLS impairment (r=0.31; p=0.003); this remained significant on multivariate analysis. However, extent of flow rate reduction was not significantly correlated with minimal systolic blood pressure or extent of recovery over 3 months.
Conclusions/Translational Implications: These data establish definitively for the first time that in its acute stages, TTS is an inter-related coronary vasculitis and myocarditis. However, this association does not establish a pathogenetic cascade, nor does it alone explain hypotension. The current results also suggest that prevention/treatment of hypotension/shock in TTS with inotropic agents (the current norm) is inappropriate.

LAY DESCRIPTION

TakoTsubo Syndrome (TTS) mimics heart attacks despite the fact that coronary arteries are usually not blocked. Recent developments have suggested that in TTS patients the small coronaries, and then the heart muscle itself, are inflamed, and that the coronaries become leaky. In the current study, we analysed coronary angiograms and echocardiograms from 284 TTS patients to show that early extent of coronary flow impairment predicts that of impairment of heart contractile strength, but not extent of fall in blood pressure. Our findings provide an extra theoretical basis for treating TTS with fluid replacement to strengthen heart contractions.

ABSTRACT 32

THE DIET OF AUSTRALIANS WITH ULCERATIVE COLITIS DIFFERS TO RECOMMENDED DIETARY GUIDELINES: A CROSS-SECTIONAL STUDY

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Introduction: Westernised dietary patterns, higher in animal protein and lower in fibre are implicated in the relapsing and remitting disease course of ulcerative colitis (UC).
Aim: To explore the habitual dietary patterns of Australian adults with active UC, comparing nutritional adequacy against recommended dietary targets.
Methods: Dietary data from four prospective studies conducted between 2013-2020 at a South Australian tertiary inflammatory bowel disease service were pooled. Adults ≥18 years with mild-moderately active UC who completed 3- or 7-day weighed food diaries measuring habitual diet were included. Foodworks 10TM nutritional analysis software was used to assess dietary intake. Data was compared against relevant UC dietary targets. Data were reported as frequency and percentage for demographic and categorical data or mean and standard deviation (SD) or median and interquartile range (IQR) for continuous data.
Results: Of 144 adults completing food diaries, habitual protein intake was excessive for females and males. Mean total protein intake was 93.6g/d (SD 4.76g/d), with females consuming double (203%) the recommended daily intake (RDI). Animal sources made up two thirds of total protein (60.1g/d; SD 28.2g/d). Mean sulphur protein intake was 1.3 times higher than the reference intake. Mean total dietary fibre intake was 23.1g/day (SD 9.99g/d). This was near adequate intake for females (95%), yet inadequate for males (77%). Resistant starch intake met only 13% of the reference intake (2.5g/d; IQR 1.84-3.62g/d). Adults' calcium intake met only 81% of the RDI (805mg/d; SD 430mg/d). Females met only two thirds the recommended iron intake (11.9g/day; SD 5.15g/d).
Conclusions: Habitual diets of adults with UC do not align with current recommendations. Dietary intakes are high in protein, particularly animal protein, and low in dietary fibres. This emphasises need for tailored guidance to support adults with UC in achieving dietary adequacy for colonic health.

LAY DESCRIPTION

The role of diet in the management of ulcerative colitis (UC) is still unclear. This study aimed to examine the usual dietary patterns of adults with active UC and compare them to current dietary recommendations. Results found adults with UC do not eat according to recommendations. Adults with UC are eating too much protein overall and too much animal protein, while not eating enough dietary fibre, including resistant starch. Calcium intake in adults was below recommendations, as was iron intake in females. This identifies a need for tailored dietary guidance to help adults with UC in achieving healthy diets to support colonic health.

ABSTRACT 33

THE IMPACT OF AREA-LEVEL SOCIOECONOMIC STATUS (SES) ON VISITS TO GENERAL PRACTITIONERS (GPs) AND SPECIALIST PHYSICIANS BY INFLAMMATORY ARTHRITIS (IA) PATIENTS: AN AUSTRALIAN RHEUMATOLOGY ASSOCIATION DATABASE (ARAD), MEDICARE (MBS) AND PHARMACEUTICAL BENEF

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Introduction: IA patients require long term rheumatologist care for optimal medical treatment and disease monitoring. Variation in use of GP and specialist physician ('specialist') services according to SES may influence the type of care received and could contribute to greater pain and disability seen in low SES IA patients.
Research Question: How does SES influence GP and specialist IA patient visit frequency.
Methods: IA ARAD participants aged 20-78 years at diagnosis with linked MBS/PBS data (2011-18) were included. Primary outcome: annual GP and specialist visits based on MBS claim item number. Secondary outcome: out of pocket (OOP) cost for each type of service. SES (Index of Relative Advantage and Disadvantage) was approximated to SA1 area level. A comorbidity index (RxRisk) was calculated from PBS dispensing data. Analysis was performed using panel regression.
Results: 1896 participants were included, 71.3% women, 76.5% rheumatoid arthritis, mean age 53.7 years (SD 12.2), mean disease duration 6 years (SD 4). Participants averaged 9.1 (95% CI 8.8,9.5) annual GP visits and 3.9 (3.8,4.1) annual specialist visits. By comparison, the broader Australian population averaged 6.0 and 1.2 annual visits, respectively. After adjustment for sex, age, education, remoteness and comorbidity, there was an inverse relationship between annual GP visits and higher SES quintile (slope –0.6, (-0.9,–0.3) visits/quintile) and direct relationship between more frequent specialist visits and higher SES (slope 0.3 (0.2,0.5) visits/quintile). Average OOP costs per visit were substantially higher for specialists ($38.43 (37.34,39.53) compared to GPs ($7.86 (7.42,8.31)).
Conclusions: IA patients use more GP and specialist services than the general population. Lower SES IA patients use relatively more GP services and relatively fewer specialist services than higher SES patients, and OOP costs may be a contributing factor. These results may indicate reduced rheumatology care in lower SES patients.

LAY DESCRIPTION

Patients living with social/financial hardship (low socioeconomic status–SES) experience greater pain and disability from inflammatory arthritis (IA) than patients with higher SES. We examined how frequently patients from different SES backgrounds visit GPs and specialists. Patients with low SES visit GPs more, and specialists less, than patients living in high SES areas. Out of pocket costs are significantly higher to see specialists than GPs. Seeing a rheumatology specialist is important for the optimal care of IA. Patients with low SES might therefore see rheumatologists less frequently, despite our universal healthcare system.

ABSTRACT 34

DESIGNING AND EVALUATING A NOVEL MULTIANTIGENIC ZIKA VIRUS DNA VACCINE.

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Zika virus (ZIKV) causes lifelong birth defects following infection in pregnancy, for which there is no available vaccine. Most ZIKV vaccines in development focus on the induction of neutralising antibodies (Nab) against the envelope (E) structural protein. Vaccines that target the E antigen carry a risk of antibody-dependant enhancement of infection (ADE), which enhances virus entry and replication into host cells, resulting in more severe disease. Adaptive immune responses, specifically CD8+ T-cell responses preferentially target highly conserved non-structural (NS) proteins (such as NS1, 3 and 4) during natural ZIKV infection. NS proteins do not elicit NAbs and thus abrogate the risk of ADE, making them ideal vaccine targets.
In this study, we developed DNA vaccines, pNS3 and pNS4 which we evaluated immunogenicity in mice and both vaccines were demonstrated to be highly immunogenic using a fluorescent target array and an IFN-γ enzyme-linked immunospot assays. Furthermore, we developed a DNA vaccine encoding both NS3 and NS4 (pNS3/4) in combination with a DNA vaccine encoding secreted NS1 (tpaNS1). tpaNS1 has been extensively validated and shown to be highly immunogenic.
Mice were vaccinated with the cocktail of pNS3/4 and ptpaNS1 and the protective efficacy was evaluated using RT-qPCR following ZIKV challenge. This cocktail vaccination exhibited significantly reduced viral titres one day post challenge, with superior ZIKV viral loads reduction compared to vaccination with tpaNS1 vaccine alone. Our data demonstrates that the inclusion of NS3 and NS4 targets can increase protective efficacy against ZIKV. Further evaluation needs to be performed to determine if this cocktail vaccine is suitable to protect against vertical transmission and prevent testicular damage from ZIKV. Taken together our results have important implications for the development of protective and safe T-cell based ZIKV vaccines, that can abrogate the risk of ADE of flavivirus disease.

LAY DESCRIPTION

Infection with Zika virus during pregnancy causes severe defects in unborn babies. There are no vaccines to prevent infection. Most Zika vaccines in development focus on the structural viral protein (envelope) as its vaccine target. This is problematic as viral envelope can produce infection enhancing antibodies after vaccination. A safer substitute is to use virus proteins that do not make these antibodies. Proteins such as NS1, 3 and 4 induce strong T cell immunity during infection, making them ideal targets for vaccines. Here we have shown that a vaccine making these proteins, develops strong immune responses and reduces virus replication.

ABSTRACT 35

EXAMINING THE IMMUNOLOGICAL PHENOTYPE OF IMMUNOCOMPETENT AND IMMUNOSUPPRESSED PATIENTS ACUTELY ILL WITH SEVERE COVID-19

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Introduction: Three years on, the COVID-19 pandemic has amassed over 6 million deaths. Severe/critical COVID-19 accounts for 20% of symptomatic infections and remains a significant risk to vulnerable populations. There have been few detailed studies on the immunophenotype of acute severe COVID-19 at controlled timepoints. Further, immunosuppressed patients have not been considered as a distinct cohort.
Research Question/Hypothesis: We hypothesise there is a distinct immunological phenotype for immunosuppressed patients acutely ill with severe COVID-19, that is predictive of patient outcomes.
Methods: Serological and cellular analysis was performed on 63 patients admitted to the Royal Adelaide ICU with COVID-19. Patients were categorised as immunocompetent (n = 43) or immunosuppressed (n = 20) per the APAHCE III-J model. Serum and PBMCs were isolated from blood samples taken within 24 hours of ICU admission. Serum titers of SARS-CoV-2 specific antibodies were measured using ELISA. Multiparametric flow cytometry was performed on PMBCs to measure proportions of immune cell subpopulations, and detect maturation, activation and chemotactic markers. Spearman correlation analysis was then conducted to investigate the relationships between clinical and immunological parameters, risk of death and in-hospital mortality.
Results: When vaccinated, immunosuppressed patients produce similar titers of SARS-CoV-2 antibodies to immunocompetent patients. Our results also indicate that during the acute phase of severe COVID-19, immunosuppressed patients exhibit significant alterations in monocyte, NK, B and T cell compartments, with several parameters that differentially correlate with in-hospital mortality.
Conclusions: In summary, this data suggests that immunosuppression and vaccination impact magnitude and function of the innate and adaptive immune response during acute severe COVID-19. The results of this project will inform treatment guidelines for immunosuppressed patients, allocation of ICU resources and guide further research on interventions for progression of disease.

LAY DESCRIPTION

Immunosuppressed people, including cancer and transplant patients, are at greater risk of developing severe COVID-19. However, there is little research examining how their immune response differs to immunocompetent people on a cellular level. This project sought to identify these differences by analysing components of patient blood samples who were admitted to the ICU with severe COVID-19. Additionally, we investigated how these differences may increase or decrease the likelihood of in-hospital death. Understanding these immunological differences will help guide future ICU interventions and resource allocation for immunosuppressed patients.

ABSTRACT 36

EMERGENCY PHYSICIANS' PERSPECTIVES OF FRAILTY

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Introduction: The proportion of older people living with frailty, a syndrome of increased vulnerability to stressors due to decreased physiological reserves, is rising. Frailty is linked to increased health services' utilization by older patients such as emergency department attendance. Frailty assessment provides a comprehensive insight into a patient's health status and can contribute to clinical decision making. Frailty is assessed relatively less frequently in emergency medicine practice worldwide compared to other specialties
Aim: To explore the perspectives of frailty among emergency physicians (EP).
Methods: An exploratory qualitative descriptive study. 16 emergency physicians were interviewed. The interview data were inductively and thematically analysed.
Results: Three themes were constructed from the data.
1. Emergency physicians did not view frailty as a priority due to their orientation towards acuity as well as their perceived lack of knowledge and resources.
2. Emergency physicians detected and managed frailty indirectly, instead of formally using a validated tool to identify frailty.
3. Emergency physicians saw a beneficial role in the future for frailty recognition and management in emergency medicine.
Discussion: Our exploration of EPs' perspectives has identified that frailty was not, at the current time, a priority of care and was managed indirectly. Benefits with frailty awareness were identified for patient care and futility avoidance. Our study is the first to explore solely EPs' perspectives on frailty, which, in other qualitative studies, were not fully identifiable within mixed groups of health workers.
Conclusions: EP participants had a positive view on making progress with the role of increased frailty awareness and management in emergency, for patient and health care system benefits.

LAY DESCRIPTION

Sixteen emergency department senior doctors were interviewed on their views about frailty. Frailty is a decline of function, commonly seen with increasing age, and carrying a risk of problems like falls and hospital admissions. Currently, emergency doctors did not see frailty as a priority, due to their focus on urgent problems, workload pressures and lack of knowledge on frailty. For the future, they felt more attention to addressing frailty in emergency departments could help improve the care and well-being of older patients who are frail.

ABSTRACT 37

ENVIRONMENTAL AND FINANCIAL COSTS OF VOLATILE ANAESTHESIA AT THE QUEEN ELIZABETH HOSPITAL AND THE ROYAL ADELAIDE HOSPITAL

Stolz N (1,2), Kour K (2), Thiruvenkatarajan V (1)
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Introduction: Following use, anaesthetic gases are expelled into the atmosphere and contribute to climate change. Volatile anaesthetic agents are responsible for a substantial proportion of total anthropogenic greenhouse gas emissions. Awareness of these impacts and a push for elimination of volatile use in anaesthetic practice is rapidly emerging.
Objective: To quantify and assess trends in usage, and financial and environmental cost of volatile anaesthetic agents at the Queen Elizabeth Hospital and Royal Adelaide Hospital.
Methods: Data for a six-year period from July 2016 to June 2022 was collected from pharmacy (volume of sevoflurane and desflurane purchased, total cost) and ORMIS records (total operating time) in a retrospective observational audit. Carbon footprint was expressed in metric tonnes of CO2 equivalent (MTCO2e), calculated using the formula MTCO2eX = (volume x GWP x density)/1000/1000, where GWP is the global warming potential of the agent relative to CO2. Monthly operating time was used to adjust for fluctuating volume of practice.
Results: Since 2016 use of desflurane and sevoflurane has reduced by 94.38% and 21.18% respectively. There was an 88.50% reduction in 6-monthly MTCO2e, primarily due to reduction in desflurane use. Emissions per hour operating time for desflurane have decreased from 0.023 to 0.0013 MTCO2e, sevoflurane emissions have decreased from 0.0019 to 0.0015 MTCO2e, with an overall reduction from 0.025 to 0.0028 MTCO2e per hour. The total cost of desflurane in the 2021-22 financial year was 89.25% less than 2016-17, 44.40% less was spent on sevoflurane, with a 67.83% total reduction in cost of volatile agents.
Conclusion: Decreasing use of volatile anaesthetic agents over the last six years has seen a vast reduction in MTCO2e produced by the departments. Total cost of volatiles saw a similar reduction over the same time. The different trends across hospitals highlighted the impact of awareness and attitudes on practice within the same network.

LAY DESCRIPTION

Climate change increasingly undermines the pillars of public health. We performed a retrospective observational audit assessing the usage of volatile anaesthetic agents, a known significant contributor to the greenhouse effect, within CALHN, and how these changes are affecting the overall carbon footprint of anaesthetic departments. Over a six-year period, we observed an 89.8% reduction in carbon emissions secondary to volatile anaesthetic use per hour operating time. Reduction in usage has been seen across hospitals worldwide and represents positive change in attitudes and practice that will have beneficial effects on the climate crisis.

ABSTRACT 38

IMPACT OF MALNUTRITION, FRAILTY AND SOCIOECONOMIC STATUS ON PERIOPERATIVE OUTCOMES

Stretton, B (1,2), Booth, AEC (1,2). Kovoor, J (1,3), Bacchi, S (1,2), Gupta, A (4), Edwards, S (5), Hugh, TJ (6), Maddison, J (7), Talley, NJ (8), Verghese, S (9), Meyer, E (2), Gilbert, T (1,7), Barreto, G (9), Padbury, R (9), Plummer, M (1,2), Horowitz
1) Adelaide Medical School, Faculty of Health and Medical Science, University of Adelaide, Adelaide, South Australia, Australia 2) Royal Adelaide Hospital, Central Adelaide Local Health Network, Adelaide, South Australia, Australia 3) University of Adelaide, Discipline of Surgery, The Queen Elizabeth Hospital, Adelaide, South Australia, Australia 4) Department of Cardiothoracic Surgery, Gold Coast University Hospital, Southport, Queensland, Australia 5) Adelaide Health Technology Assessment, The University of Adelaide, Adelaide, South Australia, Australia 6) Surgical Education Research and Training, Royal North Shore Hospital, St Leonards, New South Wales, 7) Division of Medicine, Northern Adelaide Local Health Network, Adelaide, South Australia, Australia 8) School of Medicine and Public Health, University of Newcastle, Callaghan, New South Wales, Australia 9) College of Medicine and Public Health, Flinders University, Bedford Park, South Australia 10) Research, Audit and Academic Surgery, Royal Australasian College of Surgeons, Adelaide, South Australia, Australia

Introduction: Malnutrition, frailty and low socioeconomic status may mutually perpetuate reinforce each other in an interdependent manner. The intertwined nature of these factors are often overlooked when investigating impacts on perioperative outcomes.
Research Q: Investigate the individuyal impact of malnutrition, frailty and socioeconomic status on perioperative outcomes.
Methods: A multicentre cohort study, involving six Australian tertiary hospitals was undertaken. All consecutive surgical patients, who underwent an operation were included. Malnutrition was measured by the Malnutrition Universal Screening Tool(MUST), frailty by the Hospital Frailty Risk Score (HFRS) and low socioeconomic status by the Index of Relative socioeconomic disadvantage(IRSD). Linear mixed-effects and Binary logistic Generalised Estimated Equation models were performed for the outcomes: inpatient mortality, length of stay, 30 day readmission and re-operation.
Results: A total of 21,976 patients were included. Frailty was most significantly associated with poor outcomes. Patients at high risk of frailty have a mean hospital LOS 3.46 times longer(Mean ratio=3.46, 95%CI: 3.20,3.73, P<0.001), odds of 30 day readmission 2.4 times higher (Odds Ratio=2.4, 95% CI:2.19,2.63, P<0.0001) and odds of dying in hospital 12.9 times greater than patients with low risk of frailty (Odds Ratio=12,9, 95%CI 4.51,36.69, P<0.001). Elevated MUST scores were also significantly associated with worse outcomes, but to a lesser extent. IRSD had no association with outcomes.
Conclusion: Frailty and malnutrition are strongly associated with multiple adverse perioperative outcomes, when controlling for nutritional and socioeconomic status. Perioperative risk evaluation should consider malnutrition and frailty. Additional studies regarding the prospective identification of these patients and strategies to mitigate their increased risk are required.

LAY DESCRIPTION

Given the interdependent nature of frailty, malnutrition, and socioeconomic status, evaluation of the factors together may provide insights for both individual patients and healthcare systems.Despite all three factors being an interdependent process and reinforcing each other, frailty was the most significant factor associated with worse post-operative outcomes. Conversely, there was no association between relative societal disadvantage and risk of malnutrition or frailty. Socioeconomic status held no association with any outcome.

ABSTRACT 39

BEWARE OF LITTLE EXPENSES: LOW-VALUE ENDOCRINOLOGICAL BLOOD TESTS IN GERIATRIC MEDICAL INPATIENTS

Tan S (1), Vuong A (2), Kovoor J (1,3,4), Gupta A (1,5), Chan W (1,4), Umapathysivam M (1,4), Wong B (6), Gluck S (1,6), Gilbert T (1,4), Bacchi S (2,4,7)
(1) School of Medicine, University of Adelaide, Adelaide, South Australia, Australia (2) School of Medicine, Flinders University, Bedford Park, South Australia, Australia (3) Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital, Woodville South, South Australia, Australia. (4) Department of Medicine and Surgery, Royal Adelaide Hospital, Adelaide, South Australia, Australia (5) Department of Cardiothoracic Surgery, Gold Cost University Hospital, Southport, Queensland, Australia (6) Department of Medicine, Lyell McEwin Hospital, Elizabeth Vale, South Australia (7) Department of Neurology, The Queen Elizabeth Hospital, Woodville South, South Australia, Australia.

Introduction: Blood tests for endocrinological derangements are frequently requested in general medical inpatients, in particular those in the older age group. Interrogation of these tests may present opportunities for healthcare savings.
Aims: To determine, in the general medicine population and subset of this population (≥65 years of age), the frequency with which common endocrinology investigations return abnormal results, the frequency of duplicate ordering within a single admission, and the associated costs.
Methods: This multicentre retrospective study analysed the frequency with which three common endocrinological investigations (thyroid stimulating hormone [TSH], HbA1c, 25-hydroxy [Vitamin D3]) were performed in general medicine patients from the Royal Adelaide Hospital and The Queen Elizabeth Hospital over a 2.5-year period. This includes the frequency of duplicate tests within a given admission, and the frequency of abnormal test results. The Medicare Benefits Schedule was used to calculate the associated cost.
Results: There were 28,564 individual admissions included in the study. Individuals ≥65 years old were the majority of inpatients in whom the selected tests were performed (80% of tests). TSH was performed in 6730 admissions, HbA1c was performed in 2259 admissions, and vitamin D levels were performed in 5632 admissions. There were 6114 vitamin D tests performed during the study period, of which 2911 (48%) returned outside the normal range. Over the study period, 8% of tests for TSH, HbA1c, and Vitamin D were duplicates (where a second test was performed within a single admission), which was associated with a cost of $32,134.
Conclusions: Tests for common endocrinological abnormalities are associated with significant healthcare costs. Avenues by which future savings may be pursued include the investigation of strategies to reduce duplicate ordering and examining the rationale and guidelines associated with ordering tests such as vitamin D levels.

LAY DESCRIPTION

There is potential to significantly reduce costs associated with low-value endocrinology testing, such as through the minimisation of test duplication. This study has demonstrated that most often, these results return within the normal range. System-based strategies to improve the efficiency of inpatient blood test ordering is warranted in order to reduce the financial, environmental, and patient burden of over-testing. For example, machine learning strategies to identify potentially wasteful blood test ordering practices may be further investigated.

ABSTRACT 40

THE STERILE COCKPIT – WHAT CAN WE LEARN FROM AVIATION?

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Discipline of Surgery, The University of Adelaide, The Queen Elizabeth Hospital, Adelaide, Australia

Poor quality ward rounds can lead to several adverse outcomes for hospitals and patients, including delayed discharge, increased chance of complication, and increased cost. In time pressured chaotic environments such as the ward round, there is an increased chance of miscommunication and mistakes which ultimately affect patient care. The aviation industry have long been successful in mitigating human error using a 'Sterile Cockpit' to reduce interruptions and non-essential activities. However, this concept has never been trialled in the ward round. Accordingly, this study aims to implement the Sterile Cockpit concept in the surgical ward round to improve patient outcomes and satisfaction.

Hypothesis: The 'Sterile Cockpit' will improve patient outcomes, documentation and reduce hospital cost.

Methodology: A pre and post cohort intervention study will be performed by reviewing audio-visual recordings of surgical ward rounds over a span of 6 months in 2023. The 'Sterile Cockpit' intervention involves reducing the number of non-essential staff and duties that are performed in the Surgical Ward round. The sterile cockpit design will involve instructing the staff to allocate team roles, ensure only essential activities are carried out, interruptions and distractions are limited, and the patients plan is repeated back to the team at the end of the encounter. Recordings will be transcribed, and matched to the patient case notes to determine how accurate the documentation is; associated coding costs will also be analysed. Additionally, patient satisfaction will be assessed.

Results: Power calculations performed by a senior biostatistician using Fisher's Exact Conditional Test for two Proportions with alpha =0.05 and a 2-sided test determined that a sample size of N=70 per group was needed for 80% power. Data collection is ongoing and will be finished by October 2023.

LAY DESCRIPTION

In hospitals, teams of doctors review each patient in their care in the daily ward round. This allows important communication between doctor and patient, to assist planning, and to allow the patient to voice questions or concerns. Often, ward round quality is affected by time pressure, and non-essential activities. This subsequently affects patient outcomes and satisfaction. Our project therefore aims to derive a concept from the aviation industry called the 'Sterile Cockpit', a method used to reduce human error, to improve the quality of ward rounds.

ABSTRACT 41

EXPLORING THE POTENTIAL OF PERHEXILINE, AN ANTI-ANGINAL DRUG, FOR THE TREATMENT OF HEAD AND NECK SQUAMOUS CELL CARCINOMA

Fangmeinuo Wu(1), Kenny Ker Li Yeo(2), Runhao Li(1), Sima Kianpour Rad(1), John Licari(2), Sarah Vreudge(2), Amanda Townsend(1), Tim Price(1), Yoko Tomita(1), Kevin Fenix(2), Eric Smith(1)
(1) Solid Tumour Group, Discipline of Surgery, Basil Hetzel Institute for Translational Health Research, and The University of Adelaide, Australia (2) ENT Group, Discipline of Surgery, Basil Hetzel Institute for Translational Health Research, and The University of Adelaide, Australia

In Australia, >3,500 cases of head and neck squamous cell carcinoma (HNSCC) are diagnosed annually. Most cases are locally advanced, with low survival. Cisplatin, a platinum-based chemotherapy, is commonly used to treat HNSCC. However, its usage and effectiveness are limited due to toxicity and therapeutic resistance. Perhexiline, an anti-anginal drug, inhibits the mitochondrial enzymes carnitine palmitoyl transferase (CPT), thereby impeding the fatty acid β-oxidation metabolic pathway. Pre-clinical studies indicated that perhexiline possesses anti-tumour effects on many cancer cell types in vitro and in vivo settings, either as monotherapy or in combination with chemotherapeutics. However, the potential of perhexiline to treat HNSCC remains unknown. We hypothesise that perhexiline alone or in combination with cisplatin will inhibit the growth of HNSCC cell lines. The half-maximal inhibitory concentration (IC50) of drug treatments was determined by crystal violet staining. Kinetics of apoptosis and loss of cell membrane integrity were determined by measuring activated caspase 3/7 and propidium iodide (PI) staining. Drug interaction (synergy, additive, or antagonist) was determined by Zero Interaction Potency (ZIP) analysis. Transcript expression of CPTs were measured by qPCR. Our result showed that perhexiline IC50 for SCC1, FADU, and SCC47 were 6.2□M (95%CI:6.1-6.3), 8.1□M (7.9-8.3), and 9.0□M (8.8-9.2), respectively. In addition, perhexiline increased caspase 3/7 activation, indicating growth inhibition by apoptosis. The most abundant CPT1 isoform was CPT1A, and significantly ($p<0.01$) expression higher was found in HPV-negative cell lines (FADU: 5.3-fold, SCC1: 2.7-fold) compared to HPV-positive cell line (SCC47). The combination treatment was synergistic for SCC1 (ZIP score 1.37, p=6.78e-3) and additive for FADU (-1.42, p=4.38e-3) and SCC47 (-5.07, p=1.56e-21). This study suggests perhexiline has potential to be repurposed for the treatment of HNSCC.

LAY DESCRIPTION

Chemotherapy treatment in head and neck cancer is limited by toxicity. Toxicity impacts treatment delivery and patient quality of life. Hence, this project investigates the possibility of perhexiline, a drug used to treat heart diseases, as a treatment for head and neck cancer patients. Furthermore, we will also investigate the potential of combining perhexiline with other chemotherapy. Overall, this project aims to provide an alternative treatment for head and neck cancer patients.

ABSTRACT 42

IDENTIFICATION OF CONSENSUS HEAD AND NECK CANCER-ASSOCIATED MICROBIOTA SIGNATURES: A META-ANALYSIS OF 16S rRNA AND THE CANCER MICROBIOME ATLAS DATASETS.

Kenny Yeo (1,2), Runhao Li (1,3), Fangmeinuo Wu (1,3), George Bouras (2), Linh T.H. Mai (1,2), Eric Smith(1,3), Peter-John Wormald (1,2), Rowan Valentine(2), Alkis James Psaltis (1,2), Sarah Vreugde (1,2), and Kevin Fenix (1,2)
(1) Discipline of Surgery, Adelaide Medical School, The University of Adelaide, Adelaide, SA, 5000, Australia (2) Department of Surgery- Otolaryngology Head and Neck Surgery, The University of Adelaide and the Basil Hetzel Institute for Translational Health Research, Central Adelaide Local Health Network, Adelaide, SA, 5000, Australia (3) Department of Haematology and Oncology, Basil Hetzel Institute for Translational Health Research and The Queen Elizabeth Hospital, Central Adelaide Local Health Network, Adelaide, SA, 5000, Australia

Objective: Multiple reports have attempted to describe the tumour microbiota in head and neck cancer (HNSC). However, these have failed to produce a consistent microbiota signature which may undermine understanding the importance of bacterial-mediated effects in head and neck cancer. The aim of this study is to consolidate these datasets and identify a consensus microbiota signature in head and neck cancer.
Methods: We analysed 11 published HNSC 16S rRNA microbial datasets collected from cancer, cancer-adjacent and non-cancer tissue to generate a consensus microbiota signature. These signatures were then validated using The Cancer Microbiome Atlas database and correlated with the tumour microenvironment phenotypes and patient's clinical outcome.
Results: We identified a consensus microbial signature at the genus level to differentiate between HNSC sample types, with cancer and cancer-adjacent tissues sharing more similarity than non-cancer tissues. Univariate analysis on 16S rRNA datasets identified significant differences in the abundance of 33 bacterial genera among the tissue types. Paired cancer and cancer-adjacent tissue analysis in 16S rRNA and TCMA datasets identified increased abundance in Fusobacterium, Selenomonas, and Treponema in cancer tissues and decreased abundance of Rothia and Actinomyces in cancer-adjacent tissues. Furthermore, these bacteria were associated with different tumour microenvironment phenotype. Notably, high Fusobacterium signature was associated with high neutrophil ($r = 0.37$, $p < 0.0001$), angiogenesis ($r = 0.38$, $p < 0.0001$), and granulocytes signatures ($r = 0.38$, $p < 0.0001$) and better patient's overall survival (Continuous: HR 0.8482, 95% CI 0.7758– 0.9273, $p = 0.0003$).
Conclusions: Our meta-analysis demonstrates a consensus microbiota signature for head and neck cancer, highlighting its potential importance in this disease.

LAY DESCRIPTION

Head and neck cancer is a cancer of the mouth, nose, throat, and voice box. It is a deadly disease that can lead to low quality of life for patients even with treatments. The tissue samples from healthy and cancer patients contains different number and types of bacteria. These differences can affect positively or negatively on the body's defence system and on the cancer itself. Importantly, we found that the amount of a specific bacteria was associated with patient's survival. This study highlights the importance of bacteria within head and neck cancer.

TQEH Research Expo Prize Winners: 1992 – 2022

2022	
Honours & Summer Student	Ellie Treloar
Junior Laboratory Research	Ryan Santos
Senior Laboratory Research	Laurine Kaul
Junior Clinical Research	Olivia Girolamo
Senior Clinical Research	Madeleine Bryant
Clinical Trainee Research	Matthew Tunbridge
Best Mini-Oral	Matheesha Herath
Best Lay Description	Madeleine Bryant

2021		2020	
Honours & Summer Student	Lana Matteucci	**Honours Student**	Michelle Sims
Junior Laboratory Research	Man Ying (Celine) Li	**Junior Laboratory PhD Student**	Gohar Shaghayegh
Senior Laboratory Research	Muhammed Awad	**Senior Laboratory PhD Student**	Michael Gouzos
Junior Clinical Research	Joshua Kovoor	**Clinical Research Group 1**	Alannah Quinlivan
Senior Clinical Research	Anna Megow	**Clinical Research Group 2**	Giri Krishnan
Best Mini-Oral (Group A)	Madeleine Bryant	**Mini-Oral - Undergraduates**	Dawn Whelan
Best Mini-Oral (Group B)	Sheree Cross	**Mini-Oral - PhD students**	Muhammed Awad
Best Lay Description	Amita Ghadge	**Best Lay Description**	Sean Mangion

2019		2018	
Honours/Summer Student	Ahad Sabab	**Honours/Summer Student**	Ashley Twigger
Junior Laboratory PhD Student	Laurine Kaul	**Junior Laboratory PhD Student**	Giri Krishnan
Senior Laboratory PhD Student	Amita Ghadge	**Senior Laboratory PhD Student**	Lisa Cherian
Clinical Trainee	Oscar Russell	**Clinical Trainee**	Rachel Goggin
Clinical Higher Degree Student	Mark Thompson	**Clinical Higher Degree Student**	Anupam Gupta
Mini-Oral/Poster Prize (Lab)	Maryam Nakhjavani	**Poster Prize**	Namfon Pantarat
Mini-Oral/Poster Prize (Clinical)	Tom Eldredge	**Best Lay Description**	Rachel Goggin
Best Lay Description	Unyime Jasper	**Ivan De La Lande Award**	Clementine Labrosciano

2017		2016	
Honours/Summer Student	Sean Mangion	**Honours/Summer Student**	Bahador Assadi-Khansari
Junior Laboratory PhD Student	Sathish Paramasivan	**Junior Laboratory PhD Student**	Vahid Atashgaran
Senior Laboratory PhD Student	Christopher DeFelice	**Senior Laboratory PhD Student**	Dijana Miljkovic
Clinical Trainee	Fiona Chan	**Clinical Research Group 1**	Ben Thurston
Clinical Higher Degree Student	Mian Ooi	**Clinical Research Group 2**	Scott Ellis
Poster Prize	Alexandra Shoubridge	**Poster Prize**	Vasilios (Bill) Liapis
Best Lay Description	Maddison Archer	**Best Lay Description**	Vasilios (Bill) Liapis

2015		2014	
Honours Student	Aashray Gupta	**Honours Student**	Tammy Willsmore
Junior Laboratory PhD Student	Vasilios (Bill) Liapis	**Junior Laboratory PhD Student**	Kati Richter
Senior Laboratory PhD Student	Aneta Zysk	**Senior Laboratory PhD Student**	Bill Panagopoulos
Junior Clinical Researcher	Zoe Kopsaftis	**Clinical Research Group 1**	Shailaja Nair
Senior Clinical Researcher	Kristin Carson	**Clinical Research Group 2**	Harshani Jayasinghe
Poster Prize	Ben Thurston	**Poster Prize: Junior**	Alice Du
Best Lay Description	Kati Richter	**Poster Prize: Senior**	Helen Palethorpe
		Best Lay Description	Aneta Zysk

TQEH Research Expo 2023

The Institute

2013		2012	
Honours Student	Zacki Malik	**Honours Student**	Sathish Paramasivan
Junior Laboratory PhD Student	Vikram Padhye	**Junior Laboratory PhD Student**	Erin Swinstead
Senior Laboratory PhD Student	Amanda Drilling	**Senior Laboratory PhD Student**	Irene Zinonos
Clinical Research Group 1	Tharshy Pasupathy	**Clinical Research Group 1**	Neil CW Tan
Clinical Research Group 2	Shailaja Nair	**Clinical Research Group 2**	Rachel Dreyer
Poster Prize	Shalini Sree Kumar	**Poster Prize**	Michael Collins
Best Lay Description	Tamsin Garrod	**Best Lay Description**	Tessa Gargett

2011		2010	
Honours Student	Sam Biermann	**Honours Student**	Joshua Woenig
Junior Laboratory PhD Student	Amenah Jaghoori	**1st year PhD Laboratory**	Camille Jardeleza
Senior Laboratory PhD Student	Irene Zinonos	**2nd year PhD Laboratory**	Joshua Jervis-Bardy
Clinical Higher Degrees	Elsa Dent	**3RD year PhD Laboratory**	Sam Boase
Clinical Research	Scott Graf	**Clinical Higher Degree**	Rachel Dreyer
Poster Prize	Yang Du	**Poster Prize**	Sumithra Krishnan
Best Lay Description	Michael Djukic	**Best Lay Description**	Chris Lauder

2009		2008	
Honours Student	Raymond Yu	**Honours Group 1**	Krishna Jeyaraman
Junior Laboratory PhD Student	Kanchani	**Honours Group 2**	Kanchani Radjopadhyaya
Senior Laboratory PhD Student	Rajopadhyaya	**PhD Basic Science Jnr**	Tyson Matthews
Clinical Higher Degree	Darling Rojas	**PhD Basic Science Snr 1**	Christine Ball
Allied Health-Pharmacy	Andrew Foreman	**PhD Basic Science Snr 2**	Victoria Kopetz
Poster Prize	Nicole Such	**Nursing & Allied Health**	Hayley Vasileff
Best Lay Description	Shaundeep Sen	**Higher Degrees Clinical**	Rowan Valentine
	Michael Collins	**Poster Prize**	Andrew Foreman
		Best Lay Description	Boris Fedoric

2007		2006	
Honours student	Tyson Matthews	**Honours student**	Darling Rojas
PhD Basic Science Jnr	Darling Rojas &	**PhD Basic Science**	Deirdre Zander
	Boris Fedoric	**PhD Basic Science**	Christine Ball
PhD Basic Science Snr	Nicola Leung	**PhD Clinical 1**	Alkis Psaltis
PhD Snr Clinical	Shilpa Prasad	**PhD Clinical 2**	Achim Beule
Higher Degrees Clinical	Tong Le	**Nursing & Allied Health**	Wendy McInnes
Nursing & Allied Health	Hayley Vasileff	**Undergraduates Vacation**	Khanh Tran
Undergraduates Vacation	Julia Kirby	**Poster Prize**	Rosanna Tavella
Poster Prize	Alicia Chan		

2005		2004	
Honours Group 1	Boris Fedoric	**Honours Group 1**	Kara Cashman
Honours Group 2	Nick Mabarrack	**Honours Group 2**	Joanne Reed
PhD Junior Laboratory	Rebecca Dragovic	**PhD Junior Laboratory**	Rebecca Dragovic
PhD Senior Laboratory	Theresa Hickey	**PhD Senior Laboratory**	Harshita Pant
PhD Clinical	Alkis Psaltis	**PhD Clinical**	Wai Lim
Nursing & Allied Health	Peter Cheung	**PhD Population Health**	Mark Kohler
Undergraduates Vacation	Amellia Laidlaw	**Medical Student**	Anthony Pisanello
Poster Prize	Cadence Minge	**Poster Prize**	Theresa Hickey

The Institute

TQEH Research Expo 2023

2003		2002	
Honours Group 1	Maggie Centenera	**Honours**	Deborah Marrocco
Honours Group 2	Claire Seymour-Griffin	**PhD Junior Laboratory**	Ashley Newland
PhD Junior Laboratory	Ben Davies	**PhD Senior Laboratory 1**	Cassandra Woithe
PhD Senior Laboratory	Madelyn Zawitkowski	**PhD Senior Laboratory 2**	Madelyn Zawitkowski
PhD Clinical	Jim Jannes	**Higher Degree Clinical**	Matt Worthley
PhD Population Health	Katie Kandelaars	**Higher Degree Surgical**	Charles Morrison
Poster Prize	Melanie Bagg	**Medical Student**	Sasa Todorovic
		Poster Prize	Lien Ho

2001		2000	
Honours	Ashley Newland	**Honours Group 1**	Ilse Dahn
Higher Degree Jnr	Cassandra Woithe	**Honours Group 2**	Melanie Sutton
Higher Degree Snr	Al Truong Tran	**Higher Degree Group 1**	Samantha Yates
Higher Degree Clinical	Matt Worthley	**Higher Degree Group 2**	Tina Bianco
Higher Degree Surgical	Fiona Court	**Higher Degree Clinical**	Merlin Thomas
Advanced Fellowship Trainee	Anita Lee	**Nursing & Allied Health**	Libby Birchmore
Medical Student	Aiden Burrell	**Medical Student**	Victoria Tay
Poster Prize	Greg Roach	**Poster Prize**	Nicole Lamond

1999		1998	
Honours	Tenielle Webb	**Honours**	Ai Truong Tran
Higher Degree Group 1	Ai Truong Tran	**Higher Degree Group 1**	Sarah Swinburne
Higher Degree Group 2	Damien Hussey	**Higher Degree Group 2**	Damien Hussey
Higher Degree Clinical	Denise Roach	**Higher Degree Clinical**	Sarah Downie
Advanced Fellowship Trainee	Justin Evans	**Advanced Fellowship Trainee**	Alan Wigg
Nursing & Allied Health	Terry Jones & Dorothy Pannell	**Nursing & Allied Health**	Robyn Clark
		Medical Student	Rae-Wen Chang
Medical Student	Edmund Tse & Ru-Siang Cheng	**Poster Prize**	Lucia Sabordo

1997		1996	
Honours	Samantha Yates	**Honours**	Anthony Kiosoglous
Higher Degree Group 1	Lisa Butler	**Higher Degree Group 1**	Jennifer Hardingham
Higher Degree Group 2	Michael Texler	**Higher Degree Group 2**	Guy Patrick
Higher Degree Clinical	Dorothy Keefe	**Higher Degree Clinical**	Christopher Zeitz
Advanced Fellowship Trainee	Andrew Luck	**Advanced Fellowship Trainee**	Alan Wigg
Nursing & Allied Health	Simon Stewart	**Nursing & Allied Health**	Julie Lucker
Medical Student	Nan Williams	**Medical Student**	Michael Osborn
		Poster Prize	Matthew Callaway

1995		1994	
Honours	Antiopi Varelias	**Honours**	Lucia Sabordo & Linda Dadds
Higher Degree Group 1	Guy Patrick		
Higher Degree Group 2	Andreas Evdokiou	**Higher Degree Group 1**	Rebecca Ritchie & James Moore
Higher Degree Clinical	Christopher Zeitz		
Advanced Fellowship Trainee	Toby Coates	**Higher Degree Group 2**	Guy Patrick
Medical Student	Rohini Sharma	**Advanced Fellowship Trainee**	David Campbell
		Medical Student	I-Wen Chu

1993		1992	
Basic Science	Dean Bacich	**Basic Science**	Yi Zhang
PhD/MD	Cui Lan Zhang	**PhD/MD**	Warwick Grooby
In Training	Jennifer Hardingham	**Clinical**	David Campbell
Clinical	Dorothy Keefe		
Medical Student	Kenneth Ooi		

TQEH Research Expo Plenary Lectures: 1992 - 2021

2022 Prof Caroline McMillen AO – Chief Scientist for South Australia
"Research Innovation: the global and personal challenges, opportunities and foresight"

2021 Dr Michael Cusack – SA Chief Medical Officer
"Outcomes & Data – 20 years on from Bristol"

2020 Prof Toby Coates – Royal Adelaide Hospital and The University of Adelaide
"Recycling Islets to Treat Diabetes"

2019 Prof John Rasko AO – Centenary Institute, Sydney
"Cell and Gene Therapy: great power brings great responsibility"

2018 Prof Peter Rathjen – The University of Adelaide

2017 Hon. Mark Butler MP – Australian Labor Party
"The Politics of Ageing"

2016 Prof Anne Kelso AO – NHMRC
"Medical research: why we mustn't stop now"

2015 Prof Steve Webb – Royal Perth Hospital, University of Western Australia & Monash University
"Pushing or pulling over the evidence-practice gap"

2014 Prof Brendan Crabb – Burnet Institute
"Malaria in the 21st century"

2013 Prof Tanya Monro – The University of Adelaide
"From theoretical physics to solutions in health and defence: a transdisciplinary journey"

2012 Prof Barry Brook – The University of Adelaide
"Future climate extremes and how to avoid them!"

2011 Prof Steve Wesselingh – SAHMRI
"Health Reform and Medical Research: Building better links between medical research and health care delivery to improve health outcomes"

2010 Prof David Allen - The University of Sydney
"Duchenne muscular dystrophy; connecting the gene to the disease"

2009 Prof David Vaux - La Trobe University
"Ten rules for the presentation and interpretation of data in publications"

2008 Dr Bob Irving - Nanotechnology Victoria
"Nanotechnology - Opportunities and Challenges at the Smallest Frontier of Science"

2007 Jenni Metcalfe - President Australian Science Communicators
"A Schizophrenic Life: the Career of a Science Communicator"

2006 Dr Rob Morrison - Science Communicator
"Trust me, I'm a Science Communicator"

2005 Prof Rob Norman - The University of Adelaide
"The reproductive revolution: How The Queen Elizabeth Hospital led the field"

2004 Robyn Williams - Australian Broadcasting Corporation
"How modern medicine changed the world - some anniversaries"

2003 Dr Sarah Robertson - The University of Adelaide
"Facing Challenges and Finding Solutions in Reproductive Medicine"

2002 Prof John Chalmers - The University of Sydney
"Enhancing Health and Medical Research in the Teaching Hospital Environment"

2001 Prof Peter Rathjen - The University of Adelaide
"Regenerative medicine using stem cells: Medicine for the new millennium"

2000 Prof Grant Sutherland - The University of Adelaide
"The human genome project: Applications to medical research"

1999 Dr Philip Reece - Biota Holdings
"Biota and Relenza: New drug discovery in Australia"

1998 Prof Colin Matthews (Moderator) - The University of Adelaide
Speakers: Dr Tim Kuchel, Dr David Turner, Dr John Chandler
"And Man-made Dolly: The ethics of cloning"

1997 Dr Julian Cribb – CSIRO
"The origin of AIDS"

1996 Dr Deane Hutton - Science Communicator
"20:20 vision – Living in the 21st Century"

1995 Prof Mike Tyler - The University of Adelaide
"Frogs – the new frontier for natural products pharmacology"

1994 Dr Gael Jennings - Australian Broadcasting Corporation
"Communicating research via the medium of television"

1993 Dr Mark Wahlqvist - Monash University
"Salt intake and the non-pharmacological treatment of hypertension"

1992 Prof David Jarrett - The Queen Elizabeth Hospital
"The place of research in the face of a shrinking medical budget"