ROYAL ACADEMY OF MEDICINE IN IRELAND

IRISH JOURNAL OF MEDICAL SCIENCE

UCD School of Medicine

Summer Students Research Awards 2017

4th October 2017

UCD, Dublin, Ireland

**Irish Journal of Medical Science
Volume 186 Supplement 12
DOI 10.1007/s11845-017-1711-z**

Springer

Disclosure Statement

The UCD School of Medicine supported the running of the Summer Student Research Awards (SSRA) 2017.

ABSTRACTS

UCD School of Medicine, Summer Student Research Awards 2017, 4th October 2017, UCD, Dublin, Ireland

© The Author(s) 2017. This article is an open access publication

1. WHAT ARE THE DECISIONAL NEEDS OF YOUTH WITH JUVENILE IDIOPATHIC ARTHRITIS, THEIR CAREGIVERS AND THEIR HEALTHCARE PROVIDERS, REGARDING PAIN MANAGEMENT?

Muradia P¹, El-Hindi T², Toupin-April K^{2, 3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada
³Department of Pediatrics and School of Rehabilitation Sciences, University of Ottawa, Ottawa, Canada

Juvenile idiopathic arthritis (JIA) is one of the most common causes of chronic musculoskeletal pain in youth, and can negatively impact quality of life^{1,2}. Youth with JIA, their families and health care providers face a variety of challenging decisions when choosing pain management options. However, there seems to be a lack of information on how these decisions are made.

The aim of this research was to explore and summarize decisional needs among youth with JIA, their caregivers, and health care providers, with a focus on pain management, to ultimately develop a decision support intervention.

A systematic search was conducted in major electronic databases. Studies were included if they assessed decisional needs of youth with JIA from their own perspectives, those of their caregivers or health providers. Out of the 47 included articles, only 11 discussed pain specifically. Excerpts were extracted and a narrative analysis was conducted to classify them into the different domains of shared decision making using the NVivo10 system. The most common domains were: 1) pain as an important value for youth and families, 2) the need for more information on a variety of pain management options and 3) how coping with pain would be improved by providing more information.

The results demonstrate that there is a need to provide more information to youth and caregivers about a wide variety of pain management options, and to support youth and families when making these decisions. A decision support intervention will be developed to address these needs in clinical practice.

Acknowledgement:

The author would like to acknowledge funding from the Human Resources and Skills Development Canada (HRSDC) Canada Summer Jobs 2017 initiative.

References:

1. Schanberg LE, Anthony KK, Gil KM, Maurin EC. Daily pain and symptoms in children with polyarticular arthritis. *Arthritis Rheum* 2003; 48(5):1390-1397.
2. Haverman L, Grootenhuis MA, van den Berg JM, van VM, Dolman KM, Swart JF et al. Predictors of health-related quality of life in children

and adolescents with juvenile idiopathic arthritis: results from a Web-based survey. *Arthritis care & research* 2012; 64(5):694-703.

Presenting Author: Ms Priya Muradia

Supervisor: Dr Karine Toupin-April

Co-Supervisor: Ms Tania El-Hindi

2. ASSESSMENT OF MEDICAL STUDENTS ADJUSTMENT TO LIFE IN MALAYSIA AFTER STUDYING ABROAD IN IRELAND

Velu. G¹, O'Brien F², O'Brien FM³

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²Institute of Leadership, Royal College of Surgeons in Ireland, Dublin 2, Ireland
³Department of Psychiatry, Penang Medical College, Penang, Malaysia

"Reverse culture shock" describes the experience of "re-adjusting, re-aculturating and re-assimilating into one's home culture after living in a different culture for a significant period of time". It is associated with disturbances of mental, personal, interpersonal and academic functioning¹. Medical students from Penang Medical College (PMC) complete their pre-clinical years at either University College Dublin or The Royal College of Surgeons in Ireland before returning to Malaysia to complete their studies. This project assesses returning students' experiences of reverse culture shock, psychological distress, traits of emotional intelligence and interpersonal supports.

All students of the same class that returned to Malaysia from Ireland 6 months previously were emailed an online questionnaire via SurveyMonkey. Data was collected using validated instruments, and analysed using Microsoft Excel version-14.7.3 and SPSS version-24.

71 out of 136 Malaysian medical students participated. This group of students experienced moderately high levels of reverse culture shock and stress. A strong positive correlation was found between levels of reverse culture shock and perceived stress (PS). T-tests identified that students who had high PS scores scored significantly higher on reverse culture shock and lower on emotional intelligence, while levels of interpersonal support was not significantly different when compared to students with low PS scores.

Students who were less emotionally intelligent tended to experience higher levels of reverse culture shock and stress. Modules on stress management, resilience promotion and emotional intelligence enhancement should therefore be offered to PMC students to help adjust to the marked cultural changes they undergo.

References:

1. Gaw, Kevin F. "Reverse Culture Shock in Students Returning from Overseas." *International Journal of Intercultural Relations*. 2000; 24(1): 83-104.

Presenting Author: Gayathrie Velu
 Supervisor: Prof Finian O'Brien
 Co-Supervisor: Assoc Prof Amanda McCann

4. VIDEO AS A MEDICAL INTERVENTION AND ITS EFFECTIVENESS IN MEDICAL STUDENTS PERFORMANCE: A LITERATURE REVIEW

W.S. Wan Safuan¹, Gavin, B¹, Mc Nicholas, F.¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

Technology has been vastly used in medical education. This is especially true with multimedia that shows a correlation with its' use and students' academic performance [1]. The use of video in education has been said to be helpful in terms of stimulating educational experience which might increase medical students' performance. However, the question is still highly debatable. [2]

Cochrane, Embase, ERIC, Medline, PsychINFO and Pubmed databases are searched using terms related to medical education, videos and psychiatry (if applicable) and filtered under randomized controlled trial type of study. Journals reviews are roughly based on PRISMA guidelines.

A total of 24 journals were obtained with nine meeting the final criteria for full review. Nine journals were based on hands-on skills which are catheterization, endocrinological, basic life support, surgical, vacuum delivery and venepuncture skills. One journal was based on consultation skills. The natures of the results of all studies are heterogeneous but only one clearly shows video usage being significant in medical education. Other studies show significance based on different experimental circumstances.

The review suggests that the use of video in medical education differs in effectiveness based on the skills to be taught by the video. Other variables also affect the results of video usage in medical education including the content of the video and how the video is being used eg: as a supplementary material or solely on its' own. The inter-relations of the variables with the results will be further discussed.

References:

[1] Aloraini S. The impact of using multimedia on students' academic achievement in the College of Education at King Saud University. *Journal of King Saud University-Languages and Translation*. 2012 Jul 31;24(2):75-82.

[2] Willmot P, Bramhall M, Radley K. Using digital video reporting to inspire and engage students. *The Higher Education Academy*. 2012:1-7.
 Presenting Author: Wan Salwa Wan Safua
 Supervisor: Dr Blanaid Gavin
 Co-Supervisor: Prof Fiona McNicholas

6. FACTORS THAT INFLUENCE MEDICAL RESIDENTS' ATTITUDES TOWARDS PEOPLE WITH SUBSTANCE USE DISORDERS: A SCOPING REVIEW.

Sandhu S¹, Adye-White L², McCombe G¹, Cullen W¹, Wood E², Klimas J²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²British Columbia Centre on Substance Use and for Excellence in HIV/AIDS, St. Paul's Hospital, Vancouver

Evidence suggests that attitudes of medical personnel towards people with substance use disorders (SUD) can influence the care provided. This is a serious concern as stigmatizing and negative attitudes have been shown to decrease the quality of care provided to people with SUD¹. Therefore, the aim of this scoping review was to determine what factors

that may influence medical residents' attitudes towards SUD have been reported

'Medline', 'Embase' and 'PsycInfo' electronic databases were searched in July 2017. Additionally, 9 journals were hand searched. The search strategy yielded 4585 references. Of those, 55 articles were assessed in full text for eligibility. Seven journal articles and four conference abstracts were included in the scoping review based on the inclusion criteria. Following data extraction, three factors influencing medical residents' attitudes were identified: 1) participation in addiction training (n= 7), 2) post-graduate year (n=1), and 3) personal or family history of drug use (n=1).

This review revealed that medical residents' attitudes towards SUD become increasingly negative over the course of residency training and that participation in addiction training may serve as a step in alleviating these negative attitudes. Additionally, residents with personal history of drug use have higher positive attitudes towards SUD.

However, it should be noted that some studies did not report adequate information about addiction training, study methods or attitudinal outcomes. To address research gaps, further research should examine factors that influence medical residents' attitudes towards SUD and a systematic review should be conducted to assess the quality of research.

Acknowledgement:

The author would like to acknowledge funding from the SSRA International Deans Scholarship.

References:

1. Van Boekel LC, Brouwers EP, Van Weeghel J, Garretsen HF. Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: Systematic review. *Drug and Alcohol Dependence*. 2013; 131(1-2):23-35.

Presenting Author: Sharnet Sandhu

Supervisor: Dr Jan Klimas

Co-Supervisor: Prof Walter Cullen

7. POOR LEVELS OF KNOWLEDGE ON THE ASSESSMENT OF UNDERWEIGHT IN CHILDREN AND ADOLESCENTS AMONG PAEDIATRIC TRAINEE DOCTORS IN IRELAND

O' Leary E¹, O' Connell S², Kyne L², Barrett E^{1,2}, Hudson L³, Cumby C³

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Temple Street Children's University Hospital, Temple Street, Dublin 1.

³Great Ormond Street Hospital, Great Ormond St, London WC1N 3JH, UK

Paediatricians have an important role in assessing children with potentially life threatening levels of underweight. A British study conducted in Great Ormond Street Hospital (GOSH) (1) demonstrated that clinical knowledge among paediatric trainee doctors on the assessment and management of underweight in children, is often unsatisfactory. No formal study has been undertaken to date to assess levels of knowledge among Irish paediatric trainees. The aim of this research was to identify the current knowledge base of paediatric trainees on the assessment of an underweight child/adolescent.

Cross-sectional telephone surveys of paediatric junior doctors, from each centre that provides acute inpatient general paediatric care in Ireland, were recorded. The questionnaire was based on Junior MARSPAN (Management of Really Sick Patients under 18 with Anorexia Nervosa) (2) guidelines and included questions on the clinical features of underweight, ECG changes, and the refeeding syndrome.

100% (n=19) of eligible hospitals participated in the telephone survey. Responses were recorded from 34 paediatric trainees. 35% (n=12) identified BMI as the appropriate measure for assessing underweight in

children. 79% (n=27) did not identify the clinical cardiovascular complications of severe underweight, while 62% (n=21) reported they did not know the ECG findings in a child with severe level of underweight. 44% (n=15) identified some clinical features of the refeeding syndrome, 14% (n=5) were unable to define it. These findings were similar to the GOSH study.

We recommend the incorporation of the Junior MARSIPAN guidelines into paediatric training programmes to potentially improve clinical diagnosis and management of underweight children.

References:

1. Hudson LD, Cumby C, Klaber RE, Nicholls DE, Winyard PJ, Viner RM. Low levels of knowledge on the assessment of underweight in children and adolescents among middle-grade doctors in England and Wales. *Archives of disease in childhood*. 2013 Jan 1:archdischild-2012.
 2. Royal College of Psychiatrists. Junior MARSIPAN: Management of Really Sick Patients under 18 with Anorexia Nervosa (College Report CR168). Royal College of Psychiatrists, London, 2012. <http://www.rcpsych.ac.uk/files/pdfversion/CR168.pdf>
- Presenting Author: Eilis O Leary
Supervisor: Dr Elizabeth Barrett
Co-Supervisor: Dr Louise Kyne

9. CLINICAL PROFILE OF CHILDREN WITH 22Q11DS ATTENDING PEDIATRIC LIAISON SERVICES

Madhu V¹, McNicholas F^{1,2,3}

¹School of Medicine and Medical Sciences, UCD, Belfield, Dublin 4 ²Our Lady's Children's Hospital, Crumlin, Dublin 12; ³Lucena Clinic Services, Rathgar, Dublin 6

22Q11 deletion syndrome (DS) is a genetic disorder caused by a deletion on chromosome 22. It can lead to a variety of clinical complications involving the heart, face and immune system. Additionally, many children present with mental health issues such as ADHD or anxiety. [1] The aim of this research was to create a clinical profile of children with 22Q11DS seen at Our Lady's Children's Hospital, Crumlin's (OLCHC) pediatric liaison services and to observe general trends in this population, especially regarding their mental health.

Children with a formal diagnosis of 22Q11 were referred to OLCHC for a mental health assessment. Data from these assessments, performed between the years 2010 and 2017, were used to fill out a modified version of the Patient Case Complexity data collection form. This also included data from a Child Behavior Checklist (CBCL), filled out by parents and teachers, which is used to identify problem behavior in children. Data from 28 patients were collected, with the majority of patients referred by a plastic surgeon. While almost every child suffered from at least one medical complication, around 50% either showed signs of or had a formal Axis 1 diagnosis.

The results show that these patients not only had the medical problems associated with 22Q11DS but the majority also faced issues with mental health. The complexity of these patients show that GPs and pediatricians need to be aware of the mental health issues associated with 22Q11DS to allow for early screening and referrals.

References:

1. Niklasson L, Rasmussen P, Oskarsdottir S, Gillberg C. Autism, ADHD, mental retardation and behavior problems in 100 individuals with 22q11 deletion syndrome. *Research in Developmental Disabilities*. 2009; 30(4):763–73.
- Presenting Author: Veena Madhu
Supervisor: Prof Fiona McNicholas

10. A PEEP INTO PEEP: DESIGNING AND DELIVERING A MENTAL HEALTH PSYCHO-EDUCATIONAL MENTAL HEALTH PROGRAMME FOR PARENTS AND CARERS OF CHILDREN WITH 22Q11DS

Cooke L.J.¹, Gronostaj A.³, Lawlor A.⁴, Crotty F.^{4, 5}, Kerin L.^{4, 6}, Gavin B.¹ & McNicholas F.^{1,2,3}

¹UCD Department of Child and Adolescent Psychiatry, ²Our Lady's Children's Hospital Crumlin, ³Lucena Clinic Services, Rathgar, Dublin, ⁴22Q11 Ireland Association, ⁵Department of Psychiatry, Mater Misericordiae University Hospital, ⁶Love Knowledge Research Consultancy

22q11.2 deletion syndrome (22q11DS) is a multisystem genetic condition with a broad phenotype and an increased psychiatric risk, which families are inadequately informed of at diagnosis¹. Parents interviewed had indicated overwhelming support for a psycho-educational mental health (MH) programme (PEEP) to help prepare and cope with possible MH issues in their children². This study describes the design and delivery of 4 one-day PEEP for parents and carers of children with 22Q11DS, for the age groups infant, child, adolescent and young adult.

In accordance with ethics approval, training days were designed to include a section on MH disorders pertinent to their child's age group, along with general parenting and parental MH information. Parents registered with the '22q11 Ireland' support group were invited to participate. Family details, parental stress (PSI), self-reported stress, fulfilment, and training day goals were recorded before each day and a client satisfaction questionnaire completed following the PEEP day.

Despite numerous medical and mental health problems associated with 22q11DS children, parental stress levels, as measured by PSI, were not exceedingly high, with an average of 45.4 out of 90 reported with a standard deviation of 6.4 in the 24 people who attended. Fulfilment with parenting was negatively correlated with self-reported stress (as seen in Table 1).

Each day was videoed and edited for confidentiality and packages of each PEEP day were made, so future days can be replicated with ease by a clinician. The programme may be replicated annually for 22q11DS or for other conditions to help ease parental stress.

Infant	4	3	0	2.5 years	100%	50%	25%	0%	4.75	3.75
Child	8	5	9	7.38 years	100%	87.5%	100%	75%	4.9	4.3
Adolescent	6	6	3	12.5 years	83.3%	50%	100%	83.3%	5	4.3
Young Adult	6	7	3	22.23 years	100%	71.43%	85.7%	71.43%	3.7	4.1

Table 1

References:

1. Schneider M, Debbane M, Bassett AS, Chow EW, Fung WL, van den Bree M, et al. Psychiatric disorders from childhood to adulthood in 22q11.2 deletion syndrome: results from the International Consortium on Brain and Behavior in 22q11.2 Deletion Syndrome. *Am J Psychiatry*. 2014;171(6):627-39.
 2. Alugo T, Malone H, Sheehan A, Coyne I, Lawlor A, McNicholas F. Development of a 22q11DS psycho-educational programme: exploration of the views, concerns and educational needs of parents caring for children or adolescents with 22q11DS in relation to mental health issues. *Child Care Health Dev*. 2017;43(4):527-35.
- Presenting Author: Lindsay Cooke
Supervisor: Prof Fiona McNicholas

12. LOOKING BEFORE WE YEEP: AN EVALUATION OF THE EXPERIENCES OF HEALTHCARE TRANSITIONS FOR YOUNG PEOPLE WITH 22Q11DS.

Lynch D¹, Kerin L², McNicholas F^{3,4,5}

¹Medical Student, University College Dublin. ²Independent Researcher, Love-Knowledge Consultancy. ³Dept of Child & Adolescent Psychiatry, OLCHC, Crumlin, ⁴Lucena Clinic, Rathgar, ⁵UCD School of Medicine, University College Dublin, Belfield, Dublin 4.

The importance of well managed transition care has been increasingly recognised¹. Individuals with 22Q11DS face particular challenges, by virtue of increased risk of psychiatric disorders along with a variety of medical, educational and learning problems, all contributing to unique challenges of transition into adulthood. This current project reviews existing transition policy and the experience of Young Experts by Experience (YEPP) panel members.

Ethical approval was obtained from UCD ethics committee, and YEPP recruited via the national support organisation, 22Q11 Ireland. A semi-structured interview schedule was designed and informed by a rapid review of relevant literature on healthcare transitions in rare disease populations. Three focus groups were conducted over a 3-month period.

The overwhelming experience by the 6 YEPP members (aged 21–37) was of a difficult and stressful transition, with poor transfer of information between healthcare services and an overall lack of knowledge by new providers of their complex disability burden, requiring multiple retelling of their story. A draft transition tool to enhance patient-clinician communication was piloted and edited according to the group's feedback. Future planned work is to develop a Transition Training Video, incorporating seminal messages from the literature, discussions with professionals, parents and YEPP members about transitioning from Employment, Education, Family, and Healthcare. Optimum transition experience is critical to engagement with new services, treatment efficacy and overall quality of life. Such care should be planned and co-ordinated, with the young person central to the process². A Transition Training Video coupled with a Transition Toolkit, should assist in this endeavour.

Acknowledgements:

The author would like to acknowledge the support given by Prof F McNicholas and Ms Lorna Kerin, supervisors, Ms Anne Lawlor, Chairperson of 22Q11 Ireland, and the members of the YEPP group which made the SSRA experience so enriching.

References:

1. National Institute for Health and Care Excellence (NICE) Transition from children's to adults' services for young people using health or social care services. London NICE: 2016
 2. A Vision for Change: The Report of the Expert Group on Mental Health Policy, Department of Health & Children, 2006
- Presenting Author: Diarmuid Lynch
Supervisors: Prof Fiona McNicholas
Ms Lorna Kerin

13. CLINICAL REFERRALS TO PAEDIATRIC LIAISON PSYCHIATRY SERVICES- HOW APPROPRIATE ARE THEY?

Sheridan G¹, Clifford M³, Keogh C^{1,2}, Abualsaud D¹, Barrett E⁴, McNicholas F¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²Our Lady's Children's Hospital Crumlin (OLCHC), Dublin 12 ³Child and Adolescent Psychiatry Department, Tallaght Hospital, Tallaght, Dublin 24 ⁴Child and Adolescent Psychiatry Department, Temple Street Children's University Hospital, Dublin

Mental health (MH) co-morbidity among children with medical illness is high as 30%^[1]. Paediatric Consultation Liaison (CL) psychiatry services, based within Dublin's paediatric hospitals, provide services to address MH co-morbidities that negatively impact chronic illness outcomes and hospitalizations. CL provisions for cases with medical and psychiatric co-morbidities (true CL) are being re-directed towards emergency department (ED) presentations of self-harm (SH) and suicidal ideation (SI) in absence of medical co-morbidities.

The aim of this project is to analyse MH presentations and compare and contrast true ward CL presentations across Dublin's three paediatric hospitals.

Clinical data from referrals (N=97) to three CL psychiatry services during November 2016 was collected using study specific questionnaire - Patient Case Complexity Data Collection (PACS).

13 (13.4 %) of 97 presented to Wards and 58 (59.8%) to ED. 100% of ward cases were true CL while 72.4% ED presentations were not true CL. Of the 13, 53.8% were referred for psychiatric assessment of an axis-I diagnosis. All 13 had no current or past SH, with 1 past SI. All 13 had medical co-morbidities with 53.8% psychosomatic. 69.2% cases had no axis-I diagnosis, 1 axis-II and 84.6% had axis-III diagnosis. Cases were frequently long-term, with 62.5% longer than 6-months. All received psycho-educational treatment. Mean length of stay was 13.09 days (SD 21.267), mean age of 12.23 (SD 3.655), 69.2% white ethnicity and 61.5% male.

Results show CL services being shifted from wards, where cases are long-term and require long hospital admittance, to ED DSH and SI cases.

Initial presentation location	Temple Street Children's Hospital	OLCHC	Tallaght Hospital	Total Location
ED	32 (55.2%)	11 (57.9%)	15 (75%)	58 (59.8%)
OPD	21 (36.2%)	2 (10.5%)	3 (15%)	26 (26.8%)
Ward	5 (8.6%)	6 (31.6%)	2 (10%)	13 (13.4%)
Total Hospital:	58	19	20	97

Table 1: Rates of presentation locations across the 3 paediatric hospitals in Dublin.

References:

[1] Spady DW, Schopflocher DP, Svenson LW, Thompson AH: Medical and psychiatric comorbidity and health care use among children 6 to 17 years old, Arch Pediatr Adolesc Med. 2005 Mar;159(3):231-7.

Presenting Author: Miss Gretta Sheridan

Supervisor: Prof Fiona McNicholas

Co-Supervisor: Dr Elizabeth Barrett

14. PAEDIATRIC CONSULTATION-LIAISON PSYCHIATRY PRESENTATIONS TO THE EMERGENCY DEPARTMENT: COMPARISON BETWEEN HOSPITALS

Abualsaud, D. ¹, Barrett, E. ^{1,2}, Kehoe, C. ^{1,3}, O'Donoghue, C. ², Butler, J. ², McNicholas, F. ^{1,3,4}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Temple Street Children's University Hospital, Dublin 1 ³Our Lady's Children's Hospital, Crumlin, Dublin 12. ⁴Lucena Clinic Services, Rathgar, Dublin 6

Paediatric Consultation-Liaison Psychiatry (PCLP) provides care for patients with comorbid physical and mental health (MH) problems, psychosomatic illnesses in paediatric settings and emergency psychiatric presentations to the emergency department (ED) [2]. PCLP services can provide early intervention aimed at reducing or preventing the impact of MH problems in adulthood [1].

The project aimed to compare the type of ED presentations and interventions by PCLP between Temple Street Children's University Hospital (TSCUH) and Our Lady's Children's Hospital, Crumlin (OLCHC) over a one-month period (November 2016). Clinical data was retrieved from all case notes using a study specific questionnaire and the Paddington Complexity Scale.

There were 42 presentations during the audit period, one patient presented twice. More than half of the 31 from TSCUH, presented with deliberate self-harm (53%, $N=17$) compared to 27% (3) from OLCHC. Suicidal ideation was present in 53% (16) of TSCUH and 73% (8) in the OLCHC. In both hospitals, a mood disorder was the most prominent Axis I diagnosis, 73% in TSCUH and 71% OLCHC. There was a significant difference in the proportion of cases admitted, with 82% (9) admitted in OLCHC, compared to 41% (13) in TSCUH ($p=0.018$). Similarly, there was significantly more multi-disciplinary involvement in TSCUH (66% moderate, 21) compared to 91% (10) minimal in OLCHC ($p\leq 0.000$). The teams at TSCUH and OLCHC differ in their composition and approach, which requires further research given that the hospitals will merge into the New Children's Hospital and will require a standardised approach.

References:

1. Brown, JF, Schubert CM. An examination of emergency department pediatric psychiatric services. *J Behav Health Serv Res.* 2010;37(4): 412-426.
 1. Garralda M, Slaveska-Hollis K. What is special about a Paediatric Liaison Child and Adolescent Mental Health service?. *J Child Adolesc Ment Health.* 2016; 21(2): 96-101.
- Presenting Author: Dalia Abualsaud
Supervisor: Dr Elizabeth Barrett & Prof Fiona McNicholas.

16. LITERATURE AND MENTAL HEALTH: CAN THIS INITIATIVE IMPROVE ATTENDEE'S SELF-REPORTED CONFIDENCE REGARDING THE USE OF LITERATURE IN MEDICAL PRACTICE AND REFLECTIVE PRACTICE?

Yew WT¹, Barrett E^{1,2}, Kehoe C^{1,3}, Dickson M⁴

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Children's University Hospital, Temple Street, Dublin 1

³Our Lady's Children's Hospital, Crumlin, Dublin 12

⁴Diseases of Modern Life, St Anne's College, Oxford OX2 6HS

An educational survey was done on adult learners attending a one-day conference, titled Mind Reading: Mental Health and the Written Word. It aimed to have members of various disciplines work together in exploring the interactions between literature and mental health. These include identifying roles of literature in therapeutic engagement and self-reflection. Both survey distribution and data collection was done via Survey Monkey. Two surveys were sent, one before and after the conference. The collected data was reviewed and analysed using SPSS Statistics.

Response rate for the pre and post conference surveys are 45.8% and 46.5% respectively ($n=38$, $n=40$). Respondents attended this conference both for personal and professional development. Participants were from various professional disciplines such as the humanities, healthcare, librarianship and members of the public. 90% of respondents stated that the interdisciplinary nature of the conference had a positive learning impact and 82% met their aims. Over 80% were comfortable with all learning environments in the conference. By comparing both surveys, a significant increase was found in participant's knowledge on bibliotherapy, use of literature in mental health services, and locating resources for clinical practice. Feedback was very positive with requests for similar events. The conference organizers were keen to reflect

on the heterogeneous nature of the participant group and in turn, foster an interdisciplinary learning model for future events.

Furthermore, an online toolkit of resources was collated from those shared during the conference and suggested in the surveys.

Presenting Author: Wan Ting Yew

Supervisor: Dr Elizabeth Barrett

Co-supervisor: Dr Melissa Dickson

19. DEFINING ANAEMIA IMPORTANCE IN PATIENTS WITH RECTAL CANCER

Pua P¹, Alsaif S¹, Kothar H², Cahill R^{1,2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Mater Misericordiae University Hospital, Eccles St, Inns Quay, Dublin 7.

Anaemia has long been recognized as a common feature of rectal cancer. Although studies have shown that patients with preoperative anaemia will have an increased risk of postoperative complications and length of hospital stay compared to non-anaemic patients [1], the timely detection and management of preoperative anaemia is still constantly ignored, with indiscriminate usage of allogenic blood transfusions as a solution [2].

The aim of this retrospective data collection and analysis was to determine (a) the prevalence of iron deficiency anaemia in rectal cancer patients, (b) the date anaemia was detected relative to surgery date to identify the possible therapeutic window for its correction and (c) ideate the optimum corrective measure that can be implemented into the workflow and timelines of the patient presenting for surgery.

Retrospective analysis was performed on a set of 140 patients diagnosed with rectal cancer between 2008 to 2016 who went through curative resection at the Mater Misericordiae University Hospital. 42 patients (30%) were found to have preoperative anaemia that was directly influenced by the type of malignancy and the choice of neoadjuvant treatment (radiotherapy and chemotherapy). Variables including age, sex, tumour stage and pre-existing medical conditions were considered.

Given the significant percentage of rectal cancer patients with anaemia, pragmatic implementation of the diagnosis and treatment of anaemia is recommended to commence as early as possible in the preoperative period with adequate allocation of resources from the hospital administrators. Table 1: Severity of anaemia in rectal cancer patients with preoperative anaemia

Severity of Anaemia	Non-pregnant women (15 years of age and above)	Men (15 years of age and above)	No. of patients
Mild	11–11.9	11–12.9	22
Moderate	8–10.9	8–10.9	19
Severe	<8	<8	1

References:

1. Leightle SW, Mouawad NJ, Lampman R, Singal B, Cleary RK. Does preoperative anaemia adversely affect colon and rectal surgery outcomes?. *Journal of the American College of Surgeons.* 2011; 212(2): 187-194.
2. Muñoz M, Gómez-Ramírez S, Kozek-Langenekker S, Shander A, Richards T, Pavia J, et al. 'Fit to fly': overcoming barriers to preoperative haemoglobin optimization in surgical patients. *British Journal of Anaesthesia.* 2015; 115(1): 15-24.

Presenting Author: Priscilla Pua

Supervisor: Prof Ronan Cahill

21. VIDEO EDUCATION IN SURGERY: COLORECTAL DISEASE JOURNAL

Tan A¹, Cahill R^{1, 2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Mater Misericordiae University Hospital, Eccles Street, Dublin 7.

Colorectal Disease Journal (CDJ) uses YouTube as a platform to show open and laparoscopic colorectal surgical procedures; including proctology and minimal access surgery as well as innovative techniques and technologies [1]. YouTube is among the best options due to its countless number of videos which span a variety of topics and interactive elements. YouTube also provides channels with specific topic or content area (e.g., math, social studies) [2].

The aim of this research was to a) know the importance of video education in surgery, b) investigate the elements that attract audience and c) analyse the correlation between audience demographics and engagement shown.

The most viewed video is Transanal Total Mesorectal Excision (TaTME) with Stapled Side to End Anastomosis (32,294 viewer; 97% non-subscriber) where TaTME surgery technique applied mostly in CDJ videos followed by laparoscopic. The top videos with significant high number viewer in relation to searched topic would be suggested to public. This is indicated by weekly analysis on the number of new viewer. In fact, the number of viewer is unreliable to specify the elements used and audience demographics in correlation with engagement. Viewers are contributed majority by non-subscriber and male gender were analysed.

Video education in surgery with focused area of study (edited video) is beneficial because audience can pause and re-watch videos that results with better understanding and comprehension.

References:

1. Colorectal Disease Journal [Internet]. YouTube. 2017 [cited 10 August 2017]. Available from: https://www.youtube.com/channel/UCi8Rw-2e92Eiam7kjrfMn_g

2. Riley J. Integrating YouTube Videos in Online Teacher Education Courses. *Journal of Teaching and Learning with Technology*. 2017;6(1):81.

Presenting Author: Muhammad Adham Azlan Hadi Tan

Supervisor: Prof Ronan Cahill

22. ADDED VALUE OF SYSTEMATIC CORE BIOPSIES IN PATIENTS REFERRED FOR TARGETED PROSTATE BIOPSY

McCarthy A², Butt Z¹, Bambrick M⁴, Sheehy N^{3, 4}, Beddy P^{3, 4}.

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Radiography and Diagnostic Imaging, School of Medicine, University College Dublin, Belfield, Dublin 4

³Beacon Hospital, Sandyford D18 AK68 Dublin 18

⁴St. James's Hospital, Dublin 8, Ireland

The diagnostic pathway for prostate cancer has substantially changed in recent years with a greater emphasis on MRI guided biopsy.¹ This study assessed the common indications for MRI guided biopsy and the associated complications.

This was an IRB approved retrospective study of men who underwent MRI guided prostate biopsy between January 2015 and May 2017. Eligible subjects had an MRI prior to biopsy and had not received prior treatment for Prostate Cancer. The MRI, biopsy and histology reports for each patient were reviewed and patient demographics, history of previous prostate biopsy, clinical presentation, PSA level, PiRADS score, biopsy result and complications were recorded.

There were 281 cases included in the study. The mean age for the cohort was 69. The majority of these cases were referred due to prostate specific

antigen (n=230). The mean PSA value for all cases was 8.7. Seventy-one patients had a previous biopsy and 35 patients had an established diagnosis of prostate cancer which had not been actively treated. Most cases had a single lesion identified on MRI (n=193). 178 of the targeted biopsies were performed by MRI cognitive biopsy and 103 were MRI fusion biopsies. The immediate complication rate was low with 4 patients complaining a vaso-vagal symptom. 12 patients had sepsis post biopsy (4.2%).

MRI guided TRUS biopsy is safe technique with similar sepsis rates to standard TRUS biopsy. The majority of patients had 1 lesion detected on MRI and all were suitable for targeted biopsy.

References

1. Oberlin DT, Casalino DD, Miller FH, Matuelwicz RS, Perry KT, Nadler RB, et al. Diagnostic Value of Guided Biopsies: Fusion and Cognitive-Registration Magnetic Resonance Imaging Versus Conventional Ultrasound Biopsy of the Prostate. *Urology*. 2016; 92:75-79.

2. Ahmed HU, Bosaily AE, Brown LC, Gabe R, Kaplan R, Parmar MK, et al. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. *The Lancet*. 2017; 389:815-22.

Presenting Author: Aoife McCarthy

Supervisor: Prof Peter Beddy

Co-Supervisor: Dr Niall Sheehy

26. THE ASSOCIATION OF OBSTRUCTIVE SLEEP APNOEA WITH MORTALITY, CARDIOVASCULAR EVENTS, CANCER AND DIABETES INCIDENCE AND THE IMPACT OF CPAP THERAPY.

Su Wei Ng¹, Geraldine Nolan², Linda Hayes² and Silke Ryan, M.D., PhD.^{1,2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Sleep Disorders Unit, St. Vincent's University Hospital Dublin, Dublin 4

Obstructive sleep apnoea (OSA) is highly prevalent and increasingly recognised as a significant risk factor for cardiovascular diseases, cancer and type 2 diabetes (T2D). However, large prospective data on these associations and the potential benefit of continuous positive airway pressure (CPAP) are lacking. The European Sleep Apnoea Database (ESADA) cohort, including over 20,000 subjects evaluated for suspected OSA at baseline, commenced in 2007 and data on mortality and morbidity are prospectively recorded. The aim of this longitudinal study was to provide a systematic follow-up of the Dublin cohort.

1482 participants (70.5% male and 29.5% female; mean age=48.3±12.5 years old; mean body mass index=34±7.9kg/m²; median smoking pack-year=8 pack-years (range:0-200); median apnoea/hypopnoea index[AHI]=10.4 (range:0-148.6)) or relatives were interviewed by phone about death, cardiovascular events, diagnosis of cancer and T2D since baseline along with data on CPAP treatment. Medical records were utilised to verify positive responses. Cox regression analysis was performed to compare subjects with no or mild OSA (AHI<15), moderate to severe OSA (AHI>15) or OSA treated with CPAP.

Over a median follow-up time of 6.7 years(range:1-15.7), a total of 50 deaths, 87 cardiovascular events, 63 cases of cancer and 105 T2D incidence occurred. Compared with subjects AHI<15, the unadjusted hazards for AHI>15 were for death 3.37, p<0.001; CV events 1.86, p=0.028; cancer 2.08, p=0.016; T2D 1.54, p=0.137. CPAP reduced all hazards except T2D.

These data support an association of OSA with mortality and morbidity and a potential positive impact with CPAP therapy. However, numbers are too small and analysis of the entire ESADA cohort with adjustment for multiple potential confounders is awaited.

Presenting Author: Su Wei Ng

Supervisor: Dr Silke Ryan

Co-Supervisor: Ms Geraldine Nolan

28. COMPARISON OF LASIK OUTCOMES BASED ON DIFFERENT ABLATION PROFILES

Sim Jing Ying¹, Cummings A², Brennan E²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Wellington Eye Clinic, Level 2, Suite 36, Beacon Hall, Beacon Court, Sandford, Dublin 18

LASIK is refractive surgery for the correction of myopia, hyperopia, and astigmatism. Different ablation profiles provide different outcomes that impact the cornea in terms of shape, pachymetry and asphericity.

We aimed to (a) collect and analyse topographical data as well as refractive outcomes (b) The LASIK ablation profiles studied were Wavefront Optimised (WFO), Wavefront Guided (WFG), Contoura (Topography-guided), Custom-Q (Asphericity-guided), and Ray Tracing. A retrospective study of myopic and myopic astigmatism LASIK was carried out. Patients received Contoura (n=69 eyes), Custom-Q (n=56 eyes), Ray Tracing (n=22 eyes), Wavefront-guided (n=62 eyes) and Wavefront-Optimised (n=86 eyes) giving a total of 295 eyes.

With all profiles, as the amount of myopia increased, so did the corneal curvature flatten more. Ray Tracing and Contoura LASIK created more corneal flattening per dioptre than the other profiles. The Q-value increased accordingly, as the amount of myopic correction increased. At lower dioptre range (0 to -4), Contoura appeared best. Custom-Q is the most economical with tissue under -3 diopters. Above -4 diopters, Ray Tracing uses the most tissue/dioptre of treatment.

The results of modern day LASIK are excellent in terms of vision for all ablation profiles with Ray Tracing showing the greatest gain in vision. Wavefront Guided was best, followed by Ray Tracing, Contoura, Custom Q and Wavefront Optimised in that order for uncorrected vision. For best-corrected vision, Ray Tracing was best. All 5 profiles provided 6/5 or better best-corrected acuity. In terms of predictability, Ray Tracing was best.

Acknowledgements:

The author would like to acknowledge the mentorship, time and guidance given from Dr. Arthur Cummings, Madam Liz Brennan and Madam Stephanie Naughton.

References:

- Schumacher S, Seiler T, Cummings A, Maus M, Mrochen M. Optical ray tracing-guided laser in situ keratomileusis for moderate to high myopic astigmatism. *J Cataract Refract Surg*. 2012; 38:28-34.
- Cummings A, Durrie D, Gordon M, Williams R, Gow JA, Maus M. Prospective Evaluation of Outcomes in Patients Undergoing Treatment for Myopia Using the Wavelight Refractive Suite. *J Refract Surg*. 2017; 33(5):322-328.

Presenting Author: Mr Sim Jing Ying

Supervisor: Dr Arthur Cummings

Co-Supervisor: Madam Elizabeth Brennan

29. A FEASIBILITY STUDY OF ELECTROENCEPHALOGRAM (EEG) NEUROFEEDBACK TRAINING IN THE TREATMENT OF CHRONIC MIGRAINE

Keane, M^{1,2}, Forbes, R³, McCann A^{1,4}

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Actualise Neurofeedback Clinic, Dublin City University Innovation Campus, Glasnevin, Dublin 11 ³Neurology Department, Craigavon Area Hospital, Portadown, BT63 5QQ. ⁴UCD Conway Institute of Biomolecular and Biomedical Research, University College Dublin, Belfield, Dublin 4.

Neurofeedback Training (NFT), an operant conditioning process which allows a patient to gain some conscious control over brain function, is an effective intervention for several chronic conditions, including attention deficit disorder (ADD/ADHD) and epilepsy. Standard non-EEG biofeedback is an effective intervention for migraine and tension headache, but it is not known if severe chronic migraine (CM) can be treated using this technique. In CM there is a daily or near daily headache with frequent superimposed bouts of typical severe migraine headache pain. The current study aimed to investigate the feasibility of using NFT in the treatment of refractory CM.

Twenty chronic migraine patients were recruited through the Neurology Clinic at Craigavon Area Hospital. Baseline eyes open and eyes closed EEG data were collected from all patients. To determine if abnormal EEG patterns exist in this group, neural dysregulation was assessed by analysing EEG resting baselines using quantitative EEG database comparisons and 3-D source localisation (Low resolution electromagnetic tomography analysis, LORETA).

Compared to a normative database of healthy controls, CM patients had 'deviant' activation in the anterior cingulate gyrus – and area crucial to pain perception – in both delta (1-4Hz) and beta (13-30Hz) frequencies. Common patterns were also observed in EEG phase across the group. Given these commonalities of deviance, this feasibility study provides a rationale for a larger clinical trial to assess the utility of NFT in the treatment of CM.

Acknowledgements:

The authors would like to acknowledge funding from the Migraine Association of Ireland, and the Actualise Neurofeedback Training Clinic.

References:

- Kropp P, Siniatchkin M, Gerber WD. On the pathophysiology of migraine-links for "empirically based treatment" with neurofeedback. *Applied Psychophysiology and Biofeedback*. 2002, vol 27(3):203-13.

Presenting Author: Michael Keane

Supervisor: Dr Raeburn Forbes

Co-supervisor: Assoc Prof Amanda McCann

30. HRS STABILISES THE HTLV-2 ANTISENSE PROTEIN APH-2 AT THE PROTEIN LEVEL

Hassett A¹, Martini F², Sheehy N²

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Centre For Research in Infectious Diseases, School of Medicine, University College Dublin, Dublin 4, Dublin.

Human T-cell leukemia virus type 2 (HTLV-2) is a retrovirus that establishes lifelong infection. Recent studies have shown that antisense transcription of the HTLV-2 genome produces the APH-2 protein (1). Little is known about the function of APH-2 except that it inhibits Tax-mediated viral transcription possibly contributing to viral latency. Previous studies in the lab using the Yeast Two Hybrid system have shown that APH-2 interacts with the endosomal ESCRT-0 protein Hrs. Hrs is a component of the ESCRT pathway which mediates viral budding, membrane remodeling and membrane scission processes².

In the course of functional studies on the interaction between APH-2 and Hrs in the lab, it was discovered that Hrs enhances the expression of the APH-2 protein in co-transfected cells. The aim of this study was to further investigate this finding and determine whether the effect of Hrs on APH-2 occurs at the protein or RNA level. HEK293T cells were transfected with expression plasmids encoding Hrs and APH-2. RNA and protein levels were analysed by RT-qPCR and western blot, respectively.

We demonstrated that there was no statistically significant difference in the amount of APH-2 mRNA present in the cells transfected with APH-2

and Hrs compared to those transfected with APH-2 only. We also demonstrated that there was a statistically significant difference in the amount of APH-2 protein present in the cells transfected with APH-2 and Hrs, compared to cells transfected with APH-2 only.

Overall, we conclude that Hrs stabilises APH-2 at the protein and not the RNA level.

References:

1. Halin M, Douceron E, Clerc I, Journo C, Ko NL, Landry S, et al. Human T-cell leukemia virus type 2 produces a spliced antisense transcript encoding a protein that lacks a classic bZIP domain but still inhibits Tax2-mediated transcription. *Blood*. 2009;114(12):2427-38.
 2. Christ L, Raiborg C, Wenzel EM, Campsteijn C, Stenmark H. Cellular Functions and Molecular Mechanisms of the ESCRT Membrane-Scission Machinery. *Trends Biochem Sci*. 2017;42(1):42-56.
- Presenting Author: Amy Hassett
Supervisor: Dr Noreen Sheehy
Co-Supervisor: Ms Fanny Martini

32. CT CORONARY ANGIOGRAPHY – ADVANCED SCANNING TECHNIQUES AND CORRELATION OF A NORMAL CALCIUM SCORING AS A PREDICTOR OF CLINICALLY SIGNIFICANT CORONARY DISEASE IN YOUNGER PATIENTS

Armstrong B¹, Burke D²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²MD, Cardiology Department, Beacon Hospital, Sandyford, Dublin 18

CT coronary angiography has fast become a gold standard in the non-invasive assessment of coronary disease as scanning techniques have become more advanced and ‘caught up’ to the beating heart¹. The early development of a ‘calcium score’ which provides a surrogate marker in the detection of underlying coronary atheroma² has continued to be used as a part of our comprehensive scanning abilities, but in younger patients (<50 years old) with more likely ‘soft plaque’ as opposed to calcific lesions, we sought to determine whether the simple calcium score remains representative.

454 patients were included in this retrospective study, with scans obtained using a GE Revolution CT scanner. We collected demographic information, indication for testing, cardiac risk factors, and test findings including ‘calcium score’ (‘Agatston’ method) and analysed disease severity.

Table 1: Results

n = 454		<50 years		50-60 years		>60 years	
		158		150		146	
Ca2+ Score	0	116	73.3%	75	50.0%	36	24.7%
	1-10	13	8.2%	10	6.7%	15	10.3%
	11-100	19	12.0%	37	24.7%	30	20.6%
	>100	10	6.3%	28	18.7%	65	44.5%
Disease Severity	None	102	64.6%	57	38.0%	26	17.8%
	Mild	37	23.4%	50	33.3%	46	31.5%
	Moderate	17	10.8%	40	26.7%	53	36.3%
	Severe	2	1.3%	3	2.0%	21	14.4%

Only 2/116 (1.7%) of under 50s with a calcium score of zero had disease severity of moderate or greater. Of patients 50-60 years old, this figure was 4/75 (5.3%) and in over 60s, 2/36 (5.5%).

CT coronary angiography provides an excellent tool in ruling out significant coronary artery disease, particularly in a younger population, and our results suggest that a calcium score of zero in these patients remains helpful in providing a significant level of reassurance.

We would like to extend our thanks to the staff at UCD Beacon Hospital Academy for all their help.

References:

1. Gerber TC. Non-invasive coronary imaging with cardiac computed tomography and cardiovascular magnetic resonance. In: UpToDate, Post TW (Ed) UpToDate, Waltham, MA Nov 16
 2. Moshae WE, Achenbach S, Seese B, et al. Coronary artery stenosis: three-dimensional imaging with electrocardiographically triggered, contrast agent-enhanced, electron-beam CT. *Radiology* 1995; 196:707
- Presenting Author: Brian Armstrong
Supervisor: Dr David Burke
This project has been accepted for presentation at the European Society of Cardiology Euro-Echo Annual Congress in Lisbon, Portugal, in December 2017.

33. HIV CURE: TARGETING HIV LATENT RESEVOIRS WITH NEW CLASSES OF LATENCY-REVERSING AGENT

Roberts-Walsh, S.¹, Crowley, N.¹, Le Douce, V.¹, Gautier, V.W.¹

¹ UCD Centre for Research in Infectious Diseases, UCD School of Medicine, University College Dublin, Belfield, Dublin 4

There is currently no HIV cure¹. While combined Antiretroviral Therapy(cART) effectively supresses viral replication¹, long-lived latent HIV cellular reservoirs persist¹ where the provirus remains epigenetically silenced but replication-competent¹. HIV cure research focuses on forcing viral expression¹, while maintaining the patient on cART to protect uninfected cells¹⁰, so productively infected cells can be targeted by the immune system¹.

Dr Gautier’s research group identified a new signalling pathway X’s involvement in HIV gene silencing. This project aimed to evaluate the capacity of X inhibitors(Xis) to enhance JQ1-mediated HIV-1 reactivation. We examined the synergistic potential of 2 drug pairs, JQ1, a BET bromodomain inhibitor and validated Latency Reversing Agent(LRA)¹, with Xis, Y or Z, using J-Lat-A2 T-cells, an *in vitro* model of HIV latency containing a silenced HIV-1 promoter fused to the Green Fluorescent Protein(GFP) reporter gene¹. GFP expression level, analysed by FACS, measures HIV reactivation¹.

Z(20µM) or Y(20µM) significantly enhanced JQ1(5µM)-mediated reactivation up to 4-fold. Fold-synergy(FS) calculations[FS=Fold-change(FC)(A+ B)/FC(A)+FC(B)] indicated 3.0-FS for JQ1/Z and 1.70-FS for JQ1/Y for Mean Fluorescent Intensity. We lowered JQ1 concentration(0.5-5µM) to test for dose-dependency and best synergy was 3.35-FS with JQ1(1µM)/Z. Remarkably, even the lowest JQ1 concentration(0.5µM) induces synergistic HIV reactivation with Y or Z, surpassing HIV reactivation with the highest JQ1 concentration(5µM) alone possibly allowing for lower drug dosages clinically, increasing treatment specificity and reducing treatment off-target/side-effects.

While both co-treatments effectively de-repress the HIV-1 promoter, JQ1/Z displayed the best synergy. Further validation in pre-clinical trials is necessary to verify the synergistic potential of these new drug combinations.

References:

1. Li Z, Guo J, Wu Y, Zhou Q. The BET bromodomain inhibitor JQ1 activates HIV latency through antagonizing Brd4 inhibition of Tat-transactivation. *Nucleic Acids Res*. 2013;41(1):277-87.

Presenting Author: Siân Roberts-Walsh
Supervisor: Dr. Virginie Gautier
Co-Supervisor: Dr. Valentin Le Douce

34. A SCOPING REVIEW ON THE EFFECTS OF ADHD TREATMENT ON CHILDREN'S PERFORMANCE IN SCHOOL

Ting P¹, Honorio Neto F^{1,2}, Mulligan A^{1,2*}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²UCD School of Medicine, Department of Child and Adolescent Psychiatry (CAP)

A number of interviews were conducted examining the experience of ADHD assessment and treatment by CAMHS¹ service users. These interviews were recorded and transcribed, giving background information regarding the treatments provided for children with ADHD. Children interviewed were concerned about their success in school.

The review aimed to investigate the effects of ADHD treatment on children's performance in school, per available medical literature on PubMed. A search strategy was built based on PICO² adapted from the Cochrane methodology and 524 records were identified. Records were screened by titles and abstracts by two authors (PT and FHN) for a consensual decision, which resulted in 11 articles eligible for full-text reading. These were included in the narrative synthesis.

Most studies were conducted in the United States, and were focused on the effects of medication (Methylphenidate). Few studies focused on acupuncture, computer assistance, and school-based programmes. Success in school was related mostly to mathematics, followed by classroom behaviour. Most studies showed that medication generally improved children's classroom performance, including math performance, class productivity, and decreased off-task behaviour.

Not enough evidence is present about medication combined with other treatments and to conclude that ADHD treatment improves children's performance in school worldwide, as most studies were conducted in USA. This suggests that other factors might play a role in ADHD treatment and children's performance, such as environment or country-specific factors. This review suggests cross-cultural aspects and other treatment modalities for supporting children with ADHD in school worthy of further studies.

References:

1. Health Service Executive- HSE (2014) Fifth Annual Child and Adolescent Mental Health Service Report 2012-2013. Health Service Executive, Dublin

2. Higgins J P T, Green S (2011) Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration. www.handbook.cochrane.org

Presenting Author: Ms Phoebe Ting

Supervisor: Ms Fabiola Honorio Neto

Co-Supervisor: Dr Aisling Mulligan

35. CARDIOVASCULAR DISEASE RISK SCORE IN MALAWIAN ADULTS WITH HIV

Goh CY¹, Willard T², Mallon P², Kelly C².

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4.

² HIV Molecular Research Group, UCD School of Medicine, University College Dublin.

Human Immunodeficiency Virus (HIV) is associated with increased cardiovascular disease (CVD) risk [1]. Despite high prevalence of HIV, there are few data on the assessment of CVD risk in Sub-Saharan Africa (SSA). We aimed to compare existing CVD risk scores in an SSA cohort with a high proportion of young HIV-infected individuals and to assess whether they correlate with carotid intima media thickness (IMT) and pulse wave velocity (PWV).

Retrospective analysis was done on 389 Malawian adults (279 HIV-infected, 110 HIV-uninfected). WHO/ISH, SCORE, FRS, ASCVD, QRISK2 and D:A:D scores were calculated for each individual. HDL-cholesterol was not available; thus, a standardised value of 50mg/dL (1.3mmol/L) was used for scores that required this. Scores were compared to IMT and PWV using Spearman's rho.

Median (interquartile range) age and systolic blood pressure were 36 (31-43) years and 122 (110-130) mmHg. 201 (51.7%) patients were male. FRS and QRISK2 included the largest number of patients and correlated most closely with IMT and PWV (see Table 1). D:A:D, a risk score specific for HIV-infected patients, identified more patients in moderate and high risk groups. Currently available models are of limited use in resource-limited settings due to the lack of laboratory data and a younger cohort of HIV-infected adults. QRISK2 is useful in SSA as it includes most of the patients and correlates well with IMT and PWV. D:A:D may be a useful score to identify HIV-infected patients but requires modification to exclude HDL-cholesterol as a criterion for calculation of risk in an SSA cohort.

Table 1. 10-year CVD risk, number of patients in each risk score category and the association with IMT and PWV.

			WHO /ISH	SCORE	FRS	ASCVD	QRISK2	D:A:D (5-year risk)
10-year cardiovascular risk according to CVD risk score	HIV-infected	Low Risk	31 (97%)	29 (74%)	240 (97%)	45 (92%)	182 (100%)	111 (63%)
Moderate Risk	1 (3%)	10 (26%)	5 (2%)	N/A	N/A	62 (35%)		
High Risk	0 (0%)	0 (0%)	3 (1%)	4 (8%)	0 (0%)	4 (2%)		
HIV-uninfected	Low Risk	16 (100%)	11 (65%)	97 (94%)	23 (92%)	83 (100%)	-	
Moderate Risk	0 (0%)	6 (35%)	6 (6%)	N/A	N/A	-		
High Risk	0 (0%)	0 (0%)	0 (0%)	2 (8%)	0 (0%)	-		
Correlation of absolute 10-year cardiovascular risk with IMT (mm)	N/A	0.2710 p=0.063	0.5108 p<0.0001	0.3505 p=0.004	0.4654 p<0.0001	0.4585 p<0.0001		
Correlation of absolute 10-year cardiovascular risk with PWV (m/s)	N/A	0.3606 p=0.006	0.4749 p<0.0001	0.4678 p<0.0001	0.5095 p<0.0001	0.4072 p<0.0001		

Key:

WHO/ISH - World Health Organisation/ International Society of
SCORE Hypertension Risk Prediction Chart
FRS - Systematic Coronary Risk Evaluation
ASCVD - Framingham Risk Score
QRISK2 - American College of Cardiology/ American Heart Association
D:A:D Atherosclerotic Cardiovascular Disease Risk Calculator
- QRISK2 Risk Calculator- Data Collection on Adverse Events of
Anti-HIV Drugs Risk Calculator

References

1. Triant VA. Cardiovascular Disease and HIV Infection. *Current HIV/AIDS Report*. 2013; 10(3):199-206.

Presenting Author: Ms Chia Yin Goh

Supervisor: Dr Christine Kelly

Co-Supervisor: Dr Patrick Mallon

36. HIV CURE: VALIDATING X AS A NOVEL THERAPEUTIC TARGET IN HIV LATENCY REVERSAL USING RNA INTERFERENCE

O'Reilly S¹, Crowley N¹, Le Douce V¹, Gautier VW¹

¹UCD Centre for Research in Infectious Disease, UCD School of Medicine, University College Dublin, Belfield, Dublin 4

HIV is currently incurable due to latent reservoir persistence, where the provirus is epigenetically silenced, evading immune detection and antiretroviral treatment¹. 'Shock and kill' is a cure strategy focused on reactivating latent reservoirs by forcing viral gene expression¹. Latently infected cells, predominantly memory CD4+ T-cells, could then be eliminated by immune-mediated cytolysis¹.

We have identified enzyme X, as a mediator of HIV gene silencing. This project aimed to validate X as a novel therapeutic target for HIV latency reversal by optimising the knockdown of X using RNA interference and investigating whether depletion of X can reactivate latent HIV.

J-Lat cells are a HIV latency T-cell model, containing the silenced HIV promoter fused to the GFP reporter gene². Dharmacon Accell siRNA transfection was selected as siRNA uptake is passive, improving efficiency and cell viability, even in difficult-to-transfect T-cell lines. Parameters optimised were time, cell number, siRNA concentration and foetal calf serum (FCS) concentration. X mRNA was measured by RT-PCR 72-hours post-transfection. GFP levels were monitored with FACS 48, 72 and 120-hours post-transfection.

Optimal conditions for transfection efficiency were: 6x10⁵ cells/ml, 2uM siRNA, 2% FCS, increased to 10% FCS at 48-hours. X mRNA was decreased by up to 70% compared to non-target siRNA-transfected controls. Independent experiments showed large variation in knockdown efficiency. Reactivation of the HIV promoter was not observed under any tested conditions. The difficult-to-transfect nature of J-Lat cells and variable knockdown efficiency highlights the need for alternative transfection methods or X inhibitors to validate X as a potential therapeutic target.

References:

1. Dahabieh MS, Battivelli E, Verdin E. Understanding HIV latency: the road to an HIV cure. *Annu Rev Med*. 2015;66:407-21.

1. Jordan A, Bisgrove D, Verdin E. HIV reproducibly establishes a latent infection after acute infection of T cells in vitro. *Embo j*. 2003;22(8):1868-77.

Presenting Author: Sophie O'Reilly

Supervisor: Dr. Virginie Gautier

Co-Supervisor: Dr. Valentin Le Douce

37. UNRAVELLING THE ROLE OF EPHX2 AND POLYUNSATURATED FATTY ACIDS IN ANOREXIA NERVOSA

Hill N¹, Lam L², Woodside B²

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² Department of Psychiatry, University Health Network, University of Toronto, Toronto, ON, Canada.

Effective treatment of Anorexia Nervosa (AN) is elusive and influenced by nutritional genomics¹. The EPHX2 gene plays a role in polyunsaturated fatty acid metabolism. Variants of EPHX2 are prevalent in patients with AN. This study sought to determine how EPHX2 variants influence fatty acid metabolism and promote negative eating behaviours.

100 females between 18 and 60 years of age were needed for each category: healthy controls (HC), women recovered from AN (RecAN) and women ill with AN (IAN). A novel strategy was developed to improve recruitment. Physicians in the Toronto General Hospital eating disorder (ED) clinic informed patients about the study. Research employees informed colleagues about the study. Advertisements were posted in elevator bays of University Health Network hospitals. ED organizations posted the advertisement on research study boards on-site and online.

Thus far, 28 participants completed the study requirements and 17 volunteers were screened and deemed eligible, 7 of which were scheduled to complete the experiment within three weeks of their screening. The recruiting strategy was implemented seven months after the study began. After two months of using this strategy the total number of people that contacted us to participate increased from 47 to 98, including 14 IAN, 9 RecAN and 75 HCs.

Success in recruiting volunteers varied depending on strategies used. A targeted marketing strategy proved most efficient in recruiting volunteers from all participant groups. This approach could be modified for future research studies in which HCs, and patients and ex-patients afflicted by a specific illness are required.

References

1. Shih PB, Woodside B. Contemporary views on the Genetics of Anorexia Nervosa. *Eur Neuropsychopharmacol*. 2016; 26(4):663-673.

Presenting Author: Ms Nadia Hill

Supervisor: Dr Blake Woodside

Co-Supervisor: Ms Eileen Lam

39/60. DESIGN & PRODUCTION OF A NOVEL, SYNTHETIC STENTED HEART VALVE FOR MINIMALLY-INVASIVE DELIVERY IN PAEDIATRIC PATIENTS

Mooney N^{1,*}, Walsh E^{2,*}, Black A³, Kenny D⁴, Wang W¹, Jones JFX¹, O'Cearbhaill ED², Flanagan TC¹

¹School of Medicine, University College Dublin, Belfield, Dublin 4.

²School of Mechanical & Materials Engineering, University College Dublin, Belfield, Dublin 4.

³Anatomy, School of Medicine, National University of Ireland - Galway (NUIG), Galway.

⁴Department of Cardiology, Our Lady's Children's Hospital, Crumlin, Dublin 12.

**These authors contributed equally to the study.*

Current paediatric heart valve replacement options are limited by their inability to grow/remodel, necessitating repeated open-heart surgery procedures. There is currently no alternative for children, nor is minimally-invasive transcatheter implantation a routine procedure in infants. The present project aims to target this unmet clinical need by developing a

novel, stented tissue-engineered heart valve (TEHV) with growth potential.

Our prototype valve design was based on a ‘tube-in-tube’ concept: the outer tube (self-expandable support-stent) was created using CAD software and printed using commercially-available photopolymers (one rigid/one flexible) on a digital-light-processing 3-D printer. The inner tube was created by electrospinning polycaprolactone (PCL) nanofibres onto a custom-printed collector. Fabrication parameters were manipulated to allow high accuracy and orientated fibre deposition. The tubular components were sutured in a concentric configuration to permit collapsible valve leaflet formation. SEM, crimp- and functionality testing was performed.

SEM of electrospun PCL tubular valves revealed a nanofibrous (400nm–1µm) architecture, with fibre alignment permissible by altering spinning parameters. The stents were shown to be printed at high resolution (<50µm layer deposition), with smoother layer transition on flexible polymer struts. Stented valves were crimped to 33% of original diameter and shown to self-expand on release. Collapse of the inner tube was shown to approximate native valve closure.

We have demonstrated the proof-of-concept of our proposed approach to fabricate stented paediatric heart valves by combining 3-D photopolymer printing and electrospinning technology. The resulting prototype forms the basis for further development of biocompatible stented TEHVs for minimally-invasive correction of heart valve defects in children.

This project was supported by funding through the UCD Seed Funding Scheme 2017 – Horizon Scanning (SF1522).

Presenting Author: Niall Mooney and Eoin Walsh

Supervisor: Dr Tom Flanagan

Co-Supervisor: Dr Eoin O’Cearbhaill

40. pT1 COLORECTAL CANCER PATIENTS: THE IMPACT OF ADVERSE TUMOUR FACTORS ON THE THERAPEUTIC APPROACH

Schwartz H,¹ Ryan E,² Creavin B,² Cullen G,² Nolan B,² Winter D,^{1,2} O’Connell R,^{1,2} Kennelly R,² Martin S,² Sheahan K.^{1,2}

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² St. Vincent’s University Hospital and Centre for Colorectal Disease, Dublin, Ireland

pT1 colorectal adenocarcinoma in a polyp has become more prevalent due to increased screening via colonoscopy and the introduction of BowelScreen in 2013. Treating these patients with endoscopic polypectomy alone harbours a risk of leaving residual cancer, however surgery involves potential morbidity. Adverse histological factors such as tumour budding, margin positivity and lymphovascular invasion (LVI) may contribute to poorer outcomes, therefore histological examination is increasingly important in deciding treatment. [1].

The aims of this project included comparing screen-detected to symptomatic cancers, evaluating whether adverse histological features contributed to poorer outcomes, and whether polypectomy alone is adequate treatment. We reviewed the pathology reports of 84 patients who had polypectomies, as well as their clinical reports to evaluate survival rates and outcomes.

18 patients were screen-detected and 66 presented symptomatically. 61.1% of screen-detected, and 32.9% of symptomatic polypectomies were followed by formal colonic resection. Of these, 47% had cancer present at surgery. 10.6% of patients had cancer recurrence and 2 patients, both of whom presented symptomatically and underwent resectional surgery, died of their cancers (2.4%). 42.5% of those with budding had surgery, versus 25% of those without. 41.7% of those with venous invasion had surgery versus 28.6% of those without, and 56.6% of those with LVI had surgery versus 23.5% of those without. Of those who died of

their cancer, 50% had LVI, 0% had venous invasion and 50% had budding.

In conclusion, polyps with adverse features were more likely to have surgery, however, since only 2 patients died due to their cancer, limited conclusions can be drawn regarding the impact of adverse tumour factors on survival rates. Further research into the effect of adverse tumour factors on patient survival is necessary.

References

1. Hassan C, Zullo A, Risio M, Rossini FP, Morini S. “Histologic Risk Factors and Clinical Outcome in Colorectal Malignant Polyp: A Pooled-Data Analysis.” *Dis Colon Rectum*. 2005 Aug;48(8):1588-9. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/15937622> [Accessed on: 30/07/2017]

Presenting Author: Ms. Hannah Schwartz

Supervisor: Prof Kieran Sheahan

Co-Supervisor: Dr Garret Cullen

41. CLINICAL AUDIT OF THE VIP COMPASS PALLIATIVE CARE TOOL

O’Connell-Hussey F¹, Tiernan E², Lanham P²

¹UCD School of Biomedical Engineering, University College Dublin, Belfield, Dublin 4

²Palliative Care Unit, Beacon Hospital, Sandyford, Dublin 18

The VIP Compass Care Plan is a pilot navigation tool for palliative medicine. The aim of the tool is to set out appropriate assessments and timely interventions for those deemed to be at the end of life stage, with the objectives being to maximise the comfort of the patient and families, ensure the physical symptoms are properly managed and to ensure the patients psychological needs are properly attended to. The form has three sections, an initial assessment known as the ‘Master Care Plan’ which is filled in once the patient is deemed to be at the end of life stage, a daily assessment known as the ‘Daily Patient Assessment’ which is filled out every four hours starting from 02H00 and finally a ‘Care Following Death Form’ which is filled out when the patient passes away.

The primary aim of this audit was to assess how well the forms were being filled in and what sections of the assessment sheet were being left out, the secondary aim was to look at the charts of several end of life patients who were not on the compass program to establish if the symptoms covered in the VIP Compass were being recorded anyway.

The findings of the audit were that overall the forms were constantly filled in with the exception being the ‘Care Following Death’ form which was occasionally overlooked. It was also noted that patients on the VIP Compass had detailed records of many symptoms which were not documented in the charts of the non-VIP Compass patients

Presenting Author: Mr Fionn O’Connell-Hussey

Supervisor: Dr Eoin Tiernan

Co-Supervisor: Nurse Paul Lanham

44. A SYSTEMATIC REVIEW OF THE EFFECTIVENESS OF ART THERAPY FOR CHILDREN

Ahmed M¹, Rudd T², Braito I³, Buyuktasik D⁴, Mulligan A¹.

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² Child and Adolescent Mental Health Service, Trim, Meath

³School of Medicine, University of Pisa, Italy

⁴ Gazi University Faculty of Medicine, Ankara, Turkey

Child Art Psychotherapy is an understudied treatment modality [1]. This has led to Art Psychotherapists finding difficulty in establishing their role

in Child and Adolescent Mental Health Services (CAMHS) in Ireland. The aim of this review is to question the clinical effectiveness of art psychotherapy for use in CAMHS. If proven to be effective, this review can be used when budgeting and deciding on the provision of different services.

Literature previously published on this topic was collected and reviewed. Articles were retrieved from searching 3 databases (Web of Science, PubMed and EBSCO) using the terms; child, adolescent, art therapy, psychotherapy, mental health, CAMHS. The articles were subject to the following exclusion criteria: articles referencing clients above the age of 18 and articles that involve art therapy as a co-therapy that could not be assessed separately were excluded. Art psychotherapy as an intervention to improving mental health in children was included, as were articles with a clinical outcome published.

The results demonstrate that most studies yielded positive outcomes that suggest the effectiveness of art therapy, however this was with small sample sizes (mainly case studies). There was only one randomised control trial (RCT) within our study inclusion criteria [2]. Therefore, conclusive evidence that proves the effectiveness of art therapy for children was not found.

In conclusion, further research in the form of RCTs is needed to answer the above question. To offer the most beneficial service to CAMHS, this intervention needs to be researched with robust methods and outcome measures.

References

1. Slayton S, D'Archer J, Kaplan F. Outcome Studies on the Efficacy of Art Therapy: A Review of Findings. *Art Therapy*. 2010;27(3):108-118.
1. Beebe A, Gelfand E, Bender B. A randomized trial to test the effectiveness of art therapy for children with asthma. *Journal of Allergy and Clinical Immunology*. 2010;126(2):263-266.e1.

Presenting Author: Mr Mohammed Ahmed

Co-Supervisor: Dr Tara Rudd

Supervisor: Dr Aisling Mulligan

46. INFLAMMATORY MARKERS IN DEPRESSION AND THE THERAPEUTIC RESPONSE TO ELECTROCONVULSIVE THERAPY

Corcoran N¹, Ryan K^{2,3}, McLoughlin D^{2,3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Trinity College Institute of Neuroscience, Trinity College Dublin, Dublin

³Department of Psychiatry, Trinity College Dublin, St. Patrick's University Hospital, Dublin

Depression is one of the leading contributors to the global burden of disease. About 30% of depressed patients are treatment resistant. Such patients may benefit from electroconvulsive therapy (ECT). The mechanism of action of ECT is not fully understood. However, there is compelling evidence to suggest that ECT induces an enhanced immune response¹, which may contribute to its therapeutic effect.

This project examines protein levels of inflammatory markers commonly implicated in depression in plasma collected from severely depressed patients treated with ECT and age- and sex-matched healthy controls. Samples were analysed using V-Plex assays on the Mesoscale Discovery System. IBM SPSS statistical software was used to analyse differences in concentrations of inflammatory markers in healthy controls and depressed patients, in patients pre- and post-ECT, and in responders and non-responders. Correlation analyses determined if changes in levels of inflammatory markers are associated with changes in mood scores.

Inflammatory markers are significantly higher in depressed patients at baseline compared with healthy controls (IL-6: $p=0.001$, IL-1B

$p=0.048$, TNF- α $p=0.000$, CRP $p=0.000$). A larger increase in TNF- α levels pre- to post-ECT correlates with a larger decrease in Hamilton Rating Scale for Depression scores ($p=0.002$). Higher baseline CRP levels predict a larger decrease in HRSD scores ($p=0.012$) while lower baseline CRP levels predict patient relapse ($p=0.033$).

Results establish a possible mechanism of action for the therapeutic effect of ECT through an increase in TNF- α and demonstrate the potential utility of a CRP blood test prior to treatment in order to predict likelihood of treatment response.

Acknowledgement

The author would like to acknowledge funding from the Wellcome Trust Biomedical Vacation Scholarship.

References

- ¹Buel EMV, Patas K, Peters M, Bosker FJ, Eisel ULM, Klein HC. Immune and neurotrophin stimulation by electroconvulsive therapy: is some inflammation needed after all? *Translational Psychiatry* 2015;5. doi:10.1038/tp.2015.100.

Presenting Author: Niamh Corcoran

Supervisor: Prof Declan McLoughlin

47. COMPARISON OF THREE COMMERCIAL SEROLOGICAL TESTS FOR THE DETECTION OF *CHLAMYDIA ABORTUS* INFECTION IN EWES.

O'Driscoll Á¹, Markey B¹, O'Neill L¹

¹UCD School of Veterinary Medicine, University College Dublin, Belfield, Dublin 4

20.9% of diagnosable ovine abortions in Ireland are caused by *Chlamydia abortus* infection. Abortion usually occurs in the last 2-3 weeks of gestation. Up to 30% of ewes may be affected in naïve flocks. Serological diagnosis of *C. abortus* in flocks using lipopolysaccharide (LPS) or whole bacteria as antigens is often hindered by cross reactions with *C. pecorum* [1].

While the complement fixation test is the most widely used serological test for diagnosis of EAE, more sensitive and specific ELISAs have been developed [2]. This study aimed to compare three commercial ELISA kits to detect *C. abortus* antibodies in ewes and to determine which of the kits had the highest sensitivity: the IDvet kit (coated with MOMP antigen), the MVD-Enfer kit (coated with POMP90-3 antigen) and the LSI kit (coated with chlamydial LPS).

The study also aimed to examine the potential of these ELISAs to distinguish between vaccinated and infected animals as well as evaluating antibody responses in ewes that abort compared to those that have live lambs. The results show that the LSI kit was the most sensitive out of the three kits tested in this study, when sera were tested at 3 weeks post lambing. With all the ELISA kits, antibody levels were higher in ewes that aborted compared to ewes that had live lambs, at both 35 days post challenge and at 3 weeks post lambing. Vaccinating ewes with a recombinant protein vaccine did not elicit an antibody response, which may provide a basis to distinguish between vaccinated and infected ewes.

Acknowledgment

This study was completed with the help of the Thomas O'Hanlon bursary and research supported by Teagasc and DAFM.

References

1. Livingstone M, Entrican G, Wattedgedera S, Buxton D, McKendrick I, Longbottom D. Antibody Responses to Recombinant Protein Fragments of the Major Outer Membrane Protein and Polymorphic Outer Membrane Protein POMP90 in *Chlamydia abortus*-Infected Pregnant Sheep. *Clinical and Vaccine Immunology*. 2005; 12(6):770-777.

2. Wilson K, Livingstone M, Longbottom D. Comparative evaluation of eight serological assays for diagnosing *Chlamydomydia abortus* infection in sheep. *Veterinary Microbiology*. 2009; 135(1-2):38-45.

Presenting Author: Áine O'Driscoll

Supervisor: Dr Bryan Markey

48. USE OF LIPID LOWERING THERAPY (LLT) AND ACHIEVEMENT OF RECOMMENDED TARGETS IN AN AGING COHORT OF PEOPLE LIVING WITH HIV

Gill H K¹, Boyle C², Tinago W¹, Macken A¹, Lambert J^{1,2}, Sheehan G^{1,2}, Cotter A^{1,2}, W. G. Mallon P^{1,2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²HIV Molecular Research Group, School of Medicine, University College Dublin, Belfield, Dublin 4, Ireland

³Department of Infectious diseases, Mater Misericordiae University Hospital, Dublin, Ireland

Statins are used in prevention of cardiovascular diseases, which occurs frequently in people living with HIV (PLWH). The purpose of this study was to examine if the proportion of PLWH > 40 years on antiretroviral therapy (ART) prescribed statins reached the target lipid-lowering levels. Information on demographics, clinical history, lipids (total cholesterol (TC), high density lipoprotein (HDL), low density lipoprotein (LDL) and triglycerides) and statin use, categorised as high, medium and low intensity [1], accounting for impact of concurrent boosted protease inhibitor (PI/r) use was collated. For PLWH on statins, we assessed attainment of LDL targets, and categorised the degree of dyslipidaemia [2]. We compared between group data using Mann-Whitney and chi-square tests with data presented as median (IQR).

Of 432 subjects, 77 were on statins, and 114 were on PI/r. Those on statins were older, often male and less likely to be intravenous drug users. Although TC and HDL were similar between the two groups, LDL was lower, and triglycerides higher in those on statins. Statin use comprised atorvastatin, rosuvastatin, and pravastatin. There were only significant differences in the distribution of those prescribed, and not prescribed statins within triglycerides grades [2]. Only 48 PLWH on statins achieved recommended LDL target, <2.6mmol/L. Although most of them were on medium intensity statins, there was no association between statin intensity and achieving a target LDL.

Of PLWH using statins, <50% achieve recommended LDL targets despite medium intensity statin use. Further research should ascertain the optimum statin dose required to maximise CVD risk reduction in PLWH.

References

1. American College of Cardiology/American Heart Association (ACC/AHA) guidelines

2. National Cholesterol Education Program-Adult Panel III (NCEP-ATPIII)

Presenting Author: Harveena Kaur Gill

Supervisor: Dr Patrick Mallon

Co-Supervisor: Dr Willard Tinago

49. THE HEAT DISSIPATION OF GUTTURAL POUCHES IN HORSES

Ling Ai¹, Ni Annaidh, A¹

¹UCD School of Mechanical Engineering, University College Dublin, Belfield, Dublin 4

The horse is an amazing athletic machine, but there's still much we don't know about the inner workings of horses. Brain cooling is defined as the

lowering of brain temperature below arterial blood temperature. As an anatomical heat exchanger, the function is to cool arterial blood shortly before it enters the brain. It has been proposed that guttural pouches of horses serve the heat-exchange function by cooling the blood, thus protecting the brain from heat injury. In this study, I focus on the guttural pouches (GP) to review heat dissipation, then the intake of air (volume) would have to be accounted for through the GP opening in the naso-pharynx and into the GP. Along with focusing on the mixing of this air with any existing residual air which remains in the GP following exhalation. In addition, the change of air temperature as a result of this mixing would need to be accounted for. The measurements of the carotid artery within the GP (from CT/MRI scan) are also important, and determine the heat exchange which could occur between the GP air and the blood within the artery. I need to determine if it is possible from the volume (and temperature) of the air taken in and mixed with the residual air (any change in temperature as a result of mixing) - is it possible for the air to cool the blood, based on the flow of blood through the carotid artery and if so, by how much. Using a 3D model where different physical conditions can be replicated to evaluate the response of this organ. DICOM image files of horse heads will be used to generate 3D volumes of the horse guttural pouch, which in turn will be used to produce a 3D model. Finally, the printed model will be used as a mould to create membrane models of varying stiffness.

Presenting Author: Ling Ai

Supervisor: Dr Aisling Ni Annaidh

51. ENHANCING GP SCREENING AND BRIEF INTERVENTION FOR PROBLEM ALCOHOL USE: A SCOPING REVIEW

DK Wright¹, G McCombe¹, D Swan¹, J Klimas^{1,2}, W Cullen¹

UCD School of Medicine, University College Dublin, Belfield, Dublin 4

Problem alcohol use (PAU) is a leading global concern. In 2012, 5.9% of all deaths and 5.1% of the global burden of disease were attributable to alcohol. General Practitioners (GP) are optimally suited to address PAU, yet some find undertaking screening and brief intervention (SBI) for PAU challenging. This review examines potential interventions to enhance GP screening and brief Intervention for problem alcohol use in primary care. The aim of this study was to determine to enhance GP screening and brief Intervention for problem alcohol use in primary care?

Sources searched were Pubmed, Cochrane Library, PsycInfo and Google Scholar (2000-2017), as well as grey literature. Search terms included: 'alcohol screening', 'implementation', 'strategy/strategies', 'deliver', 'brief intervention', '(A)SBI' 'primary care/general practice/family practice', 'dissemination', 'intervention', 'programmes', 'strategies', 'facilitators' and 'screening rates'. Primary care studies, written in English, and published between 1/1/2000 and 30/7/2017 were included.

The search identified 110 full-text articles, of which 17 were included in the analysis as they met the inclusion criteria. These included randomised controlled trials (RCTs) (n=8), qualitative studies (n=4), observational studies (n=2), mixed-methods studies (n=2) and a cross-sectional study. Interventions included: GP training (n=12), financial incentives (n=3), audit and feedback (n=3) and the use of an Electronic ASBI tool (eBI) (n=1). Ten of the quantitative studies reported increased SBI rates after implementation period and three (of four) qualitative studies reported positive GP attitudes towards alcohol SBI programmes, but acknowledged implementation challenges.

Support strategies are necessary to enable alcohol SBI in primary care. Further research should examine the effectiveness of such interventions in under-researched (rural) geographical areas and among specific high-risk populations.

Presenting Author: Dean Wright

Supervisor: Dr Geoff McCombe

52. HEPATITIS C MANAGEMENT AMONG PATIENTS RECEIVING OPIOID SUBSTITUTION TREATMENT IN GENERAL PRACTICE IN IRELAND

R Murtagh¹, D Swan¹, E O'Connor^{1,2}, G McCombe¹, C Murphy², JS Lambert^{1,2}, G Avramovic¹, W Cullen¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² Infectious Diseases Department, Mater Misericordiae University Hospital, Dublin 7

This study aims to describe current management of hepatitis C (HCV) among Irish general practice patients on opioid substitution treatment (OST). HCV is associated with considerable morbidity and public health burden (1). Injecting drug use is the main route of transmission in most countries (2). General practice is increasingly providing continuing care, including OST, for people who inject drugs (PWID), and is therefore well placed to care for PWID at risk of and infected with HCV.

OST-prescribing GP practices in North Dublin were recruited through the research team's professional networks/databases. Participant eligibility criteria included: ≥ 18 years of age, on OST and attendance at the practice during the recruitment period. A standardised non-probability sampling framework was used to identify 10 consecutive patients from each practice. The clinical records of participants were reviewed and data extracted on demographics and HCV-related care processes. Statistical analysis was performed using SPSS V24.

Fourteen practices and 135 patients were recruited. Data was extracted from the charts of 133 patients; 71.4% male, median age 42 years. Of these 92.5%, 72.2%, and 66.9% had been screened for HCV, HIV, and hepatitis B (HBV), respectively. Among those who had been tested, the prevalence of HCV, HIV, and HBV infection was 77.2%, 8.3%, and 7.9% respectively. Just 14 (14.7%) patients previously diagnosed with HCV had ever initiated HCV treatment.

A majority of OST patients had been screened for HCV. However, a minority had initiated HCV treatment. New strategies are needed to facilitate greater continuity of care among this population.

Acknowledgement

This study was co-funded by the Health Programme of the European Union and HSE.

References

1. Gower E, Estes C, Blach S, Razavi-Shearer K, Razavi H. Global epidemiology and genotype distribution of the hepatitis C virus infection. *J Hepatol.* 2014;61(1 Suppl):S45-57.
2. Nelson PK, Mathers BM, Cowie B, Hagan H, Des Jarlais D, Horyniak D, et al. Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet.* 2011;378(9791):571-83.

Presenting Author: Mr Ross Murtagh

Supervisor: Prof Walter Cullen

Co-Supervisor: Dr Davina Swan

54. PILOT PROJECT: DEVELOPMENT OF AN IRISH PLACENTAL WEIGHT NOMOGRAM

O'Brien O¹, Higgins M², Mooney E²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²National Maternity Hospital, Holles Street, Dublin 2

The weight of the placenta gives a useful representation of placental function in utero [1]. Placental weight is associated with many common complications in pregnancy [1], and has been found to be predictive of

perinatal morbidity and mortality as well as childhood growth and development [2]. Currently there is no established average placental weight for Irish women, therefore the development of a population specific nomogram would aid in the examination of placentas after delivery.

The aim of this project was to develop a nomogram of average placental weights among Irish women and establish median placental weights for each gestational age.

This was a prospective cohort study of placentas delivered in the National Maternity Hospital in June/July 2017. All singleton pregnancies were included except stillbirths and clinical obstetric complications involving the placenta. The placentas were weighed with Seca 856 scales. Length, breadth, maximum depth and shape of the placenta were also measured and the data was recorded in an excel database. Birth weight, maternal parity and race was also recorded. In order to assess whether placental weight was affected by time since delivery, a subsection of placentas were weighed at multiple intervals after delivery.

430 placentas were weighed over six weeks (June-August 2017). An average placental weight based on gestational age was established. Median placental weight was 460g at 37 weeks, up to 500g at 42 weeks. References

1. Wallace JM, Bhattacharya S, Horgan GW. Gestational Age, Gender and Parity Specific Centile Charts for Placental Weight for Singleton Deliveries in Aberdeen, UK. *Placenta.* 2013; 34(3):269-274.
2. Almog B et al. Placenta Weight Percentile Curves for Singleton and Twin Deliveries. *Placenta.* 2011; 32(1):58-62

Presenting Author: Orlagh O'Brien

Supervisor: Prof Mary Higgins

59. QUANTITATIVE ANALYSIS OF CHONDROGENESIS OF EMBRYONIC LIMB BUDS IN MICROMASS CULTURE.

McMorrough D W^{1,2}, Rolfe R², Shea C², Murphy P^{2,3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Department of Zoology, School of Natural Sciences, Trinity College Dublin, Ireland

³Trinity Centre for Bioengineering, School of Engineering, Trinity College Dublin, Ireland

Cartilage is formed in the embryo by chondrogenic differentiation of progenitor cells, where the process is precisely controlled in time and space. The entire appendicular skeleton forms from mesenchymal cells at the core of the limb bud that condense and undergo chondrogenic differentiation. Embryonic limb bud cells grown in high-density micromass cultures spontaneously form a self-organising pattern of cartilage nodules and provide an *in vitro* system to study chondrogenesis [1]. However, it has previously served as an indicative rather than a quantitative tool.

Here, we develop a method of quantifying the spatial patterns of chondrogenesis in micromass cultures providing a more sophisticated and high-throughput analysis of the self-organising process. Using a combination of image analysis and statistical tools, parameters including nodule number, size, and density were quantified for the first time. To develop this method, micromass cultures exposed to different growth conditions were compared. Patterns of nodule formation in normal growth medium or with the addition of bone morphogenic protein (BMP2), were analysed at Days 4 and 6 post-plating.

We found that multiple aspects of the spatial pattern of chondrogenesis varied significantly between the treatments with cultures exposed to BMP2 forming nodules closer together which also grow larger in size over time, in comparison to growth medium.

Our results demonstrate that this method can be used to quantify spatial and temporal patterns of cellular differentiation. We anticipate that this

method can be used to further investigate the complex spatial patterning that occurs over fine timescales in the developing embryonic limb.

References

1. Saha A, Rolfe R, Carroll S, Kelly DJ, Murphy P. Chondrogenesis of embryonic limb bud cells in micromass culture progresses rapidly to hypertrophy and is modulated by hydrostatic pressure. *Cell and tissue research*. 2017 Apr 1;368(1):47–59.
- Presenting Author: Dermott W McMorrough

Supervisor: Dr Rebecca Rolfe
Co-Supervisor: Dr Paula Murphy

39/60. DESIGN & PRODUCTION OF A NOVEL, SYNTHETIC STENTED HEART VALVE FOR MINIMALLY-INVASIVE DELIVERY IN PAEDIATRIC PATIENTS

Mooney N^{1,*}, Walsh E^{2,*}, Black A³, Kenny D⁴, Wang W¹, Jones JFX¹, O'Cearbhaill ED², Flanagan TC¹

¹School of Medicine, University College Dublin, Belfield, Dublin 4.

²School of Mechanical & Materials Engineering, University College Dublin, Belfield, Dublin 4.

³Anatomy, School of Medicine, National University of Ireland - Galway (NUIG), Galway.

⁴Department of Cardiology, Our Lady's Children's Hospital, Crumlin, Dublin 12.

**These authors contributed equally to the study.*

Current paediatric heart valve replacement options are limited by their inability to grow/remodel, necessitating repeated open-heart surgery procedures. There is currently no alternative for children, nor is minimally-invasive transcatheter implantation a routine procedure in infants. The present project aims to target this unmet clinical need by developing a novel, stented tissue-engineered heart valve (TEHV) with growth potential.

Our prototype valve design was based on a 'tube-in-tube' concept: the outer tube (self-expandable support-stent) was created using CAD software and printed using commercially-available photopolymers (one rigid/one flexible) on a digital-light-processing 3-D printer. The inner tube was created by electrospinning polycaprolactone (PCL) nanofibres onto a custom-printed collector. Fabrication parameters were manipulated to allow high accuracy and orientated fibre deposition. The tubular components were sutured in a concentric configuration to permit collapsible valve leaflet formation. SEM, crimp- and functionality testing was performed.

SEM of electrospun PCL tubular valves revealed a nanofibrous (400nm–1µm) architecture, with fibre alignment permissible by altering spinning parameters. The stents were shown to be printed at high resolution (<50µm layer deposition), with smoother layer transition on flexible polymer struts. Stented valves were crimped to 33% of original diameter and shown to self-expand on release. Collapse of the inner tube was shown to approximate native valve closure.

We have demonstrated the proof-of-concept of our proposed approach to fabricate stented paediatric heart valves by combining 3-D photopolymer printing and electrospinning technology. The resulting prototype forms the basis for further development of biocompatible stented TEHVs for minimally-invasive correction of heart valve defects in children.

This project was supported by funding through the UCD Seed Funding Scheme 2017 – Horizon Scanning (SF1522).

Presenting Author: Niall Mooney and Eoin Walsh
Supervisor: Dr Tom Flanagan
Co-Supervisor: Dr Eoin O'Cearbhaill

61. DESIGN & DEVELOPMENT OF A BIOREACTOR SYSTEM FOR IN VITRO TESTING OF TISSUE-ENGINEERED HEART VALVES

About D¹, O'Cearbhaill ED¹, Flanagan TC²

¹School of Mechanical & Materials Engineering, University College Dublin, Belfield, Dublin 4.

²UCD School of Medicine, University College Dublin, Belfield, Dublin 4

Recent focus in prosthetic heart valve research for paediatric patients has shifted to the development of tissue-engineered heart valves (TEHVs) – living devices with growth/remodelling capabilities. An essential factor in the development of TEHV is a bioreactor system to condition the scaffold and cells to the native valve environment and promote tissue development prior to implantation. Important design considerations for a bioreactor system include autoclavable components, ease of assembly, adjustable pulsatile flow and pressure conditions, maintenance of a sterile flow loop and leak-free joints. The current study aimed to develop a TEHV bioreactor system by modifying an existing bioreactor design (1) to aid sterile assembly and permit pressure, pH, O₂ and temperature monitoring during TEHV conditioning protocols. The proposed bioreactor system consisted of a pump to circulate medium, pH, O₂ and pressure sensors, and a chamber to house the valve and mimic valvular blood flow. The valve chamber components were designed using CAD software and fabricated from polycarbonate and aluminium (both autoclavable) at the design workshop. The chamber allowed medium to be propelled through the TEHV via displacement of a silicone diaphragm using a linear actuator, with the pulse and stroke of the actuator controlled through LabView. The new chamber design allowed rapid and straightforward assembly of the system under sterile conditions, and the constructed system was shown to be leak-free.

The newly-developed bioreactor system met each of the proposed design requirements, and will be used in further studies for the dynamic conditioning of TEHVs for paediatric valve replacement applications.

This project was supported by funding through the UCD Seed Funding Scheme 2017 – Horizon Scanning (SF1522).

References

1. Flanagan TC, Cornelissen C, Koch S, Tschoeke B, Sachweh JS, Schmitz-Rode T, Jockenhoevel S (2007). The in vitro development of autologous fibrin-based tissue-engineered heart valves through optimised dynamic conditioning. *Biomaterials*, 28(23):3399–97.

Presenting Author: Danielle About
Supervisor: Dr Eoin O'Cearbhaill
Co-Supervisor: Dr Tom Flanagan

63. A COMPARITIVE STUDY ON THE USE OF MC3T3 CELLS IN DIFFERENT COLLAGEN-BASED ENVIRONMENTS.

Joel Lee¹, Chau Sang Lau², Ammar Hassanbhai², Swee-Hin Teoh²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²School of Chemical and Biomedical Engineering, Nanyang Technological University, Singapore.

Guided Bone Regeneration (GBR) is a dental surgical procedure to direct the growth of bone tissue on the alveolar ridge with the use of a barrier membrane. Geistlich's Bio-Gide® is the most common membrane [1] used for such procedures. However, the high-cost and the porcine collagen nature of the membrane limits its usage in certain groups. The Centre for Bone Tissue Engineering² aims to create a more affordable membrane made out of Tilapia Collagen.

The aim of this research is to investigate the growth of pre-osteogenic MC3T3 cells in different collagen-based environments. Namely: Bio-

Gide®, Decellularised Tilapia Skin (DTS), Alkali-Treated DTS, Crosslinked Electrospun Tilapia Collagen (CETC) membrane (2h crosslinking), and CETC (24h crosslinking).

The MC3T3 cells were seeded onto the different collagen-based scaffolds in 24-well plates. Half of the MC3T3 cells were exposed to osteogenic media to stimulate differentiation into osteogenic cells. Compatibility of the cell on a scaffold was tested by deriving the level of expression of osteogenic genes through Real-time Reverse Transcription Polymerase Chain Reaction. Genes assessed were: Bone Sialoprotein (BSP), Osteocalcin (OC), and Osteopontin (OPN) [2]. Metabolic activity of the cells was also assessed using the Alamar Blue Assay. The experiment lasted for 3 weeks.

The results demonstrate that the MC3T3 cells differentiate and grow best on the Alkali-Treated DTS. Experiment repeats are required to ensure the validity of the study. Also, further *in vivo* studies with MC3T3 Cells and Human Cells are needed for future development of the GBR membrane.

Acknowledgement:

The author would like to acknowledge funding from the Nanyang Technological University, School of Chemical and Bioengineering, Centre for Bone Tissue Engineering.

References

- [1] iDataResearch, US Market Overview for Dental Bone Graft Substitute and Other Biomaterials 2017 – Medview. Burnaby: iDataResearch; 2017
- [2] Rupani A, Hidalgo-Bastida LA, Rutten F, Dent A, Turner I, Cartmell S. Osteoblast activity on carbonated hydroxyapatite. *Journal of Biomedical Materials Research*. 2012; 100A(4):1089-1096.

Presenting Author: Mr Joel Lee

Supervisor: Prof Teoh Swee-Hin

Co-Supervisor: Dr Ammar Hassanbhai

67. SYSTEMATIC LITERATURE REVIEW ON SUBSTANCE ABUSE DISORDER

Williams, S¹, Shivananda Nayak²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²University of the West Indies, St Augustine

Adolescence is a crucial time in a person's life which signals the developmental period between childhood and adulthood. This phase involves many complex yet subtle biological, social, behavioural and often psychological changes which affects decision making, reasoning and social skills. Within recent years, there has been a continuing upward trend in the number of persons ranging between ages 15-64 who have tried at least one drug annually. While substance abuse is seen across a wide range of age groups, it poses greater risk to adolescents than older people. It has been estimated that 1.5 million adolescents in the United States of America currently suffer from substance use disorder and while adolescents typically experiment with various illicit substances, alcohol, marijuana and tobacco are the most commonly abused substances. In this review, three critical areas pertinent to this topic is examined. The first relates to the many factors which contribute to the initiation of substance use among adolescents. Research suggests that substance use is influenced by many factors including peer influence, dysfunctional family environment, stress and the media. The second area examines the consequences of substance use among adolescents. Substance use was found to be associated with heightened road injuries and fatalities, comorbid psychiatric conditions, juvenile delinquency, violence and substance use disorder. The third and final area examines the efficacy of prevention and treatment programmes currently available to adolescents. It was found that while these programmes do in fact play a significant role in curbing and treating adolescent substance use, a lot more can be done to improve the efficacy of these programmes. This can be achieved through a more interactive approach to prevention programmes, the introduction of

normative education and screening for comorbid psychiatric conditions prior to treatment admission. It is hoped that these would ultimately improve the efficacy of prevention and treatment programmes.

References

1. Strom, H., Adolfsen, F., Fossum, S., Kaiser, S. and Martinussen, M. (2014) 'Effectiveness of school-based preventive interventions on adolescent alcohol use: A meta-analysis of randomized controlled trials', *Substance Abuse Treatment, Prevention, and Policy*, 9, pp 48.
1. Winters, K., Tanner-Smith, E., Bresani, E. and Meyers, K. 'Current advances in the treatment of adolescent drug use', *Adolescent Health, Medicine and Therapeutics*, 5, pp 199–210.
3. World Health Organisation. (2016) World drug report 2016. Vienna: United Nations Office on Drugs and Crime.

Presenting Author: Shianna Williams

Supervisor: Dr Shivananda Nayak

68. ADDED VALUE OF SYSTEMATIC CORE BIOPSIES IN PATIENTS REFERRED FOR TARGETED PROSTATE BIOPSY.

Butt Z¹, McCarthy A², Bambrick M⁴, Sheehy N^{3, 4}, Beddy P^{3, 4}.

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Radiology and Diagnostic Imaging, School of Medicine, University College Dublin, Belfield, Dublin 4.

³Beacon Hospital, Sandyford D18 AK68 Dublin 18.

⁴St. James's Hospital, Dublin 8, Ireland.

The diagnostic pathway for prostate cancer has substantially changed in recent years with a greater emphasis on MRI guided biopsy.¹ This study assessed the common indications for MRI guided biopsy and the associated complications.

This was an IRB approved retrospective study of men who underwent MRI guided prostate biopsy between January 2015 and May 2017. Eligible subjects had an MRI prior to biopsy and had not received prior treatment for Prostate Cancer. The MRI, biopsy and histology reports for each patient were reviewed and patient demographics, history of previous prostate biopsy, clinical presentation, PSA level, PiRADS score, biopsy result and complications were recorded.

There were 281 cases included in the study. The mean age for the cohort was 69. The majority of these cases were referred due to prostate specific antigen (n=230). The mean PSA value for all cases was 10.02. Seventy-one patients had a previous biopsy and 35 patients had an established diagnosis of prostate cancer which had not been actively treated. Most cases had a single lesion identified on MRI (n=193). 178 of the targeted biopsies were performed by MRI cognitive biopsy and 103 were MRI fusion biopsies. The immediate complication rate was low with 4 patients complaining a vaso-vagal symptoms. 12 patients had sepsis post biopsy (4.2%).

MRI-guided TRUS biopsy is a safe technique with similar sepsis rates to standard TRUS biopsy. The majority of patients had 1 lesion detected on MRI and all were suitable for targeted biopsy.

References

1. Oberlin DT, Casalino DD, Miller FH, Matuelwicz RS, Perry KT, Nadler RB, et al. Diagnostic Value of Guided Biopsies: Fusion and Cognitive-Registration Magnetic Resonance Imaging Versus Conventional Ultrasound Biopsy of the Prostate. *Urology*. 2016; 92:75-79.
2. Ahmed HU, Bosaily AE, Brown LC, Gabe R, Kaplan R, Parmar MK, et al. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. *The Lancet*. 2017; 389:815-22.

Presenting Author: Zaran Butt

Supervisor: Prof Peter Beddy

69. AN AUDIT OF THE SAFETY AND EFFICACY OF LIRAGLUTIDE IN THE TREATMENT OF OBESITY AS AN ADJUNCT TO AN ESTABLISHED MULTIDISCIPLINARY LIFESTYLE MODIFICATION PROGRAMME

McDonnell B¹, Burke TP², O'Shea D^{2, 3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Weight Management Service, St Columcille's Hospital, Loughlinstown, Co. Dublin

³St Vincent's University Hospital, Elm Park, Dublin 4

Obesity is classified by the World Health Organisation as a global epidemic. If current trends continue, Ireland is predicted to be the most obese nation in Europe by 2025¹. To date lifestyle modification has been the mainstay of treatment but weight loss is difficult to maintain through lifestyle intervention alone. Liraglutide, a glucagon like peptide-1 analogue, has been shown to have potential benefit for weight management². The aim of our study was to audit the safety and efficacy of once a day Liraglutide injected subcutaneously in patients attending a specialist multidisciplinary tertiary referral weight management clinic over a three-year period. Liraglutide was prescribed as an adjunct to an established multidisciplinary lifestyle modification programme. A retrospective review was conducted of a prospectively maintained database. 145 patients were deemed suitable for inclusion in our study.

At baseline, mean age of our patients were 47.7 years, mean BMI was 50.2kg/m², mean weight was 137.3kg, 68.3% were female and 30.3% had a diagnosis of pre-existing diabetes mellitus II. At 6 months, mean weight loss was recorded as 5.65kgs. 44.8% of patients achieved a clinically significant weight loss of >5% of bodyweight. Notable variations were recorded in treatment responses when subdivided for age and gender. Constipation was the most commonly reported side effect. No serious adverse events were recorded attributable to liraglutide during the study period.

In this study, liraglutide was shown to be safe as an adjunct to lifestyle modification in the treatment of obesity within a specialist weight management centre.

References

Ng N, Fleming T, Robinson M, Thomson B, Graetz N, Margono C et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2014;384(9945):766–781
1. Pi-Sunyer X, Astrup A, Fujioka K, Greenway F, Halpern A, Krempf M et al. A Randomized, Controlled Trial of 3.0 mg of Liraglutide in Weight Management NEJM. 2015;373(1):11–22

Presenting Author: Brian McDonnell

Supervisor: Prof Donal O'Shea

71. ANXIETY AND DEPRESSION IN CONCUSSED CHILDREN: A RETROSPECTIVE CHART REVIEW

M. Woodfield¹, G. Macartney², K. Goulet², M. Vassilyadi²

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² Children's Hospital of Eastern Ontario (CHEO), Ottawa, ON, Canada.

Associations between concussions and the development of post-concussion symptoms have been well documented. However, questions still remain in regards to the symptom experience of concussed children. Few studies have systematically reviewed the incidence and prevalence of psychiatric and psychological challenges in children post head injuries [1,2].

The goal of the retrospective chart review is to describe the symptom experience of children at presentation, including post-concussion

symptoms such as anxiety and depression. Specifically, this study will examine the most frequent symptoms identified at presentation, as well as the incidence of vestibular ocular findings at initial consult. Additionally, the anxiety and depression scores at initial consultation will be assessed. The retrospective chart review evaluated new consultations at the CHEO concussion clinic from March 2016 to May 2017. Baseline population characteristics were collected, as well as the mean scores from the KADS (Kutcher Adolescent Depression Scale), GADS (General Anxiety Disorder Scale), PVSQ (Pediatric Vestibular Symptom Questionnaire), and PCSS (Post Concussion Symptom Scale).

A total of 155 patients met inclusion criteria. The most common reported symptoms on the PCSS at baseline were: headache, fatigue, and feelings of head pressure. The incidence of vestibular ocular findings was 31.6% of patients. The mean anxiety scores, as measured by the GADS (n=108), was 7.4 (range 0–24). The mean depression score, as measured by the KADS (n=94), was 4.7 (range 0–18). Concussed children may experience a wide array of symptoms, including emotional challenges such as anxiety and depression.

References

1. Emery CA, Barlow KM, Brooks BL, et al. A Systematic Review of Psychiatric, Psychological, and Behavioural Outcomes following Mild Traumatic Brain Injury in Children and Adolescents. *Can J Psychiatry*. 2016;61(5):259–269. Doi:10.1177/0706743716643741
2. Keightley ML, Côté P, Rumney P, et al. Psychosocial Consequences of Mild Traumatic Brain Injury in Children: Results of a Systematic Review by the International Collaboration on Mild Traumatic Brain Injury Prognosis. *Arch Phys Med Rehabil*. 2014;95(3):S192–S200. Doi:10.1016/j.apmr.2013.12.018.

Presenting Author: Michelle Woodfield

Supervisor: Gail Macartney

72. ESTABLISHING THE CTENOPHORE AS A MODEL ORGANISM OF NEUROBIOLOGY: DOES PLEUROBRACHIA PILEUS EXHIBIT HABITUATION?

O'Carroll R¹, Courtney A¹, Pickering M.¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

A major barrier to understanding fundamental questions in neurobiology is the lack of animal models which combine simple structural organization with the ability to exhibit complex integrated function. This study aims to investigate whether the marine invertebrate Pleurobrachia pileus, which has a structurally simple nervous system, can display complex adaptive behaviour, specifically a simple form of learning.

Animals were collected from the Irish Sea and housed in seawater chambers while the activity of the locomotor cilia was measured by high speed videography. A decrease in response to repeated mechanical stimulation could be considered habituation, similar to the classical studies in *Aplysia* (1).

Ciliary beat frequency (CBF) after the first stimulation was 13.5±2.6Hz, n=3, and the response lasted 5.5±0.4s. After 12 trials at 5 minute intervals no significant difference in response was seen (CBF: 7.1±2.0Hz, p=0.3; duration: 8.1±1.4s, p=0.5, paired t-test). Similarly, no change was seen after 24 stimulations at 2.5 minute intervals (first trial - CBF: 5.8±0.9Hz, n=3; duration: 9.7±1.4s. Final trial: CBF: 3.7±3.5Hz, p=0.7; duration: 6.5±4.3s, p=0.5)

While we have not provided evidence of learning in this species with these experiments, it is possible that such evidence may be found using a different behavioural paradigm. Given the potential value of this model species of complex behaviour, we believe further behavioural characterisation of these animals are warranted.

References

1. Carew T, Walters E, Kandel E. Classical conditioning in a simple withdrawal reflex in *Aplysia Californica*. The Journal of Neuroscience [Internet]. 1981 [cited 17 August 2017];1(12):1426–1437. Available from: <https://pdfs.semanticscholar.org/20b7/e5ae6f623e26763d604761c89b8f2bad490d.pdf>

Presenting Author: Mr Ross O'Carroll

Supervisor: Dr Mark Pickering

Co-Supervisor: Ms Amy Courtney

74. USE OF SYMPTOM PROFILES FOR DIAGNOSIS OF CHILDHOOD DISEASES

Adeusi L¹, Gomes M², Piyasena D², Jha P²

¹ UCD School of Medicine, University College Dublin, Belfield, Dublin 4

² Centre for Global Health Research, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Canada

Most deaths in low-middle income countries occur without medical attention at the time of death, and hence their causes of death (COD) remain unknown¹. This lack of information greatly limits evidence-based resource allocation, misses identifying new diseases or disease outbreaks and reduces accountability over health expenditures². This project aims to use information about signs and symptoms collected via the Indian Million Death Study (MDS) verbal autopsy (VA) records to determine if various childhood causes of death can be distinguished in the absence of laboratory and clinical data from the symptom profiles alone.

VA contains a structured questionnaire to gather information from relatives of the deceased on symptoms and risk factors leading up to death. In this study we extracted the signs and symptoms (SS) from MDS data collected from 2004–2013 for children 1 month to 14 years of age. The majority of children were 1–59 months of age. We then grouped related SS of major childhood causes of death into 50 broad disease categories and tracked their frequency. Statistical analysis was done using Stata Version 14.2.

The results from this study showed that verbal autopsy diagnosis is in line with clinical symptoms and diagnosis of the various studied causes of death.

This study will help to improve verbal autopsy coding and inform clinical diagnostic guidelines in resource constrained settings, and in turn allow for evidence-based resource allocation, health system strengthening and progress towards the UN 2030 Sustainable Development Goals.

Acknowledgment

This research was supported by The Keenan Research Summer Student Program.

References

1. Aleksandrowicz et al. Performance criteria for verbal autopsy-based systems to estimate national causes of death: development and application to the Indian Million Death Study. BMC Medicine. 2014 12:21.
2. Castillo et al. Validity of a Minimally Invasive Autopsy for Cause of Death Determination in Adults in Mozambique: An Observational Study. PLOS Medicine. 2016. PMID 24495839

Presenting Author: Ms. Lade Adeusi

Supervisor: Dr Prabhat Jha

Co-Supervisor: Dr Mireille Gomes

78. A REVIEW OF IMAGE-GUIDED SCLEROTHERAPY FOR CYSTIC LYMPHATIC MALFORMATIONS IN THE PEDIATRIC POPULATION

Myat, Y.¹, Parra, D.²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²The Hospital for Sick Children

Lymphatic malformations (LM) are rare congenital vascular malformations which can cause variable symptoms depending on compression of nearby structures. Image-guided sclerotherapy is a minimally non-invasive technique that is performed to shrink lymphatic malformations with the guidance of ultrasound. Various sclerosing agents can be used to shrink these cysts. This project aims to review the basic concepts of lymphatic malformations and their treatment with image-guided sclerotherapy in the pediatric population. This review is based on the information gathered from observing procedures and clinical consultations at a pediatric hospital.

Sclerotherapy is widely used to treat lymphatic malformations to alleviate symptoms. Unlike a complete surgical excision, the malformation is not removed. Thus, sclerotherapy avoids some of the risks associated with surgery. Although the procedure focuses on management, a child with a lymphatic malformation can live a perfectly normal life.

Keywords

LM Lymphatic Malformation, Vascular Malformation, Injection Sclerotherapy, Image-Guided Sclerotherapy, Pediatric, Interventional Radiology

Presenting Author: Yin Myat

Supervisor: Dr Dimitri Parra

81. OPTIMISING THE KERATIN-ALGINATE SPONGE, A DERMAL EQUIVALENT IN WOUND HEALING

Xin Hui Sujata Liew¹, Ng Kee Woei², Moay Zi Kuang², John Baugh¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Nanyang Technological University, School of Materials Science & Engineering, College of Engineering

Human hair keratins have been explored for biomedical applications because of its relative abundance, easy accessibility and bioactivity. Previous studies on mice show that human hair keratin is comparable to collagen (PelnacTM) in terms of its ability to provide a template for cell infiltration, tissue growth and neoangiogenesis [1]. Pure keratin, however, has poor mechanical properties which limit its practical relevance. To improve the mechanical properties of the sponge, keratin is cross-linked with alginate using enhancing agents EDC and ethyl-NHS [2]. Mercaptoethanol is used to quench the cross-linking reaction. However, mercaptoethanol has great toxicity. Hence, the aim of this research was to optimise the effective removal of mercaptoethanol from the cross-linked keratin solution.

The method of this research involved using the 2 dialysis bags to dialyse the cross-linked keratin solutions over 2 days. One set-up used 3.5kDa Thermo ScientificTM SnakeSkinTM and another used 14kDa Membrane Cel[®] dialysis tubing. The presence of mercaptoethanol in the dialysed solution was determined using Fourier transform infrared (FTIR) spectroscopy at the end of 2 days.

The FTIR results demonstrate that mercaptoethanol was present in trace amounts in both dialysed cross-linked keratin solutions, but further tests would be required to quantify remaining mercaptoethanol in order to determine which dialysis bag was more effective.

Acknowledgements

The author would like to acknowledge funding from National Healthcare Group (NHG) Singapore.

References

1. Human keratin hydrogels support fibroblast attachment and proliferation in vitro [Internet]. Singapore: Springer-Verlag 2012; 2012. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22287039>
2. Fabrication and characterization of a novel crosslinked human keratin-alginate sponge [Internet]. Singapore: Wiley Online Library; 2017. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27109145>

Presenting Author: Liew Xin Hui Sujata

Supervisor: Assoc Prof Ng Kee Woei

Co-supervisors: Assoc Prof John Baugh, Mr Moay Zi Kuang

82. SPONTANEOUS REPAIR OF LUNG TISSUE DOES NOT OCCUR FOLLOWING VENTILATION INDUCED LUNG INJURY IN A NEONATAL RAT MODEL

Ward A^{1,2}, Lok I^{1,3}, Baugh J², Bouch S¹ & Post M^{1,4}

¹Translational Medicine, Peter Gilgan Centre for Research and Learning, Hospital for Sick Children, Toronto

²UCD School of Medicine, University College Dublin, Belfield, Dublin 4

³Department of Neonatology, Emma Children's Hospital, Amsterdam

⁴Department of Physiology, University of Toronto, Toronto

Bronchopulmonary dysplasia (BPD) remains the most common serious complication of preterm birth.

Mechanical ventilation is a significant contributing factor to the aetiology of BPD. Various treatments have been investigated using animal models however, none of these are as effective as anticipated when tested clinically¹. Spontaneous repair of lung injury following O₂ exposure has been observed in rat models thus limiting their clinical relevance². Our aim was to investigate spontaneous repair of lung tissue following ventilation induced lung injury (VILI).

Sprague-Dawley rats were ventilated for 4 hours at post-natal day (PND) 9 with a tidal volume of 9 ml/kg and a positive end expiratory pressure of 2 cmH₂O. Four treatment groups (n=2/group) were used. Lungs were pressure fixed and collected immediately following ventilation or following a 12-day recovery period in room air at PND 21. Lung sections were stained with hematoxylin and eosin and measurements of mean linear intercept (MLI) and air fraction were performed using a novel algorithm to assess alveolarization.

No observable difference was seen in air fraction for the ventilated group at PND 9 compared to the control group however, at PND 21 the air fraction was higher suggesting an increase in air space of the ventilated lung. MLI of the PND 9 and PND 21 ventilated groups were higher than the control groups suggesting larger alveolar size post-ventilation.

Preliminary data generated in this pilot study suggests that there is no spontaneous repair of lung tissue following VILI.

Acknowledgement

We would like to thank the Canadian institute for Health Research for funding this research.

We would also like to acknowledge Elaine Stirrat for her expert contribution to the analysis of the histological images.

References

1. Jobe, A. The new bronchopulmonary dysplasia. *Current Opinion in Pediatrics*. 2011, vol. 23(2); 167-172.
2. Mankouski A, Kantores K, Wong M *et al*. Intermittent hypoxia during recovery from neonatal hyperoxic lung injury causes long-term impairment of alveolar development: A new rat model of BPD. *American Journal of Physiology - Lung Cellular and Molecular Physiology*. 2016; vol. 312(2); 208-216.

Presenting Author: Amy Ward

Supervisor: Prof Martin Post & Assoc Prof John Baugh

Co-Supervisor: Dr Sheena Bouch

83. INVESTIGATING AND ESTABLISHING BASELINE SAFETY CLIMATE SCORES IN A LARGE, TERTIARY REFERRAL MATERNITY HOSPITAL

L. M. N. Affendi, S. N. A., Feeney, L., Canty, G., Higgins, M., O'Dwyer, C. and O'Hara, D.

Clinical Risk Dept., National Maternity Hospital, Holles Street, Dublin 2 Research indicates a fully functioning culture of safety is a key requirement to achieve zero patient harm. Measuring an organization's "safety climate" can provide understanding and insight into staff perception of safety to underpin strategies to achieve this zero patient harm⁽¹⁾. The aim of this research was to investigate and establish the baseline safety climate scores for the National Maternity Hospital (NMH) using the evidence-based "Safety Climate Survey" (SCS) instrument⁽²⁾ to provide a key "indicator" for the NMH's "journey" to zero patient harm.

Following identification of the appropriate population (*doctors, midwives, nurses, healthcare assistant and allied health professionals*) and the required representative sample (*n=189*), data was collected using the SCS instrument (*n=212*). The data were analysed identifying overall mean and safety climate scores plus the percentage of participants with a positive safety climate disposition. Qualitative "free text" patient safety improvement suggestions were also collected with demographic data to support stratified analysis by department/unit and role.

Data analysis indicated an overall mean of 4.19; average safety climate score of 79.57 and 71.52% of respondents reporting a positive safety climate. 55 patient improvements were collected and themed with the demographic data analysis revealing variation across locations and roles. This research has established the NMH's baseline safety climate scores which will be used as a benchmark for future safety climate measurements following implementation of patient safety initiatives (*including consideration of respondent suggestions collected by the SCS*). The variations between locations and roles require further research to establish the reason(s) for such variation.

References

1. Flin R, Burns C, Mearns K, Yule S, Robertson EM. Measuring safety climate in health care. *Qual Saf Health Care*. 2006 Apr;15(2):109–15.
2. Sexton JB, Helmreich RL, Pronovost P, Thomas E. Safety Climate Survey [Internet]. The Center of Excellence for Patient Safety Research and Practice, University of Texas; 2003 [cited 2017 Aug 14]. Available from <http://www.primaris.org/sites/default/files/resources/Patient%20Safety/safety%20climate%20survey.pdf>

Presenting Author: Sharifah Noor Adwinna Long Mohd Noor Affendi

Supervisor: Prof Mary Higgins

84. DO ALL SOLID PALPABLE BREAST MASSES IN YOUNG WOMEN REQUIRE BIOPSY?

S.Kneafsey¹, D. Duke², DP O'Leary D², A Hegarty², ADK Hill²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Department of Breast Surgery, Beaumont Hospital, Beaumont Road, Dublin 9

³Department of Radiology, Beaumont Hospital, Beaumont Road, Dublin 9

There are large numbers of young women referred to symptomatic breast services with clinically benign breast lumps every year. This constitute a significant workload for most units as the majority of these breast lumps

will prove on subsequent histological or cytological sampling to be benign lesions, such as fibroepithelial lesions (2).

The aim of this study is establish a clinical and ultrasonic criteria by which core needle biopsy can safely be avoided in young women with solid breast masses.

The details were obtained of all women under 30 years of age who attended the Breast Unit in Beaumont Hospital over a seven year period between January 2010 and December 2016, with a radiological diagnosis of a benign breast mass and whom subsequently underwent a breast biopsy (n=849). Patients with a radiologic score of 3, 4 or 5 were eligible for inclusion in this study. Exclusion criteria consisted of women older than 30 years of age and/or an R score 1/2 (n=8). Radiological data and histopathological data was gathered, analysed and compared. Patients who did not have both imaging and pathology reports were excluded from the study (n=31). The report of the targeted ultrasound for these patients was reviewed and this was correlated with the histopathology report (n=810).

There were 849 patients included in this study. The age range of women was 13-30 years old, with a mean of 23 years old. The maximum lesion size range was 2-160 mm, with a mean of 20.8 mm. A total of 668 (82.4%) patients had an ultrasound diagnosis of fibroadenoma confirmed on biopsy. In 796 (98.2%) of these patients, the final histology was either benign pathology or normal. 14 women (1.7%) had an invasive carcinoma. Other benign lesions included fibrocystic change, abscess, inflammation and 1 patient had a benign phyllodes tumors on histology. Of 810 lesions included, the majority (66%) of lesions were in patients ≤ 25 years old. There were no carcinomas found in women in this age group. Carcinoma was much more likely in older women (>25 years old). Overall, the radiologic score appeared to be an excellent predictor of benign histological diagnosis. The findings of this study would support a change in policy of avoiding biopsy in women under the age of 25 years old.

References

1. Hamilton LJ, Cornford EJ, Maxwell AJ. A survey of current UK practice regarding the biopsy of clinically and radiologically benign breast masses in young women. *Clin Radiol*. 2011;66(8):738-41.
2. Maxwell AJ, Pearson JM. Criteria for the safe avoidance of needle sampling in young women with solid breast masses. *Clin Radiol*. 2010;65(3):218-22.
3. Smith GE, Burrows P. Ultrasound diagnosis of fibroadenoma - is biopsy always necessary? *Clin Radiol*. 2008;63(5):511-5; discussion 6-7.

Presenting Author: Sian Kneafsey

Supervisor: Prof Arnold Hill

85. MECHANICAL AND STRUCTURAL CHARACTERISATION OF THE HUMAN OVARIAN ARTERIES

Conlon N¹, Bonin L², Byrne D³, Geoghegan T³, Flanagan TC¹, Annaidh AN², Brennan D^{1,3}

¹UCD School of Medicine and Medical Science, University College Dublin, Belfield, Dublin 4

²School of Mechanical and Materials Engineering, University College Dublin, Belfield, Dublin 4

³Mater Misericordiae University Hospital, Eccles St, Dublin 7

The architecture of the ovarian artery (OA) is unique, demonstrating a spiral configuration throughout its length. This distinctive structure may reflect a mechanical adaptation for the regulation of ovarian blood pressure. We hypothesise that the conformation of the OA inherently facilitates adaptation to various physiological processes. The aim of this study was to (a) characterise the non-linear anisotropic elastic behaviour of OAs under uniaxial tension and (b) compare against the mechanical behaviour of the inferior mesenteric artery (IMA), which is a similar calibre vessel.

14 OAs/1 IMA were obtained from elective surgical patients and subjected to uniaxial tests in two orthogonal directions. The mean ultimate tensile strength (UTS) of the OA was 0.80 ± 0.39 MPa and 0.57 ± 0.26 MPa in the longitudinal (L) and circumferential (C) direction, respectively. The mean failure stretch of the OA was 1.30 ± 0.09 (L) and 1.67 ± 0.38 (C), with a mean Young's Modulus of 6.58 ± 3.54 MPa (L) and 2.26 ± 1.79 MPa (C). Conversely, the mean UTS of the IMA was 3.03 ± 0.01 MPa (L) and 0.98 ± 0.52 MPa (C), the mean failure stretch was 1.34 ± 0.03 (L) and 1.79 ± 0.56 (C), and the mean Young's Modulus was 16.97 ± 3.38 MPa (L) and 2.28 ± 0.46 MPa (C). These results indicate that the OA is significantly stiffer longitudinally than circumferentially. From initial analysis, the OA is more compliant than the IMA although further testing is required to confirm this.

Ongoing histological and ultrastructural analyses will facilitate quantitative assessment of the mechanical contribution of the arterial microstructure to hypothesised adaptive functions of the ovarian artery.

Presenting Author: Niamh Conlon

Supervisor: Prof Donal Brennan

86. RbpA: AN ESSENTIAL MYCOBACTERIAL PROTEIN REQUIRED FOR TRANSCRIPTION INITIATION

Mukerji N¹, Prusa J², Stallings CL²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Department of Molecular Microbiology, Washington University School of Medicine, Saint Louis, MO, USA

Mycobacterium tuberculosis (Mtb) causes 1.5 million deaths per year by withstanding stress imposed by the human immune system and antibiotics during infection. RNA Polymerase (RNAP) binding protein A (RbpA) contributes to Mtb's stress response by regulating transcription. RbpA's C-terminal domain is essential for its role in RNAP binding. Previous data suggests that RbpA's N-terminal domain antagonises the C-terminal domain's ability to bind to RNAP. The aim was to test this hypothesis by creating a point mutation in the C-terminal domain that weakens RbpA-RNAP binding and observing whether deletion of the N-terminal domain would restore RbpA-RNAP binding.

An RbpA double mutant lacking the N-terminal domain and encoding a mutation at a key residue in the C-terminal domain required for RbpA's RNAP binding was engineered. The double mutant was recombinantly expressed and purified. It was also transformed into *Mycobacterium smegmatis* (Msm), a non-pathogenic mycobacterium species.

The purified RbpA double mutant will be used for future *in vitro* assays to measure its affinity for RNAP. If the double mutant is confirmed to support Msm viability, cellular lysate from this strain will be collected for co-immunoprecipitation experiments to measure its interaction with the RNAP *in vivo*.

Preliminary results suggest that the double mutant does not restore the slow growth phenotype caused by C-terminal mutations; alluding that the weakened RbpA-RNAP binding caused by the mutation in the C-terminal domain is not restored by the deletion of the RbpA's N-terminal domain. Further assays will be carried out to determine the double mutant's affinity for RNAP.

Presenting Author: Narayani Mukerji

Supervisor: Prof Christina Stallings

87. A SURVEY OF MEDICAL DOCTOR AND STUDENT'S PERCEPTIONS, ATTITUDES AND UNDERSTANDING TO EXERCISE PRESCRIPTION IN A HOSPITAL SETTING

Ní Shiocháin D¹, McCaffrey², Cahill R^{1,3}, McCarthy C.^{1,3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Mater Misericordiae University Hospital, Eccles St, Dublin 7

In recent years, organisations such as Exercise in Medicine have begun working on the promotion of exercise prescription for patients in primary and secondary care, as part of disease prevention and medical treatment. However, to date, few studies have been carried out to investigate the willingness of secondary and tertiary care physicians to prescribe exercise as a preventative or as a treatment method for disease.

The aim of this project is to assess the attitudes of medical doctors and medical students towards exercise prescription.

A cross-sectional online survey was distributed among medical students and tertiary care physicians and their responses were collected online. The questions covered current use of exercise prescription, their own level of physical activity and opinions on exercise prescription and what they felt was lacking.

A total of 118 responses were received with 47 of those responses from medical doctors and 71 from medical students. 34.19% of respondents regularly recommend exercise but there are a lot of barriers reported by the respondents to prescribing an exercise plan.

Lack of knowledge on how to prescribe exercise for a specific disease and limited access to resources and education appear to be the main problems for medical doctors and students, despite efforts to recommend exercise to their patients.

Presenting Author: Doireann Sheehan

Supervisor: Prof Ronan Cahill

88. PREOPERATIVE INFLAMMATORY MARKERS AS PREDICTORS OF POSTOPERATIVE COMPLICATIONS IN COLORECTAL CANCER PATIENTS

Alsaif, S¹, Aherne G¹, Casey P¹, Kothar H², Pua P¹, Cahill R^{1,2}

¹School of Medicine, University College Dublin, Belfield, Dublin 4.

²Mater Misericordiae University Hospital, Eccles St, Dublin 7.

A prognostic value of inflammatory markers in colorectal cancer (CRC) patients has been proposed [1][2]. However, the association between preoperative inflammatory markers and clinical outcomes of CRC patients undergoing resection has not yet been established. This retrospective study aims to determine the predictive value of preoperative inflammatory markers in postoperative complications of CRC patients in terms of type and severity.

Patients (n=186) who electively underwent potentially curative resection in the Mater Misericordiae University Hospital between 2009 and 2016 were reviewed. C-reactive protein (CRP), white blood cells (WBC), platelets, neutrophils, lymphocytes, platelets-to-lymphocyte ratio (PLR), neutrophil-to-lymphocyte ratio (NLR), hemoglobin, and carcinoembryonic antigen (CEA) levels were collected. Other variables accounted for were age, sex, BMI, smoking status, pre-existing medical issues, type of operation, and tumour characteristics. All 30-day postoperative complications were included and patients were assigned Clavien-Dindo grades accordingly. Analysis was performed using SPSS version 20.

Multivariate regression analysis indicates that CRP is correlated to sepsis (p=0.002), embolism (p=0.047), and urinary, respiratory, and cardiovascular complications (p=0.006, 0.002, 0.004). WBC is correlated to cardiovascular and respiratory complications (p=0.005, p=0.015). Platelets are correlated to embolism and neurological complications (p=0.05, p=0.003). Lymphocytes are correlated to wound infection (p=0.016), CEA to anastomotic leak (p=0.006), and neutrophils to cardiovascular complications (p=0.007). CRP shows significant association to Clavien-Dindo grade (p<0.001), as demonstrated in table 1. Preoperative levels of these markers, most prominently CRP, are independent predictors of postoperative complications for CRC patients. Further prospective

studies are recommended to determine their clinical applicability and to stratify patients into risk categories.

Table 1: CRP as an independent predictor of Clavien-Dindo grade

CD Grade	OR	95% CI for OR	p
1	1.35	(1.17, 157)	<0.001
2	1.55	(1.31, 1.85)	<0.001
3	1.58	(1.33, 1.87)	<0.001
4	1.60	(1.35, 1.90)	<0.001
5	1.59	(1.34, 1.89)	<0.001

References

1. Leitch EF, Chakrabarti M, Crozier JEM, McKee RF, Anderson JH, Horgan PG, et al. Comparison of the prognostic value of selected markers of the systemic inflammatory response in patient with colorectal cancer. *BJC*. 2007; 97(9): 1266-1270.
2. Roxburgh CSD, Salmond JM, Horgan PG, Oien KA, McMillan DC. Comparison of the prognostic value of inflammation based pathological and biochemical criteria in patients undergoing potentially curative resection for colorectal cancer. *Annals of Surgery*. 2009; 249(5): 788-793.

Presenting Author: Sufana Alsaif

Supervisor: Prof Ronan Cahill

Co-Supervisor: Dr Haseeb Kothar

89. MAKING BEST PRACTICE FOR THE CORRECTION OF IRON DEFICIENCY ANAEMIA IN THE PATIENT JOURNEY

Casey P¹, Cahill R^{1,2}, Killeen D^{1,2}, Aherne G¹, Alsaif S, Pua P¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Mater Misericordiae University Hospital, Eccles Street, Dublin 7

Pre-operative iron deficiency anaemia is well documented to be associated with poor outcome as well increased hospital stay post-operatively. The condition is particularly prevalent in patients undergoing curative resection for non-metastatic colo-rectal neoplasms, particularly those of which the tumour is present in the ascending colon. The standard treatment for pre-operative iron deficiency anaemia is a perioperative allogenic blood transfusion (ABT), however this method is limited to counteracting the effects of acute anaemia caused by blood loss and diminished postoperative erythropoiesis associated with major surgery. Indeed this perioperative acute anaemia is amplified for that cohort of patients with existing pre-operative iron deficiency anaemia increasing their risk for requiring ABT. ABT is known to be associated with poor clinical outcome and increased hospital stay as well as being expensive and reliant on selfless donations from the general public. The aim of this study is to minimize the amount of patients undergoing curative bowel resection for colorectal cancer requiring perioperative ABT by addressing the the issue of pre-operative iron deficiency anaemia, and formulating a safe and cost effective way of correcting haemoglobin levels in the afflicted patients. We examined the blood work of 214 patients undergoing curative bowel resection in the mater hospital between February 2010 and January 2016. From those patients who were anaemic pre-operatively, we noted the date of onset of anaemia and determined the time between onset and date of surgery. From this we were able to determine which patients would benefit from a course of oral iron supplementation pre-operatively, which from current data suggests requires a period of 2 months.

References

1. T, C. (2017). *Pre-operative anaemia*. - PubMed - NCBI. [online] Ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25440391> [Accessed 17 Aug. 2017].

2. Thakrar, S., Clevenger, B. and Mallett, S. (2017). *Patient blood management and perioperative anaemia*.

Presenting Author: Paul Casey
Supervisor: Prof Ronan Cahill

94. INVESTIGATION OF THE PROGNOSTIC VALUE OF THE DIFFERENTIAL WHITE CELL COUNT IN PATIENTS UNDERGOING ELECTIVE SURGERY FOR MISMATCH REPAIR DEFICIENT COLORECTAL CANCER

D Al-Hassan¹, E Ryan², B Creavin², K Sheahan^{1, 2}, DC Winter^{1, 2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²The Centre for Colorectal Disease, St. Vincent's University Hospital, Elm Park, Dublin 4

Systemic inflammatory scoring systems, such as the neutrophil: lymphocyte ratio (NLR), and their prognostic value have been reported in many solid organ cancers, including colorectal cancer (CRC)¹. The aim of this study was to examine the relationships between the components of white cell count (WCC), from which the NLR is derived, and survival in patients undergoing elective surgery for the mismatch repair deficient (dMMR) molecular subtype of CRC.

Patients undergoing elective resection for dMMR CRC at a single centre (2005–2016) were identified from a prospective database (n=190). Patient demographics and preoperative laboratory measurements including the differential WCC and their association with disease-free survival (DFS) and overall survival were examined. MMR status was assessed using immunohistochemistry (IHC) for mismatch repair proteins, hMLH1 (BD Bioscience, clone G168-728), hPMS2 (BD Biosciences, clone A16-4, hMSH2 (Calbiochem, clone FE11) and hMSH6 (BD Biosciences, clone 44).

Stage, budding, poorly differentiated clusters (PDC) grade, venous and perineural invasion, margin and peritoneal involvement were associated with DFS ($p \leq 0.016$) on Kaplan-Meier analysis. No component of the WCC or NLR was significantly associated with patient outcome in univariable analysis. Using Cox-regression age ($p=0.010$), stage ($p=0.030$), budding ($p=0.009$) and peritoneal involvement ($p=0.025$) were the only variables independently associated with DFS in dMMR CRC.

No component of the WCC or NLR was significantly associated with outcome in patients who had elective surgery for dMMR CRC. Prognostic markers such as inflammatory scoring systems may not be applicable to all molecular subtypes of CRC.

References

1. Watt D, Martin J, Park J, Horgan P, McMillan D. Neutrophil count is the most important prognostic component of the differential white cell count in patients undergoing elective surgery for colorectal cancer. *The American Journal of Surgery*. 2015;210 (1):24-30.

Presenting Author: Dalal Alhassan
Supervisor: Prof Des Winter

95. EVALUATING LUNG TISSUE ERYTHROPOIETIN LEVELS IN EMPHYSEMATOUS MICE

Brady T¹; Whelan, S¹; Brines, M²; Howell, K¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4
²Araim Pharmaceuticals, New York, USA

Chronic obstructive pulmonary disease (COPD), including emphysema, is a leading cause of death worldwide, and Ireland has over twice the EU

mortality average. Emphysema is characterised by a loss of alveolar walls and associated capillaries leading to enlarged airspaces. Loss of pulmonary vessels may be important in emphysema, since inhibition of Vascular Endothelial Growth Factor causes emphysematous changes in the rodent lung [1]. Concurrent administration of Erythropoietin (Epo) prevented the development of emphysema suggesting a potential therapeutic role. Furthermore, alterations in serum Epo levels have been demonstrated in patients with acute exacerbations of COPD [2].

Epo has recently been identified as cell protective, and previous results suggest that the Epo mimetic ARA-290 (Araim) may reverse existing emphysema in the mouse lung. Our aim was to measure Epo levels in a murine model of emphysema, and determine whether ARA-290 and the scrambled peptide control ARA-297 altered Epo levels.

Serum, Broncho-Alveolar Lavage (BAL) fluid and lung tissue were used from adult male mice (n = 6 per group). Group 1: Control; Group 2: Emphysema; Group 3: Emphysema + ARA-290 and Group 4: Emphysema + ARA-297. Serum and BAL fluid Epo levels were too low to be detected using the Epo ELISA kit.

Epo levels in lung tissue homogenate were within the detectable range, however there were no statistically significant differences in Epo levels between the groups. This does not exclude the possibility that alterations in Epo levels were different in serum or BAL fluid, or in specific cell types within the lung.

References

1. Kasahara Y, Tuder RM, Taraseviciene-Stewart L, Le Cras TD, Abman S, Hirth PK, Waltenberger J, Voelkel NF. Inhibition of VEGF receptors causes lung cell apoptosis and emphysema. *Journal of Clinical Investigation*. 2000 Dec 1;106(11):1311.
2. Sala E, Balaguer C, Villena C, Ríos A, Noguera A, Núñez B, Agustí A. Low erythropoietin plasma levels during exacerbations of COPD. *Respiration*. 2010 Aug 1;80(3):190.

Presenting Author: Ms Tara Brady
Supervisor: Dr Katherine Howell

96. SP4 ENHANCES THE TRANSCRIPTIONAL ACTIVITY OF THE HUMAN SEROTONIN 1A RECEPTOR PROMOTER IN A HUMAN NON-NEURONAL CELL LINE

Bauer J¹, Daigle M^{2,3}, Albert PR^{2,3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4.
²Ottawa Hospital Research Institute (Neuroscience), University of Ottawa, ON K1H 8M5, Canada
³Department of Cellular and Molecular Medicine, University of Ottawa, ON K1H 8M5, Canada

The serotonin 1A (5-HT1A) receptor has been implicated in the pathogenesis and treatment of depression. In a mouse model of chronic stress-induced depression, DNA methylation sites on the promoter of the 5-HT1A gene were evaluated post-stress, and a putative Sp4 site was found in a region susceptible to methylation following stress: the conserved -681 CpG site [1]. Sp4 is a neural analogue of the Sp1 transcription factor. In a construct containing the conserved -681 CpG site alone, Sp4 was found to repress transcriptional activity; however, in the context of a larger mouse 5-HT1A promoter construct, Sp4 was shown to enhance transcriptional activity in some cell lines. We evaluate Sp4 activity in a human construct of the 5-HT1A promoter in a human non-neuronal cell line.

The human 5-HT1A promoter-luciferase construct (-723) was used in human embryonic kidney (HEK293) cells, and the effect of Sp4 on promoter activity was assessed using luciferase as a reporter. We found that Sp4 had an enhancing effect on transcriptional activity of the full promoter in these cells, despite previous evidence showing repression at the -681 CpG site.

We believe that the effect found could be due to stronger enhancing activity of Sp4 at other Sp1-type sites along the promoter, masking the repressor activity of Sp4 at the -681 CpG site. Future studies in human neuronal cells may clarify the role of Sp4 in regulating brain 5-HT1A receptor levels.

Acknowledgement

This research was supported by funding from the Canadian Institutes of Health Research (P.R.A.).

References

1. Le François B, Soo J, Millar AM, Daigle M, Le Guisquet A-M, Leman S, et al. Chronic mild stress and antidepressant treatment alter 5-HT1A receptor expression by modifying DNA methylation of a conserved Sp4 site. *Neurobiol Dis* 2015;82:332–41. doi:10.1016/j.nbd.2015.07.002.

Presenting Author: Ms. Jessica Bauer

Supervisor: Dr Paul R. Albert

97. EVALUATING THE POTENCY OF TOCOTRIENOL AGAINST α -TOCOPHEROL ON THE RECOVERY POTENTIAL OF RETINAL PIGMENT EPITHELIAL (RPE) CELLS IN AGE-RELATED MACULAR DEGENERATION (AMD)

Rathakrishnan S¹, Hor JH^{2,3}, Ng SY^{2,4,5}

¹University College Dublin, School of Medicine, University College Dublin, Stillorgan Road, Belfield, Dublin 4

²Division of Stem Cell, Regenerative Medicine and Aging, 61 Biopolis Drive, Institute of Molecular and Cell Biology, Singapore 138673.

³Department of Biological Sciences, National University of Singapore, 14 Science Drive 4, Singapore 117543.

⁴National Neuroscience Institute, 11 Jalan Tan Tock Seng, Singapore 308433.

⁵Department of Physiology, National University of Singapore, 28 Medical Drive, Singapore 117456.

Age-related macular degeneration (AMD) is the leading cause of irreversible blindness in developed countries, in people above the age of 55. In both atrophic and neovascular AMD, the degeneration of retinal pigment epithelium (RPE) features prominently. It is universally acknowledged that chronic oxidative stress is the initial insult that triggers the development of AMD. This elicits RPE dysfunction as the cells enter senescence¹. The Age-Related Eye Disease Study (AREDS) have established that the use of antioxidants such as ascorbic acid (vitamin C) and α -tocopherol (sub-group of vitamin E) can combat reactive oxygen species and consequently, delay the progression of AMD².

We investigated the potency of tocotrienol (another vitamin E sub-group), an antioxidant with anti-angiogenesis properties, to aid in the recovery potential of RPE cells subjected to oxidative stress. The aim of this research was to evaluate, in comparison with α -tocopherol, the ability of tocotrienol to (a) protect the cells from oxidative stress, and (b) reduce VEGF expression in ARPE-19 cells.

ARPE-19 cells were seeded in culture medium containing α -tocopherol or tocotrienol. After 3 days of incubation, tert-butyl peroxide was added to simulate an environment of oxidative stress. 24 hours later, Operetta® High Content Imaging System was used to detect γ -H2AX, a biomarker for double-stranded breaks. Quantitative PCR was used to assess a panel of oxidative stress response genes, and VEGF expression.

The results demonstrate that tocotrienol is more effective than α -tocopherol in combating oxidative stress, with cells exhibiting diminished upregulation of oxidative stress genes; in addition to greater downregulation of VEGF.

References

1. Marazita M, Dugour A, Marquioni-Ramella M, Figueroa J, Suburo A. Oxidative stress-induced premature senescence dysregulates VEGF and CFH expression in retinal pigment epithelial cells: Implications for Age-related Macular Degeneration. *Redox Biology*. 2016;7:78–87.
2. A Randomized, Placebo-Controlled, Clinical Trial of High-Dose Supplementation With Vitamins C and E, Beta Carotene, and Zinc for Age-Related Macular Degeneration and Vision Loss. *Archives of Ophthalmology*. 2001;119(10):1417.

Presenting Author: Sharmini Rathakrishnan

Supervisor: Dr Shi-Yan Ng

Co-Supervisor: Jin-Hui Hor

98. CAN STOP THE FEELING: INVESTIGATING THE RELATIONSHIP BETWEEN ADOLESCENTS WITH DEPRESSION AND MUSIC

Lorigan J¹, McDonald J², McNicholas F^{1,2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Lucena Clinic Services, Rathgar, Dublin 6

Depression is a common mental disorder, with a global prevalence of approximately 4%.¹ It is the leading cause of disability worldwide. Treatment is usually based around psychological therapy and antidepressant medication, although the latter can have adverse side effects. Therefore it is important that people have a range of treatment options in order to choose the one most suited to them. Music therapy could potentially be an addition to this arsenal. It has been shown to be effective at treating depression among working-age people, although little research has been done concerning music therapy for adolescents with depression.²

This preliminary research sought to investigate and characterise the relationship between adolescents with depression and music. A series of one-on-one interviews were conducted with 6 adolescents diagnosed with depression. The themes that arose from these interviews were collated and examined using thematic analysis.

All of the interviewees strongly emphasized the importance of music in their lives. The two main areas in which it affected them were through socializing, and through aiding emotional regulation. The effects on emotional regulation were complex, and had a profound impact on the psychological state of the adolescents. The adolescents interviewed all asserted that music was important in many areas of their lives. Therefore, it could potentially be incorporated into existing therapeutic treatments for depression. Future research should be conducted investigating modes of incorporating music into dialectical behavioural therapy, for example, through musical performance or the collation of personalized playlists designed to complement or counteract particular emotional states.

Presenting Author: John Lorigan

Supervisor: Dr James McDonald

Co-Supervisor: Prof Fiona McNicholas

¹ World Health Organization. (2017). *Depression*. [online] Available at: <http://www.who.int/mediacentre/factsheets/fs369/en/> [Accessed 8 Aug. 2017].

² Erkkila J, Punkanen M, Fachner J, Ala-Ruona E, Pontio I, Tervaniemi M, et al. Individual music therapy for depression: randomised controlled trial. *Br J Psychiatry*. 2011;199(2):132–9.

100. A CLINICAL AUDIT OF THE REFERRAL AND MANAGEMENT OF PATIENTS WITH GENDER DYSPHORIA

Coffey J¹, O'Riordan F², O'Shea D³, Moran P³, McNicholas F^{1,4,5,6}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin

²University of Limerick, Ireland

³St. Columcille's Hospital, Loughlinstown, Dublin

⁴Our Lady's Children's Hospital, Crumlin

⁵Lucena Clinic Rathgar, Dublin 6

⁶St. John of God Hospital, Dublin, Ireland

Gender dysphoria (GD) is a condition characterised by incongruence between an individual's gender identity and their biological sex, causing significant distress. The diagnosis of patients with GD in Ireland is increasing [1], meaning that accurate referral and treatment are becoming increasingly important. Dual-energy X-ray Absorptiometry (DXA) scanning is used to monitor GD patients for pathological changes in bone mineral density (BMD) related to cross-sex hormone therapy (CHT). [2] We reviewed the charts of the 46 GD patients in St. Columcille's Hospital recorded to have had a DXA scan. Our aim was to evaluate these patients' demographics, the information contained in their letter of referral, the results of their DXA scan, and their clinical follow-up.

There were 36 male-to-female (MTF) and 10 female-to-male (FTM) patients, with mean ages of 39.9 and 34.5 years respectively. Only 70% of MTF and 64% of FTM patients had their chart-recorded gender the same as their gender identity. 54% of patients were first referred by a private psychologist, 31% by a GP and 15% by a psychiatrist. With regards to the letter of referral, a diagnosis of GD was mentioned in 96%, the patient's co-morbidities were mentioned in 28%, and the patient's suitability for CHT was mentioned in 63%. Interestingly, only 19% had their DXA scan booked under their gender identity. 7% of patients had osteoporosis, 52% had osteopenia and 41% were normal. Follow-up scans were indicated in 30 patients, however 27% missed these scans. Treatment for reduced BMD was indicated in 23 patients, however only 30% received this treatment.

These findings show that there is currently a lack of consistency in the recording of gender, compliance with follow-up care, and the application of treatment for osteoporosis in GD patients. Further improvements are necessary to ensure GD patients receive more precise and effective care.

References

1. Judge C, O'Donovan C, Callaghan G, Gaoatswe G, O'Shea D. "Gender dysphoria - prevalence and co-morbidities in an Irish adult population." *Front Endocrinol (Lausanne)*. 2014 Jun 13;5:87.
2. Hembree WC, Cohen-Kettenis P, Delemarre-van de Waal HA et al. "Endocrine Treatment of Transsexual Persons: An Endocrine Society Clinical Practice Guideline." *J Clin Endocrinol Metab*. 2009 Sep;94(9):3132-54.

Presenting Author: Mr Jonathan Coffey

Supervisor: Prof Fiona McNicholas

Co-Supervisors: Prof Donal O'Shea & Dr Paul Moran

103. ARE ADVERSE PSYCHOLOGICAL OUTCOMES MORE LIKELY IN PATIENTS WITH CARDIAC IMPLANTABLE ELECTRONIC DEVICES?

Mahadevan H¹, Miranda A², Stiles M^{2,3}, Lever N^{2,4}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²University of Auckland, Auckland District Health Board, Auckland, New Zealand

³Cardiology Department, Waikato Hospital, Waikato District Health Board, Waikato, New Zealand

⁴Cardiology Department, Auckland City Hospital, Auckland District Health Board, Auckland, New Zealand

There is considerable uncertainty about the impact of Cardiac Implantable Electronic Devices (CIED) on the overall psychological wellbeing of patients [1]. Clinical depression and anxiety are major adverse psychological outcomes and can add additional impairment to the quality of life for CIED patients [2].

The aim of this research was to (a) investigate the quality of life of patients with CIED and (b) assess the treatment satisfaction of patients.

100 CIED patients (24 ICD and 76 pacemaker) were questioned regarding their device and treatment satisfaction. Their levels of depression and anxiety were quantified using the Hospital Anxiety and Depression Scale (HADS). The prevalence of clinical depression and anxiety based on the scores were 7% and 15%, respectively. The mean anxiety and depression scores were 2.78 and 3.29, respectively; which reflected levels similar to the general population. These results are consistent with the patient's satisfaction from treatment; 60% of the patients felt better after the device implantation, while 38% felt the same. 70% of the patients took less than a month to adapt to their devices. 84% of the patients felt it was worthwhile having the device implanted.

These results demonstrate that these patients have insignificant levels of depression or anxiety and are highly satisfied with the treatment. The small sample size and lack of correlation with other clinical markers (e.g. underlying cardiac condition, co-morbidities and presence or absence of device therapy or malfunction) is a significant limitation. Recruiting continues to hopefully address this issue.

Acknowledgment

The author would like to acknowledge the Green Lane Cardiovascular Service of Auckland City Hospital.

References

1. Newall EG, Lever NA, Prasad S, Hornabrook C, Larsen PD. Psychological implications of ICD implantation in a New Zealand population. *Europace*. 2007, vol. 9(1):20-24.
2. Duru F, Büchi S, Klaghofer R, et al. How different from pacemaker patients are recipients of implantable cardioverter-defibrillators with respect to psychosocial adaptation, affective disorders, and quality of life? *Heart*. 1 April 2001, vol.85(4):375

Presenting Author: Ms Hamsa Mahadevan

Supervisor: Dr Nigel Lever

Co-Supervisor: Dr Martin Stiles

105. A STUDY TO EVALUATE THE PHARMACIST'S PERSPECTIVE OF THE HEART FAILURE PATIENT PATHWAY

E Lennon¹, R Kernan¹, J Gallagher¹, M Walshe¹, J Riley², C Keane¹, K McDonald¹

¹Heart Failure Unit St. Vincent's University Hospital, Elm Park, Dublin 4

²Imperial College London, London

Heart Failure (HF) is a chronic condition affecting over 90,000 people nationwide. It is responsible for over 20,000 hospital admissions.

Upon diagnosis of HF, patients enter a pathway through which they learn to manage and live with their diagnosis. The community pharmacist (CP) plays an integral role in this pathway.

Therefore, we administered a validated questionnaire to 32 pharmacists linked to patients of the Heart Failure Unit in St Vincent's to gather *their* perspective of the HF patient pathway. This was a single center study, ethical approval was granted.

Our results showed that 48% (15) of CP's had to re-confirm the diagnosis of HF for patients and 45% (14) reported no access to the hospital team

regarding medication queries. Furthermore, 20% (7) indicated that there were errors on discharge scripts (DS). Results showed that 28%(9) found that patient's regular medications were left off their DS and 53% reported dedicating 30–60 minutes of their day trying to contact medical professionals to clarify medications. Notably, 49% (15) of CPs felt that GP's were not up to date with HF patients and their diagnosis. Finally, 72% (23) of pharmacists felt that it should be standard of care for teams making a medication change on a HF patient's script, to communicate this change and reason for it to the pharmacist.

These results give novel insight into how the HF pathway is perceived by the CP's who *arguably* have the most contact with these patients (in the community). Results suggest there is a gap in communication between CP's & hospital teams. It is pivotal that the CP is informed of medication changes, enabling them to counsel the patient effectively.

Presenting Author: Emma Lennon

Supervisor: Prof Kenneth McDonald

106. EFFECT OF EXERCISE ON THE BIOMAKER LEVEL IN PATIENTS WITH COLORECTAL CANCER

Lok JW¹, Alsaif S¹, Kothar H², Cahill R^{1,2}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Mater Misericordiae University Hospital, Eccles St, Inns Quay, Dublin 7

A lot of studies show that people who are physically active are healthier. Some studies have also shown that recreational physical activity after the diagnosis of cancer has an effect on the overall mortality [1]. Besides, exercise can affect the composition of leukocytes in peripheral blood hence improve the immune system of a cancer patient and as well improve the problems caused by obesity, infections or other disease [2].

The aim of this retrospective data collection and analysis was to (a) compare the biomarker level at diagnosis and the biomarker level before surgery of the patients who undergo exercises and (b) compare the pre-operative biomarker level between patients who undergo exercises and patients who do not undergo exercises.

14 patients from Mater Misericordiae University Hospital who were diagnosed with colorectal cancer between 2016–2017 had undergone an exercise programme conducted by MedEx Wellness before surgery. In this 4 weeks exercise programme, they were required to perform both aerobic and resistance training. Patients who underwent the exercise programme were reported feeling physical stronger and this exercise programme had resulted in an increase in important preoperative CPET variables and increased leg strength in patients. On the other hand, the retrospective analysis was performed on a set of 214 patients diagnosed with colorectal cancer between 2010 to 2016 who went through curative resection at the Mater Misericordiae University Hospital.

Overall, this retrospective data collection and analysis does not provide definitive evidence for an effect of exercise on reducing the biomarker level in patients with colorectal cancer.

References

1. Jeffrey A.Meyerhardt, Edward L.Giovannucci, Michelle D.Holmes, Andrew T.Chan, Jennifer A.Chan, et al. Physical activity and survival after colorectal cancer diagnosis. *Journal of Clinical Oncology*. 2006; 24(22): 3527–3534.
2. Michael P. Gustafson, Ara Celi DiCostanzo, Courtney M. Wheatley, Chul-Ho Kim, et al. A systems biology approach to investigating the influence of exercise and fitness on the composition of leukocytes in peripheral blood. *Journal for Immunotherapy of Cancer*. 2017; 5(30).

Presenting Author: Jia Wen Lok

Supervisor: Prof Ronan Cahill

107. EVALUATION OF OCULOMOTOR PERFORMANCE IN HEALTHY VOLUNTEERS USING WEARABLE EYE-TRACKER

Jayanthinathan N¹, Han JXG², See AAQ², King NKK²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Department of Neurosurgery, National Neuroscience Institute, Singapore.

Saccadic eye movements are influenced by attention, learning, working memory and decision making and have been found to correlate with neurological function¹. Heitger *et al.* found oculomotor deficits in mild head injury patients compared to healthy controls². This study aims (a) to test a wearable eye-tracker as a measure of oculomotor performance and (b) determine baseline characteristics for oculomotor performance in healthy volunteers.

Twenty-one healthy volunteers (mean age 33±12 years, 62% female) completed three tasks (horizontal and vertical anti-saccades and memory saccades) while wearing an eye-tracker (SensoMotoric Instruments), as well as a Standardized Assessment of Concussion (SAC) to measure cognitive function. Student's *t* test was used to compare means of our healthy volunteers with those reported in Heitger's study².

We found a higher percentage of horizontal anti-saccade (HAS) directional errors in our cohort (40%) compared to reported data² (20%, $\chi^2=9.52$, $p=0.002$). For HAS, our cohort had significantly lower mean gain of primary saccade (overshoot from desired eye position) than reported data² ($p=0.03$) while mean final eye position ($p=0.16$) and mean absolute position error ($p=0.45$) were not significant. For memory saccades, mean gain of primary saccade ($p=0.46$), mean final eye position ($p=0.21$) and mean absolute position error ($p=0.88$) were not significant compared to literature². There was negative weak correlation ($r=-0.27$, $p=0.24$) between HAS and SAC scores.

Wearable eye-tracker produced comparable data to traditional set-up². Novel baseline characteristics that were established for oculomotor performance in our cohort can be compared to brain injury patients, post-concussion, in future to assess oculomotor performance.

References

1. Hutton SB. Cognitive control of saccadic eye movements. *Brain and cognition*. 2008;68(3):327–40.
2. Heitger MH, Anderson TJ, Jones RD, Dalrymple-Alford JC, Frampton CM, Ardagh MW. Eye movement and visuomotor arm movement deficits following mild closed head injury. *Brain*. 2004;127(3):575–90.

Presenting Author: Miss Nandini Jayanthinathan

Supervisor: Dr Nicolas Kon Kam King

108. OPTIMISATION OF THE NEWLY DISCOVERED IRR IN MURINE LUNG TISSUE: IMPLICATIONS FOR EMPHYSEMA

King A¹; Howell K²; Whelan S²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²UCD Conway Institute of Biomedical and Biomolecular Research, University College Dublin, Belfield, Dublin 4.

Chronic obstructive pulmonary disease, including emphysema, is particularly prevalent in Ireland with over twice the EU mortality rate. Emphysema is characterised by the development of enlarged airspaces due to alveolar wall destruction and associated vessel loss. Pulmonary vessel damage is now thought to play a pathogenic role in emphysema, since inhibition of vascular endothelial growth factor (VEGF) signalling caused emphysematous changes

in the rat lung [1]. Co-administration of Erythropoietin (EPO) prevented the development of these emphysematous changes, suggesting a novel therapeutic approach in future treatment.

The protective effects of EPO are likely mediated via activation of the innate repair receptor (IRR), a receptor complex of Erythropoietin-receptor (EPOR) and β -common receptor (BCR). VEGF-receptor (VEGFR) is also associated with this IRR receptor complex [2], therefore our aim was to identify the presence of this receptor complex in the lung using a Co-immunoprecipitation (Co-IP) kit (Pierce) with VEGFR as the ‘bait’ protein and BCR as the ‘prey’ protein.

Initially optimisation of both VEGFR and BCR antibodies was carried out using Western Blot analysis on adult lung tissue. Co-IP was then performed, including an evaluation of the effects of bovine serum albumin (BSA) on protein yield. Previous reports had suggested primary antibodies commercially diluted in BSA, may result in reduced yield of target protein due to BSA occupying target binding sites during the Co-IP process.

We assessed VEGFR antibody without using the BSA clean-up process and observed bands at the correct molecular weight. However, technical issues with BSA clean up require further investigation.

References

1. Kashara Y, Tuder RM, Taraseviciene-Stewart L, Le Cras TD, Abman S, Hirth PK, Waltenberger J, Voelkel NF. Inhibition of VEGF receptors causes lung cell apoptosis and emphysema. *Journal of Clinical Investigation*. 2000 Dec 1;106(11):1311-1319
1. Sautin L, Sautin Y, Beem E, Zhou Z, Schuler A, Brennan J, Zharikov SI, Diao Y, Bungert J, Segal MS. Induction of nitric oxide by erythropoietin is mediated by the β -common receptor and requires interaction with VEGF receptor 2. *Blood Journal*. 2010 Jan 28;115(4):896-905

Presenting Author: Ailbhe King

Supervisor: Dr Katherine Howell

109. INVESTIGATING IgM ANTIBODY ACTIVITY AGAINST MAJOR PROTEIN AND CARBOHYDRATE ANTIGENS OF THE LIVER FLUKE, *F. hepatica*, AND ITS EFFECT ON THE RESPONSE OF CATTLE TO LIVER FLUKE VACCINES

Tomany K¹, Garcia-Campos A¹, Garza Cuartero L¹, Sekiya M¹, Mulcahy G¹

¹UCD School of Veterinary Medicine, University College Dublin, Belfield, Dublin 4

The trematode parasite *Fasciola hepatica*, is a very common and economically-important parasite of ruminants with a wide global distribution [1]. In order to increase the options for control of fasciolosis, vaccination strategies are urgently required. Several groups have demonstrated partial protection with a number of recombinant and native antigens. However, results are inconsistent for reasons which are not always immediately obvious.

We hypothesized that one potential reason for this inconsistency may be interference with the development of protective antibodies by promiscuous IgM binding to vaccine target antigens.

The objectives of this investigation were to examine the extent to which IgM antibody interacts with putative protein and carbohydrate antigens on the parasite, as a potential confounder of *Fasciola* vaccine efficacy. It was hoped to elucidate the nature and specificity of this binding, and assess variation in IgM responses between protective and non-protective vaccine trials.

Indirect IgM and IgG1 ELISA against a leading candidate vaccine, Cathepsin L1 (FhCL1) were carried out to compare IgM and IgG1 activity, at time points from pre-vaccination to post infection. Western blots were also generated against liver fluke homogenate (LFH), both before and after sodium meta-periodate treatment (LFH-P) to de-glycosylate

carbohydrates/glycans and thus, by comparison with raw LFH, indicate anti-glycan antibody activity.

We demonstrated high levels of nonspecific IgM antibodies in the sera of cattle not previously infected with *F. hepatica*, particularly against carbohydrate antigen. Increasing IgM titers for vaccinated animals for the non-protective trial, compared with baseline titers for a protective trial may indicate interference with the development of protective immunity. Additionally, IgM activity against FhCL1 disappears following processing for a Western Blot. We therefore propose that IgM interacts with conformational, rather than linear epitopes on FhCL1. Results have implications for potential blockade of IgM in order to improve future vaccine efficacy, as demonstrated in other models [2].

References

1. Charlier, Vercruysse J, Morgan E, van Dijk J, Williams D, et al. Recent advances in the diagnosis, impact on production and prediction of *Fasciola hepatica* in cattle. *Parasitology*. (2014) Mar;141(3):326-35.
2. Lapke N, Tartz S, Kyeong-Hee L, Jacobs T, et al. The application of anti-Toso antibody enhances CD8+ T cell responses in experimental malaria vaccination and disease Vaccine 33 (2015) 6763–6770.

Presenting Author: Kevin Tomany

Supervisor: Prof Grace Mulcahy

110. “EVALUATING THE PATIENT’S PERSPECTIVE OF THE HEART FAILURE PATHWAY FOLLOWING AND ADMISSION WITH AN ACUTE DECOMPENSATION OF HEART FAILURE”

R Kernan¹, E Lennon¹, J Gallagher¹, M Walshe¹, J Riley², C Keane¹, K McDonald¹

¹Heart Failure Unit St. Vincent’s University Hospital, Elm Park, Dublin 4

²Imperial College London, London

Heart Failure (HF) affects over 90,000 people in Ireland. An acute decompensation of HF (ADHF) is a sudden worsening in the signs and symptoms of HF particularly breathlessness and lower limb swelling. It is one of the most common causes of hospitalisations in Ireland.

In an attempt to gain insight into how patients perceive HF, we administered a validated questionnaire to 70 patients admitted to St Vincent’s with an ADHF. This was a single centre study with full ethical approval. The Questionnaire consisted of 4 stages; 1) ADHF recognition, 2) ADHF management, 3) ED Experience & 4) Understanding & Management.

Of 70 patients, 66% were male, 31 were Known (K) and 39 were De Novo (DN). The average age was 72.88±12.82. The Average number of Co-morbidities was 3.79±2.01. The average number of Hospitalisations in past 12 months was 0.6875±0.96 (K=1.37±1.01 and DN=0.19±0.52). Results showed that; 70% (21) DN and 42% (11) K patients did not recognise breathlessness as a sign of HF with, 65% (25) DN and 68% (21) K patients were suffering for >7 days.

In the ED, 79% (31) DN and 35% (11) K patients were surprised that their admission was HF related, however, 10% (3) DN and 16% (3) K patients stated they did not want to know what was happening.

Regarding HF medication, 60% (23) DN and 23% (7) K patients were not familiar with them. The average understanding of HF, was DN=4.717 and K=6.19.

These results suggest that there is a lack of familiarity with the symptoms of HF. This is especially interesting in the Known HF population who have gone through an intensive disease management programme. If symptoms were recognised earlier, patients may gain access to treatment earlier in the community, thereby preventing costly hospitalisations.

Presenting Author: Ronan Kernan

Supervisor: Prof Kenneth McDonald

111. A SIGHT FOR SORE EYES: DIFFERENTIAL EXPRESSION OF KEY MARKERS OF APOPTOSIS AND THE CELL CYCLE IN THE GLAUCOMATOUS LAMINA CRIBROSA

Hassan M Bin Yussuf^{T1}, Imaten M¹, Wallace D¹, O'Brien C¹, Brennan D¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

In glaucoma, a chronic rise in intraocular pressure(IOP) leads to deformation of the optic nerve head(ONH) specifically in the lamina cribrosa(LC) region. The LC is a specialized fenestrated region consisting of fibroelastic beams through which unmyelinated retinal ganglion cell axons pass before becoming the optic nerve. Elevated IOP causes excess strain on the LC beams, resulting in their collapse and offsetting a cascade of damage resulting in LC mechanical failure and fibrosis. The LC progressively undergoes fibrotic remodeling leading to excessive deposition of extracellular matrix(ECM) to pathological levels^{1,2}. However the underlying mechanisms responsible for this pro-fibrotic response are not fully understood. Therefore, the aim of this study was to compare the differential expression of 43 key markers of the cell cycle and apoptosis, in order to elucidate the underlying fibrotic mechanisms at play in the glaucomatous LC. Primary human LC cells (normal and glaucoma) were grown under standard cell culture conditions of 37°C and 5%CO₂. Protein was extracted from cell lysates and 1000µg from each sample applied to an antibody array membrane, followed by incubation with a HRP conjugated secondary antibody. Chemiluminescent detection and densitometry analysis was used to quantify the protein expression levels for each of the targets of interest. Results showed a stark difference in the expression levels of all 43 apoptosis/cell cycle targets, with protein expression levels being significantly decreased or absent in our glaucomatous sample. Statistically significant decreases in protein expression (p<0.05) were found in glaucoma related to both the intrinsic and extrinsic apoptotic cascades (Cytochrome C, Bcl-2 family, TNF, TRAIL receptors, Caspases 3&8, Fas, HSPs) and cell cycle-regulatory proteins (p21, p27 p53). In conclusion, our novel findings reveal a significant dysregulation of both apoptotic and cell cycle machinery in response to glaucoma in the LC. This is likely to be a key mechanism responsible for fibrotic glaucomatous disease development in the ONH.

References

1. Wallace DM, O'Brien CJ. The role of lamina cribrosa cells in optic nerve head fibrosis in glaucoma. *Exp Eye Res.* 2016 Jan;142:102-9.
2. Tovar-Vidales T, Wordinger RJ, Clark AF. Identification and localization of lamina cribrosa cells in the human optic nerve head. *Exp Eye Res.* 2016 Jun;147:94-7.

Presenting Author: Ms Talia Hassan M Bin Yussuf

Supervisors: Dr Deirdre Brennan, Dr Deborah Wallace, Prof Colm O'Brien

112. BIOMIMETIC MODELLING OF THE GLAUCOMATOUS LAMINA CRIBROSA REGION USING TISSUE ENGINEERED SCAFFOLDS

Low R¹, Murphy R¹, Hopkins A¹, Wallace D¹, O'Brien C¹, Brennan D¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

The lamina cribrosa(LC) is a key region of the optic nerve head(ONH) which forms a pressure barrier between the intraocular and retrobulbar spaces. Elevated intraocular pressure(IOP) is the dominant risk factor in disease onset and progression in glaucoma. As an adaptive mechanism to rising IOP, the extracellular matrix(ECM) of the LC becomes less compliant, subsequently inducing pro-fibrotic changes in LC cells^{1,2}. The stiffened LC microenvironment is hypothesized to play a pivotal role in

fibrotic remodeling of the ONH contributing to the pathogenesis of glaucoma. The aim of this study was to create a novel, 3D *in-vitro* model of the stiffened glaucomatous LC region using tissue engineered scaffolds. Collagen/glycosaminoglycan scaffolds (5mm&8mm width, porosity 40-50µm) were fabricated using a freeze drying method. Dehydrothermal and 1-ethyl-3-(3-dimethyl aminopropyl) carbodiimide crosslinking was utilised to produce soft(0.5kPa, 1kPa) and stiff(1.5kPa) scaffold stiffness reference values. Scaffolds were seeded with primary human LC or conjunctival cells at 3500cells/mm² using a dual-seeding method on both top and bottom scaffold surfaces. Cell-seeded scaffolds were subsequently harvested at 2, 7 and 14 days and processed for histological evaluation. The 0.5kPa scaffold proved non-viable, as it experienced extensive shrinkage and loss of mechanical integrity. However, the soft(1kPa) and stiff(1.5kPa) scaffolds both successfully retained their 3D architecture. Upon histological analysis, primary cells had successfully adhered and infiltrated into the scaffolds.

In conclusion, primary human ocular cells have successfully been grown for the first time on 3D 'soft' and glaucomatous 'stiff' LC scaffolds. Utilising this *in-vitro* model of glaucoma has significant potential for deciphering the underlying fibrotic response of LC cells to stiffening and glaucomatous change occurring in the ONH.

References

1. Wallace DM, O'Brien CJ. The role of lamina cribrosa cells in optic nerve head fibrosis in glaucoma. *Exp Eye Res.* 2016 Jan;142:102-9.
2. Liu B, McNally S, Kilpatrick JJ, Jarvis SP, O'Brien CJ. Aging and ocular tissue stiffness in glaucoma. *Surv Ophthalmol.* 2017 Jun 27. pii:S0039-6257(15)30018-7.

Presenting Author: Ms Rebecca Low

Supervisors: Dr Deirdre Brennan, Dr Deborah Wallace, Prof Colm O'Brien

114. BURKITT LYMPHOMA/LEUKAEMIA IN CHILDREN & YOUNG ADOLESCENTS: SINGLE CENTRE/COUNTRY EXPERIENCE [2000-2017]

O'Rourke E¹, Smith O.P²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Our Lady's Children's Hospital Crumlin

Burkitt Lymphoma (BL), a mature B-Cell Non-Hodgkin Lymphoma (NHL) first described by Irish surgeon-scientist Denis Parsons Burkitt in Uganda in 1957, accounts for approximately 40% of childhood NHL in the developed world. Despite notoriety for its aggressiveness, event free survival (EFS) and overall survival (OS) have improved dramatically in recent years - largely attributed to the introduction of combination poly-chemotherapy with targeted immunotherapy. Nevertheless, relapse is unpredictable and carries a significantly poor prognosis. In this study, the aim was to determine EFS and OS rates of BL in the child/young adolescent population of Republic of Ireland (ROI) and to evaluate possible clinical and laboratory predictors of failure in terms of relapse.

A retrospective case-control study of all child/young adolescent cases of BL (<16 yrs) in ROI during 2000-2017 was carried out on patient records in Our Lady's Children's Hospital (OLCH), Crumlin. All BL patients in the ROI have been diagnosed and treated at OLCH.

33 patients were identified (25 males, 8 females), the majority having abdominal symptoms and stage III disease at presentation. 6 patients had stage IV disease (5 Burkitt leukaemia's and 1 CNS involvement). 25 patients received EICNHL COG-Inter-B-NHL and 7 received FAB/LMB-96 protocol. 5 patients had refractory disease; one was salvaged with allogeneic stem cell transplant.

Of the 4 patients who died; 2 had Burkitt leukaemia; 1 died during induction from refractory lactic acidosis (LDH 40,000 IU/l at diagnosis)

and the other from early relapse (LDH 13,572 IU/L at diagnosis). Both patients were obese. One of these patients had an anaphylactic reaction to Rituximab.

The EFS and OS for the total cohort was 85% and 89% respectively which is in keeping with the best results worldwide.

Presenting Author: Ellen O'Rourke

Supervisor: Prof Owen Smith

118. INFLUENCE OF DIET IN HEART FAILURE: ROLE OF SHORT CHAIN FATTY ACIDS IN MONOCYTE PHENOTYPE

Matthews, M¹, Baugh, J¹

¹UCD Conway Institute, University College Dublin, Belfield, Dublin 4

There is insufficient knowledge of molecular and cellular mechanisms causing heart failure (HF). To create efficient HF prevention programmes, we must understand early processes. We suggest a link between prevention of HF and high-fibre diets due to "friendly" gut bacteria.ⁱ SCFAs have anti-inflammatory effects via FFAR2. FFAR3 and GPR109A are suspected to behave similarly. The project aims to investigate the role of dietary soluble fibre fermentation products. We could then conclude that SCFAs prevent exaggerated inflammation, preventing "HF".

QPCR assays were developed to quantify expression of free fatty acid receptors FFAR3 and GPR109A. ⁱⁱ SCFA receptor expression was assessed in patient-derived monocyte cDNA (n=40) using QPCR. Thermodynamic QPCR and cDNA serial dilution optimised temperature and cDNA concentration. Cells treated with SCFAs, LPS and PAM determined optimal concentrations. ELISA detected IL-6 levels from treated cells. GraphPad Prism was used to create data and compare results to previous propionate and FFAR2 correlations in serum/monocyte mRNA. FFAR3 was found in THP-1 cDNA and patient monocyte DNA. Optimal concentration and annealing temperature for FFAR3 primer were 0.5M and 58°C respectively. Optimal cDNA concentrations were 1:5 to 1:125. The GPR109A primers gave no consistent results. ELISA showed that 1 µg/ml of PAM/LPS increases IL-6 secretion effectively. 10mM Butyrate was the most effective inhibitor of LPS/PAM.

This data can be used to examine SCFA's effect on human monocyte and macrophage phenotype using optimal concentrations.

References

ⁱAng, Z., Er, J.Z., Tan, N.S., Lu, J., Lious, Y., Grosse, J. & Ding, J.L. (2016) 'Human and mouse monocytes display distinct signalling and cytokine profiles upon stimulation with FFAR2/FFAR3 short-chain fatty acid receptor agonists', *Scientific Reports*, vol. 6, pp. 34145

ⁱⁱMacia L, Tan J, Vieira AT, Leach K, Stanley D, Luong S, et al. Metabolite-sensing receptors GPR43 and GPR109A facilitate dietary fibre-induced gut homeostasis through regulation of the inflammasome. *Nature communications*. 2015;6:6734

Presenting Author: Maeve Matthews

Supervisor: Assoc Prof John Baugh

120. NOVEL THERAPEUTIC APPROACH AND NEXT GENERATION SEQUENCING (NGS) ANALYSIS OF A PATIENT WITH CENTRAL NERVOUS SYSTEM (CNS) MYELOMA: A CASE REPORT

Boyle A¹, Blum A^{2, 3}, Howard S³, Bazou D³, O'Gorman P^{1, 2, 3}

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

²Department of Haematology, Mater Misericordiae University Hospital, Eccles Street, Dublin 7

³Next Generation Sequencing Laboratory, Mater Misericordiae University Hospital, Eccles Street, Dublin 7

We present the case of a 40-year-old female with relapsed refractory extramedullary myeloma with central nervous system (CNS) involvement.

The patient initially presented with a 2-month history of epistaxis, menorrhagia, abdominal pain and diarrhoea. Following a full diagnostic workup, she was diagnosed with ISS stage 3 IgG-kappa multiple myeloma (MM) with high-risk features [1, 2].

She underwent induction therapy with lenalidomide, bortezomib and dexamethasone followed by melphalan and autologous stem cell transplantation, achieving a complete response. Lenalidomide and bortezomib maintenance followed. Shortly thereafter, the patient relapsed and was commenced on pomalidomide, bortezomib and dexamethasone. Following a subsequent relapse, she was started on daratumumab. 4 months later she presented with headaches and dizziness leading to a diagnosis of CNS relapse. She received triple intra-thecal chemotherapy, craniospinal irradiation and recommenced pomalidomide with no response. Salvage therapy with marizomib [3], pomalidomide and daratumumab resulted in resolution of leptomeningeal enhancement. However, cerebrospinal fluid is still positive for malignant plasma cells by means of conventional cytology and flow cytometry. In summary, in terms of the CNS involvement patient achieved stable disease. This is a promising therapeutic strategy given the very poor prognosis in this cohort of patients.

Targeted gene sequencing and genetic data analysis were performed on the patient's bone marrow sample with the Illumina TruSight targeted sequencing panel and Sophia Genetics DDM® platform. The most well-known genes involved in MM (KRAS, NRAS, BRAF, TP53, JAK3, KIT) were negative for variants. However, 286 variants were identified (41 highly pathogenic, 94 potentially pathogenic, 149 of unknown significance, 2 likely benign). A literature review was conducted on the highly pathogenic variants (HPVs) focusing on prognostic significance and potential therapies. 32 HPVs conferred a poor prognosis and 10 potential targeted therapies were identified. This demonstrates how targeted gene sequencing in MM could lead to more effective risk stratification and development of novel personalised therapies in the future.

References

1. Kumar S et al., International Myeloma Working Group consensus criteria for response and minimal residual disease assessment in multiple myeloma. *Lancet Oncol*. 2016 Aug;17(8): p328-46.

2. Sonneveld P et al., Treatment of multiple myeloma with high-risk cytogenetics: a consensus of the International Myeloma Working Group. *Blood*. 2016 Jun 16;127(24):2955-62.

3. Badros A et al., Marizomib for central nervous system-multiple myeloma. *Br J Haematol*. 2017 Apr;177(2):221-225

Presenting Author: Ms Aoife Boyle

Supervisor: Prof Peter O'Gorman

Co-Supervisor: Dr Agnieszka Blum

122. MATERNAL EDUCATION AND RACE/ETHNICITY ARE ASSOCIATED WITH FOETAL GROWTH: PRELIMINARY RESULTS FROM NYU CHILDREN'S ENVIRONMENTAL HEALTH STUDY

Mandon, A.¹, Kahn, L.G.², Gilbert, J.², Koshy, T.T.², Nathan, L.M.³, Brubaker, S.³, Mehta-Lee, S.S.³, Roman, A.S.³, Trasande, L.²

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4.

²Department of Environmental Paediatrics, New York University Langone Medical Center, 403 E 34th Street, New York, NY, 10016, United States.

³Department of Maternal Fetal Medicine, New York University Langone Medical Center, 150 E 32nd Street, New York, NY, 10016.

Previous studies suggest that socioeconomic status and race/ethnicity influence foetal growth. This study explored associations of maternal education and income with foetal weight and head circumference in a socioeconomically and racially diverse cohort.

Participants were women enrolled in NYU Children's Environmental Health Study who gave birth at Bellevue (n=54) and Tisch (n=149) hospitals between October 2016 and July 2017. Demographic data and maternal prepregnancy height and weight were collected via questionnaire. Head circumference (HC) and estimated foetal weight (EFW) percentiles were extracted from sonography reports across three trimesters. We collected HC and birthweight (BW) from the EMR. Income level was defined as annual household income/# of people supported by that income. Covariate-adjusted linear regression was used to estimate associations of income level and maternal education with foetal growth.

Income level was not associated with foetal growth. First and second trimester EFW percentiles were higher among Hispanic vs. white women (beta=35.38; 95% confidence interval [CI]=4.50, 66.26; beta=26.63, 95% CI=6.65, 46.60). Third trimester EFW and BW percentiles were lower among black vs. white women (beta=-36.05, 95% CI=-59.06, -13.04; beta=-32.97, 95% CI=-53.46, -12.49). HC was smaller among black vs. white newborns (beta=-1.68, 95% CI= -2.86, -0.50) and larger among higher educated ($\geq$ bachelor's degree) vs. lower educated ($\leq$ high school diploma) women (beta=2.26, 95% CI=0.94, 3.59).

Foetal weight gain trajectories varied by race/ethnicity and maternal education was positively associated with HC at birth in our cohort. These findings suggest black women and women of lower education should be monitored to improve foetal growth outcomes.

Acknowledgments

The author would like to acknowledge funding from NYU Langone Health (US).

Presenting Author: Ms Alexis Mandon

Supervisor: Mr Joseph Gilbert

Co-Supervisor: Ms Evelyn Hernandez

123. THE ROLE OF VISCOSITY IN DETERMINING PERFORMANCE OF EX VIVO LUNG PERFUSATE

Lim E.¹, Rowan S.C.¹, McLoughlin P.¹

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4

To increase donor lung availability for transplantation, *ex vivo* lung perfusion (EVLP) is now commonly used to "recondition" lungs previously deemed unsuitable for transplantation. However, this can only be continued for a short period (hours) following which lungs deteriorate due to oedema.

Blood has a relative viscosity that varies between 1.6 and 5.0 depending on vessel diameter, the Fåhræus-Lindqvist effect¹. Standard physiological solutions used for EVLP have a lower viscosity than blood. Previous work in our laboratory has shown that increasing perfusate relative viscosity to 2.5, reduces oedema formation and extends the period of EVLP in isolated mouse lungs (Rowan *et al*, unpublished data). The experiments reported here were undertaken to determine the effect on oedema formation of further increasing perfusate relative viscosity to 5.0.

Perfusates were prepared by dissolving macromolecules weighing 70kDa and 400kDa, in Dulbecco's modified extracellular medium to produce a relative viscosity of 5.0, but the same molarity as

current standard EVLP perfusion solutions. Mouse lungs isolated post mortem were perfused and ventilated until oedema developed or three hours had elapsed.

Of five EVLP preparations, two became oedematous before three hours elapsed. Immunohistochemistry subsequently detected phospho-Yes-associated protein² in the vascular endothelium, a known post-translational, shear stress dependent protein modification.

Comparison with our previous results suggests that a relative viscosity of 5.0 prevents oedema more effectively than the current standard perfusate with a relative viscosity of 1.5, but not as effectively as a relative viscosity of 2.5. Similar viscosity modifications may improve EVLP in human donor lungs.

Acknowledgment

The author would like to acknowledge funding from the Wellcome Trust. References

1. Fåhræus R, Lindqvist T. The viscosity of the blood in narrow capillary tubes. American Journal of Physiology. 1931, Mar 1;96(3):562-8.
2. Wang L, Luo JY, Li B, Tian XY, *et al*. Integrin-YAP/TAZ-JNK cascade mediates atheroprotective effect of unidirectional shear flow. Nature. 2016 Dec 22;540(7634):579-82

Presenting Author: Ms Eunice Lim Yuying

Supervisor: Prof Paul McLoughlin

Co-supervisor: Dr Simon C Rowan

124. A CLINICAL ASSESSMENT OF THE EFFECTS OF ORKAMBI® (LUMACAFTOR-IVACAFTOR) IN PATIENTS WITH MILD/MODERATE CYSTIC FIBROSIS LUNG DISEASE HOMOZYGOUS FOR THE *Phe508del* MUTATION.

Finnegan AM^{1,2}, Carter SC^{1,2}, McKone EF^{1,2}

¹National Referral Centre for Adult Cystic Fibrosis, St Vincent's University Hospital, Dublin 4

²UCD Conway Institute of Biomedical and Biomolecular Research, Belfield, Dublin 4

Background: Cystic fibrosis (CF) is a chronic disease with pulmonary manifestations. In June 2017, the CFTR modifier Orkambi® was approved in Ireland for patients homozygous for the *Phe508del* mutation.

Methods: Responses to Orkambi® in patients with mild/moderate cystic fibrosis were studied by comparing data from three time points: before commencing Orkambi® therapy (Day 0); at 14 days and at 3 months. Outcomes of interest were pulmonary function tests (PFTs), body mass index (BMI) and 3 patient-reported outcome measures (PROMs): CF Questionnaire-Revised (CFQ-R), 24-Hour Symptom Diary and Sino-Nasal Outcome Test-22 (SNOT-22). Sputum and blood were banked for quantitative bacterial culture and cytokine measurement.

Results: To-date, 21 patients were recruited and 13 have provided data at Day 0 and 14. Changes in PFTs were not significant. There was a small but significant improvement in BMI. Quality of life in the Respiratory domain of the CFQ-R increased (p=NS) with an change of +6.1 points (Minimal Important Change (MIC) = ± 4 points). There was a significant reduction in the 24-Hour Symptom Diary score with a change of -16.8 points (MIC = ± 17.8). In contrast to patients with severe lung disease, no patients required dose reduction or hospital admission due to worsening respiratory symptoms.

Conclusion: Orkambi® leads to small but significant improvements in BMI and PROM at 14 days in patients with mild/moderate CF and was well tolerated. Longer-term followup of more patients is needed and is underway to assess the therapeutic benefits of Orkambi®.

Table 1: Clinical response to Orkambi® therapy at Day 14.

Clinical Parameters		Mean Day 0	Mean Day 14	Mean Absolute change
PFTs (n=11)	Forced Expiratory Volume in one second (FEV ₁)	59% (2.311)	60.7% (2.421)	+1.7% (110 ml)
	BMI (n=12)	22.6 kg/m ²	22.9 kg/m ²	+0.3 kg/m ² *
PROMs	CFQ-R (n=11)	70.7	76.8	+6.1
	Role (100 possible points)	67.4	86.7	+19.3
	Weight	69.7	78.8	+9.1
	Vitality	57.5	67.1	+9.6
	SNOT-22 (n=11)	21.5	22.5	+1
	(110 possible points)			
	24hr Symptom Diary (n=12)	36.3	30.2	-6.1*
	(100 possible points)			

*p<0.05

Presenting Author: Ms Aisling Finnegan
 Supervisor: Dr Edward McKone
 Co-Supervisor: Dr Suzanne Carter

126. TESTING THE ROLE OF VISUAL SYSTEM CONNECTIVITY IN THE ONSET OF CDKL5 DISORDER: DEPTH PERCEPTION IN CDKL5 MICE

Saba L¹, Corredor K², Fagiolini M³

¹UCD School of Medicine, University College Dublin, Belfield, Dublin 4, Ireland.

²Neuroscience and Behavior Laboratory, Department of Psychology, Universidad de los Andes, Colombia.

³Department of Neurology, F.M. Kirby Neurobiology Center, Boston Children's Hospital, Boston, Massachusetts 02115, USA.

Mutations in the cyclin-dependent kinase-like 5 (CDKL5) gene give rise to a neurological disorder characterized by early-onset epileptic seizures and severe developmental delay. Murine models of the X-linked CDKL5 disorder mirror symptoms encountered in humans, such as visual deficits and decreased visual acuity.¹ We are interested in exploring these visual impairments, particularly by assessing depth perception, which refers to the ability to see the world in three dimensions starting from a two-dimensional representation on the retina. Therefore, the aim of this study is to evaluate depth perception in CDKL5 knockout male mice, heterozygous female mice, and their wild-type littermates, utilizing the visual cliff task.

Thirty-three adult CDKL5 mutant and wild-type littermates underwent a behavioral test to assess their ability to discriminate the difference in depth between two surfaces. The mice were placed on a platform and had to choose to jump to the deep or shallow side. Three disparities (35,

17.5 and 8.75 cm) were tested in 10/each depth of randomly presented trials.

CDKL5 knockout mice, like wild-type animals, preferred the shallow side at 35 cm, while their ability to differentiate between the two sides decreased at 17.5 cm and 8.75 cm. Interestingly, the capability of the CDKL5 knockout mice to discriminate between the two sides was significantly reduced compared to wild-type mice at 8.75 cm. In contrast, CDKL5 heterozygous female mice behaved like wild-type mice at all three depths.

Thus, CDKL5 knockout male mice have a depth perception deficit, which could be attributed to an altered visual processing due to binocular depth cues.

References

1. Amendola E, Zhan Y, Mattucci C, Castroflorio E, Calcagno E, Fuchs C, et al. Mapping pathological phenotypes in a mouse model of CDKL5 disorder. *PloS one*. 2014; 9(5):91613.

Presenting Author: Ms Leslie Saba

Supervisor: Dr Michela Fagiolini

127. A CLINICAL REVIEW OF HIV MANAGEMENT AND ANTIRETROVIRAL RESISTANCE IN A RURAL SOUTH AFRICAN HOSPITAL

Cunneen B¹, Vanleene P²

¹UCD School of Medicine and Medical Science, University College Dublin, Belfield, Dublin 4.

²Manguzi Hospital, 1 Hospital road, Manguzi, KwaZulu-Natal, Republic of South Africa.

Of the estimated 33 million people infected with HIV worldwide, approximately 7 million of them live in South Africa. The country has by far the highest number of HIV positive inhabitants internationally and has the third highest prevalence of the virus, with approximately 19.2% of the population infected⁽¹⁾. To combat this, South Africa has rolled out the largest antiretroviral (ARV) programme in the world and in May of 2016 announced the major new initiative to supply ARVs to everyone in the country infected with the virus, regardless of CD4 count. As a result, ARVs are now widely available, free of charge, to almost every South African diagnosed with HIV⁽²⁾.

Despite this, there remains many socioeconomic barriers to implementing such measures and adherence to ARV regimens remains highly variable, further perpetuating the epidemic. Of all the HIV positive people in the country, nearly a third reside in the north-eastern province of KwaZulu-Natal (KZN), with the bulk of these in the rural north of the province⁽³⁾. A clinical audit of HIV management was carried out, amongst all admissions to the male medical ward, at a rural hospital in northern KZN over a four week period. The results displayed low levels of viral suppression combined with high levels of resistance to first line drugs. These figures were benchmarked against the rest of South Africa and against similar research in Europe.

References

1. South Africa | UNAIDS [Internet]. Unaid.org. 2017 [cited 14 July 2017]. Available from: <http://www.unaids.org/en/regionscountries/countries/southafrica>

2. Nordling L. South Africa ushers in a new era for HIV. *Nature*; 535, 214–217 (14 July 2016). Available from: <https://www.nature.com/news/south-africa-ushers-in-a-new-era-for-hiv-1.20253>.

3. Dorrington R E, Johnson L F, Bradshaw D and Daniel T. The Demographic Impact of HIV/AIDS in South Africa. National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Research Council and Actuarial Society of South Africa.

Presenting Author: Mr Brian Cunneen
Clinical Supervisor: Dr Philip Vanleene

135. PRELIMINARY INVESTIGATION OF THE POTENTIAL ROLE OF GLUTEN IN CANINE CHRONIC ENTEROPATHY

A. Scott¹, M. Bennaim¹, E. O'Neill¹, K. Jankowska¹, R. Shiel¹

¹School of Veterinary Medicine, UCD, Belfield, Dublin 4

Coeliac disease is the best-characterised manifestation of gluten-related disease, with a worldwide prevalence of approximately 1% (1). In dogs, gluten has been proposed to be a common dietary antigen (2) however; few studies have attempted to determine the prevalence of gluten sensitivity by either dietary trials or the demonstration of antibody positivity. The hypothesis was that an immune response to gluten antigens is present in dogs with severe gastrointestinal inflammation.

Anti-gliadin antibodies were determined in 40 dogs with clinical signs of gastrointestinal disease and a low serum folate and/or cobalamin concentration. Antibodies were measured in residual serum samples from clinical cases stored in the clinical pathology laboratory using a validated commercial assay. The frequency of antibody positivity was recorded, as well as association between antibody positivity and the clinical and clinicopathological findings.

Seropositivity was identified in three of the initial 40 samples tested; two Cavalier King Charles spaniels and one Dobermann. The remaining samples were negative.

The finding of seropositivity to antigens known to be related to human coeliac disease in dogs with gastrointestinal disease is an interesting finding that warrants further study.

Acknowledgement

The authors would like to acknowledge funding from Interchem Ireland LTD.

References

1. Kelly et al. (2015) *Gastroenterology* 148, 1175
 2. Gaschen & Merchant (2011) *Veterinary Clinics North America Small Animal Practice* 41, 361
- Presenting Author: Aoife Scott
Supervisor: Dr Rob Shiel

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.