LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

ADVANCES IN STRUCTURAL AND PHYSIOLOGICAL TREATMENT OF DISEASE AND THERAPEUTIC INTERVENTION (INCLUDES SURGERY AND DRUGS)

Poster Number: 1
Name: Cory Lefebvre
Degree: PhD Candidate
Abstract Title: Understanding the kinomic contributions to tyrosine kinase inhibitor resistance in triple negative breast cancer
Supervisor(s): A. Allan

Poster Number: 2
Name: Moulik Patel
Degree: MSc Candidate
Abstract Title: Incremental maxillomandibular advancement: The relationship between skeletal advancement and airway volume
Supervisor(s): T. Wilson

Poster Number: 3
Name: Oleksiy Zaika
Degree: PhD Candidate
Abstract Title: Perceived significance of clinical steps and frequency of errors in cerebral aneurysm coiling
Supervisor(s): S. de Ribaupierre, R. Eagleson

Poster Number: 4
Name: Nadya Morrow
Degree: MSc Candidate
Abstract Title: Nobiletin corrects intestinal lipid metabolism in LDLR -/- mice fed a high-fat diet
Supervisor(s): M. Huff

Poster Number: 5
Name: Patrick Carnahan
Degree: MSc Candidate
Abstract Title: Interactive-automatic ultrasound segmentation for mitral valve modelling
Supervisor(s): T. Peters, E. Chen

Poster Number: 6
Name: Khaled Hijazi
Degree: PhD Candidate
Abstract Title: Finite element analysis of porous titanium alloy constructs for intra-osseous mandibular implants: A pilot study
Supervisor(s): A. Rizkalla

Poster Number: 7
Name: Hisham Kamoun
Degree: MSc Candidate
Abstract Title: The co-delivery of syngeneic adipose-derived stem/stromal cells and macrophages on decellularized adipose tissue bioscaffolds for in vivo soft tissue regeneration
Supervisor(s): L. Flynn

Poster Number: 8
Name: Christopher Leclerc
Degree: MSc Candidate
Abstract Title: Formation of a vascular regenerative microenvironment within implantable human decellularized adipose tissue bioscaffolds
Supervisor(s): D. Hess, L. Flynn

Poster Number: 9
Name: Libin Liang
Degree: PhD Candidate
Abstract Title: Automatic radiofrequency ablation planning based on set covering for liver tumours
Supervisor(s): A. Fenster

Poster Number: 10
Name: Hareem Nisar
Degree: PhD Candidate
Abstract Title: Ultrasound calibration for unique 2.5d conical images
Supervisor(s): T. Peters

Poster Number: 11
Name: Fiona Serack
Degree: PhD Candidate
Abstract Title: Development of a cell-based regenerative strategy to modulate angiogenesis and inflammation in ischemic tissue
Supervisor(s): L. Flynn

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 12
Name: Nadia Sharma
Degree: MSc Candidate
Abstract Title: Design of cell-instructive biomaterial scaffolds for intervertebral disc regeneration
Supervisor(s): C. Séguin, L. Flynn

Poster Number: 13
Name: Pendar Soltanmohammadi
Degree: MSc Candidate
Abstract Title: The effects of sex and age on shoulder density for population-based design of orthopedic implants
Supervisor(s): R. Willing

Poster Number: 14
Name: Reid Vassallo
Degree: MSc Candidate
Abstract Title: Augmented reality guidance in cerebrovascular surgery using microscopic video enhancement
Supervisor(s): T. Peters

Poster Number: 15
Name: Yue Zhou
Degree: PhD Candidate
Abstract Title: Development of a wearable tremor suppression glove
Supervisor(s): A.L. Trejos, M.D. Naish

Poster Number: 16
Name: Demetri Pananos
Degree: PhD Candidate
Abstract Title: Increased predictive accuracy of apixiban pharmacokinetics via Bayesian statistics
Supervisor(s): D. Lizotte

Poster Number: 17
WITHDRAWN

Poster Number: 18
Name: Michaela Khan
Degree: MSc Candidate
Abstract Title: A randomized clinical trial to compare the effect of non-operative treatment with or without platelet-rich plasma on healing and function in patients with Achilles tendon ruptures
Supervisor(s): T. Birmingham

Poster Number: 19
Name: Bryn Zomar
Degree: PhD Candidate
Abstract Title: A randomized control trial to investigate the cost-effectiveness of outpatient total hip arthroplasty
Supervisor(s): D. Bryant

Poster Number: 20
Name: Tina Khazaee
Degree: MSc Candidate
Abstract Title: Micro-CT imaging technique to characterize diffusion of small molecules
Supervisor(s): D. Holdsworth

Poster Number: 21
Name: Adam Paish
Degree: PhD Candidate
Abstract Title: Iterative design of a small-animal hip-hemiarthroplasty model for preclinical orthopaedic research
Supervisor(s): D. Holdsworth

Poster Number: 22
Name: Stefan Poirier
Degree: MSc Candidate
Abstract Title: PET-guided DTI analysis of white matter integrity to improve epilepsy surgical planning
Supervisor(s): J. Thiessen, U. Anazodo

Poster Number: 23
Name: Fabio Salerno
Degree: PhD Candidate
Abstract Title: Varying intensity of remote ischemic preconditioning to prevent hemodialysis-induced cardiac injury: A randomized controlled trial
Supervisor(s): C. McIntyre, G. Parraga

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 24
Name: Harley Williams
Degree: MSc Candidate
Abstract Title: Does surgical technique impact implant migration in cementless total knee arthroplasty?
Supervisor(s): M. Teeter

Poster Number: 25
Name: Heather Young
Degree: PhD Candidate
Abstract Title: Volumetric 4-dimensional computed tomography for reduction of respiratory motion artefacts
Supervisor(s): S. Gaede, T-Y. Lee

Poster Number: 26
Name: Ji Yun Lee
Degree: PhD Candidate
Abstract Title: Recombinant apoptosis inhibitor of macrophage protein ameliorates transplant ischemia-reperfusion injury
Supervisor(s): L. Gunaratnam

Poster Number: 27
Name: Hannah MacNeil
Degree: MSc Candidate
Abstract Title: Growing new dendritic spines to correct the cognitive deficits of schizophrenia
Supervisor(s): B. Allman, N. Rajakumar

Poster Number: 28
Name: Meagan Wiederman
Degree: MSc Candidate
Abstract Title: Psychological stress modulates synaptic mechanisms for immune-induced HPA axis activation
Supervisor(s): W. Inoue

Poster Number: 29
Name: Brianna Ananthan
Degree: MSc Candidate
Abstract Title: Characterization of pancreatic ductal and alpha-cell stimulation by bone marrow multipotent stromal cells
Supervisor(s): D. Hess

Poster Number: 30
Name: Alexandra Kozlov
Degree: PhD Candidate
Abstract Title: Metabolites as regulators of metabolism, redox signaling and pluripotency
Supervisor(s): R. Cumming, D. Betts

Poster Number: 31
Name: Marc Chretien
Degree: Resident
Abstract Title: Drug disposition in celiac disease – A study with felodipine
Supervisor(s): G. Dresser, D. Bailey

Poster Number: 32
Name: Susan Kimani
Degree: Resident
Abstract Title: Use of combination therapy with acetaminophen and ibuprofen for treatment of patent ductus arteriosus in premature neonates
Supervisor(s): S. Bhattacharya

Poster Number: 33
Name: Soodeh Nikan
Degree: Postdoctoral Scholar
Abstract Title: Automated multi-structure deep segmentation of micro-CT images of temporal bone
Supervisor(s): H. Ladak, S. Agrawal

Poster Number: 34
Name: Frances Yeung
Degree: Resident
Abstract Title: Comparison of saline-lock versus continuous infusion: Assessing duration of functional patency of peripheral intravenous catheters in a pediatric population
Supervisor(s): S. Taheri

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

ADVANCING HEALTH SERVICES PROVISION AND HEALTH POLICY

Poster Number: 35
Name: Aneeka Hafeez
Degree: MSc Candidate
Abstract Title: Cost-effectiveness of pharmacogenomic-guided warfarin therapy compared to standard care for patients diagnosed with atrial fibrillation in Ontario, Canada
Supervisor(s): S. Sarma

Poster Number: 36
Name: Natalie Nightingale
Degree: MSc Candidate
Abstract Title: Establishing optimal haemoglobin thresholds among patients with acute upper gastrointestinal bleeding
Supervisor(s): G. Zou, V. Jairath

Poster Number: 37
Name: Thy Vu
Degree: MSc Candidate
Abstract Title: Utilization of mental health services in primary care: Comparison of Ontario's family health groups and family health organizations
Supervisor(s): S. Sarma, K. Anderson

Poster Number: 38
WITHDRAWN

Poster Number: 39
Name: Amy Lewis
Degree: MSc Candidate
Abstract Title: Public policy advocacy: Evidence-based competencies for educating health care and social service providers
Supervisor(s): A. Oudshoorn

Poster Number: 40
WITHDRAWN

Poster Number: 41
Name: Theodore Wigle
Degree: PhD Candidate
Abstract Title: A cohort study on the impact of hospital-wide dihydropyrimidine dehydrogenase genotype testing for fluoropyrimidine-based chemotherapy, analysis of adverse events and hospital costing
Supervisor(s): R. Kim

Poster Number: 42
Name: Xiao Yue Cai
Degree: Resident
Abstract Title: Pulmonary hypertension and left atrial enlargement is associated with blunting of reduction in hospital resource utilization in patients enrolled in specialty heart failure clinic
Supervisor(s): R. Davey

Poster Number: 43
Name: Emily Ionson
Degree: Research Assistant/Associate
Abstract Title: Sudarshan Kriya Yoga (sky) program in post-traumatic stress disorder (PTSD): A feasibility study
Supervisor(s): K. Vasudev, A. Vasudev

Poster Number: 44
Name: Stephanie Kim
Degree: Medical Student
Abstract Title: Assessing non-technical skills in otolaryngology emergencies through simulation-based training
Supervisor(s): K. Roth

Poster Number: 45
Name: Rebecca Rodrigues
Degree: Research Assistant/Associate
Abstract Title: Risk of involuntary admission among first-generation ethnic minority groups with first-episode psychosis
Supervisor(s): K. Anderson

DETECTION, SCREENING AND DIAGNOSIS OF HEALTH AND DISEASE

Poster Number: 46
Name: Patrick Murphy
Degree: MSc Candidate
Abstract Title: Characterization of Wilms' tumour 1 (WT-1) as a fibrotic biomarker for Duchenne muscular dystrophy
Supervisor(s): L. Hoffman

Poster Number: 47
Name: Julieta Lazarte
Degree: PhD Candidate
Abstract Title: Rare loss of function variant analysis for lone atrial fibrillation
Supervisor(s): R. Hegele

Poster Number: 48
Name: Mahsa Bataghva
Degree: PhD Candidate
Abstract Title: Microvessel detection in power Doppler ultrasound using adaptive singular value decomposition clutter filtering
Supervisor(s): J. Lacefield

Poster Number: 49
Name: Salma Dammak
Degree: PhD Candidate
Abstract Title: Radiomics for detecting recurrence after stereotactic ablative radiotherapy: Sensitivity of performance to sample size
Supervisor(s): A. Ward, D. Palma

Poster Number: 50
Name: Seva Ioussoufovitch
Degree: PhD Candidate
Abstract Title: Towards quantifying tissue perfusion at the point of care with dynamic contrast-enhanced near-infrared imaging
Supervisor(s): M. Diop

Poster Number: 51
Name: Niusha Kheirkhah
Degree: PhD Candidate
Abstract Title: A novel full-inversion-based ultrasound elastography technique for evaluating breast cancer response to chemotherapy
Supervisor(s): A. Samani, A. Sadeghi-Naini

Poster Number: 52
Name: Parsa Omidi
Degree: PhD Candidate
Abstract Title: Algorithm for phase-displacement conversion from reflection digital holographic interferometry
Supervisor(s): J. Carson, M. Diop

Poster Number: 53
Name: Michael Riddle
Degree: MSc Candidate
Abstract Title: Evaluation of individual finger forces during activities of daily living
Supervisor(s): E. Lalone, L. Ferreira

Poster Number: 54
Name: Hui Wang
Degree: PhD Candidate
Abstract Title: Development of a non-contact holographic scanner for photoacoustic tomography of the breast
Supervisor(s): J. Carson, M. Diop

Poster Number: 55
Name: Nicole Guitar
Degree: PhD Candidate
Abstract Title: The effects of physical exercise on executive function in community-dwelling older adults living with Alzheimer's-type dementia: A systematic review of randomized controlled trials
Supervisor(s): D. Connelly

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 56
Name: Emilie Woehrle
Degree: MSc Candidate
Abstract Title: Is professional breath-hold diving associated with endothelial dysfunction?
Supervisor(s): K. Shoemaker, J. Dickey

Poster Number: 57
Name: Nico Arezza
Degree: PhD Candidate
Abstract Title: Clinically-viable and robust measurement of microscopic diffusion anisotropy
Supervisor(s): C. Baron, R. Menon

Poster Number: 58
Name: Justin Ching-Johnson
Degree: MSc Candidate
Abstract Title: Assessment of aortic wall architecture by a novel magnetic resonance imaging approach
Supervisor(s): J. Pickering, R. Bartha

Poster Number: 59
Name: Charmainne Cruje
Degree: PhD Candidate
Abstract Title: Microcomputed tomography of the vasculature using lanthanide nanoparticles as contrast agent
Supervisor(s): M. Drangova, E. Gillies

Poster Number: 60
Name: Mary-Ellen Empey
Degree: MSc Candidate
Abstract Title: Imaging placental metabolism in pregnant guinea pigs fed a Western diet
Supervisor(s): C. McKenzie

Poster Number: 61
Name: Jeffrey Hamilton
Degree: MSc Candidate
Abstract Title: Quantitative brain imaging in TTP patients: From CT to MRI
Supervisor(s): S. Huang, J. Thiessen

Poster Number: 62
Name: Laurie Huang
Degree: MSc Candidate
Abstract Title: Registration of prostate histology to MRI using convolutional neural networks
Supervisor(s): A. Ward

Poster Number: 63
WITHDRAWN

Poster Number: 64
Name: Lucas Narciso
Degree: PhD Candidate
Abstract Title: Reference-based non-invasive hybrid PET/MRI method for CMRO2 imaging: Error analysis and initial assessment
Supervisor(s): K. St. Lawrence

Poster Number: 65
Name: Qi Qi
Degree: PhD Candidate
Abstract Title: Comparison of tumour pH environment and glycolysis measurements in a C6 rat model of glioma
Supervisor(s): J. Thiessen, T-Y. Lee

Poster Number: 66
Name: Lauren Smith
Degree: PhD Candidate
Abstract Title: Optimizing signal-to-noise ratio for hyperpolarized carbon-13 MRI using a hybrid flip angle scheme
Supervisor(s): C. McKenzie

Poster Number: 67
Name: Qin Sun
Degree: MSc Candidate
Abstract Title: Developing gene-based iron contrast for magnetic resonance imaging using essential magnetosome genes
Supervisor(s): D. Goldhawk, F. Prato

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 68
Name: Xin Yue Wang
Degree: MSc Candidate
Abstract Title: Multinuclear magnetic resonance imaging of a rat glioblastoma model
Supervisor(s): T. Scholl

Poster Number: 69
Name: Lawrence Yip
Degree: PhD Candidate
Abstract Title: Assessing improvements to the intraoperative photoacoustic screening (iPAS) system: A question of trade-offs
Supervisor(s): J. Carson

Poster Number: 70
Name: Sarah Donnelly
Degree: MSc Candidate
Abstract Title: Magnetic resonance imaging of commensal and pathogenic bacteria and potential for contrast enhancement with MagA expression
Supervisor(s): J. Burton, D. Goldhawk

Poster Number: 71
Name: Erind Alushaj
Degree: MSc Candidate
Abstract Title: Differentiating the substantia nigra pars compacta and ventral tegmental area in early-stage Parkinson's disease using quantitative susceptibility mapping
Supervisor(s): P. MacDonald, A. Khan, A. Owen

Poster Number: 72
Name: Sherain Harricharan
Degree: PhD Candidate
Abstract Title: Emotion under- and overmodulation through the lens of the insula: Anterior and posterior insula resting-state connectivity and machine learning in PTSD and its dissociative subtype
Supervisor(s): R. Lanius

Poster Number: 73
Name: Oren Princz-Lebel
Degree: MSc Candidate
Abstract Title: Optimization of the touchscreen-based visuomotor conditional learning task in mice
Supervisor(s): P. MacDonald, L. Saksida, T. Bussey

Poster Number: 74
Name: Janice Gomes
Degree: PhD Candidate
Abstract Title: Development of a microparticle-based bio-marker of hemodialysis induced vascular injury
Supervisor(s): C. McIntyre, S. Pasternak

Poster Number: 75
Name: Yong (James) Lim
Degree: PhD Candidate
Abstract Title: Metabolomic alterations in a mouse model of cisplatin-induced AKI
Supervisor(s): B. Urquhart

Poster Number: 76
Name: Joseph Dube
Degree: Research Assistant/Associate
Abstract Title: Self-referral for cognitive study enrollment: An advertising-based recruitment strategy for participants with early cognitive decline
Supervisor(s): M. Borrie

Poster Number: 77
Name: Robin Liu
Degree: Medical Student
Abstract Title: Clinical utility and practical considerations of a coronary artery disease genetic risk score
Supervisor(s): R. Hegele

Poster Number: 78
Name: Lihai Yu
Degree: Research Assistant/Associate
Abstract Title: A 18F-labelled PET probe targeting EZH2 for pancreatic cancer imaging
Supervisor(s): L. Luyt

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

DETERMINANTS OF HEALTH

Poster Number: 79
Name: Brooke O'Donnell
Degree: MSc Candidate
Abstract Title: The characterization of Panx1 and Panx3 in skin using two knockout mouse models
Supervisor(s): S. Penuela

Poster Number: 80
Name: David Wright
Degree: PhD Candidate
Abstract Title: Acetylation regulates thioredoxin reductase 1 activity and oligomerization
Supervisor(s): P. O'Donoghue

Poster Number: 81
Name: Chen Wei Huang
Degree: MSc Candidate
Abstract Title: Seizure worry in adolescents and young adults with childhood-onset epilepsy: An exploration ten years after diagnosis
Supervisor(s): K. Speechley

Poster Number: 82
Name: Myanca Rodrigues
Degree: MSc Candidate
Abstract Title: The risk of multiple chronic health conditions after a first episode of psychosis – Systematic review and meta-analysis
Supervisor(s): K. Anderson

Poster Number: 83
Name: Brenton Button
Degree: PhD Candidate
Abstract Title: Understanding differences in children achieving recommended amount of MVPA on weekdays and weekend days
Supervisor(s): J. Gilliland

Poster Number: 84
Name: Azar Varahrami Vigeh
Degree: PhD Candidate
Abstract Title: Prognostic factors of recovery in patients with proximal humerus fracture: A systematic review based on the ICF model
Supervisor(s): J. MacDermid

Poster Number: 85
Name: Juan Garcia
Degree: MSc Candidate
Abstract Title: Sex differences and integration of mechanotransduction and blood flow regulation in microcirculation
Supervisor(s): D. Jackson

Poster Number: 86
Name: Chantelle Lloyd
Degree: PhD Candidate
Abstract Title: Dissociation as a predictor of post-traumatic tonic immobility
Supervisor(s): R. Lanius, M. McKinnon

Poster Number: 87
Name: Marwan Shahid
Degree: MSc Candidate
Abstract Title: Developing a non-invasive optical system for monitoring oxygenation and blood flow dynamics in the adult brain
Supervisor(s): K. St. Lawrence, M. Diop

Poster Number: 88
Name: John Chmiel
Degree: MSc Candidate
Abstract Title: Dysregulation of the Duox pathway via chronic exposure to common pesticide may alter gut microbiota composition and susceptibility to infection
Supervisor(s): G. Reid

Poster Number: 89
Name: Arash Bandegan
Degree: Postdoctoral Scholar
Abstract Title: Indicator amino acid oxidation protein requirement estimate in endurance-trained men 24h post-exercise exceeds both the EAR and current athlete guidelines
Supervisor(s): P. Lemon

Poster Presentations – Morning Session

Poster Number: 90
Name: Callista Forchuk
Degree: Research Assistant/Associate
Abstract Title: Sexual dysfunction in male treatment-seeking Canadian Armed Forces members and veterans
Supervisor(s): J.D. Richardson

Poster Number: 91
Name: Erik Tamberg
Degree: Medical Student
Abstract Title: Anatomical and functional aspects of the discomalleolar ligament in cadaveric human adults: A new link to tinnitus and otological symptoms?
Supervisor(s): K. Galil, M. Darling

EARLY LIFE PROGRAMMING AND DEVELOPMENT

Poster Number: 92
Name: Kelly Baines
Degree: PhD Candidate
Abstract Title: Inflammation during early pregnancy results in impaired placental development and reduced fetal growth in rats
Supervisor(s): S. Renaud, D. Hardy

Poster Number: 93
Name: Katherine Quesnel
Degree: PhD Candidate
Abstract Title: The role of ATRX in excitatory neurons in the developing mouse brain
Supervisor(s): N. Berube

Poster Number: 94
Name: Estee Goldberg
Degree: MSc Candidate
Abstract Title: Can an auditory task stimulate the fetal primary auditory cortex? An fMRI investigation
Supervisor(s): S. de Ribaupierre

Poster Number: 95
Name: Simran Sethi
Degree: MSc Candidate
Abstract Title: Quantification of T1 and T2* of fetal tissues at 1.5T
Supervisor(s): C. McKenzie

Poster Number: 96
Name: Faraj Haddad
Degree: PhD Candidate
Abstract Title: The role of natural killer cells in mediating the effects of maternal immune activation on offspring brain and behaviour
Supervisor(s): S. Schmid

Poster Number: 97
Name: Jamie Ching
Degree: MSc Candidate
Abstract Title: The role of Pannexin 1 in human mesenchymal stem cells during in vitro adipogenesis
Supervisor(s): D. Laird

Poster Number: 98
Name: Anish Engineer
Degree: PhD Candidate
Abstract Title: The role of microRNA-122 in pregestational diabetes-induced congenital heart defects
Supervisor(s): Q. Feng

Poster Number: 99
Name: Elizabeth Greco
Degree: MSc Candidate
Abstract Title: Maternal nicotine exposure induces congenital heart defects in mice offspring
Supervisor(s): Q. Feng, D. Jones

Poster Number: 100
Name: Danielle Spice
Degree: PhD Candidate
Abstract Title: CRISPR/Cas9 knockout of Hh signaling modulators attenuates neuronal differentiation of P19 embryonal carcinoma cells
Supervisor(s): G. Kelly

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 101
Name: Maisoon Yousif
Degree: MSc Candidate
Abstract Title: Oleic acid prevents palmitic acid-induced decreases in blastocyst development
Supervisor(s): D. Betts, A. Watson

Poster Number: 102
Name: Takashi Hashimoto
Degree: Postdoctoral Scholar
Abstract Title: The impact of lifelong high-fat high-sugar exposure during pregnancy on placental structure, inflammation and oxidative stress in non-obese guinea pigs
Supervisor(s): T. Regnault

MECHANISMS OF DISEASE

Poster Number: 103
Name: Khadija Ahmed
Degree: MSc Candidate
Abstract Title: Mediation of endoplasmic reticulum stress sensitivity by TORC1 signaling in Saccharomyces cerevisiae
Supervisor(s): P. Lajoie

Poster Number: 104
Name: Sarah Chadwick
Degree: PhD Candidate
Abstract Title: Investigating Tauroursodeoxycholic acid's role in cell stress responses: Mechanistic insights
Supervisor(s): P. Lajoie

Poster Number: 105
Name: Jamie Fritz
Degree: MSc Candidate
Abstract Title: NUAK1 has a dual role in regulating spheroid viability and adhesion in ovarian cancer metastasis
Supervisor(s): T. Shepherd

Poster Number: 106
Name: Chidambra Halari
Degree: PhD Candidate
Abstract Title: Role of Decorin during decidualization of human endometrial stromal cells
Supervisor(s): P. Lala, S. Renaud

Poster Number: 107
Name: Elizabeth Jewlal
Degree: MSc Candidate
Abstract Title: Relationship of phenotypic variation with mechanisms of craniofacial development in two connexin-43 mutant mouse models
Supervisor(s): K. Willmore

Poster Number: 108
Name: Ornela Kljakic
Degree: PhD Candidate
Abstract Title: Mesopontine cholinergic signalling influences stress responses affecting behaviour
Supervisor(s): M. Prado, V. Prado

Poster Number: 109
Name: Daniel Nouri Nejad
Degree: MSc Candidate
Abstract Title: Pannexin 1 modulates the malignant properties of melanoma
Supervisor(s): S. Penuela

Poster Number: 110
Name: Brent Wakefield
Degree: PhD Candidate
Abstract Title: Pannexin 1 and Pannexin 3 regulate body fat accumulation in mouse models of exercise and diet-induced obesity
Supervisor(s): S. Penuela

Poster Number: 111
Name: Ryan Cochrane
Degree: MSc Candidate
Abstract Title: Development of synthetic organelle genomes for commercial and scientific use
Supervisor(s): B. Karas, D. Edgell

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 112
Name: Jacqueline Dron
Degree: PhD Candidate
Abstract Title: Severity of hypertriglyceridemia increases with increasing prevalence of genetic determinants
Supervisor(s): R. Hegele

Poster Number: 113
Name: Tony Huang
Degree: MSc Candidate
Abstract Title: Development of a 3D in vitro model of Cutibacterium acnes shoulder joint infection after surgery
Supervisor(s): D. O'Gorman, J. Burton

Poster Number: 114
Name: Jeremy Lant
Degree: PhD Candidate
Abstract Title: Natural variants in human cytoplasmic tRNAs and their influence on disease
Supervisor(s): P. O'Donoghue

Poster Number: 115
Name: Matthew Maitland
Degree: PhD Candidate
Abstract Title: Activity and targets of the C-terminal to LisH (CTLH) E3 ubiquitin ligase complex
Supervisor(s): C. Schild-Poulter, G. Lajoie

Poster Number: 116
Name: Gabriel Onea
Degree: PhD Candidate
Abstract Title: Elucidating the role of the CTLH complex in the nucleus
Supervisor(s): C. Schild-Poulter

Poster Number: 117
Name: Hailie Pavanel
Degree: MSc Candidate
Abstract Title: Development of a targeted exome panel for driver genes in basal cell carcinoma to detect the effect of a microenvironmental modifier that inhibits keratinocyte tumours
Supervisor(s): E. Turley, K. Hill

Poster Number: 118
Name: Scott Roffey
Degree: PhD Candidate
Abstract Title: Development of CK2 inhibitor-resistant CK2 holoenzyme human osteosarcoma cell lines
Supervisor(s): D. Litchfield

Poster Number: 119
Name: An Tran
Degree: MSc Candidate
Abstract Title: The cure for Parkinson's: An oxidative approach
Supervisor(s): G. Shaw

Poster Number: 120
Name: Tristan Kuehn
Degree: MSc Candidate
Abstract Title: Evaluation of diffusion MRI fibre reconstruction with a 3D printed phantom
Supervisor(s): A. Khan, C. Baron

Poster Number: 121
Name: Alireza Moslemian
Degree: MSc Candidate
Abstract Title: Injury to posterior cruciate ligaments increases the internal/external laxity of the knee joint, an experimental study
Supervisor(s): R. Willing

Poster Number: 122
Name: Yueqin Shen
Degree: PhD Candidate
Abstract Title: Antibacterial gluey silver-calcium phosphate composite for dentine remineralization
Supervisor(s): E. Gillies, Y. Zhu

Poster Number: 123
Name: Andrea Barker
Degree: MSc Candidate
Abstract Title: Vascular pruning and MRI ventilation defects in COPD and bronchiectatic patients
Supervisor(s): G. Parraga

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 124
Name: Madeleine Dacey
Degree: MSc Candidate
Abstract Title: Cardiac rehabilitation has the potential to reverse degeneration of white matter tracts in patients with moderate cardiovascular disease
Supervisor(s): C. McIntyre, U. Anazodo

Poster Number: 125
Name: Brayden Halvorson
Degree: MSc Candidate
Abstract Title: Impaired dilator reactivity in middle cerebral arteries in the Goto-Kakizaki rat with Type 2 diabetes mellitus
Supervisor(s): J. Frisbee

Poster Number: 126
Name: Alexander Matheson
Degree: MSc Candidate
Abstract Title: Perfusion abnormalities and ventilation heterogeneity in asthma
Supervisor(s): G. Parraga

Poster Number: 127
Name: Benjamin Wilk
Degree: PhD Candidate
Abstract Title: Penetration with time of Gd-DTPA into infarcted and microvascular obstructed myocardium during a constant infusion
Supervisor(s): J. Thiessen, F. Prato

Poster Number: 128
Name: Wyatt Anderson
Degree: MSc Candidate
Abstract Title: The effect of HPV on the expression of the cytokine IL-18 in head and neck squamous cell carcinomas
Supervisor(s): J. Mymryk

Poster Number: 129
Name: Izabela Batko
Degree: MSc Candidate
Abstract Title: Examination of iron acquisition strategies employed by Staphylococcus aureus small colony variants
Supervisor(s): D. Heinrichs

Poster Number: 130
Name: Mackenzie Dodge
Degree: MSc Candidate
Abstract Title: Identification and characterization of novel viral AKAPs and their effect on the host
Supervisor(s): J. Mymryk

Poster Number: 131
Name: Katherine Ferguson
Degree: MSc Candidate
Abstract Title: Regulation of fatty acid efflux pump FarE by TetR family transcriptional regulator FarR in Staphylococcus aureus
Supervisor(s): M. McGavin

Poster Number: 132
Name: Jasper Lee
Degree: MSc Candidate
Abstract Title: The role of tumour kidney injury molecule-1 in metastatic renal cell carcinoma
Supervisor(s): L. Gunaratnam

Poster Number: 133
Name: Amanda Marple
Degree: MSc Candidate
Abstract Title: Identification of regulators involved in Type IIb bacteriocin expression in streptococcus pyogenes
Supervisor(s): J. McCormick

Poster Number: 134
Name: Mitchell Mumby
Degree: MSc Candidate
Abstract Title: Elucidating the molecular mechanisms underlying HIV-1 Nef-mediated antagonism of the human SERINC5 restriction factor
Supervisor(s): J. Dikeakos

Poster Number: 135
Name: Noor Salloum
Degree: PhD Candidate
Abstract Title: Elucidating the effects of HcpE & DsbK on the pro-inflammatory immune response
Supervisor(s): C. Creuzenet

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 136
Name: Tarannum Tasnim
Degree: MSc Candidate
Abstract Title: Identification of the signalosome and signalling pathway of the efferocytic receptor MERTK
Supervisor(s): B. Heit

Poster Number: 137
Name: Simon Benoit
Degree: PhD Candidate
Abstract Title: Evidence for widespread alteration in gene expression and splicing patterns in brain tissue samples from living Parkinson's disease patients
Supervisor(s): M. Hebb, S. Schmid

Poster Number: 138
Name: Keon Coleman
Degree: MSc Candidate
Abstract Title: Automated touchscreen tasks reveal early cognitive dysfunction caused by mutant TDP-43 in an FTD/ALS mouse model
Supervisor(s): T. Bussey, F. Beraldo

Poster Number: 139
Name: Tyler Dexter
Degree: PhD Candidate
Abstract Title: Mouse performance on a novel touchscreen continuous performance task is dependent on signaling in the prelimbic cortex
Supervisor(s): T. Bussey, L. Saksida

Poster Number: 140
Name: Liliana German-Castelan
Degree: PhD Candidate
Abstract Title: Cholinergic regulation of plaque pathology in an Alzheimer's disease mouse model
Supervisor(s): M. Prado, V. Prado

Poster Number: 141
Name: Radu Gugustea
Degree: MSc Candidate
Abstract Title: Effect of ATRX inactivation on hippocampal synaptic plasticity in mice
Supervisor(s): L. Leung, N. Bérubé

Poster Number: 142
Name: Aja Hogan-Cann
Degree: PhD Candidate
Abstract Title: In vivo modulation of microglial activity using chemogenetics
Supervisor(s): M. Prado, V. Prado

Poster Number: 143
Name: Tony Jung
Degree: PhD Candidate
Abstract Title: Peroxisome proliferator-activated receptor gamma activation in the nucleus accumbens regulates mesolimbic dopamine signaling and induces anxiolytic effects
Supervisor(s): S. Laviolette, W. Rushlow

Poster Number: 144
Name: Shany Lahan
Degree: MSc Candidate
Abstract Title: Secretory lysosomes mediate calcium-dependent exocytosis of beta-Amyloid (Aβ)
Supervisor(s): S. Pasternak

Poster Number: 145
Name: Matthew Maksoud
Degree: PhD Candidate
Abstract Title: Nitric oxide production from inducible nitric oxide synthase inhibits microglia proliferation via TRPV2-mediated calcium influx
Supervisor(s): W-Y. Lu

Poster Number: 146
Name: Onyedikachi Ojiakor
Degree: MSc Candidate
Abstract Title: Regulatory mechanisms underlying the functional activity of the high affinity choline transporter CHT in Alzheimer's disease
Supervisor(s): R.J. Rylett

Poster Number: 147
Name: Maggie Prenger
Degree: MSc Candidate
Abstract Title: A longitudinal analysis of depression and anxiety in Parkinson's disease
Supervisor(s): P. MacDonald, A. Owen

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 148
Name: Katrina Zmavc
Degree: MSc Candidate
Abstract Title: Neurogenesis in the adult hippocampus and its role in mood
Supervisor(s): L. Saksida, T. Bussey

Poster Number: 149
Name: Hind Amzil
Degree: MSc Candidate
Abstract Title: Determination of Rho guanine nucleotide exchange factor's (RGNEF) role in the regulation of ALS related proteins
Supervisor(s): H. Amzil, C. Droppelmann, Z. Hawley, M. Strong

Poster Number: 150
Name: Saumik Biswas
Degree: PhD Candidate
Abstract Title: The long non-coding RNA HOTAIR is an important angiogenic mediator in diabetic retinopathy
Supervisor(s): S. Chakrabarti

Poster Number: 151
Name: Jenna Fortunato
Degree: MSc Candidate
Abstract Title: The influence of estrogen signalling on Th2 cell sensitivity to glucocorticoid
Supervisor(s): L. Cameron

Poster Number: 152
Name: Seana Hill
Degree: MSc Candidate
Abstract Title: Defining domains of differential chromatin compaction between human metaphase homologues: Exploring their link to higher-order chromosome structure
Supervisor(s): J. Knoll

Poster Number: 153
Name: Jina Kum
Degree: PhD Candidate
Abstract Title: High glucose levels in diabetes disrupt transforming growth factor-beta signalling in the marrow to enhance adipogenic differentiation
Supervisor(s): C. Howlett, Z. Khan

Poster Number: 154
Name: Maedeh Naghibosadat
Degree: MSc Candidate
Abstract Title: GHSR and des-acyl ghrelin binding in cardiac tissue are altered with cardiovascular inflammation in Duchenne muscular dystrophy
Supervisor(s): S. Dhanvantari, L. Hoffman

Poster Number: 155
Name: Amanda Oakie
Degree: PhD Candidate
Abstract Title: c-Kit and IR co-stimulation does not lead to additive intracellular signalling in INS-1 cells
Supervisor(s): R. Wang

Poster Number: 156
Name: Vitali Veramkovich
Degree: MSc Candidate
Abstract Title: The role of GDF15 in T cell function
Supervisor(s): X. Zheng

Poster Number: 157
Name: Nawab Azizi
Degree: MSc Candidate
Abstract Title: The role of ATF3 for pancreatic ductal adenocarcinoma initiation and progression
Supervisor(s): C. Pin

Poster Number: 158
Name: Michelle Cai
Degree: MSc Candidate
Abstract Title: Transient receptor potential vanilloid-4 (TRPV4): A mechanism of prostanoid-mediated platelet activation in atherosclerotic plaque
Supervisor(s): R. Ramachandran

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 159
Name: Melissa Fenech
Degree: PhD Candidate
Abstract Title: Pancreas-specific secretory pathway calcium ATPase 2 affects calcium influx and endoplasmic reticulum calcium stores
Supervisor(s): C. Pin

Poster Number: 160
Name: Geoffrey Kerr
Degree: PhD Candidate
Abstract Title: Investigating the relationship between diet-induced obesity, intervertebral disc degeneration and back pain
Supervisor(s): C. Séguin

Poster Number: 161
Name: Nidhi Kulkarni
Degree: MSc Candidate
Abstract Title: The role of TIMP3 in microvascular endothelial cell-extracellular matrix interaction and regulation of microvascular barrier function
Supervisor(s): S. Gill

Poster Number: 162
Name: Asad Lone
Degree: PhD Candidate
Abstract Title: The adaptor protein p66Shc regulates metabolism, redox state, and sensitivity to Amyloid-beta in CNS cells
Supervisor(s): R. Cumming

Poster Number: 163
Name: Xin Tong Ma
Degree: MSc Candidate
Abstract Title: The role of regulator of G-protein signalling 2 in inflammatory cytokine release in endotoxemic mice
Supervisor(s): Q. Feng, P. Chidiac

Poster Number: 164
Name: Gillian Petroff
Degree: MSc Candidate
Abstract Title: ATF4 mediates amyloid β-induced neuronal death
Supervisor(s): S. Cregan

Poster Number: 165
Name: Charles Trelford
Degree: PhD Candidate
Abstract Title: The role of autophagy on TGFβ-dependent EMT and signalling
Supervisor(s): J. Di Guglielmo

Poster Number: 166
Name: Rachel Wilson
Degree: PhD Candidate
Abstract Title: Effects of intervention with elongation factor 1A1 inhibitor, didemnin B, on NAFLD in Western diet-induced obese mice
Supervisor(s): N. Borradaile

Poster Number: 167
Name: Santiago Iglesias
Degree: MSc Candidate
Abstract Title: Investigating the antimicrobial effects of synovial fluid and its role in preventing S. aureus infection
Supervisor(s): E. Vasarhelyi, D. Heinrichs

Poster Number: 168
Name: Adrian Buensuceso
Degree: Postdoctoral Scholar
Abstract Title: The metabolic stress mediator LKB1 is required for ovarian cancer metastasis
Supervisor(s): T. Shepherd

Poster Number: 169
Name: Flavien Delhaes
Degree: Postdoctoral Scholar
Abstract Title: Hypoxia induces placental mitochondria morphology remodelling and impaired complex II activity
Supervisor(s): T. Regnault

Poster Number: 170
Name: Tomonori Kaneko
Degree: Research Assistant/Associate
Abstract Title: Identification and characterization of phosphotyrosine-binding SH2 domains from Legionella
Supervisor(s): S. Li

Poster Presentations – Morning Session

Poster Number: 171
Name: Eric S. Kuebler
Degree: Postdoctoral Scholar
Abstract Title: Cross-species comparisons of neuronal cell types using optimal sets of morphological features and machine learning algorithms
Supervisor(s): J. Martinez-Trujillo

Poster Number: 172
Name: Alexander Moszczynski
Degree: Research Assistant/Associate
Abstract Title: Synergistic neuropathology resulting from co-expression of TDP-43 and tau protein in vivo
Supervisor(s): M. Strong

Poster Number: 173
Name: S. Alireza Rohani
Degree: Postdoctoral Scholar
Abstract Title: Visualization of the smallest human synovial joint using synchrotron-radiation phase-contrast imaging
Supervisor(s): H. Ladak, S. Agrawal

Poster Number: 174
Name: Meera Shah
Degree: Medical Student
Abstract Title: Primary bloodstream infections in persons who inject drugs on treatment for infective endocarditis
Supervisor(s): M. Silverman

Poster Number: 175
Name: Julia St. John
Degree: Research Assistant/Associate
Abstract Title: Distribution of apolipoprotein(a)-containing species in human plasma assessed by fast protein liquid chromatography
Supervisor(s): M. Koschinsky, M. Boffa

Poster Number: 176
Name: Amer Youssef
Degree: Research Assistant/Associate
Abstract Title: Apolipoprotein(a) and apolipoproteinB co-localize and interact intracellularly in lipoprotein(a) biosynthesis
Supervisor(s): M. Koschinsky

PREVENTION OF DISEASES AND HEALTH CONDITIONS AND PROMOTION OF WELL-BEING

Poster Number: 177
Name: Stephanie Brumwell
Degree: PhD Candidate
Abstract Title: Designer Sinorhizobium meliloti strains and multi-functional vectors for direct inter-kingdom transfer of high G+C content DNA
Supervisor(s): B. Karas, D. Edgell

Poster Number: 178
Name: Ahmed Tanashi
Degree: MSc Candidate
Abstract Title: A novel method for measuring in vivo finger kinematics using electromagnetic tracking
Supervisor(s): E. Lalone

Poster Number: 179
Name: Yuguang Kang
Degree: MSc Candidate
Abstract Title: Optimal antithrombotic strategy for patients with atrial fibrillation and acute coronary syndrome: A systematic literature review
Supervisor(s): I. Karp

Poster Number: 180
Name: Kirsten Dillon
Degree: MSc Candidate
Abstract Title: The RESEDENT study: REducing SEDENTary behaviour in assisted living facilities: A pilot study
Supervisor(s): H. Prapavessis

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Morning Session

Poster Number: 181
Name: Nedeljko Jovanovic
Degree: PhD Candidate
Abstract Title: Swallowing and weight outcomes for oropharyngeal cancer patients treated with (chemo)radiation therapy: Investigating differences based on feeding tube use
Supervisor(s): P. Doyle, J. Theurer

Poster Number: 182
Name: Codie Primeau
Degree: PhD Candidate
Abstract Title: The feasibility and efficacy of a 12-week body re-composition and neuromuscular exercise program in patients with knee osteoarthritis
Supervisor(s): T. Birmingham, J. Marsh

Poster Number: 183
Name: Sarah Best
Degree: Research Assistant/Associate
Abstract Title: Jazzercise as an intervention for subjective cognitive decline in postmenopausal women: Pilot study rationale and feasibility
Supervisor(s): M. Borrie

Poster Number: 184
Name: Laura Craven
Degree: PhD Candidate
Abstract Title: Fecal microbiota transplantation in patients with non-alcoholic fatty liver disease and metabolic syndrome has the potential to improve small intestinal permeability
Supervisor(s): J. Burton, M. Silverman

Poster Number: 185
Name: Emiley Watson
Degree: MSc Candidate
Abstract Title: Potential beneficial attributes of vaginal Lactobacillus crispatus
Supervisor(s): G. Reid

Poster Number: 186
Name: Joyla Furlano
Degree: PhD Candidate
Abstract Title: The effects of resistance training on the brain in overweight older adults: A feasibility pilot study
Supervisor(s): L. Nagamatsu

Poster Number: 187
Name: Adnan Qamar
Degree: MSc Candidate
Abstract Title: Mitochondrial permeability regulates heart graft ischemia-reperfusion injury and rejection
Supervisor(s): Z. Zhang, A. Jevnikar

Poster Number: 188
Name: Monisha Basu
Degree: Medical Student
Abstract Title: The Canadian Collaboration on Neurodegeneration and Aging—Platform 1—COMPASS-ND Study. Planning and implementation
Supervisor(s): M. Borrie

Poster Number: 189
Name: S. Ben Peckham
Degree: Research Assistant/Associate
Abstract Title: Sahaj Samadhi Meditation vs. a health enhancement program in improving late-life depression severity and executive function: Study protocol for a two site, randomized-controlled trial
Supervisor(s): A. Vasudev

SALON B - 10:30 a.m.

Bojana Radan
Medical Student

Research Areas:
Population health and education
Population, public health and education

Supervisor(s):
M. Shkrum

Creation of a coding and documentation hospital trauma registry system for fatal and non-fatal road traffic accident-collisions in Kisumu County, Kenya

Introduction
The World Health Organization (WHO) estimates that about 1.25 million people die each year as a result of Road Traffic Accidents (RTA) and that 90% of these fatalities occur in low and middle-income countries. Road traffic accidents are a major public health concern in Kenya with about 3,000 deaths occurring each year from roadside accidents alone, of which 40% are pedestrians. A significant public health issue in Kenya is the poor documentation and capturing of information at the accident scene, hospital and mortuary, of patient injuries and deaths due to RTAs. This documentation blind spot in hospital networks creates a gap in the systemic response to tackle motor vehicle-related trauma rapidly and effectively, leading to higher rates of more severe disability.

Hypothesis
The creation of an evidence-based dataset from a sustainable and holistic medical coding and documenting system for road traffic accidents and deaths will provide information for public health and hospital authorities to invest and respond proactively to road traffic safety and trauma.

Materials and Methods
Through an interventional pilot study, an electronic medical coding and documenting system will be created and launched in the major provincial hospital in Kisumu City, Kenya to document common patient injuries, fatalities and patient outcomes from those involved in road traffic accidents. This coding system will also include patients brought to the hospital dead on the accident scene, and follow patients who succumb to their injuries while in the hospital. The goal of this data collection will be to create an evidence-based dataset on the health impact and burden of road traffic injury and trauma within this region, and to create a regional hub for road traffic research to better respond and invest in this growing epidemic.

Results
An exploratory observational study was conducted in the summer of 2018 at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), the study site in Kisumu City, Western Kenya. Discussions with various subspecialty physicians, healthcare providers and medical health records staff showed various gaps in the documentation of road traffic injuries with a major absence of documentation in the outpatient Casualty (Emergency) Ward. Similarity, there was no standard protocol in place for the collection of road traffic injury and fatality data, even with the majority of physicians anecdotally agreeing that 2 in 3 outpatient casualty ward visits are due to road traffic injuries.

Discussion and Conclusions
Early exploration at JOOTRH suggests major flaws in the coding and documenting of road traffic injuries and fatalities, including major variations in the current measurement tools used to code patient visits and injuries. Pilot implementation of this project's data collection tool is required to understand the true healthcare burden of this public health issue, in parallel with measures assessing the usefulness and sustainability of the coding system.

SALON B - 10:45 a.m.

Matthew Borrelli
MSc Candidate

Research Areas:
Circulatory
Mechanisms of disease

Supervisor(s):
M. Koschinsky

Characterization of novel missense mutations in the key kringle IV type 10 domain of apolipoprotein(a)

Introduction
Elevated concentrations of lipoprotein(a) (Lp(a)) in plasma are an independent risk factor for cardiovascular diseases including myocardial infarction. Lp(a) resembles low-density lipoprotein (LDL) but is distinguished by the unique glycoprotein apolipoprotein(a) (apo(a)), which confers the unique pathogenic potential of Lp(a)). In our previous research, missense mutations in the kringle IV type 10 (KIV10) domain of apo(a) inhibit the high affinity lysine binding ability of this domain, and prevent the covalent addition of a highly inflammatory oxidized phospholipid (oxPL) to the protein, thereby attenuating the pathogenic potential of apo(a). Recently, two human patients were identified as heterozygous for missense mutations in the kringle IV type 10-encoding region of LPA, and the effects of these novel mutations (R10Q and M64T) on apo(a) have now been characterized.

Hypothesis
Missense mutations in the KIV10 region of the LPA gene may inhibit the strong lysine binding activity of this domain and prevent the covalent addition of proinflammatory oxPL species to apo(a).

Materials and Methods
Whole blood was isolated from human patients in a large scale screening study for apo(a) variants. Assessment of mutations in exons of the KIV10 domain of LPA, the gene encoding apo(a), was conducted using polymerase chain reaction followed by Sanger sequencing. Two patients were identified to be heterozygous for novel KIV10 exon mutations; one for the R10Q mutation and one for the M64T mutation. The mutations were introduced into apo(a) expression vectors which were then transfected into HEK293 cells for protein expression. The mutant proteins were characterized for their ability to bind lysine and the presence of covalently-bound oxPL. A lysine-Sepharose affinity assay was used to assess lysine binding ability, and western blot using the E06 anti-oxPL antibody was used to assess oxPL status.

Results
Generation, purification, and characterization of the M64T variant in an apo(a) construct containing only the KIV10 and kringle V (KV) domains of apo(a) (KIV10KV) was performed. This mutant is functionally indiscernible from the wildtype version – that is, it is readily processed and secreted, its lysine binding functionality is retained, and it hosts a covalently bound oxPL.

KIV10KV R10Q was not detectable by anti-apo(a) western blot in conditioned medium or cell lysates. The mutation was also made in a construct composed of KIV10, KV, and the inactive protease domain of apo(a) (10-P) as well as a 6-kringle (6K) construct containing these domains plus KIV types 5-9; it was anticipated that this would aid in processing and secretion. The 10-P variant was likewise undetectable and while it was found that 6K R10Q was absent in conditioned medium, it was observed in the lysates of transfected cells, albeit at a reduced molecular weight indicative of a deficient glycosylation state.

Discussion and Conclusions
While numerous mutations in the LPA gene have been identified in humans, the KIV10 R10Q mutation described herein potentially represents not only a novel null allele for the LPA gene, but the first null allele described for LPA featuring incomplete protein processing and failure to secrete a mature apo(a) protein product.

SALON B - 11:00 a.m.

James Armstrong
PhD Candidate

Research Areas:
Musculoskeletal health and rehabilitation
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
C. Hutnik

Acetylsalicylic acid reduces TGFb1 induced myofibroblast transdifferentiation and activity

Introduction
Inflammation-induced myofibroblast activity, leading to progressive scarring and the destruction of complex ocular anatomy, is the ultimate cause of visual impairment across multiple ophthalmic disease categories. Scar formation within the highly inflammatory micro-environment of the human Tenon's capsule can lead to complete failure of intra-ocular pressure lowering surgery. Acetylsalicylic acid (ASA) has theoretical grounds for use as an anti-scarring agent; however, its effects on transforming growth factor beta (TGFβ)-induced myofibroblastic changes in human Tenon's capsule fibroblasts (HTCFs) remain unknown.

Hypothesis
ASA will decrease TGFβ-induced myofibroblast proliferation and protein expression in primary human Tenon's capsule fibroblasts through altered regulation of transcription factors SMAD2/3 and PPARγ.

Materials and Methods
HTCFs were co-treated with 2 ng/mL of TGFβ and ASA ranging from 50 μg/mL to 3200 μg/mL. MTT/LDH and LIVE/DEAD assays were conducted to assess the effect of ASA treatment on TGFβ induced changes in cellular metabolism and viability. Western blot and immunohistochemistry were used to examine the effect of ASA on the expression of pro-fibrotic proteins: alpha-smooth muscle actin (α-SMA), collagen 1 and matrix metalloproteinase-9 (MMP-9). Transcription factors (p)SMAD2/3 and PPARγ were also probed for on western blot to assess the possibility of altered regulation induced by ASA treatment.

Results
ASA decreased TGFβ-induced cellular metabolic activity without observed reductions in cellular viability until relatively high concentrations of ASA were assessed. The relative expression levels of α-SMA, collagen 1 and MMP-9 in TGFβ-induced myofibroblasts were decreased in a dose dependent manner with ASA exposure. The expression of PPARγ, as well as the ratio of pospho-SMAD2/3 to total-SMAD2/3, were corroborative, and mechanistically supported the altered expression of aSMA, collagen 1 and MMP9 observed with ASA treatment.

Discussion and Conclusions
ASA demonstrated the capacity to repress, in a dose dependent manner, TGFβ-induced myofibroblastic changes in human Tenon's capsule fibroblasts. These findings suggest a capacity to mitigate the central aspect of many devastating ocular pathologies. Given ASA's long-established safety profile in humans, translation of these findings to the human patient should be rapid.

SALON B - 11:15 a.m.

Charles Yin
PhD Candidate

Research Areas:
Circulatory
Mechanisms of disease

Supervisor(s):
B. Heit

Gene expression profiling of macrophages in early human atherosclerosis reveals profound defects in efferocytosis

Introduction
Atherosclerosis is a chronic inflammatory disease involving formation of lipoprotein-rich lesions in the arterial wall and infiltration of these lesions by macrophages, which drive disease progression. Animal models of atherosclerosis have identified pathological changes in lesion-resident macrophages, but reproducing these results in humans remains challenging. One key function of macrophages known to be relevant in animal models and human disease is their phagocytic clearance of apoptotic cells, termed efferocytosis. Defective efferocytosis is a hallmark of advanced atherosclerotic disease. Our objective is to examine gene expression in macrophages isolated from patient coronary atherosclerotic lesions in order to better characterize macrophage dysfunction in human disease, especially in the context of dysregulated efferocytosis.

Hypothesis
We hypothesize that key biological pathways involved in efferocytosis and efferosome maturation will be dysregulated in human atherosclerotic macrophages.

Materials and Methods
Aortic punch samples were obtained from patients undergoing coronary artery bypass graft surgery. Samples were sectioned and stained using an anti-CD163 antibody to identify lesion-resident macrophage populations. These cell populations were isolated through laser capture microdissection (LCM). Gene expression profiling was performed on LCM-dissected macrophage populations by human whole-exome microarray, with peripheral blood mononuclear cell-derived macrophages from healthy donors as a control. We established that our samples contained evidence of intimal thickening in the absence of plaque and necrotic core formation, indicating an early stage of atherosclerotic disease.

Results
We demonstrate through histology that patient aortic punch samples contained early, pre-atherosclerotic lesions characterized by lipid accumulation and intimal thickening, along with the presence of discrete macrophage cell populations. Macrophage populations were isolated and qPCR analysis demonstrated enrichment of macrophage-specific CD14 compared to whole-section controls, demonstrating isolation of a pure macrophage cell population. Gene expression profiling revealed a total of differentially ~3,000 regulated genes in patient lesion-resident macrophages, with particular enrichment in pathways involved intracellular transport, phagocytosis/efferocytosis and phagosomal/ efferosomal cargo processing. Interestingly, we also identified significant upregulation of the hematopoietic transcription factor GATA2 (single nucleotide polymorphisms in GATA2 are associated with coronary artery disease) and several genes regulated by this transcription factor. We demonstrate that overexpression of GATA2 in human macrophage cell lines in vitro resulted in a decreased efferocytic capacity and delayed efferosomal maturation.

Discussion and Conclusions
This study is to our knowledge the first to assess the transcriptional profile of intima-infiltration macrophages from the initial stages of coronary atherosclerosis in humans. We identify efferocytosis and cargo processing as dysregulated pathways in these intima-infiltrating macrophages, and are the first to identify a potential role for GATA2 in potentially driving defects in efferocytosis observed in macrophages in the setting of atherosclerosis.

SALON B - 11:30 a.m.

Ajay Rajaram
PhD Candidate

Research Areas:
Medical biophysics, engineering and imaging
Detection, screening and diagnosis of health and disease

Supervisor(s):
K. St. Lawrence, M. Diop

Optical neuromonitoring for continuous quantification of cerebral blood flow and energy metabolism in the developing brain

Introduction
The human brain relies almost exclusively on oxidative metabolism, having very limited energy storage, and is therefore susceptible to injury related to impaired cerebral blood flow (CBF). This is particularly evident in preterm infants as the underdeveloped vascular system in the immature brain can lead to poor CBF control. For example, cerebral autoregulation – the ability to maintain CBF despite changes in blood pressure – is known to be impaired in this age group [1]. However, the impact of cerebrovascular dysfunction on the coupling of CBF to cerebral energy demand in the developing brain is unknown due to a lack of adequate technologies for assessing these measures in such a fragile population.

Hypothesis
A simultaneous measurement of CBF and energy metabolism can be used to investigate physiological changes preceding injury in the developing brain.

Materials and Methods
Optical technologies offer a safe and inexpensive approach for monitoring the brain. Broadband near-infrared spectroscopy (B-NIRS) can measure both cerebral saturation (StO2) and the redox state of cytochrome c oxidase (CCO) – a direct marker of tissue energy metabolism [2]. Diffuse correlation spectroscopy (DCS) provides continuous CBF monitoring by measuring temporal intensity fluctuations caused by moving red blood cells, and when combined with NIRS, can provide the cerebral metabolic rate of oxygen (CMRO2). Combination of these techniques is not trivial: NIRS and DCS utilize opposing light sources that produce cross-talk when used in conjunction.

NNeMo (Neonatal NeuroMonitor), a portable, non-invasive optical neuromonitor was developed by combining B-NIRS and DCS technology, utilizing a multiplexing shuttering system, to provide continuous monitoring of cerebral perfusion and metabolism at the bedside with a temporal resolution on the order of seconds. System performance was validated in an animal model of brain injury. In four newborn piglets, cerebral energy metabolism was altered by (i) serial injections of an anesthetic (propofol), and (ii) temporally occluding the common carotid arteries to induce transient ischemia (10-min), leading to CBF-driven changes in metabolism.

Results
B-NIRS and DCS techniques can be combined to obtain absolute StO2, CBF, CCO, and CMRO2. Propofol injections resulted in a reduction of all parameters (CBF: 9%, StO2: 5%, CMRO2: 6%, and oxCCO: 0.3μM). Vascular occlusion produced larger decreases (CBF: 72%, StO2: 35%, CMRO2: 60%, and oxCCO: 1μM, at their respective nadirs). A temporal delay in oxCCO was observed compared to the CBF and CMRO2 responses.

Discussion and Conclusions
NNeMo, a unique optical technology for measuring CBF and metabolism, can provide a fundamental understanding of cerebral blood flow/metabolic coupling in the developing brain as shown within a relevant animal model. When manipulating metabolism directly (anesthetic) and through vascular occlusion, expected reductions in CBF and metabolic markers were observed; however, the temporal differences in CMRO2 and oxCCO responses requires further investigation. The immediate aim is to translate the developed system to the NICU to assess if flow/metabolic monitoring will provide clinicians with greater sensitivity to changes in cerebral hemodynamics that precede preterm brain injury.

References

[1] Soul, J. et al. (2007) *Ped. Research* 61(4). [2] Bale, G. et al. (2016) *Biomed*. Opt. 21(9).

SALON B1 - 10:30 a.m.

Laura Russell
PhD Candidate

Research Areas:
Molecular cellular
Mechanisms of disease

Supervisor(s):
R. Kim

Genetic variation in the hepatic bile acid and drug transporter, NTCP: Expression, transport, and in silico functional prediction

Introduction
Sodium taurocholate co-transporting polypeptide (NTCP) is a membrane-bound transport protein in the liver. NTCP (encoded by gene SLC10A1) is a central facilitator of hepatic bile acid and drug uptake. Genetic variation in NTCP may affect bile acid circulation and signalling, as well as disposition of drugs including statins. Despite this recognition, the functional relevance of genetic variation in NTCP remains poorly characterized. Computational algorithms are promising tools to prioritize genetic variants for in vitro functional assessment. However, predictions from different in silico software often yield conflicting results for the same genetic variant. The first aim of this study is to assess transport of substrates taurocholic acid and rosuvastatin by genetic variants of NTCP. Subsequently, molecular mechanisms of decreased substrate uptake will be investigated. Lastly, three different in silico prediction algorithms will be compared for accuracy of predicting decreased substrate transport.

Hypothesis
Genetic variation in SLC10A1 will decrease NTCP expression, thereby decreasing substrate uptake in vitro.

Materials and Methods
Exonic, missense genetic variants in SLC10A1 were identified using two methods: 1. Ensembl & PubMed Variation Viewer open-access genomic databases, or 2. targeted exome next-generation sequencing (NGS). Human NTCP was cloned into an expression vector and variants were created using site-directed mutagenesis. Plasmids were transiently transfected into HEK293T cells and uptake of 4mM taurocholic acid and 1mM rosuvastatin were assessed. Whole cell and cell surface expression of variants were evaluated by western immunoblot and immunofluorescence microscopy. Three commonly used, publicly available softwares were used to rank variants by predicted deleteriousness.

Results
A total of thirty-six rare, missense, variants with no associated functional data were identified in SLC10A1. Thirty-two variants were identified using online databases. Four additional variants were identified in our cohort of 245 next-generation sequenced LHSC patients. Uptake of taurocholic acid was reduced by more than 75% for 10/36 variants. Uptake of rosuvastatin was reduced by more than 75% for 14/36 variants. One variant, p.G191R, displayed substrate specificity: rosuvastatin uptake decreased by >90%, whereas taurocholic acid uptake was unaffected. Protein expression of seven loss-of-function variants was decreased. The most robust in silico predictor of transport function was combined annotation-dependent depletion (CADD), which classified all loss-of-function variants, with the exception of one, within the top 1% of deleterious variants in the human genome.

Discussion and Conclusions
Recent advances in technology, including NGS, yield massive genomic datasets with an abundance of newly discovered genetic variants. Accordingly, efficient and predictive screening using in silico models are critical to identify variants of potential functional significance. The findings of the current study imply that although CADD scores may prove useful for ranking variants among a large set of data, concordance between score and function is not 100%. Caution must be exercised while ranking variants based on predictive algorithms, as to not exclude variants that may indeed be pathogenic. This evidence suggests that in vitro validation should remain the preferred method to assess functional consequences of genetic variants.

SALON B1 - 10:45 a.m.

Houshang Azimi
MSc Candidate

Research Areas:
Endocrinology and metabolism
Mechanisms of disease

Supervisor(s):
D. Hill

Mice fed a low protein diet in utero show decreased apelin receptor presence in Ins+Glut2Lo cells during pregnancy associated with lower β-cell mass

Introduction
The metabolic stress of pregnancy is normally accommodated by β-cell mass (BCM) expansion and increased glucose-stimulated insulin secretion (GSIS). A failure to increase BCM contributes to the risk of gestational diabetes (GDM). Currently, a complete understanding of GDM mechanism(s) has not been established.

Recent studies show that the apelinergic system, consisting of the apelin receptor (APJ) and cognate ligand apelin, is implicated in fetal and neonatal glucose homeostasis in vivo by increasing transplacental glucose uptake and neonatal glucose uptake in lung and muscle. Furthermore, Apelin/APJ is active in pancreas, skeletal muscle, and adipose – implicating it in energy metabolism. Evidence shows apelin is secreted by adipocytes and may bind APJ on β-cell membranes to reduce GSIS. Apelin administration has been shown to increase islet cell mass and β-cell insulin content in mice with T1DM, and can increase insulin sensitivity in obese, hyperinsulinaemic mice.

As previously shown, resident β-cell progenitor cells, insulin-expressing but glucose-transporter-2-low (Ins+Glut2Lo) cells, increase prior to BCM expansion during mouse pregnancy. Examining the apelinergic system in relation to Ins+Glut2Lo cells may further understanding of normal and impaired BCM expansion during pregnancy. Thus, we investigated how APJ presence on Ins+Glut2Lo cells might differ in islets of mice during glucose intolerant pregnancy compared to control.

Hypothesis
We hypothesize that % Ins+Glut2LoAPJ+ cells will increase preceding BCM expansion during pregnancy; and, that % Ins+Glut2LoAPJ+ cells will be decreased in a rodent model of glucose intolerant pregnancy in comparison to control.

Materials and Methods
Female C57BL/6 mice with impaired BCM expansion and glucose intolerance during pregnancy were generated by feeding a low protein (LP) diet (8% casein vs. isocaloric control diet 20% casein) while in utero and early development. F1 female offspring exposed to LP or control (C) diet were time mated and pancreata collected at gestational days (GD) 9, 12, and 18. Insulin, Glut2, and APJ were visualized by immunohistochemistry using confocal microscopy. β-cell grouped as small endocrine clusters (1-5 β-cells) or islets (≥ 6 β-cells). At least 2 pancreas tissue sections (≥ 100 µm apart) from each sample (n=3 for each GD) were analyzed. Data are presented as percentage mean ± S.E.M. of insulin+ β-cells, with statistics performed using the ANOVA-R and Tukey's post-test, or student's t-test, and with an acceptable level of significance of $P < 0.05$. Statistical analysis was performed using the GraphPad Prism software (v. 5.01).

Results
The percentage of Ins+Glut2LoAPJ+ cells relative to all Ins+ cells was significantly decreased in LP-exposed mice vs. C at GD12 (C 5.7±1.0%, LP 2.7±0.1%, $p<0.05$), but not at GD9 (C 4.9±1.6%, LP 3.4±0.9%). Significant differences were not found in % Ins+Glut2LoAPJ+ cells localized to extra-islet clusters or islets between LP vs. C at GD 9 or 12.

Discussion and Conclusions
Ins+Glut2LoAPJ+ cells were found within islets and extra-islet clusters of LP and C mice at GD9 and 12 (GD 18 pending investigation). Results show that % Ins+Glut2LoAPJ+ cells relative to all β-cells significantly decreases in LP vs. C at GD 12, when Ins+Glut2Lo cell expansion has been shown to be maximal. This suggests that APJ presence may contribute to BCM expansion during pregnancy mediated by Ins+Glut2Lo cells.

SALON B1 - 11:00 a.m.

Krys Wieczerzak
PhD Candidate

Research Areas:
Neuroscience
Determinants of health

Supervisor(s):
B. Allman

Noise-induced plasticity in the brainstem, auditory cortex and anterior cingulate: Implications for functional connectivity and acoustic hyper-reactivity

Introduction
Increasing numbers of clinical studies have shown a strong correlation between hearing-loss and cognitive decline. From the physiological perspective, it is well-established that noise exposure (NE) can affect areas of the brain outside the classical auditory pathway (e.g., hippocampus; cerebellum). At present, however, it is not clear whether the nature and extent of noise-induced plasticity observed in the auditory pathway is also present in higher-order cortical areas responsible for cognitive and executive functions, and if the functional connectivity between these brain regions is affected by noise exposure. In our study, we examined the nature of noise-induced plasticity along the auditory pathway and investigated whether it was carried to anterior cingulate, a brain region known to play a crucial role in cognition and having direct projections to secondary auditory cortex.

Hypothesis
Noise-induced hearing loss leads to plasticity within higher-order brain regions and results in a loss of functional connectivity between auditory cortex and anterior cingulate.

Materials and Methods
We exposed rats to 120 dB SPL broadband noise for 2h, and compared the magnitude and time-course (pre-NE, 2- and 7-days post-NE) of noise-induced plasticity in the brainstem, auditory cortex, and anterior cingulate. We used reflexive behavioral responses to sound via the acoustic startle reflex as well as auditory brainstem responses (ABR) to investigate the plasticity at the level of brainstem. In order to examine the effects of noise at the cortical level, we recorded spontaneous oscillatory activity, and the auditory steady state responses (ASSR) to a click stimulus presented at 40 Hz at 80 dB SPL in awake animals via chronically implanted electrodes. To confirm the significance of our results, we used one-way repeated-measures ANOVA with Bonferroni corrected post-hoc test where the p-value was adjusted for multiple comparisons.

Results
At the level of the brainstem, there was a reduction in cochlear output (i.e., reduced ABR wave I amplitude) at 7 days post-NE confirming noise-induced partial hearing loss. However, these same rats showed an increase in their reflexive reactivity to moderately-loud sounds. Furthermore, awake electrophysiological recordings, showed that neither the auditory cortex nor the anterior cingulate demonstrated changes in spontaneous oscillations post-NE, whereas sound-evoked responses revealed a differential effect in these brain regions, characterized by enhanced central gain in only the auditory cortex. Adding to this regional disparity, the inter-trial coherence of the 40 Hz ASSR in the auditory cortex was unaffected by NE, yet this metric was significantly decreased in the anterior cingulate, providing evidence of reduced synchronization of these neural ensembles. Moreover, there was an early (2 days) and persistent (7 days) reduction of the phase-locking value between auditory cortex and anterior cingulate post-NE; findings which suggest that noise-induced hearing loss leads to dysfunctional network activity.

Discussion and Conclusions
Overall, we observed a differential time-course between the onset of cortical plasticity (at 2 days post-NE) and the brainstem-mediated reflexive behavior to moderately-loud sounds (at 7 days post-NE). Furthermore, we provided first reports of noise-induced plasticity within anterior cingulate that differed from the one present in the auditory pathway.

SALON B1 - 11:15 a.m.

Christine Wardell
MSc Candidate

Research Areas:
Infection and immunity
Mechanisms of disease

Supervisor(s):
M. Haeryfar

Mucosa-associated invariant T cells enhance the anti-Influenza CD8+ T cell response

Christine Wardell did not give consent to reproduction of her abstract.

SALON B1 - 11:30 a.m.

Katie Parkins
PhD Candidate

Research Areas:
Medical biophysics, engineering and imaging
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
P. Foster, J.Ronald

Dual-luciferase imaging enables visualization of efficient tumour self-homing of metastatic breast lesions

Introduction
Metastasis has been shown to be an inefficient process, with the primary tumour shedding a high number of cancer cells into the circulation, and very few going on to form overt metastases. Previous studies have shown that molecular barriers and unfavorable survival conditions in distant organs may impede the formation of lethal metastases. However, tumour vasculature is often considered 'leaky' as a result of compromised vascular endothelial barrier function, and thus would more easily facilitate the transport of cancer cells from the circulation back into the original tumour or other established lesions. This concept termed 'tumour self-homing' involves the recruitment of circulating tumour cells from the bloodstream into established lesions, contributing to both primary tumour recurrence as well as the accrual of cells at distant sites, and has been shown to occur in animal models of human breast, colon and melanoma cancer. The objective of this work was to demonstrate for the first time, an in vivo imaging model to visualize cancer self-homing in a mouse model of metastatic breast cancer using dual luciferase bioluminescence imaging (BLI). Dual-luciferase BLI is accomplished by engineering two separate cell types with either Firefly luciferase (FLuc) and Renilla luciferase (RLuc) since these luciferases can be independently visualized in the same animal.

Hypothesis
Dual-luciferase BLI will allow us to noninvasively monitor the fate of cancer cells spontaneously metastasizing throughout be body as well as the fate of circulating cancer cells that may home to these metastatic tumour sites.

Materials and Methods
Nude (Nu/Nu) mice (n=5) received an injection of 3x10^5 RLuc expressing parental mouse breast cancer 4T1 cells into the mammary fat pad (MFP) to generate a primary tumour. After 7 days of primary tumour growth and spontaneous metastases formation, 2x10^4 FLuc expressing, brain-seeking mouse breast cancer 4T1BR5 cells were injected via ultrasound guidance into the beating mouse heart. RLuc and FLuc BLI were performed over the next two weeks on adjacent days to evaluate the number of metastases throughout the mouse body that are composed of each cell type (RLuc v. FLuc signal). Immunostaining was performed on tissues at endpoint to evaluate the presence of both cell types in metastatic lesions.

Results
On day 19, the number and location of RLuc positive metastases per mouse was quantified throughout the body and compared to the number and location of FLuc positive metastases detected on day 20. Across all mice, an average of 10.62.0 total metastases (RLuc or FLuc) were detected. The number of metastases that were both RLuc and FLuc positive (M=9.81.9) was significantly higher than the number of metastases that were either only RLuc-positive (M=0.60.4; $p<0.01$) or FLuc-positive (M=0.20.2; $p<0.001$).

Discussion and Conclusions
Here, we demonstrate the utility of dual luciferase BLI to visualize cancer self-homing in a mouse model of breast cancer metastasis. Remarkably, we found that circulating breast cancer cells were able to efficiently seed and contribute to the continued growth of spontaneous metastases that had already started growing. Very few circulating breast cancer cells seeded new sites. Ongoing work has been focused on exploiting these self-homing properties of cancer cells to use them as vehicles for self-targeted delivery of gene-based therapeutics to primary and metastatic tumours.

SALON D - 10:30 a.m.

Sanna Abbasi
PhD Candidate

Research Areas:
Molecular cellular
Mechanisms of disease

Supervisor(s):
C. Schild-Poulter

Identifying Ku complex interactors using proximity-dependent biotin identification (BioID) and affinity purification-mass spectrometry (AP-MS)

Introduction
Cancer cells are known for their uncontrollable cell division. Unlike normal cells, cancer cells are deregulated in their DNA repair pathways. Both radiation and certain chemotherapy drugs take advantage of this difference and are used to produce double-stranded breaks (DSBs), with the idea that cancerous cells, unable to repair the damage, will die, while normal cells survive. In mammals, DSBs are primarily repaired by the non-homologous end-joining (NHEJ) pathway. Within seconds of a DSB forming, Ku, a heterodimer composed of subunits Ku70 and Ku80, binds and recruits other factors to repair the break. Our lab also implicated Ku in the DNA damage response (DDR), a critical pathway that leads to cell cycle arrest and apoptosis. Within Ku70, we characterized serine 155 as a novel phosphorylation site, phosphorylated in response to severe DNA damage. Our lab found that the mutants, S155A (which abolishes phosphorylation) and S155D (a phosphomimetic), had opposing effects in terms of cell survival. Ku70 S155A-expressing cells demonstrated prolonged cell survival while S155D cells demonstrated decreased survival, even in the absence of damaged DNA, leading to the assumption that S155 plays a role in modulating the DDR. Notably, both mutations had no effect on NHEJ repair, implying that S155 function is independent of Ku's role in NHEJ. Although we identified a specific residue within Ku70 that may be important for the DDR, how its modification leads to the observed phenotypes is unclear.

Hypothesis
I hypothesize that Ku70 S155 modulates key protein interactions with Ku70, and that these interactions are altered upon mutation. The aim of my research is to identify factors that interact with Ku70 in a S155-dependent manner and investigate mechanisms through which Ku70 functions in the DDR.

Materials and Methods
To identify in vivo protein associations in human cells, I am using proximity-dependent biotin identification (BioID), a high-throughput proteomics technique. The protein of interest is fused to a promiscuous biotin ligase that 'biotinylates' proteins that come in close proximity to the fusion protein. Biotinylated proteins can be isolated, then identified using mass spectrometry. To corroborate the BioID results, I used a second proteomics technique, affinity-purification coupled to mass spectrometry (AP-MS), supplementing the BioID data.

Results
Using BioID with wild-type Ku70, I was able to identify ~250 candidate proteins for interaction with Ku, most of which were novel though some were known Ku interactors, validating the use of the technique. We were the first to report the comprehensive Ku interactome based on BioID and AP-MS.

Discussion and Conclusions
Some of the candidate proteins identified are important regulators of the cell cycle and could be interacting with Ku to modulate the DDR. For example, we identified PNUTS, TOX4 and PPP1CC, which form the PTW/PP1 complex (a subcomplex of Protein Phosphatase 1), known to be involved in cell cycle progression. Interaction with this complex could implicate Ku in cell cycle regulatory processes. Future work will focus on identifying factors whose interaction with Ku70 is dependent on S155, and direct interactions will be validated by coimmunoprecipitation experiments. This research reveals novel proteins and cellular processes associated with Ku through the characterization of the Ku interactome, and may identify new factors that mediate the DDR pathway.

SALON D - 10:45 a.m.

Sergio Dempsey
MSc Candidate

Research Areas:
Circulatory
Detection, screening and diagnosis of health and disease

Supervisor(s):
A. Samani, A. So

Effect of cardiac phase on CT assessment of cardiac output in acute myocardial infarction

Introduction
Dynamic contrast-enhanced (DCE) CT imaging has been used to measure myocardial perfusion in patients with stable coronary artery disease and acute myocardial infarction (AMI). The aortic time-enhancement curve (TEC) measured from DCE cardiac images can also be used to assess cardiac output to determine if the pumping function of the heart is compromised due to myocardial ischemia or AMI. However, DCE images acquired at different cardiac phases may lead to different aortic TECs which may sequentially affect the cardiac output measurement. The objective of this study is to investigate the effect of cardiac phase on DCE CT assessment of cardiac output in a porcine model of reperfused AMI.

Materials and Methods
A total of 17 farm pigs were used for the study. Each pig was anesthetized and mechanically ventilated in a supine position on the scanner table, before a bolus of iodinated contrast (Isovue 370) was injected intravenously followed by saline flush. Next, a 30 s cine scan of the heart was acquired with breath-hold using a large-coverage CT scanner (GE Healthcare Revolution) at 100 kV voltage, 100 mA current and 280 ms gantry speed. Electrocardiogram (ECG) of the pig was simultaneously recorded during the acquisition. DCE cardiac images were retrospectively reconstructed at 30% to 80% of the R-R intervals with a 5% phase step. The TEC measured from the ascending aorta in each DCE image set was fitted with a modified gamma variate function (MGVF). The recirculation was removed using semilogarithmic extrapolation, and outliers fixed with replacement. Finally, the area under the fitted TEC curve (AUC) was then calculated and the Stewart-Hamilton equation was applied to calculate the cardiac output. To compare phases, all TEC phases of each subject were fitted with a global MGVF and the root mean squared error (RMSE) of each phase TEC to the global fit was calculated.

Results
Linear regression analysis of the TEC RMSE versus cardiac phase from end systole (ES) to end diastole (ED) indicated that there was -3.0 Hounsfield Units per phase (HU/%) with a standard error of 0.7 HU/%. The cardiac outputs across all subjects ranged from 2.97 to 5.81 litres per minute (L/m). The average standard deviation of the cardiac outputs over all phases was 0.30 L/min.

Discussion and Conclusions
Results of the RMSE trend suggest that the most stable time to sample the TEC for cardiac output measurements is at ED, or 80% of the R-R interval. Reasons for this may be the slower flow velocity in the ascending aorta at ED, and any irregularly mixed contrast ejected from the left ventricle will have had the most time to mix. The cardiac output range was acceptable given the variations in pig size and heart rates of the subjects. The standard deviation of 0.30 L/min across the phases suggests at a glance that the phase does not matter to the overall cardiac output. However, these fits were done with data replacement by an expert user significantly improving poor data. Since an expert may not be available, it is important to have the best experimental data to begin with.

When estimating cardiac output using DCE CT, the phase to collect must be selected prior to imaging since the radiation dose is too large to collect over the entire R-R interval. An investigation into the effects of cardiac phase on DCE CT estimated cardiac output was conducted. The results suggest that end diastole is the most stable phase to sample iodine concentrations for TEC calculation.

SALON D - 11:00 a.m.

Mary Bamimore
PhD Candidate

Research Areas:
Population health and education
Advancing health services provision and health policy

Supervisor(s):
S. Sarma, A. Garg

Quality of diabetes mellitus care in Ontario's Family Health Group and Family Health Organization models

Introduction
Following primary care reform in Ontario in early 2000's, Family Health Group (FHG) and Family Health Organization (FHO) models became Ontario's two predominant models for primary care delivery. Physicians in FHG and FHO models are remunerated through blended fee-for-service (FFS) and blended capitation, respectively. To date, physicians' performance in these models is very scant. We investigated the impact of physicians switching from FHG to FHO on quality of care provided to diabetic patients in Ontario. The diabetes quality indicators we used were: (1) glycated hemoglobin (HbA1c) testing; (2) lipid assessment; (3) nephropathy screening; (4) eye examination; (5) prescription of angiotensin converting enzyme inhibitors (ACEIs) or angiotensin II receptor blockers (ARBs); (6) prescription of statins; (7) risk of a diabetes-related hospitalization as an ambulatory care sensitive condition (ACSC); (8) comorbidity score; and (9) mortality risk score (MRS). Our study period spanned the 2006 to 2015 fiscal years. Our main explanatory variable was physician payment model, where we investigated physicians who either: (1) transitioned from FHG to FHO (i.e., switchers) or (2) remained in a FHG (i.e., non-switchers).

Hypothesis
We hypothesized that switchers provide better quality of care to diabetes patients compared to non-switchers; we also hypothesized that diabetic patients of switchers have better health outcomes than diabetic patients of non-switchers.

Materials and Methods
We used a retrospective cohort study design. We used health administrative data from ICES. Nine quality indicators were investigated, and analyses were conducted at the physician level. Propensity score methods (PSM) were employed to make the distribution of observable physician and patient covariates similar between the switchers and non-switchers, and then panel-data regression analyses were performed. Indicators that were proportions were analyzed using fractional regression models; indicators that were continuous measures were analyzed using linear fixed-effects regression models. We followed 2,120 physicians from the 2006 to 2015 fiscal years; thus we had 21,200 observations for our panel data.

Results
We found that switching from FHG to FHO was associated with 2.82% (95% confidence interval (CI): 2.00% - 3.65%) more HbA1c testing; 2.80% (95% CI: 1.97% - 3.62%) more lipid assessment; 2.89% (95% CI: 2.11% - 3.67%) more nephropathy screening; 1.12% (95% CI: 0.59% - 1.66%) more statin prescription; a decrease in mortality risk score by 19.67% (95% CI: 33.36% - 5.97%); and a decrease in comorbidity score by 10.34% (95% CI: 11.82% - 8.86%). However, switching was non-significantly associated with diabetes-related hospitalizations by -0.022% (95% CI: -0.050% - 0.0071%); annual eye examination by -0.019% (95% CI: -0.19% - 0.15%); and prescription of drugs for nephropathy by 0.358% (95% CI: -0.20% - 0.92%).

Discussion and Conclusions
We found that, compared to blended FFS, blended capitation payment is associated with moderately better quality of care provided to patients with diabetes. Furthermore, we found that capitated payment was associated with lower mortality risk scores and lower comorbidity scores for diabetic patients, compared to their blended FFS counterparts.

SALON D - 11:15 a.m.

Androu Abdalmalak
PhD Candidate

Research Areas:
Medical biophysics, engineering and imaging
Detection, screening and diagnosis of health and disease

Supervisor(s):
K. St. Lawrence, A. Owen

The effects of partial volume errors on oxygenation changes during fNIRS studies of motor-imagery

Introduction
Functional NIRS (fNIRS) maps regional brain activity by detecting the blood oxygenation level dependent response associated with greater neural activity. As a result, this signal is depicted by an increase in oxy- and a concurrent decrease in deoxyhemoglobin during brain activity. However, previous studies have reported the unexpected finding of inverse oxygenation in up to 50% of subjects performing motor imagery tasks. This unexplained finding questions the reliability of fNIRS given that identifying specific activation is based on detecting the expected increase in focal blood oxygenation. The purpose of this study was to investigate the prevalence of inverse oxygenation during motor imagery.

Hypothesis
Inverse oxygenation is likely caused by partial volume errors due to the low spatial resolution of fNIRS. To test this hypothesis, fMRI and fNIRS data were acquired from healthy participants performing a motor imagery task. The former provided global coverage for comparison to the focal fNIRS measurements. Monte Carlo (MC) simulations were conducted with different probe locations to evaluate sensitivity of fNIRS to relevant brain regions.

Materials and Methods
15 healthy subjects were recruited (10 males, mean age 26). The protocol consisted of five 30-s alternating cycles of rest and imagining playing tennis. Each subject performed the paradigm twice to acquire the fMRI and fNIRS data sets. fNIRS data were acquired with a four-channel system developed in-house [1]. The fibers were placed in a cross orientation with the emission fiber over FCz according to the international 10-20 template for electrode placement. This orientation was chosen to interrogate the secondary motor regions since these areas are activated by motor imagery. MC simulations were conducted on a layered head model with the same probe orientation. Regions of interest corresponding to the secondary and the primary motor cortex (M1) were included in the model. This was done to determine the relative number of photons interrogating each region. The first simulation was conducted with the emission fiber positioned correctly over FCz. Next, the fibers were moved posterior to FCz in 0.5 cm increments until the emission fiber was 2 cm from the correct position. This was done to simulate inaccuracies in probe placement associated with the 10-20 template.

Results
13 subjects showed significant activity in the secondary motor regions during motor imagery by both modalities [1]. However, 7 subjects also showed fMRI activity in M1 during the rest periods, which was attributed to inadvertent motion after performing the task. Of these subjects, only two showed inverse activation by fNIRS which was detected by probes placed posterior/lateral to the emission fiber. These probes were likely more sensitive to M1 considering the primary and secondary motor regions are adjacent. MC simulations confirmed these results as moving the probes 2 cm back was predicted to increase the light detection from M1 to 50% for the most posterior probe and 30% for the lateral probes.

Discussion and Conclusions
These results indicate that inadvertent motion during rest periods is a likely contributor to inverse oxygenation. Given the proximity of the primary and secondary motor regions, and the poor spatial resolution of fNIRS, this out-of-phase activity during the rest periods could be interpreted as inverse oxygenation.

References
[1] A. Abdalmalak et al., *BOE*, 2017.

SALON D - 11:30 a.m.

Nivin Nyström
PhD Candidate

Research Areas:
Medical biophysics, engineering and imaging
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
J. Ronald, T. Scholl

In vivo cell tracking via a clinically-relevant reporter gene for fluorescence, photoacoustic, and magnetic resonance imaging at 3 Tesla

Introduction
Reporter genes encode products that are detectable via imaging modalities, allowing for tracking of reporter-expressing cells in animals for preclinical research, and are starting to be applied towards tracking of gene and cell therapies in patients. Multimodality systems are advantageous, as they combine different imaging datasets for a more complete understanding of the biological phenomenon at hand. Human organic anion-transporting polypeptide 1b3 (Oatp1b3) encodes a protein capable of taking up the clinically-used MRI contrast agent gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA; Patrick et al PNAS 2014), and the clinically-used fluorescent dye indocyanine green (ICG; Wu et al FASEB J 2018). Our objective was to test the feasibility of tracking cells in vivo on: 1) a clinical 3-Tesla scanner based on the ability of Oatp1b3 to take up Gd-EOB-DTPA; and 2) a photoacoustic imaging (PAI) system based on the ability of Oatp1b3 to take up ICG, since ICG features a high extinction coefficient, a low quantum yield and has previously been utilized for PAI.

Materials and Methods
Human cells (MDA-MB-231) were engineered with the Oatp1b3 gene to generate OATP1B3 cells. Control and OATP1B3 cells were incubated with or without 35 ug/ml ICG, washed, and imaged via an optical scanner for fluorescence imaging (FLI; 780-nm excitation, 845-nm emission), followed by PAI (780-nm excitation) on a custom-built system (n=3). Spin-lattice relaxation rates of cells incubated with 6.4 mM Gd-DTPA (control) or Gd-EOB-DTPA were measured using an inversion recovery sequence at 3T. Mice were implanted with control (n=6) or OATP1B3 (n=5) cells. Mice were imaged via FLI as described above, and via spectral PAI (680-970 nm, $d\lambda$=5 nm) before and 24-hours after injecting 8 mg/kg ICG.

Results
Both FLI and PAI signal intensity was increased (4.0-fold and 2.7-fold, respectively; $p<0.05$) for OATP1B3 cells incubated with ICG relative to all other treated and untreated controls. Spin-lattice relaxation rates were increased 4.9-fold ($p<0.05$) at 3T following incubation with Gd-EOB-DTPA compared with all other control cells. In animals, PAI signal was increased 2.3-fold ($p<0.05$) for OATP1B3 tumours compared to control tumours 24-hours after ICG administration.

Discussion and Conclusions
Molecular imaging aims to detect in vivo molecular events with high sensitivity, specificity and resolution. This often requires multimodality imaging to provide a more thorough understanding of the system being studied. Optical imaging methods such as FLI and PAI offer rapid and cost-effective measures to detect reporter signals from localized engineered cells whereas MRI provides high resolution, 3D spatial information with detailed anatomical context. Here, we establish the Oatp1b3 gene as a multimodality reporter system that allows for ICG-enhanced FLI and PAI, as well as Gd-EOB-DTPA-enhanced MRI at 3T to track viable engineered cells in animal models. Importantly, the human derivation of Oatp1b3 relative to non-human reporter genes that raise immunogenicity concerns, along with longstanding FDA-approval of both ICG and Gd-EOB-DTPA, pave a potential path towards clinical translation for this tri-modality reporter system. Future work focuses on in vivo tumour imaging with 3-Tesla MRI.

SALON E - 10:30 a.m.

Mayu Nagao
Postdoctoral Scholar

Research Areas:
Musculoskeletal health and rehabilitation
Mechanisms of disease

Supervisor(s):
C. Séguin, J. Dixon

Loss of nucleoside transporter ENT1 slows incisor eruption in mice

Introduction
Equilibrative nucleoside transporter 1 (ENT1) transfers nucleosides, such as adenosine, across the plasma membrane. Previous studies from our group reported that mice lacking ENT1 (ENT1-KO) exhibit ectopic calcification of spinal tissues, sternocostal articulations, and the mandibular symphysis (J Bone Miner Res 28:1135-49, 2013; Bone 90:37-49, 2016). These studies showed that the ENT1-KO mouse is useful as a model for investigating the mechanisms underlying ectopic mineralization associated with diffuse idiopathic skeletal hyperostosis (DISH) in humans. However, the effect of ENT1 on the dental and periodontal tissue is not understood. Interestingly, our previous analysis revealed orofacial changes in the ENT1-KO mouse including calcification of the mandibular symphysis and apparent alterations to the structure of the mandibular incisors.

Hypothesis
Loss of ENT1-mediated adenosine transport affects the function of periodontal ligament fibroblasts, leading to a reduction in cell contraction and disrupting normal tooth eruption. The current study aims to investigate the role of ENT1 in dental and periodontal tissues using the ENT1-KO mouse model.

Materials and Methods
Heads from ENT1-KO and wild-type (WT) mice at 3 and 6 months-of-age were scanned using micro-computed tomography (micro-CT) to evaluate the morphology and densities of teeth and adjacent tissues. Representative samples were decalcified and processed for histological assessment. Rates of eruption of mandibular incisors were measured at 2 months-of-age using a tooth notch assay. Connective tissue fibroblasts were isolated from ENT1-KO and WT mice and assayed in vitro for differences in cell adhesion and cell-mediated matrix contraction.

Results
No hypercementosis or ectopic calcification of the periodontal ligament was detected in ENT1-KO mice. Micro-CT analysis revealed generally normal dental morphology in mice lacking ENT1 at both 3 and 6 months-of-age. However, mineralization of the enamel was greater toward the apical end of ENT1-KO incisors. Moreover, the pulp chambers of ENT1-KO incisors were smaller in diameter than those of age-matched WT mice. These differences are consistent with a slower rate of eruption in ENT1-KO mice. This was confirmed by measurement of eruption rates in vivo (0.22 ± 0.02 and 0.31 ± 0.02 mm/day in ENT1-KO and WT mice, respectively, $n = 6$, $p = 0.01$). Although no difference was detected between adhesion of ENT1-KO and WT fibroblasts in vitro, the ability of ENT1-KO fibroblasts to contract collagen gels was significantly less than that of WT cells.

Discussion and Conclusions
Taken together, these results demonstrate that loss of the adenosine transporter ENT1 slows the rate of incisor eruption. This effect may be mediated by a defect in the ability of ENT1-KO fibroblasts to generate tension. These findings are consistent with a role for adenosine in the regulation of tooth eruption.

SALON E - 10:45 a.m.

Joshua Dierolf
PhD Candidate

Research Areas:
Molecular cellular
Early life programming and development

Supervisor(s):
D. Betts

Nuclear PKM1 confers naivety in mouse embryonic stem cells

Joshua Dierolf did not give consent to reproduction of his abstract.

SALON E - 11:00 a.m.

Hayley Good
PhD Candidate

Research Areas:
Cancer biology
Mechanisms of disease

Supervisor(s):
S. Asfaha

The role of cyclooxygenase in initiation of colitis-associated cancer

Introduction
Colorectal cancer (CRC) is the second leading cause of cancer death in Canada. Inflammatory bowel disease (IBD), a chronic state of colonic inflammation, is a major risk factor for CRC. Despite the clear link between inflammation and cancer, the mechanism by which colitis leads to cancer is unknown. We previously showed that Dclk1-expressing tuft cells are quiescent, long-lived, and remain resistant to proliferation even upon mutation of the tumour suppressor APC. Following colitis, however, APC-mutated cells become cancer-initiating cells by a mechanism not fully understood. Interestingly, Dclk1+ tuft cells express high levels of cyclooxygenase (COX)-1 and -2, which are responsible for the downstream production of lipid mediators such as prostaglandins. Furthermore, COX-1 and -2 are the direct enzyme targets of non-steroidal anti-inflammatory drugs (NSAIDs) which are known to be chemo-preventative in sporadic CRC. The effect of NSAIDs on the inhibition of colitis-associated cancer, however, has not yet been thoroughly examined.

Hypothesis
I hypothesize that NSAIDs will inhibit colitis-associated cancer (CAC) through inhibition of COX-1 and/or -2.

Materials and Methods
Dclk1CreERT2/APCfl/fl mice were administered tamoxifen to induce an APC mutation in Dclk1-expressing cells. Mice were then exposed to the colitis-inducing agent dextran sodium sulfate (DSS), followed by daily treatment with Aspirin (non-selective COX inhibitor), celecoxib or rofecoxib (COX-2 inhibitors), SC-560 (COX-1 inhibitor), or vehicle for the experiment duration. Additionally, we followed the same experimental protocol to also test the effects of NSAIDs in the AOM/DSS model of CAC. The carcinogen azoxymethane (AOM), followed by DSS, were administered to induce tumourigenesis. Sixteen weeks post-tamoxifen or AOM, colonic tumour number and size were examined to determine the effect of NSAIDs on tumour initiation and growth, respectively. Acutely, levels of inflammatory eicosanoids were measured in colonic tissue of DSS and NSAID-treated mice by liquid chromatography-mass spectrometry (LC-MS). The extent of inflammation was assessed by myeloperoxidase (MPO) activity, histology, and mRNA expression of inflammatory mediators was measured by qRT-PCR.

Results
Treatment of mice with Aspirin, but not the COX-2 inhibitors celecoxib and rofecoxib, significantly reduced the number of colonic tumours in both the Dclk1+ cell-derived and AOM/DSS models of colitis-associated cancer. The COX-1 inhibitor SC-560 also reduced the number of colonic tumours. We detected no difference in tumour size or severity of colitis between vehicle and NSAID-treated groups, as assessed by MPO activity, histology, and qRT-PCR. LC-MS analysis of eicosanoids in colonic tissue revealed that Aspirin and SC-560, but not celecoxib, significantly reduced prostaglandin levels in DSS-colitis. Interestingly, Aspirin was associated with a significant reduction in Dclk1+ cell number, suggesting an important role for prostaglandins in the viability of Dclk1+ tuft cells.

Discussion and Conclusions
These findings suggest that cyclooxygenase and downstream prostaglandins play an important role in initiation of CAC. Our results suggest that Aspirin does not worsen the degree of DSS-colitis, and serves to be chemo-preventative in CAC – potentially through the inhibition of COX-1-derived prostaglandins that may be critical for Dclk1+ cell survival.

SALON E - 11:15 a.m.

Nicholas Handfield-Jones
MSc Candidate

Research Areas:
Neuroscience
Detection, screening and diagnosis of health and disease

Supervisor(s):
P. MacDonald, A. Khan, A. Owen

Clarifying dopaminergic projections of the ventral tegmental area and substantia nigra in humans using structural magnetic resonance imaging

Introduction
Substantia nigra pars compacta (SNc) and ventral tegmental area (VTA) are the primary dopaminergic (DAergic) producing nuclei of the midbrain, which, through projections to the striatum and cortex, mediate movement and cognitive processes. The degeneration of these projections is also implicated in the pathogenesis of multiple neurological disorders, including Parkinson's disease (PD), obsessive compulsive disorder (OCD), and substance use disorder (SUD). Classically, these projections have been divided into the disparate nigrostriatal and mesolimbic pathways, with the SNc and VTA projecting to differing brain regions. However, recent human magnetic resonance imaging (MRI) connectivity studies suggest that these pathways may be more overlapping than previously thought, whereby projections from both the SNc and the VTA target dorsal striatum (DS), ventral striatum (VS), and multiple cortical regions, irrespectively. In this study, we aim to clarify these projections in humans using ultra-high field MRI and to assess the extent to which these projections change in PD.

Hypothesis
DAergic projections from the VTA and the SNc will target multiple brain regions in both the cortex and striatum. The pattern of these projections will differ between healthy controls and PD patients.

Materials and Methods
22 healthy, elderly participants (65.60 ± 6.56 years) and 21 age-matched PD participants (67.11 ± 6.03 years) were scanned in 7-Tesla (7T) field strength. Anatomical MP2RAGE T1 (TR=6000 ms, TE=2.73 ms, 0.7mm3 iso) and diffusion weighted imaging (b=2000 s/mm2, TR=5500 ms, TE=60.8 ms, 95 directions, 1.5 mm3 iso) sequences were performed on each participant. Scans were first converted to MNI152 stereotaxic space. The cortex, striatum, and midbrain were segmented from each participant's T1 image. FSL BEDPOST probabilistic tractography was employed to parcellate the SNc and the VTA into functionally-derived sub-regions based on their maximal connectivity to an in-house parcellated striatum, itself sub-divided by maximal connectivity to the cortex. To measure the extent to which each midbrain sub-region connected with the other brain sub-regions, whole-brain probabilistic tractography was performed with seeds originating in each midbrain sub-region voxel and with streamlines targeting the striatum and cortex.

Results
Preliminary results of healthy control participants are in line with our hypothesis. Of all streamlines that emerged from the midbrain, 34.87% and 9.56% targeted the DS and the VS, respectively. A significant amount also targeted the sub-regions of the cortex, to varying degrees. Considering midbrain DAergic connections to the striatum only, 83.70% of SNc projections were to the DS compared to 16.30% to the VS. In contrast, 67.48% of VTA projections targeted the DS while 32.52% targeted the VS. Future analysis will focus on the connectivity patterns within PD patients and will compare between groups.

Discussion and Conclusions
In preliminary data analysis, we found that both the SNc and the VTA project to all striatal and cortical sub-regions, contrary to classical understandings. Midbrain DAergic circuits result in many behavioural sequelae and have been implicated in the etiology of many diseases. Clarifying their anatomical networks may provide insight as to how they produce complex behavioural outputs and how they may contribute to the pathogenesis of disease.

SALON E - 11:30 a.m.

TianDuo Wang
MSc Candidate

Research Areas:
Medical biophysics, engineering and imaging
Detection, screening and diagnosis of health and disease

Supervisor(s):
J. Ronald

Using tumour-activatable minicircles to detect prostate cancer with a urine-based test

Introduction
The holy grail for cancer detection is finding cancer-specific biomarkers which can detect tumours early and predict patient prognosis. Our group has previously developed non-viral gene vectors called tumour-activatable minicircles (TA-MCs), shortened plasmids that possess superior potency and clinical translatability (Chen et al., 2003), which can produce an exogenous blood reporter in cancers cells but not healthy cells (Ronald et al., 2015). These TA-MCs were able to identify mice with prostate tumours, and notably produced elevated blood reporter in more aggressive tumours. To improve upon these initial construct designs, we have replaced the blood reporter gene on our TA-MCs with Gaussia luciferase (Gluc), a sensitive reporter protein detectable in urine, allowing for non-invasive urine-based assay development (Tannous et al., 2005). We use the tumour-specific survivin promoter (pSurv) to limit transcription of Gluc exclusively to prostate cancer (PCa) cells, titrating biomarker output to tumour aggression, as more aggressive PCa tumours express more survivin in patients (Shariat et al., 2004).

Hypothesis
We hypothesized that the administration of Gluc-expressing TA-MCs in mice will yield measurable Gluc levels in urine that are related to PCa survivin expression.

Materials and Methods
We constructed parental plasmids, precursors to minicircles, that expressed Gluc downstream of pSurv. TA-MCs were then made from these parental plasmids using a previously described production system (Kay et al., 2010). Next, we validated these TA-MCs via transfection of PCa cell lines (Du145, LNCaP, PC3, PC3MLN4) of varying aggressiveness and normal prostate epithelial cells. Cell media was collected at 2 and 5 days post-transfection and Gluc levels were quantified using a commercial kit. We also measured the survivin expression in cell lysates using immunoblotting. For in vivo models, we established subcutaneous and orthotopic prostate tumours in nude mice by injecting aggressive, high-survivin PC3MLN4 cells in the right flank and dorsal prostate respectively. TA-MCs complexed with a polyethylenimine transfection agent were injected intratumourally, then Gluc levels were measured in urine samples collected pre- and 2, 5 and 7 days post-MC injection. Data were analyzed using a one-way ANOVA followed by Tukey's HSD.

Results
We found that Gluc levels were significantly higher in PCa cell lines than primary prostate epithelium. Between PCa cell lines, Gluc expression was highest in PC3MLN4 and lowest in LNCaP cells, showing a similar trend to that of survivin expression. Mice bearing both subcutaneous and orthotopic PC3MLN4 tumours exhibited no detectable levels of urine Gluc initially but showed significantly increased Gluc 2 days after administration of TA-MCs.

Discussion and Conclusions
Our TA-MCs were able to effectively use the tumour-specific pSurv to produce Gluc that differentiated low and high survivin PCa cells from healthy prostate cells in vitro. Gluc exhibited minimal background in vivo and is detectable in urine of tumour-bearing mice after TA-MC injection. Future work is focused on testing TA-MCs in mice with non-aggressiveness LNCaP tumours to validate our system's ability to discern PCa aggressiveness via urine Gluc. These TA-MCs represent a novel diagnostic tool that offers more comprehensive information regarding PCa, which can ultimately help patients more confidently choose appropriate care options.

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

ADVANCES IN STRUCTURAL AND PHYSIOLOGICAL TREATMENT OF DISEASE AND THERAPEUTIC INTERVENTION (INCLUDES SURGERY AND DRUGS)

Poster Number: 1
Name: Qingfan Liu
Degree: MSc Candidate
Abstract Title: Evaluating the neuroprotective potential of exosome delivered catalase-SKL in a pre-clinical model of Alzheimer's disease
Supervisor(s): S. Whitehead, P. Walton

Poster Number: 2
Name: Akmal Shahzad
Degree: MSc Candidate
Abstract Title: Esophageal protective devices for cardiac catheter ablation: Changes in the esophagus-left atrial relationship
Supervisor(s): C. Martin, M. Barbeau

Poster Number: 3
Name: McShane McKenna
Degree: MSc Candidate
Abstract Title: Pioneering the genetic code expansion of Bacillus subtilis
Supervisor(s): P. O'Donoghue

Poster Number: 4
Name: Tasnim Reza
Degree: PhD Candidate
Abstract Title: Thrombin activatable fibrinolysis inhibitor (TAFI)-specific thrombomodulin variant reduces breast cancer cell invasion
Supervisor(s): M. Boffa

Poster Number: 5
Name: Luke Helpard
Degree: MSc Candidate
Abstract Title: Evaluation of cochlear duct length measurements from a 3D analytical cochlear model using synchrotron radiation phase-contrast imaging
Supervisor(s): H. Ladak, S. Agrawal

Poster Number: 6
Name: Anas Ibrahim
Degree: PhD Candidate
Abstract Title: A feed-forward neural network approach for Parkinsonian tremor onset prediction
Supervisor(s): A.L. Trejos, M.D. Naish

Poster Number: 7
Name: Andrea Kassay
Degree: MSc Candidate
Abstract Title: Quantification of the effects of haemodialysis patient's cardiac ejection fraction: Towards patient specific structure-function models
Supervisor(s): C. McIntyre, S. Kharche

Poster Number: 8
Name: Xinyi Li
Degree: PhD Candidate
Abstract Title: A multifunctional microparticulate poly(vinyl alcohol) hydrogel for locoregional cancer therapy
Supervisor(s): W. Wan

Poster Number: 9
Name: Yu Ting (Natalie) Liang
Degree: MSc Candidate
Abstract Title: Synthesis of cross-linkable poly(ester amide)s for cell encapsulation and delivery
Supervisor(s): E. Gillies, L. Flynn

Poster Number: 10
Name: Maxwell Perelgut
Degree: MSc Candidate
Abstract Title: How are patient function, activity, and implant migration impacted by total hip arthroplasty surgical approach and implant design?
Supervisor(s): M. Teeter

Poster Number: 11
Name: Nisha Sharma
Degree: PhD Candidate
Abstract Title: Ion implanted collagen nanofibrous for tissue engineering application
Supervisor(s): W. Wan

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 12
Name: Arthi Shridhar
Degree: PhD Candidate
Abstract Title: Design of tissue-specific extracellular matrix composite hydrogels for adipose-derived stem/stromal cell (ASC) delivery
Supervisor(s): L. Flynn, E. Gillies

Poster Number: 13
Name: Jacob Tryon
Degree: PhD Candidate
Abstract Title: Evaluating EEG/EMG fusion methods for upper-limb motion classification
Supervisor(s): A.L. Trejos

Poster Number: 14
Name: Geofrey Yamomo
Degree: MSc Candidate
Abstract Title: Post-operative laxity outcomes of cruciate retaining and condylar stabilizing total knee replacements
Supervisor(s): R. Willing, B. Lanting

Poster Number: 15
Name: Zhe Li
Degree: PhD Candidate
Abstract Title: Frailty in patients undergoing transcatheter aortic valve implantation (TAVI): A systematic review and meta-analysis
Supervisor(s): A. John-Baptiste, D. Cheng

Poster Number: 16
Name: Marquise Bonn
Degree: PhD Candidate
Abstract Title: Biofeedback can improve driving performance in individuals with persistent post-concussive symptoms: Preliminary findings from an eight-week intervention
Supervisor(s): J. Dickey, L. Graham

Poster Number: 17
Name: Saravanan Esakki
Degree: PhD Candidate
Abstract Title: Rasch analysis of the Patient-Rated Wrist Evaluation questionnaire
Supervisor(s): J. MacDermid

Poster Number: 18
Name: Jenna Schulz
Degree: PhD Candidate
Abstract Title: A systematic review of aerobic exercise programs for patients with knee osteoarthritis and meta-analyses of physiological effects
Supervisor(s): T. Birmingham, F. Beier

Poster Number: 19
Name: Jordan Broberg
Degree: MSc Candidate
Abstract Title: Contact kinematics in total knee replacements: Anatomical versus non-anatomical implant designs
Supervisor(s): M. Teeter

Poster Number: 20
Name: Nathan Orlando
Degree: PhD Candidate
Abstract Title: Power Doppler ultrasound for improved intraoperative needle tip visualization during prostate brachytherapy
Supervisor(s): A. Fenster

Poster Number: 21
Name: Jarrin Penny
Degree: PhD Candidate
Abstract Title: Intradialytic exercise and the effect on myocardial stunning
Supervisor(s): C. McIntyre

Poster Number: 22
Name: Priyanka Roy
Degree: MSc Candidate
Abstract Title: Volume change of lateral ventricles in 3D ultrasound is a function of posture of neonates having intraventricular hemorrhage
Supervisor(s): S. de Ribaupierre, A. Fenster

Poster Number: 23
Name: Christopher Smith
Degree: MSc Candidate
Abstract Title: Prostate MRI delineated lesion boosting through high dose rate brachytherapy dwell time adjustment
Supervisor(s): A. Ward, D. Hoover

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 24
Name: Wenyao Xia
Degree: PhD Candidate
Abstract Title: Color coherent endoscopic/laparoscopic image enhancement with noise suppression
Supervisor(s): T. Peters

Poster Number: 25
Name: Faizah Alotaibi
Degree: PhD Candidate
Abstract Title: Targeting CD5 and Fas receptor on CD8+ immune T cells to improve anti-tumour immunity
Supervisor(s): J. Koropatnick, W. Min

Poster Number: 26
Name: Yingxue Sun
Degree: MSc Candidate
Abstract Title: Glycosylation of gp120 and HIV transmission fitness
Supervisor(s): C. Creuzenet, E. Arts

Poster Number: 27
Name: Andrew Olin
Degree: MSc Candidate
Abstract Title: Novel in vitro models of cellular homing to gliomas using safely engineered brain-derived progenitor cells as proof of concept for in vivo studies
Supervisor(s): M. Hebb, J. Ronald

Poster Number: 28
Name: Cuilin Zhu
Degree: PhD Candidate
Abstract Title: Preservation solution with AP39 supplementation, a mitochondria-target hydrogen sulfide donor, protects cardiac allograft from prolonged ischemia reperfusion injury in heart transplantation
Supervisor(s): X. Zheng

Poster Number: 29
Name: Brandon Baer
Degree: PhD Candidate
Abstract Title: Exogenous surfactant as a pulmonary drug delivery vehicle for budesonide in the treatment of acute respiratory distress syndrome
Supervisor(s): R. Veldhuizen, C. Yamashita

Poster Number: 30
Name: Yue Lai-Zhao
Degree: MSc Candidate
Abstract Title: Characterization of primary chondrocyte responses to early osteoarthritic synovium ex vivo
Supervisor(s): C. Appleton

Poster Number: 31
Name: Emily Dzongowski
Degree: Medical Student
Abstract Title: Hyoscine butylbromide (Buscopan) for abdominal pain in children: A randomized controlled trial
Supervisor(s): N. Poonai

Poster Number: 32
Name: Stephanie Newman
Degree: Postdoctoral Scholar
Abstract Title: Viral vector therapy as a therapeutic option for peripheral nerve disease associated with metachromatic leukodystrophy
Supervisor(s): T. Rupar

Poster Number: 33
Name: Kitty Wu
Degree: Medical Student
Abstract Title: Function-blocking RHAMM peptides attenuate fibrosis and support adipogenesis in bleomycin-induced systemic sclerosis
Supervisor(s): E. Turley

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

ADVANCING HEALTH SERVICES PROVISION AND HEALTH POLICY

Poster Number: 34
Name: Michael Hong
Degree: PhD Candidate
Abstract Title: The impact of Ontario's after-hours premium on emergency department utilization
Supervisor(s): S. Sarma

Poster Number: 35
Name: Nicole Schoer
Degree: MSc Candidate
Abstract Title: Identifying help-seeking patterns in primary care by young people with first-episode psychosis
Supervisor(s): K. Anderson

Poster Number: 36
Name: Mojgan Farahani
Degree: PhD Candidate
Abstract Title: Perceptual evaluation of the voice dimension of "strain" in speakers with adductor spasmodic dysphonia: A pupillometric study
Supervisor(s): P. Doyle, V. Parsa

Poster Number: 37
WITHDRAWN

Poster Number: 38
Name: Ivy Tran
Degree: MSc Candidate
Abstract Title: Undergraduate nursing students' experiences of learning Indigenous health
Supervisor(s): V. Smye

Poster Number: 39
Name: Christina Ziebart
Degree: PhD Candidate
Abstract Title: Application of ICF conceptual framework in osteoporosis
Supervisor(s): J. MacDermid

Poster Number: 40
Name: E. Ali Bateman
Degree: Resident
Abstract Title: Reducing waste: A guidelines-based approach to reducing inappropriate vitamin D and TSH testing in the inpatient rehabilitation setting
Supervisor(s): H. MacKenzie

Poster Number: 41
Name: Stacy Fan
Degree: Resident
Abstract Title: Regional wait times for patients with non-melanoma skin cancer in Southwestern Ontario
Supervisor(s): A. Grant

Poster Number: 42
Name: Andrew Khalil
Degree: Medical Student
Abstract Title: Bringing success to practical research: Applying project management strategies to health research
Supervisor(s): K. Galil

Poster Number: 43
Name: Katharine McLaughlin
Degree: Medical Student
Abstract Title: Trends in vital signs in relation to patient outcomes during induction phase in treatment of acute leukemia
Supervisor(s): C. Hamm

Poster Number: 44
Name: Vanessa Safian
Degree: Research Assistant/Associate
Abstract Title: Examining the relationships among authentic leadership, interprofessional collaboration, and nurse assessed adverse events: A mediation model
Supervisor(s): C. Wong

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

DETECTION, SCREENING AND DIAGNOSIS OF HEALTH AND DISEASE

Poster Number: 45
Name: Austyn Roseborough
Degree: PhD Candidate
Abstract Title: Characterization and isolation of brain-derived microparticles in a transgenic model of preclinical Alzheimer's Disease
Supervisor(s): S. Whitehead, S. Pasternak

Poster Number: 46
Name: William Anderson
Degree: MSc Candidate
Abstract Title: Wireless telemetry load sensor for orthopaedic applications
Supervisor(s): D. Holdsworth

Poster Number: 47
Name: Riley Bloomfield
Degree: PhD Candidate
Abstract Title: Unsupervised machine learning of parameters recorded from wearable sensor instrumented functional tests predicts early recovery paths following knee replacement
Supervisor(s): M. Teeter, K. McIsaac

Poster Number: 48
Name: Dimuthu Hemachandra
Degree: PhD Candidate
Abstract Title: Structural biomarkers for Parkinson's disease
Supervisor(s): A. Khan, P. MacDonald

Poster Number: 49
Name: Parya Jafari
Degree: MSc Candidate
Abstract Title: Ventilation image calculation from 4DCT using patient-specific biomechanical model of the lung
Supervisor(s): A. Samani, A. Sadeghi-Naini

Poster Number: 50
Name: Michael Lavdas
Degree: MSc Candidate
Abstract Title: Validation of a temperature sensor for orthopaedic infection management
Supervisor(s): M. Teeter, D. Holdsworth, B. Lanting

Poster Number: 51
Name: Hossein Rejali
Degree: MSc Candidate
Abstract Title: Cortical layer alignment in surgically-resected neocortex histology
Supervisor(s): H. Rejali

Poster Number: 52
Name: Olivia Tong
Degree: MSc Candidate
Abstract Title: Structured-light surface scanning system to evaluate breast morphology
Supervisor(s): J. Carson, M. Diop

Poster Number: 53
Name: Stephanie Cullen
Degree: MSc Candidate
Abstract Title: Dual-task gait performance declines across the cognitive spectrum in a clinical setting
Supervisor(s): M. Montero-Odasso

Poster Number: 54
Name: Shirin Modarresi
Degree: PhD Candidate
Abstract Title: Does a familial sub-type of complex regional pain syndrome exist? Results of a systematic review
Supervisor(s): D. Walton, J. MacDermid

Poster Number: 55
Name: Ryan Alfano
Degree: PhD Candidate
Abstract Title: Texture-based prostate cancer classification on MRI: How does inter-class size mismatch affect measured system performance?
Supervisor(s): A. Ward

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 56
Name: Oi Wai Chau
Degree: MSc Candidate
Abstract Title: Assessing myocardial perfusion after cardiac irradiation using dynamic contrast enhanced hybrid PET/ MRI
Supervisor(s): S. Gaede

Poster Number: 57
Name: Alicia Cronin
Degree: MSc Candidate
Abstract Title: Correction of respiration-induced magnetic field (B0) fluctuations in the spinal cord
Supervisor(s): R. Bartha

Poster Number: 58
Name: Praveen Dassnayake
Degree: MSc Candidate
Abstract Title: THP-1 monocyte MRI relaxation rates are regulated by extracellular iron and hepcidin
Supervisor(s): D. Goldhawk

Poster Number: 59
Name: Derek Gillies
Degree: PhD Candidate
Abstract Title: The sound of guidance: A novel 3D ultrasound system for image-guided liver cancer therapies
Supervisor(s): A. Fenster

Poster Number: 60
Name: Gregory Hong
Degree: PhD Candidate
Abstract Title: Simulated vs. scanned ΔB0 frequency shift maps surrounding metal in MRI
Supervisor(s): D. Holdsworth, M. Drangova

Poster Number: 61
Name: Laura Mawdsley
Degree: MSc Candidate
Abstract Title: The effect of sepsis on cerebral and skeletal microvascular blood flow
Supervisor(s): M. Diop, C. Ellis

Poster Number: 62
Name: Tomi Nano
Degree: PhD Candidate
Abstract Title: Ultrahigh-resolution imaging of microcalcifications in mammography
Supervisor(s): I. Cunningham

Poster Number: 63
Name: Claire Park
Degree: PhD Candidate
Abstract Title: Validation of a new positron emission mammography ultrasound-guidance device for biopsy in breast tumours
Supervisor(s): A. Fenster

Poster Number: 64
Name: Olivia Sehl
Degree: MSc Candidate
Abstract Title: Monitoring macrophage depletion in breast cancer using fluorine-19 MRI at 3 Tesla
Supervisor(s): P. Foster

Poster Number: 65
Name: Tracy Ssali
Degree: PhD Candidate
Abstract Title: A non-invasive hybrid PET/MR approach for measurement of CBF: Validation for clinical studies
Supervisor(s): K. St. Lawrence

Poster Number: 66
Name: Joanne Tang
Degree: MSc Candidate
Abstract Title: Modelling inflammatory brain-heart interaction in Duchenne muscular dystrophy
Supervisor(s): L. Hoffman, U. Anazodo

Poster Number: 67
Name: Dae-Myoung (Danny) Yang
Degree: PhD Candidate
Abstract Title: CT perfusion for detection and localization of dominant intraprostatic foci
Supervisor(s): T-Y. Lee

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 68
Name: Alexander Dionne
Degree: MSc Candidate
Abstract Title: Cell-free DNA release during programmed cell death in ischemia reperfusion injury
Supervisor(s): A. Jevnikar, Z. Zhang

Poster Number: 69
Name: Juweiriya Ahmed
Degree: MSc Candidate
Abstract Title: Identifying neuroimaging and genetic correlates of delusions and hallucinations in Alzheimer's disease
Supervisor(s): E. Finger

Poster Number: 70
Name: Nickolas Christidis
Degree: PhD Candidate
Abstract Title: Asymmetrical loss of hippocampal digitations in MRI-negative focal temporal lobe epilepsy at 7T: An MRI marker of the seizure focus
Supervisor(s): A. Khan

Poster Number: 71
Name: Josephine Pham
Degree: MSc Candidate
Abstract Title: Modeling executive functioning development in Chinese and Canadian children: A novel mobile assessment game battery approach
Supervisor(s): J.B. Morton

Poster Number: 72
Name: Braeden Terpou
Degree: MSc Candidate
Abstract Title: The innate alarm system and subliminal threat presentation in PTSD: Neuroimaging of the midbrain and cerebellum
Supervisor(s): R. Lanius

Poster Number: 73
Name: Rebecca Sullivan
Degree: PhD Candidate
Abstract Title: PET imaging of the cardiac growth hormone secretagogue receptor in a large animal model of heart failure
Supervisor(s): S. Dhanvantari

Poster Number: 74
Name: Nicole Sidor
Degree: MSc Candidate
Abstract Title: Investigation into TMAP as a novel biomarker of kidney disease
Supervisor(s): B. Urquhart

Poster Number: 75
Name: Matthew Fox
Degree: Research Assistant/Associate
Abstract Title: Characterization of an MRI-compatible pre-clinical PET insert with first results imaging a rat model of stroke
Supervisor(s): J. Thiessen

Poster Number: 76
Name: Jad Serhan
Degree: Medical Student
Abstract Title: Emergency department-performed renal point-of-care ultrasound for the assessment of obstructive uropathy: Accuracy and impact of a training curriculum and ongoing educational interventions
Supervisor(s): B. Hassani, D. Bastien

EARLY LIFE PROGRAMMING AND DEVELOPMENT

Poster Number: 77
Name: Gargi Jaju
Degree: PhD Candidate
Abstract Title: Histone deacetylases play a vital role in syncytiotrophoblast formation during placental development
Supervisor(s): S. Renaud

Poster Number: 78
Name: Allan Chen
Degree: MSc Candidate
Abstract Title: Mechanisms regulating IGFBP-1 phosphorylation in leucine deprivation: Role of protein kinase C
Supervisor(s): M. Gupta

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 79
Name: Leah Groves
Degree: PhD Candidate
Abstract Title: The effect of imaging and tracking parameters on ultrasound probe calibration robustness
Supervisor(s): T. Peters

Poster Number: 80
Name: Steven Trothen
Degree: PhD Candidate
Abstract Title: The role of PACS-1 and AP-1 in the intracellular trafficking of hormones within endocrine cells
Supervisor(s): J. Dikeakos

Poster Number: 81
Name: Jennifer Carleton
Degree: MSc Candidate
Abstract Title: The role of Shroom3 in heart development
Supervisor(s): T. Drysdale

Poster Number: 82
Name: Zachary Easton
Degree: PhD Candidate
Abstract Title: Mitochondrial activity of BeWo villous trophoblast cells to prolonged glucose or fatty acid exposure
Supervisor(s): T. Regnault

Poster Number: 83
Name: Mohamed Gatie
Degree: PhD Candidate
Abstract Title: A XEN story: The interplay between metabolism and differentiation
Supervisor(s): G. Kelly

Poster Number: 84
Name: Gregory Robinson
Degree: MSc Candidate
Abstract Title: The effect of delta-9-tetrahydrocannabinol on fetal heart development in mice
Supervisor(s): G. Robinson

Poster Number: 85
Name: Sandra Szlapinski
Degree: PhD Candidate
Abstract Title: The ontogeny of pancreatic α and β-cells in a rodent model of gestational glucose intolerance
Supervisor(s): D. Hill

Poster Number: 86
Name: Victoria Deveau
Degree: Research Assistant/Associate
Abstract Title: Investigating the role of NAD synthetase 1 in early Xenopus laevis development
Supervisor(s): T. Drysdale

Poster Number: 87
Name: Anastasiya Vinokurtseva
Degree: Medical Student
Abstract Title: Effects of acute sepsis in liver of an adult intrauterine growth-restricted offspring
Supervisor(s): E. Arany

MECHANISMS OF DISEASE

Poster Number: 88
Name: Maram Albakri
Degree: MSc Candidate
Abstract Title: Uncovering the role of OVOL1 in cell growth regulation using Saccharomyces cerevisiae: Implications for placental homeostasis
Supervisor(s): S. Renaud, P. Lajoie

Poster Number: 89
Name: Andrew Deweyert
Degree: PhD Candidate
Abstract Title: Intratumoral modulation therapy effectively enhances chemoradiotherapy platforms for diffuse intrinsic pontine glioma
Supervisor(s): M. Hebb, S. Schmid

Poster Number: 90
Name: Victoria Jaremek
Degree: MSc Candidate
Abstract Title: Autonomic mechanisms underlying post-stroke cardiac dysfunction in the insular ischemic stroke rat model
Supervisor(s): S. Whitehead, L. Sposato

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 91
Name: Yuwei Jiang
Degree: PhD Candidate
Abstract Title: Sfp1 links TORC1 and cell growth regulation to the yeast SAGA-complex component Tra1 in response to polyQ proteotoxicity
Supervisor(s): P. Lajoie

Poster Number: 92
Name: Nicole Martin-Kenny
Degree: MSc Candidate
Abstract Title: Linking the Alpha-thalassemia/mental retardation, X-linked (ATRX) gene to autistic-like features
Supervisor(s): N. Berube

Poster Number: 93
Name: Amanda Rampersaud
Degree: MSc Candidate
Abstract Title: Palmitic acid impairs smooth muscle cell-induced placental trophoblast cell migration
Supervisor(s): S. Renaud

Poster Number: 94
Name: Sanduni Wickramananda
Degree: MSc Candidate
Abstract Title: Differentiation potential of adipogenic stromal cells (ASCs) derived from subjects with peripheral artery disease and Type II diabetes
Supervisor(s): D. Hamilton, L. Dubois

Poster Number: 95
Name: Allison Dilliott
Degree: PhD Candidate
Abstract Title: The association of APOE E4 in neurodegenerative disorders and cognitive function
Supervisor(s): R. Hegele

Poster Number: 96
Name: E. Aisha Freeman
Degree: PhD Candidate
Abstract Title: Exploring the mechanisms of activation and ubiquitination of parkin
Supervisor(s): G. Shaw

Poster Number: 97
Name: Rachel Lacoursiere
Degree: PhD Candidate
Abstract Title: Broadening the horizons: Expansion of the ubiquitin code through acetylation
Supervisor(s): G. Shaw

Poster Number: 98
Name: Johnny Luo
Degree: MSc Candidate
Abstract Title: Characterizing Wilms' tumor 1 variants and their roles in Dupuytren's disease development
Supervisor(s): D. O'Gorman

Poster Number: 99
Name: Teresa Nunez de Villavicencio Diaz
Degree: PhD Candidate
Abstract Title: Regulatory role of lysine and acetyllysine in CK2-mediated phosphorylation
Supervisor(s): D. Litchfield

Poster Number: 100
Name: Gursimran Parmar
Degree: MSc Candidate
Abstract Title: Ku70 knockout in human cells using CRISPR/Cas9 and deal nuclease TevCas9
Supervisor(s): C. Schild Poulter, D. Edgell

Poster Number: 101
Name: Pirunthan Perampalam
Degree: PhD Candidate
Abstract Title: A CRISPR screening approach to identify therapeutic targets to treat dormant epithelial ovarian cancer
Supervisor(s): F. Dick, G. DiMattia

Poster Number: 102
Name: Megan Rowland
Degree: PhD Candidate
Abstract Title: The chromatin remodeller ATRX works with HDAC3 to specify oligodendrocyte fate in the mouse brain
Supervisor(s): N. Berube, F. Beier

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 103
Name: Anna Kornmuller
Degree: PhD Candidate
Abstract Title: Naturally derived ECM microcarriers as a substrate for the dynamic cell culture of adipose derived stem cells: The influence of ECM substrate and stirring rate on adipogenic differentiation
Supervisor(s): L. Flynn

Poster Number: 104
Name: Jonathan MacNeil
Degree: MSc Candidate
Abstract Title: Novel chronic obstructive pulmonary disease multi-parametric response map phenotypes
Supervisor(s): G. Parraga

Poster Number: 105
Name: Dale Fournier
Degree: PhD Candidate
Abstract Title: Diffuse idiopathic skeletal hyperostosis (DISH) involves ectopic calcification and ossification of the spine
Supervisor(s): C. Séguin

Poster Number: 106
Name: Nassir Al-Khishman
Degree: MSc Candidate
Abstract Title: Post-stroke changes in T2-weighted signal, inflammation, and perfusion
Supervisor(s): J. Thiessen, S. Whitehead

Poster Number: 107
Name: Jacqueline Chevalier
Degree: MSc Candidate
Abstract Title: Microvascular stenosis in end-stage peripheral artery disease: Role of partial endothelial to mesenchymal transition
Supervisor(s): J. Pickering

Poster Number: 108
Name: Rachel Eddy
Degree: PhD Candidate
Abstract Title: CT airway count as a biomarker of asthma pathogenesis: Severe asthma and ACOS in never-smokers
Supervisor(s): G. Parraga

Poster Number: 109
Name: Natasha Knier
Degree: MSc Candidate
Abstract Title: Characterization of the arrest, retention, and proliferative potential of iron-labeled breast cancer cells in the NSG and nude mice brain using MRI
Supervisor(s): P. Foster

Poster Number: 110
Name: Emma Prescott
Degree: MSc Candidate
Abstract Title: A novel 3D microvessel model to study endothelial cell dynamics under low flow
Supervisor(s): J. Pickering

Poster Number: 111
Name: Behnam Abbasian
Degree: MSc Candidate
Abstract Title: Potential role of extracellular ATP released by bacteria in bladder infection and contractility
Supervisor(s): J. Burton, G. Reid

Poster Number: 112
Name: Bita Azad
Degree: MSc Candidate
Abstract Title: Investigating whether cystic fibrosis derived macrophages are more susceptible to antibiotic-resistant Staphylococcus aureus infection
Supervisor(s): D. Heinrichs

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 113
Name: Joshua Choi
Degree: PhD Candidate
Abstract Title: Glycolipid stimulation of invariant NKT cells expands precursors of mature NK cells and potentiates their participation in immune surveillance against metastatic cancer
Supervisor(s): M. Haeryfar

Poster Number: 114
Name: Mikal El-Hajjar
Degree: MSc Candidate
Abstract Title: Understanding the immune phenotype of anti-tumour T-cells in tumours deficient in DNA mismatch repair
Supervisor(s): J. Koropatnick, S. Maleki

Poster Number: 115
Name: Jacklyn Hurst
Degree: PhD Candidate
Abstract Title: The role of Streptococcus pyogenes surface virulence factors in colonization and autoimmune disease development
Supervisor(s): J. McCormick

Poster Number: 116
Name: Michelle Lim
Degree: MSc Candidate
Abstract Title: Determination of Jak3 and Ikzf3 as recurrent driver genes cooperating with deletions of genes encoding Spi-B and PU.1 to B cell acute lymphoblastic leukemia in mice
Supervisor(s): R. DeKoter

Poster Number: 117
Name: Adam Meadows
Degree: MSc Candidate
Abstract Title: Role of glycosylation on the HIV transmitted/founder: Encountering the lectin trap in the recipient mucosa
Supervisor(s): E. Arts

Poster Number: 118
Name: Martin Prusinkiewicz
Degree: PhD Candidate
Abstract Title: A snapshot of metabolic changes in HAdV5 infected cells
Supervisor(s): J. Mymryk

Poster Number: 119
Name: Akshay Sule
Degree: MSc Candidate
Abstract Title: Role of the Streptococcus pyogenes adhesion locus in nasopharyngeal infection
Supervisor(s): J. McCormick

Poster Number: 120
Name: Yodit Tesfagiorgis
Degree: PhD Candidate
Abstract Title: B cell aggregates within the inflamed central nervous system: Their phenotype and susceptibility to therapeutic depletion
Supervisor(s): S. Kerfoot

Poster Number: 121
Name: Indra Bishnoi
Degree: MSc Candidate
Abstract Title: Lipopolysaccharide elicited behavioural effects in adolescent and adult male and female rats
Supervisor(s): M. Kavaliers, K-P. Ossenkopp

Poster Number: 122
Name: Matthew Demmings
Degree: PhD Candidate
Abstract Title: ATF4 regulates neuronal death in cellular models of Parkinson's disease
Supervisor(s): S. Cregan

Poster Number: 123
Name: Niveen Fulcher
Degree: PhD Candidate
Abstract Title: A chemogenetic approach to understanding prepulse inhibition
Supervisor(s): S. Schmid

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 124
Name: Maryam Ghahremani
Degree: PhD Candidate
Abstract Title: Characterizing the role of the marmoset posterior parietal cortex in saccade generation
Supervisor(s): S. Everling

Poster Number: 125
Name: Zachary Hawley
Degree: PhD Candidate
Abstract Title: Negative feedback loop disrupted between RNA-binding proteins and microRNAs within amyotrophic lateral sclerosis (ALS)
Supervisor(s): M. Strong

Poster Number: 126
Name: Aoi Ichiyama
Degree: MSc Candidate
Abstract Title: Optogenetically defined in vivo recordings of corticotropin releasing hormone expressing neurons
Supervisor(s): W. Inoue, B. Allman

Poster Number: 127
Name: Rachel Lackie
Degree: PhD Candidate
Abstract Title: Hsp90 co-chaperone stress inducible phosphoprotein-1 is necessary for normal chaperone expression and neuronal resilience during aging
Supervisor(s): M. Prado, V. Prado

Poster Number: 128
Name: Borna Mahmoudian
Degree: PhD Candidate
Abstract Title: Neural representations of gaze direction in primate basolateral amygdala
Supervisor(s): J. Martinez-Trujillo

Poster Number: 129
Name: Rajkamalpreet Mann
Degree: MSc Candidate
Abstract Title: The role of Cntnap2 in neuronal membrane properties in the auditory system
Supervisor(s): S. Schmid

Poster Number: 130
Name: Miguel Pena Ortiz
Degree: PhD Candidate
Abstract Title: Exploring the role of the ATRX chromatin remodeling protein in mouse astrocytes
Supervisor(s): N. Berube

Poster Number: 131
Name: Megan Roussy
Degree: PhD Candidate
Abstract Title: Ketamine impairs spatial working memory performance and neural encoding in the primate lateral prefrontal cortex
Supervisor(s): J. Martinez-Trujillo, L. Palaniyappan

Poster Number: 132
Name: Asieh Alikhah
Degree: PhD Candidate
Abstract Title: Dysregulation of circRNAs in amyotrophic lateral sclerosis
Supervisor(s): D. Campos-Melo, M. Strong

Poster Number: 133
Name: Farzad Asadi
Degree: PhD Candidate
Abstract Title: The neuronal protein stathmin-2 regulates glucagon secretion from α-cells
Supervisor(s): S. Dhanvantari

Poster Number: 134
Name: Christine Caron
Degree: MSc Candidate
Abstract Title: Characterizing T-cell phenotype in patients with hypersensitivity reactions to sulfonamides and beta-lactam antibiotics
Supervisor(s): M. Rieder

Poster Number: 135
Name: Srinitya Gannavarapu
Degree: MSc Candidate
Abstract Title: Hypomyelinating leukodystrophy: Do heterozygous variants in HSPD1 deserve a closer look?
Supervisor(s): T. Rupar, C. Prasad

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 136
Name: Matthew Hintermayer
Degree: MSc Candidate
Abstract Title: The role of pThr175tau and the N-terminal phosphatase activating domain in the formation of tau cytoplasmic inclusions in ALSci and CTE
Supervisor(s): M. Strong

Poster Number: 137
Name: Yiming Lin
Degree: MSc Candidate
Abstract Title: Characterization of the microvasculature in Duchenne muscular dystrophy skeletal muscle
Supervisor(s): L. Hoffman

Poster Number: 138
Name: Vy Ngo
Degree: PhD Candidate
Abstract Title: Oxidative stress-induced aggregation of Keap1 impairs Keap1-dependent Nrf2 regulation
Supervisor(s): M. Duennwald

Poster Number: 139
Name: John Palmer
Degree: MSc Candidate
Abstract Title: Phylogenetic estimates of gp120 indel rate variation among the HIV-1 group M subtypes
Supervisor(s): A. Poon

Poster Number: 140
Name: Madison Wallace
Degree: MSc Candidate
Abstract Title: The role of time-dependent PaSC activation on islet inflammation and fibrosis in T2DM
Supervisor(s): R. Wang

Poster Number: 141
Name: Rianne Beach
Degree: MSc Candidate
Abstract Title: Effect of connexins and connexin mutants on the differentiation and sensitivity of HEI-OC1 cochlear cells to ototoxic drugs
Supervisor(s): D. Laird

Poster Number: 142
Name: Justin Clark
Degree: MSc Candidate
Abstract Title: Apolipoprotein(a) secretion is modulated by sortilin, proprotein convertase subtilisin/kexin type 9, and microsomal triglyceride transfer protein
Supervisor(s): M. Koschinsky

Poster Number: 143
Name: Devika Jayawardena
Degree: PhD Candidate
Abstract Title: Inhibition of metalloproteinase activity promotes PMVEC barrier function under septic conditions
Supervisor(s): S. Gill

Poster Number: 144
Name: Mark Kim
Degree: PhD Candidate
Abstract Title: Spatiotemporal and functional characterization of TRPV4 in the murine intervertebral disc
Supervisor(s): C. Séguin

Poster Number: 145
Name: Qi-Tong Lin
Degree: MSc Candidate
Abstract Title: Structural and mechanistic elucidation of the EF-hand in LETM1 Ca2+/H+ antiporter function
Supervisor(s): P. Stathopulos

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 146
Name: Daniel Lorusso
Degree: PhD Candidate
Abstract Title: A novel microfluidic device for real-time microscopic imaging of endothelial cell responses to laminar and disturbed fluid flow
Supervisor(s): D. Holdsworth, S. Dixon

Poster Number: 147
Name: Matthew Novello
Degree: MSc Candidate
Abstract Title: S-nitrosylation stabilizes the STIM2 luminal region in a Cys-specific manner concomitant with marked structural changes
Supervisor(s): P. Stathopulos, Q. Feng

Poster Number: 148
Name: Bethia To
Degree: MSc Candidate
Abstract Title: Investigating the role of nuclear receptor proliferator-activated receptor delta (PPARδ) in aging and metabolic models of osteoarthritis
Supervisor(s): F. Beier

Poster Number: 149
Name: Matthew Veras
Degree: PhD Candidate
Abstract Title: Transcriptional profiling of the murine intervertebral disc and age-associated changes in the nucleus pulposus
Supervisor(s): C. Séguin

Poster Number: 150
Name: Stephanie Wojtowicz
Degree: MSc Candidate
Abstract Title: Characterizing how ITD-1 inhibits TGF-ß receptor signalling and trafficking
Supervisor(s): G. Di Guglielmo

Poster Number: 151
Name: Kurt Berger
Degree: Research Assistant/Associate
Abstract Title: Enhancer of zeste homologue 2 represses KRAS-mediated pancreatic ductal adenocarcinoma
Supervisor(s): C. Pin

Poster Number: 152
Name: Arundhasa Chandrabalan
Degree: Postdoctoral Scholar
Abstract Title: Detection of proteinase activated receptor stimulating enzymes in human arthritic knee joint fluids
Supervisor(s): R. Ramachandran

Poster Number: 153
Name: Mohammad Esmaeili
Degree: Postdoctoral Scholar
Abstract Title: Oxidized parkin, its misfolding, and aggregation produce cellular toxicity
Supervisor(s): M. Duennwald

Poster Number: 154
Name: Mohammed Imran Khan
Degree: Postdoctoral Scholar
Abstract Title: Functional knockout of EIF1AX decreases radio-sensitivity and increases cell proliferation in vitro model of human thyroid cancer
Supervisor(s): A. Nichols

Poster Number: 155
Name: Kate Mathers
Degree: Postdoctoral Scholar
Abstract Title: Pyrroloquinoline quinone (PQQ) supplementation during pregnancy affects fetal outcomes in spontaneous intrauterine growth-restricted (spIUGR) guinea pigs in a sex-specific manner
Supervisor(s): T. Regnault

Poster Number: 156
Name: Kate Parham
Degree: Postdoctoral Scholar
Abstract Title: Early interactions between anti-MOG pre-germinal center B and T cells are different to those in response to a foreign antigen
Supervisor(s): S. Kerfoot

Poster Presentations – Afternoon Session

Poster Number: 157
Name: Kara Ruicci
Degree: Medical Student
Abstract Title: Disruption of the RICTOR/mTORC2 complex enhances the response of head and neck squamous cell carcinoma cells to PI3K inhibition
Supervisor(s): A. Nichols

Poster Number: 158
Name: Bipradeb Singha
Degree: Postdoctoral Scholar
Abstract Title: ULK1 complex activity is required for autophagy and cell survival in epithelial ovarian cancer spheroids
Supervisor(s): T. Shepherd

Poster Number: 159
Name: Julia Sunstrum
Degree: Research Assistant/Associate
Abstract Title: Glutamatergic synapse potentiation is associated with neuroendocrine sensitization to stress
Supervisor(s): W. Inoue

POPULATION, PUBLIC HEALTH AND EDUCATION

Poster Number: 160
Name: Ethan Bazos
Degree: MSc Candidate
Abstract Title: Clinical anatomy and the unexpected career: Is there a curriculum for that?
Supervisor(s): T. Wilson

Poster Number: 161
Name: Yujie Chen
Degree: MSc Candidate
Abstract Title: Is SABR cost-effective in oligometastatic cancer?: An economic analysis of SABR-COMET
Supervisor(s): G. Zaric, A. Louie

Poster Number: 162
Name: Jordan Edwards
Degree: PhD Candidate
Abstract Title: Concordance between diagnosed and self-reported mood and anxiety disorders among migrant populations and ethnic minority groups in Ontario
Supervisor(s): K. Anderson, A. Thind

Poster Number: 163
Name: Carina Iskander
Degree: MSc Candidate
Abstract Title: Identifying geographic regions to assess laboratory-based outcomes for adults presenting to hospitals included in the Ontario Laboratories Information System
Supervisor(s): A. Garg

Poster Number: 164
Name: Yue Niu
Degree: MSc Candidate
Abstract Title: Predictive models for the Health Utility Index Mark 3 (HUI3) in Ontario
Supervisor(s): S. Sarma, G.Y. Zou

Poster Number: 165
Name: Sarah Singh
Degree: PhD Candidate
Abstract Title: Investigating the cardiovascular health profile of the Canadian population
Supervisor(s): S. Frisbee

Poster Number: 166
Name: Brianne Bruijns
Degree: PhD Candidate
Abstract Title: Exploring the relationship between early childhood education students' physical activity training and self-efficacy to facilitate active opportunities in childcare
Supervisor(s): P. Tucker

Poster Number: 167
Name: Rochelle Furtado
Degree: MSc Candidate
Abstract Title: The use of cognitive interviewing to evaluate the Short-WORC in rotator cuff pathology
Supervisor(s): J. MacDermid

Poster Number: 168
Name: Navjot Gill
Degree: MSc Candidate
Abstract Title: Does improved physical function following a NuStep® seated all extremity exercise intervention reduce the fear of falling and improve quality of life in older adults living in community care homes?
Supervisor(s): D. Connelly

Poster Number: 169
Name: Emma Pearson
Degree: MSc Candidate
Abstract Title: Completing team-based goals using a smartphone application to increase physical activity
Supervisor(s): M. Mitchell, H. Prapavessis

Poster Number: 170
Name: Sydney Smith
Degree: MSc Candidate
Abstract Title: Investigating the diving reflex in professional divers
Supervisor(s): K. Shoemaker

Poster Number: 171
Name: Stephanie Truelove
Degree: PhD Candidate
Abstract Title: Physical activity and sedentary time during childcare outdoor play sessions: A systematic review and meta-analysis
Supervisor(s): P. Tucker

Poster Number: 172
Name: Chloe Stewart
Degree: PhD Candidate
Abstract Title: The psychophysiology of guilt
Supervisor(s): E. Finger

Poster Number: 173
Name: Connor Chato
Degree: MSc Candidate
Abstract Title: A statistical method for optimizing HIV outbreak prediction methods: Observing measures of fit and variation for tn93-based, component clustering
Supervisor(s): A. Poon

Poster Number: 174
Name: Moheem Halari
Degree: MSc Candidate
Abstract Title: A postmortem study of injury patterns in pedestrian and cyclist fatalities as a predictor of motor vehicle collision dynamics and pedestrian kinematics
Supervisor(s): M. Shkrum

Poster Number: 175
Name: Jessica Mammoliti
Degree: Medical Student
Abstract Title: Trampoline park safety perceptions of caregivers of patients presenting to the paediatric emergency department in London, Ontario
Supervisor(s): T. Lynch, N. Poonai

Poster Number: 176
WITHDRAWN

PREVENTION OF DISEASES AND HEALTH CONDITIONS AND PROMOTION OF WELL-BEING

Poster Number: 177
Name: Sara Holland
Degree: MSc Candidate
Abstract Title: The comparison of golf grips to hand forces in individuals with and without hand arthritis
Supervisor(s): E. Lalone, L. Ferreira

Poster Number: 178
Name: Michaela Fernandes
Degree: MSc Candidate
Abstract Title: Prevention of acute kidney injury in adult patients undergoing abdominal aortic aneurysm repair: A systematic review and meta-analysis
Supervisor(s): L. Dubois, A. Garg

LONDON HEALTH RESEARCH DAY 2019
DRIVING INNOVATION THROUGH COLLABORATION

Poster Presentations – Afternoon Session

Poster Number: 179
Name: Romaisa Pervez
Degree: MSc Candidate
Abstract Title: Social connectedness and mental well-being in transitional aged youth: A comparison between Canada and London-Middlesex region.
Supervisor(s): A. MacDougall, S. Stranges

Poster Number: 180
Name: Morgan Jennings
Degree: PhD Candidate
Abstract Title: Validity and reliability of the Clinician Rated Drop Vertical Jump Scale for patients following anterior cruciate ligament (ACL) reconstruction
Supervisor(s): D. Bryant

Poster Number: 181
Name: Ashley Lowndes
Degree: MSc Candidate
Abstract Title: Primary care practitioner referral process to community exercise programs for older adult patients with hip/knee OA, pre-/post TJA, or repaired hip fracture in South-West Ontario
Supervisor(s): D. Connelly

Poster Number: 182
Name: Diksha Shukla
Degree: MSc Candidate
Abstract Title: The effect of exercise on unidirectional switch-cost when alternating between pro- and anti-saccades
Supervisor(s): M. Heath

Poster Number: 183
Name: Santiago Cobos
Degree: PhD Candidate
Abstract Title: 3D printed large-area grid for scatter reduction in cone-beam CT
Supervisor(s): D. Holdsworth

Poster Number: 184
Name: Scarlett Puebla-Barragan
Degree: PhD Candidate
Abstract Title: Probiotics for the management of urogenital malodour in women
Supervisor(s): G. Reid

Poster Number: 185
Name: Ariel Frame
Degree: PhD Candidate
Abstract Title: What does it cost to form long-term memories?
Supervisor(s): R. Cumming

Poster Number: 186
Name: Becky Horst
Degree: PhD Candidate
Abstract Title: I think therefore I can: Exploring the association between memory self-efficacy and performance on memory tasks in older adult women with mild cognitive impairment
Supervisor(s): L. Nagamatsu

Poster Number: 187
Name: Alex Peidl
Degree: PhD Candidate
Abstract Title: Therapeutic peptides based on CCN3 treat systemic sclerosis in a mouse model of the disease
Supervisor(s): A. Leask

Poster Number: 188
Name: Vishal Patel
Degree: Research Assistant/Associate
Abstract Title: In vitro testing of a 3D printed novel implant abutment
Supervisor(s): L. Kalman

Poster Number: 189
Name: Frederico Pieruccini-Faria
Degree: Postdoctoral Scholar
Abstract Title: Gait performance and incident falls in mild cognitive impairment: Results from The Gait and Brain Study
Supervisor(s): M. Montero-Odasso

SALON B - 3:30 p.m.

Mariyan Jeyarajah
MSc Candidate

Research Areas:
Molecular Cellular
Early life programming and development

Supervisor(s):
S. Renaud

Elucidating the role of OVOL2 in placental development

Introduction
The placenta is a transient organ formed during pregnancy that is essential for growth and development of the baby. Placental maldevelopment is a leading cause of sickness and death of mothers and babies and thus, understanding placental development is clinically important. The placenta is comprised of various trophoblast sublineages derived from trophoblast stem (TS) cells. Improper TS cell differentiation impairs development of these lineages and consequently the placenta. Mice deficient in the transcription factor OVO-like 2 (OVOL2), fail to produce a functioning placenta, and die at embryonic day (E)10.5, suggesting that OVOL2 has a critical function in trophoblast development.

Hypothesis
In this study, we test the hypothesis that OVOL2 is a critical regulator of TS cell development. Our objectives include: (i) characterizing the expression and localization of OVOL2 in the mouse placenta, (ii) characterizing OVOL2 expression in mouse TS cells, and (iii) generating an OVOL2 knockout in mouse TS cells to determine the role of OVOL2 in TS cell development.

Materials and Methods
Placentas and embryos were collected from pregnant female C57BL/6 and CD1 mice on E9.5, 12.5, 15.5, and 18.5. RT-PCR, western blot, and in situ hybridization were used to determine expression and localization of OVOL2 in various mouse tissues and organs throughout development. Immunohistochemistry for Cytokeratin, E-cadherin, and TPBPA were used to demarcate the various lineages of the placenta. Quantitative RT-PCR and western blot analysis were used to evaluate OVOL2 expression in TS cells in vitro.

Results
OVOL2 was highly expressed in placenta and was lowly expressed in embryos and decidua at E9.5, 12.5, 15.5, and 18.5. In placentas, OVOL2 transcript was expressed in labyrinth zone and trophoblast giant cells, but absent in junctional zone and decidua. Placentas null for OVOL2 at E9.5 exhibited impaired development and differentiation as denoted by Cytokeratin and TPBPA staining. OVOL2 null placentas also exhibited significantly decreased placental depth and area, when compared to wild-type counterparts (65% and 63% decreases, respectively; $P<0.05$). Differentiated TS cells exhibited approximately 90-fold reduced expression of stem-state associated genes Cdx2, Eomes, Esrrb, and Id2 ($P<0.05$) and increased expression of differentiation markers Prl3d1, Prl3b1, Gcm1, and Tpbpa (upregulated by 34, 5824, 4.8, and 4370-fold, respectively; $P<0.05$). Furthermore, differentiated TS cells also showed a 40-fold upregulation of OVOL2, when compared to TS cells in stem-state ($P<0.05$). We have successfully isolated OVOL2-null TS cells from blastocysts obtained following breeding of OVOL2 heterozygote mice. These will be used to investigate the role of OVOL2 in TS cell differentiation.

Discussion and Conclusions
OVOL2 is highly expressed in mouse placenta and in differentiating TS cells. Our ongoing work will delineate the importance of OVOL2 for TS cell differentiation and placental development. This research will reveal fundamental mechanisms by which OVOL2 regulates trophoblast differentiation and will lead to new insights into complexities of placental development.

SALON B - 3:45 p.m.

Karen Dunkerley
PhD Candidate

Research Areas:
Molecular Cellular
Mechanisms of disease

Supervisor(s):
G. Shaw

The E3 ligase parkin requires a ligated pUb to efficiently polyubiquitinate a substrate

Introduction
Neurodegeneration in Parkinson's disease (PD) has been linked to impaired mitochondrial homeostasis and a failure of mitophagy, i.e. autophagy mediated removal of mitochondria. Failure to remove damaged mitochondria exposes cells to damaging mitochondrial byproducts such as reactive oxygen species. Parkin, an E3 ubiquitin (Ub) ligase, is recruited to mitochondria during oxidative stress, where it becomes activated and it ubiquitinates mitochondrial proteins to signal degradation of damaged mitochondria.

Inactive parkin is largely cytoplasmic and it is not until mitochondrial depolarization that parkin becomes localized to the outer mitochondrial membrane (OMM). The current mechanism of parkin activation involves binding of a phosphorylated ubiquitin (pUb), followed by phosphorylation of parkin itself, both phospho-modifications performed by the OMM-integrated kinase, PINK1. Missing in this mechanism is what drives parkin relocation to a damaged mitochondrion, especially since cytoplasmic PINK1 and pUb are undetectable and therefore parkin activation must happen at the OMM.

Hypothesis
A ligated pUb molecule is responsible for recruiting parkin. A parkin substrate, e.g. Miro1, that is already mono-ubiquitinated will be more efficiently poly-ubiquitinated by parkin.

Materials and Methods
Recombinant proteins isolated from Escherichia coli were purified for this study. Expressed proteins included full-length parkin, ubiquitin and PINK1. One domain of the mitochondrial protein Miro1, its C-terminal GTPase2 domain (mG2), was also purified for use in this work. An additional construct of mG2-Ub was created to mimic a mono-ubiquitinated species. Fully phosphorylated pUb, parkin (pParkin) and mG2-pUb were created by mixing each with purified PINK1.

Parkin activity was observed by in vitro assays using fluorescently labelled component proteins and SDS-PAGE to separate the proteins. Other biophysical techniques including isothermal titration calorimetry, nuclear magnetic resonance and analytical ultracentrifugation were used to quantify interactions between parkin and other ubiquitination components.

Results
Parkin more efficiently ubiquitinated mG2-pUb than mG2-Ub, even without parkin being directly phosphorylated. pParkin was capable of ubiquitinating mG2-pUb but high levels of parkin autoubiquitination were also observed. In the absence of a pseudo-ligated ubiquitin, only pParkin could ubiquitinate mG2, even in the presence of free pUb. Additionally, parkin activity is altered by the presence of different E2 conjugating enzymes. The binding affinity between parkin and mG2 is weak, whereas parkin and mG2-pUb has a similar affinity to that of free pUb. Introducing known PD mutations found within parkin also significantly change parkin's expected activity and interactions.

Discussion and Conclusions
With low binding affinity for a known substrate, parkin recruitment to damaged mitochondria is more likely driven by newly phosphorylated Ub molecules, previously ligated by another E3 ligase. Using pUb as the recruitment module would also eliminate the need for any direct substrate recognition by parkin and partially explain the wide range of substrates detected in previous proteomic studies. Since mutations to PINK1 are also associated with familial PD, any deficiency in ubiquitin phosphorylation or parkin binding to pUb would therefore lead to poor mitochondrial clearance and increased neuronal damage.

SALON B - 4:00 p.m.

Madeleine Van de Kleut
PhD Candidate

Research Areas:
Transplantation, Biomedical Devices and Surgery
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
M. Teeter, J. Johnson

In vivo contact kinematics following reverse total shoulder arthroplasty: An RCT comparing glenosphere fixation technique

Introduction
Reverse total shoulder arthroplasty (rTSA) is a growing surgical procedure performed to restore function and alleviate pain associated with shoulder arthritis and rotator cuff deficiency. The design inverts conventional shoulder “ball-and-socket” anatomy by fixing a cobalt-chrome hemisphere, termed glenosphere, to the glenoid, and inserting a concave polyethylene (PE) bearing surface in place of the humeral head. Previous finite element and cadaver studies have shown an excessive superior shear force is applied at the glenosphere baseplate/bone interface in this configuration, and due to the semi-constrained nature and shallow cup depth of the artificial joint, loads are typically transferred to the glenosphere with an eccentric bias. These factors help explain why glenosphere baseplate loosening is the most frequent complication in rTSA, at approximately 10%, and merit in vivo investigation. This study, for the first time, investigates the contact kinematics of rTSA in vivo. The study objective is to compare prospectively randomized bone graft and porous metal glenosphere fixation groups to identify any differences in their contact kinematics.

Hypothesis
It is hypothesized there will be no difference in glenosphere-PE contact between fixation groups.

Materials and Methods
Forty patients were randomized to an rTSA with either autologous bone graft or porous metal glenosphere fixation. Three months postoperatively patients were imaged using stereo x-rays in five arm positions at the extents of their range of motion. In proprietary software, the 3D surface model of each implant component was aligned to its respective contour in the x-rays, identifying the relative position of each component in a global coordinate system. The PE surface model was divided into superior, inferior, anterior, and posterior quadrants, the proportion of each quadrant in contact with the glenosphere surface model at each arm position measured in a separate custom software. Differences in contact area between quadrants were measured using the Kruskal-Wallis test with Dunn’s test for multiple comparisons, and differences in contact area between the same quadrant of different fixation groups was measured using the Mann-Whitney test ($p<0.05$).

Results
Results from the first 19 patients are presented. Mean proportion of contact area for the population sample was 42, 69, 45, and 70%, for the superior, inferior, anterior, and posterior quadrants respectively. Significant differences were observed between the superior and posterior quadrants ($p=0.013$), and anterior and posterior quadrants ($p=0.013$). No differences in contact were observed between lateralization groups.

Discussion and Conclusions
Initial results reflect simulation and in vitro studies predicting a prominent superior shear force in the rTSA joint. This is shown by the least contact observed on the superior aspect of the polyethylene, and the greatest contact in inferior and posterior quadrants. The asymmetry in PE surface contact, identified by significant differences in quadrant coverage is also indicative of an eccentric loading pattern on the glenosphere, which over time may compromise implant-bone fixation. Bone graft and porous metal baseplate fixations show no difference in contact, suggesting no difference in forces transmitted between the groups. This is the first time joint contact kinematics have been measured in vivo for rTSA, the results of which may influence implant design.

SALON B - 4:15 p.m.

Klajdi Puka
PhD Candidate

Research Areas:
Mental Health and Wellness
Determinants of health

Supervisor(s):
K. Speechley

Long-term quality of life trajectories among individuals diagnosed with epilepsy in childhood

Introduction
Pediatric epilepsy extends far beyond seizures; up to 70% of children attain seizure control in the long-term, and up to 80% may have cognitive or psychosocial problems that may persist despite seizure control. Understandably, quality of life (QOL) is recognized as a key outcome considered in treating epilepsy and is critical in understanding the impact of epilepsy and its treatment. Long-term QOL of children with epilepsy (CWE) has been evaluated by only two studies; however these have utilized small samples and cross-sectional designs without a baseline assessment. There is a need for studies to prospectively evaluate CWE over the long-term and identify QOL trajectories. The evaluation of baseline characteristics is also essential in identifying children who will be at risk for poor QOL in the future.

Hypothesis
This study aimed to (1) identify quality of life trajectories of children with epilepsy over the long-term, and (2) examine baseline factors associated with each trajectory. We hypothesized that: (1) there will be distinct QOL trajectories, with some CWE showing improvements and others showing stable (i.e. unchanging) trajectories over the long-term; and (2) family factors (specifically, family, functioning, resources, and stressors) will better predict long-term outcomes relative to epilepsy-related factors, such as seizure severity, age of onset, and type of seizures.

Materials and Methods
Data came from the Health-Related Quality of Life in Children with Epilepsy Study (HERQULES), a prospective cohort study of children (aged 4-12 years) with newly-diagnosed epilepsy. Pediatric neurologists across Canada recruited CWE and reported on clinical factors and comorbidities. Parents reported on children's QOL using the QOLCE-55 at diagnosis, and 0.5, 1, 2, 8, and 10 years later. QOL scores range from 0 to 100, with higher scores indicative of better QOL. Latent class growth models were used to identify trajectories of CWE's QOL over the first 10 years after diagnosis. Multinomial logistic regression was used to identify child, parent, and family factors associated with each trajectory.

Results
A total of 367 families were included. At the 10-year follow-up, 66% of youth had been seizure-free for the past five years. Four unique trajectories of QOL were identified: 11% were characterized as 'Low-Stable' (QOL scores of 49 at diagnosis and each follow-up visit); 18% 'Intermediate-Stable' (QOL scores of 63 at diagnosis and each follow-up visit); 35% 'Intermediate-Increasing-Plateau' (QOL scores of 72 at baseline, 80 at 2-year follow-up, and 78 at 10-year follow-up); and 36% 'High-Increasing-Plateau' (QOL scores of 83 at baseline, 87 at 2-year follow-up, and 89 at 10-year follow-up). The most consistent factors, at the time of diagnosis, associated with better QOL trajectories were absence of child comorbidities (p=.001) and fewer family stressors/demands (p=.02).

Discussion and Conclusions
Children with epilepsy are not a homogeneous group and showed distinct trajectories of QOL over the long-term. Up to 30% of CWE have a relatively low QOL at the time of diagnosis and over the long-term. Interventions that address epilepsy-related comorbidities and support families to reduce stress early may help individuals diagnosed with epilepsy in childhood achieve more favourable QOL into young adulthood.

SALON B - 4:30 p.m.

Fiona Li
PhD Candidate

Research Areas:
Medical Biophysics, Engineering and Imaging
Detection, screening and diagnosis of health and disease

Supervisor(s):
T-Y. Lee, J. Koropatnick

Pharmacokinetics of 18F-FAZA: PET hypoxia imaging of pancreatic cancer patients

Introduction
Pancreatic cancer is a fatal cancer with low survival rates due to prevalent hypoxia, which contributes significantly to its resistance to chemo- and radiotherapy. Hypoxia can be imaged non-invasively using the nitroimidazole analog, 18F labeled FAZA, which is thought to bind irreversibly to macromolecules and proteins following reduction of the nitro group under conditions of reduced oxygen level. The aim of this study is to investigate if PET imaging with 18F-FAZA can detect hypoxia in pancreatic cancer.

Hypothesis
Pancreatic tumour can be differentiated from normal tissue by 18F-FAZA uptake due to tumour hypoxia. Pharmaco-kinetic analysis is more sensitive than either standardized uptake value (SUV) or graphical analysis in detecting hypoxic tumour.

Materials and Methods
Twenty patients with pancreatic ductal adenocarcinoma underwent 18F-FAZA imaging at University Health Network in Toronto. Post-injection of 18-F-FAZA, dynamic scans of the pancreas were done over 55 min. Tumour and normal tissues were contoured manually by radiologists. Due to pancreatic atrophy, normal tissue could not be contoured in 5 patients. The dynamic tissue time activity curves (TAC) were analysed using two model independent graphical analyses – Patlak and Logan plot for reversibility of tracer binding and using the standard two tissue compartment models (S2TCM) as well as our developed kinetics model, the flow modified two-tissue compartment model (F2TCM). While the S2TCM treats blood vessels as a compartment, the F2TCM incorporate the effect of transit time through blood vessels, which could affect the estimation of model parameters. Using multivariate logistic regression with backward elimination, the optimal parameter set for distinguishing normal from hypoxic tumour was determined.

Results
Graphical analysis showed that the tracer was reversibly bound and the distribution volume (DV) determined by Logan plot correlated with DV determined by S2TCM and F2TCM with R2 = 0.73 and 0.88 respectively. F2TCM fitted TACs from both normal and cancerous pancreatic tissue better than S2TCM according to the Akaike Information Criteria. Logistic regression determined that two F2TCM parameters - DV and dissociation rate constant (k4) - could classify normal from hypoxic cancerous tissue with sensitivity and specificity of 57% and 95% respectively. In contrast, sensitivity and specificity were lower - 43% and 79 % for Logan's DV and 50 % and 84% for SUV at 40-55 min post injection respectively.

Discussion and Conclusions
Results from this preliminary 18F-FAZA study showed that pharmacokinetic analysis can efficiently detect hypoxic pancreatic cancer (post-test probability > 0.90 for pre-test probability > 0.50). Contrary to the accepted notion that 18F-FAZA is irreversibly bound to macromolecules in hypoxic tumour, both graphical and kinetic analysis revealed otherwise. The proposed mechanism is that the reduced metabolite, amino-FAZA, is conjugated to glutathione (GS, amino-FAZA-GS) which is usually trapped in cells due to its hydrophilicity; however, in the presence of elevated multidrug resistance protein (MRP-1) in pancreatic tumour, amino-FAZA-GS can be 'pumped' out of the cells leading to radioactivity washout or reversible binding. Besides distinguishing normal pancreatic tissue from hypoxic tumour, kinetic modeling allows evaluation of k4 which can be associated with MRP-1 activity, while the binding rate constant (k3) can be associated with nitroreductase and GS activity.

SALON B1 - 3:30 p.m.

Wenchao Han
PhD Candidate

Research Areas:
Medical Biophysics, Engineering and Imaging
Detection, screening and diagnosis of health and disease

Supervisor(s):
A. Ward

Automatic high-grade cancer detection on digital histopathology images for prostate cancer

Introduction
Automatic high-grade cancer detection on radical prostatectomy (RP) specimens can benefit pathological assessment for prognosis and post-surgery treatment decision making. There is an unmet need for a system that can automatically detect high-grade tumours on whole-slide images (WSIs) of RP sections and validated on a large data set, so as to be integrated into the clinical pathology workflow.

Hypothesis
Machine learning based methods can differentiate cancerous from non-cancerous and high-grade from low-grade cancerous tissues for automatically finding high-grade tumours on WSIs of RP sections.

Materials and Methods
299 mid-gland WSIs were obtained from 71 radical prostatectomy patients. The surgically removed prostates were sectioned at 4μm, stained with hematoxylin and eosin (H&E) and scanned at 20X (0.5μm/pixel). Computations were conducted independently on 480μm×480μm regions-of-interest (ROIs) covering each WSI completely. 14 WSIs from 3 patients were used for system tuning and a separate 68 patient data set comprising 1,248,503 480μm×480μm sub-images across 286 WSIs was used for validation. Computation proceeded as follows:

(1) Finding cancerous regions by classifying cancerous vs. non-cancerous ROIs throughout each RP section.
(2) Classifying cancerous regions as high vs. low grade. Three grading experiments were conducted: (a) Using all Gleason grade 4 (G4) as high-grade samples; (b) All Gleason grade 5 (G5) as high-grade samples; and (c) Using any G4/G5-involved samples as high-grade vs. low-grade (G3) using 4 different classifiers: Fisher classifier, logistic classifier, support vector machine classifier, and transfer learning using AlexNet.
(3) Combining the results from steps (1) and (2), where a tumour has to be correctly detected and graded as high vs. low-grade to be considered as true positive and true negative respectively.
(4) Validating the system against expert-drawn contours via leave-one-patient-out cross-validation. All relevant ROIs were used throughout all WSIs, and error metrics were calculated on a per-tumour basis, with correct detection of high-grade cancer meaning that at least one ROI in the tumour has been correctly classified as high grade.

Results
Transfer learning using AlexNet yielded the best performance, with an AUC of 0.98 for detection and an AUC of 0.92 for high-grade vs. low-grade cancer classification. For high-grade tumour detection, the system had an error rate of 23.4%, a false negative rate of 34.8%, and a false positive rate of 18.2%. More than 50% of the false negatives were G3+4 tumours with size less than or equal to 0.23 mm^2, which is negligible compared to Epstein's 0.2 cm^3 volume threshold for clinical significance (corresponding to an area of 34 cm^2).

Discussion and Conclusions
In general, the proposed machine learning based method can classify cancer vs. non-cancer and high- vs. low-grade cancer tissue. By combing the results, the system can automatically detect high-grade tumours in WSIs of RP sections.

SALON B1 - 3:45 p.m.

Melissa Majoni
MSc Candidate

Research Areas:
Population Health and Education
Prevention of diseases and health conditions and promotion of well-being

Supervisor(s):
N. Suskin, S. Stranges

Relationship between exercise adherence and functional capacity among transient ischemic attack and mild non-disabling stroke survivors in cardiac rehabilitation

Introduction
Transient ischaemic attack (TIA) is characterized by temporary neurological dysfunction and carries a short-term risk of stroke, hospitalization for cardiovascular disease events, and death. Cardiac rehabilitation (CR) programming involving behavior change and exercise reduces morbidity and mortality among heart patients, but is typically not offered after TIA, despite similarities in risk factors between coronary artery disease and stroke. Current stroke secondary prevention strategies are suboptimal. It has been demonstrated that it is feasible and safe for TIA patients to partake in CR and research suggests that programs like CR may be a more effective means of reducing cardiovascular risk and improving quality of life than standard care. The primary objective for this study was to quantify the relationship between exercise adherence and functional capacity (METs) at CR exit among exercise-trained TIA and mild non-disabling stroke (MNDS) patients. The secondary objective was to determine whether CR resulted in significant intake to exit improvements in key CR outcomes.

Hypothesis
The primary hypothesis was that there is likely a dose-response relationship that exists between exercise attendance among exercise-trained individuals enrolled in CR and functional capacity. The secondary hypotheses were that exercise-trained participants would have significant intake to exit improvements in measurements of functional capacity, lipid profile, blood glucose, blood pressure, body measurements and psychometric domains.

Materials and Methods
Of 271 study-eligible TIA/MNDS patients from London and Ottawa 6-month CR programs, 115 exercise-trained individuals were used for this study. The number of attended exercise sessions, intake and exit measurements of METs, blood pressure, lipid profile, fasting blood glucose, body measurements, quality of life mental and physical health status, anxiety, depression, and general cognitive functioning were measured. A linear regression model was used to analyze the primary objective and paired t-tests were used to compare intake and exit measures.

Results
The regression model predicting exit METs while controlling for intake METs, age, and sedentary lifestyle showed a predicted increase of 0.6 METs for every 10 exercise classes attended (b = 0.6, CI 0.3, 0.9, p <0.001). There were significant intake-to-exit improvements in [mean (SD)]: METs [intake 6.5 (2.7) exit 8.3 (3.0), p < 0.001]; total cholesterol [intake 4.3 (1.2) mmol/L, exit 4.0 (1.1) mmol/L, p=0.006)]; triglycerides [intake 1.6 (1.3) mmol/L, exit 1.3 (0.7) mmol/L, p=0.004]; diastolic blood pressure [intake 79.3 (8.8) mmHg, exit 76.5 (8.1) mmHg, p = 0.004]; waist circumference [intake 101.3 (12.6) cm, exit 96.9 (11.8) cm, p <0.001]; and weight [intake 83.9 (14.3) kg, exit 82.2 (14.4) kg, p <0.001]. Additional results will report intake to exit changes for psychometric variables.

Discussion and Conclusions
Exercise-trained TIA/MNDS patients had significant improvements in key cardiovascular risk factors. The results demonstrated a dose-response-like relationship between exercise attendance and functional capacity which reached a clinically significant change > 0.5 METs (Canadian Cardiovascular Society quality indicator).

SALON B1 - 4:00 p.m.

Jessica Rodgers
PhD Candidate

Research Areas:
Medical Biophysics, Engineering and Imaging
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
A. Fenster

Enabling intraoperative implant assessment during high-dose-rate interstitial gynecologic brachytherapy using 3D ultrasound

Introduction
Treatment for gynecologic malignancies may include brachytherapy, which allows the radiation dose delivered to the tumour to be escalated relative to surrounding healthy tissues. High-dose-rate interstitial brachytherapy (ISBT) allows a temporary implant to be created with multiple hollow needles inserted and a radioactive source placed at planned positions in the needles to deliver the treatment. Despite requiring precise placement of needles to achieve an ideal implant and avoid overexposing nearby organs-at-risk (OAR), there is currently no standard approach to visualize needles intraoperatively, which can be challenging as gynecologic cancers have widely varying presentations with diverse disease sites. We have developed a three-dimensional (3D) ultrasound (US) system, including an automatic needle segmentation algorithm and three scanning modes to account for the variability in tumour sites, and propose its use for visualizing needles and OAR during gynecologic ISBT.

Hypothesis
We hypothesize that implementation of a 3D US system during gynecologic ISBT will enable needles and OAR to be visualized with needles localized within 5 mm and 3° of the current standard, allowing the implant quality to be immediately assessed. We also hypothesize the segmentation algorithm will provide needle localization with mean distance errors <3 mm and mean angular errors <3° in <15 s.

Materials and Methods
We developed a 3D US system with transvaginal endfire scanning to visualize the cervix and two 3D sidefire acquisition modes to acquire a 3D transrectal ultrasound (TRUS) image for more posterior needle insertions or a 360° 3D ring-shaped transvaginal ultrasound (TVUS) image to visualize needle trajectories. 3D US images are generated by rotating a two-dimensional (2D) US probe that can be quickly switched for different modes. The endfire acquisition has been tested in a pelvic phantom with six needles and the sidefire techniques have been investigated in patient studies including 58 and 54 needles for TRUS and TVUS modes, respectively, with needle positions compared to clinical post-insertion x-ray computed tomography (CT) images.

An automatic needle segmentation algorithm was implemented to simultaneously localize all needles in an image, leveraging the randomized 3D Hough transform, and was tested on one patient 360° TVUS image containing eight needles as a proof-of-concept.

Results
In the endfire image, needles were localized with mean distance and angular errors (± standard deviation) of 1.91±0.24 mm and 1.51±0.81°, respectively. In TRUS, needles were localized with a mean distance difference of 3.82±1.86 mm and a mean angular difference of 3.04±1.63°. The 360° TVUS approach enabled the bladder, rectum, urethra, and vaginal wall to be visualized with needle trajectories clearly identifiable; the mean distance difference relative to CT was 2.36±0.97 mm and mean angular difference of 1.95±0.70°. Using the segmentation algorithm, all eight needles were identified in <12 s with mean distance and angular errors relative to manual segmentations of 0.78±0.17 mm and 0.44±0.19°, respectively.

Discussion and Conclusions
We have developed a 3D US system that provides an accessible and versatile method for intraoperative implant

assessment during gynecologic ISBT, enabling needles and OAR to be visualized and with the potential for an automatic needle segmentation algorithm to be used for improved clinical utility.

SALON B1 - 4:15 p.m.

Matthew Berg
PhD Candidate

Research Areas:
Molecular Cellular
Mechanisms of disease

Supervisor(s):
C. Brandl

Expanded human tRNA variation revealed from capture array sequencing

Introduction
Transfer RNAs (tRNA) play a fundamental role in cell biology by decoding genetic information stored in nucleic acid into functional proteins. A minimal set of 32 tRNA species is required to decode the 61 sense codons, yet the human genome contains >600 tRNA genes. In a process called mistranslation, mutations in tRNAs can result in mis-reading of the genetic code and have profound phenotypic consequences. For example, a mutation in a single tRNA gene causes a synthetic neurodegenerative phenotype in mice which also lack the ribosome-recycling gene GTPB2. Despite the importance of tRNAs, the extent of tRNA variation in human populations and the phenotypic consequences of this variation have been understudied. This is due to extensive base modifications of tRNAs that prevent direct sequencing, the absence of tRNA encoding sequences in exome capture, and the lack of sequence depth in many whole-genome studies. The current estimate of tRNA sequence variation from the 1000 Genomes Project is 1-2 per individual.

Hypothesis
tRNA genes represent an untapped source of genetic diversity that has been understudied. We hypothesize that tRNA variants through their ability to destabilize the proteome, are modulators of disease, increasing the severity or decreasing the age of onset of diseases characterized by a loss of protein homeostasis, such as many neurodegenerative diseases and cardiomyopathies. The goal of this study was to develop tools to identify and characterize tRNA variants at a genome wide level.

Materials and Methods
We designed a custom capture panel for 608 human tRNA genes and performed targeted deep sequencing of these regions for 96 individuals. We developed a bioinformatic pipeline to distinguish between homologous tRNA genes and examine complete tRNA alleles. Variants were mapped onto the canonical cloverleaf tRNA structure and functional consequence of variation was predicted.

Results
We identified ~600 tRNAs from 96 individuals and mapped reads uniquely to 543 loci. In total, 572 unique tRNA variants were identified from 96 individuals. Each individual had ~10 tRNA variants that occurred at a frequency less than 5% in our population. In addition, 19 unique tRNA loci contained more than 2 variant tRNA sequences, potentially indicating copy number variation. Eighty-five percent of the tRNAs contained 1 mutation, while the maximum number of mutations per allele was 4. Variants clustered in the acceptor stem, which is recognized by aminoacyl-tRNA synthetases for amino acid charging, and in the T-arm, which facilitates ribosome interaction. Of note 15 variants had mutations in the anticodon. Of these mutations, 11 altered the tRNA decoding identity suggesting these tRNAs could be mistranslating.

Discussion and Conclusions
Gain and loss of function mutations in tRNAs have the potential to alter proteome fidelity through misreading of the code and altering the balance in tRNA pools. The fact that silent mutations impact protein expression attests to the importance of the balance in tRNA pools on gene regulation, affecting gene expression through protein expression, stability and even mRNA levels. We have shown that tRNA variation is more prevalent in humans than previously estimated and have identified variants that have the potential to directly alter the decoding of genetic information. Through their ability to alter the proteome, we predict that this tRNA variation contributes to human disease.

SALON B1 - 4:30 p.m.

Julia Abitbol
PhD Candidate

Research Areas:
Molecular Cellular
Mechanisms of disease

Supervisor(s):
D. Laird

The role of gap junctional intercellular communication in cisplatin-induced ototoxicity as revealed in organotypic cochlear cultures

Introduction
Connexins (Cxs) are the protein subunits of gap junctions which facilitate the transfer of small metabolites and ions <1 kDa in size between adjacent cells, a process known as gap junctional intercellular communication (GJIC). The organ of Corti houses the largest gap junction plaques of the body which are arranged in networks of the cochlea, including cells underlying the mechanosensory hair cells. It has been well known that gap junctions are essential in hearing as ~50% of non-syndromic congenital hearing loss occurs due to mutations in GJB2, the gene that encodes Cx26. Cisplatin is a chemotherapeutic drug that is extremely effective in treating solid tumours; however, one of the most common side effects that occurs in ~75%-100% of patients undergoing treatment is severe and permanent hearing loss. Many in vitro studies have examined the role of Cxs in propagation of 'death signals' after cisplatin, a process known as the 'bystander effect'. Due to the importance of Cxs in hearing and their potential for propagating detrimental signals after cisplatin treatment, this study aims to evaluate the impacts of GJIC in cisplatin-induced ototoxicity.

Hypothesis
We hypothesize that GJIC exacerbates cisplatin-induced apoptosis in the inner ear and that blocking GJIC during cisplatin treatment will reduce cell death.

Materials and Methods
In this study mouse organotypic cochlear cultures from postnatal day 0-3 were dissected, where the epithelium of the cochlea containing the mechanosensory hair cells and cochlear supporting cells was cultured. Cultures were either treated with regular media or with media containing 20mM cisplatin for 48 hours. Immunofluorescence was used to stain for hair cell specific markers, as well as apoptotic markers. High resolution confocal microscopy was used to visualize the distribution and expression patterns of Cx26 and Cx30 in cochlear supporting cells. Pearson's correlation coefficient was used to quantify the degree of co-localization between Cx26 and Cx30 after cisplatin treatment.

Results
Cx26 and Cx30 gap junction plaques were abundantly expressed in cochlear supporting cells of organotypic cochlear cultures with the highest levels being observed in the apical (low frequency) region and the lowest levels being found within the basal (high frequency) region. Cisplatin treatment caused a significant ~65% decrease in hair cells compared to untreated cultures as assessed by hair cell specific markers. Treatment of organotypic cultures with cisplatin also induced a significant upregulation of cleaved caspase 3, a marker of apoptosis. In the inner sulcus supporting cell region, both Cx26 and Cx30 gap junction plaques were larger in size and more numerous after cisplatin treatment. However, Pearson's correlation co-efficient suggested that there was a decrease in co-localization of Cx26 and Cx30 gap junction plaques after cisplatin treatment within the basal region.

Discussion and Conclusions
The increase in Cx26 and Cx30 gap junction plaque size after cisplatin treatment may be due to the associated increased 'death signals'. Consequently, cochlear supporting cells may upregulate Cxs and form larger plaques to buffer and clear the 'death signals' to less damaged neighbouring cells. Future studies will involve co-treating organotypic cochlear cultures with carbenoxolone, a gap junction blocker, and cisplatin to assess whether blocking gap junctions leads to reduced cisplatin-induced damage.

SALON D - 3:30 p.m.

Lauren Solomon
Postdoctoral Scholar

Research Areas:
Infection and Immunity
Mechanisms of disease

Supervisor(s):
L. Cameron

Estrogen effects on Th2 cell phenotype: Key to severe asthma in women?

Introduction
Allergic asthma is a T helper 2 (Th2) cell-associated inflammatory disease, driven by cytokines such as IL-4, IL-5, and IL-13. Th2 cells express the G-protein-coupled receptor CRTh2, a receptor for prostaglandin D2 (PGD2) that influences Th2 function and survival. Inhaled glucocorticosteroids are the primary treatment of allergic asthma and improve asthma symptoms by inhibiting Th2 cytokine production and at high levels by killing Th2 cells. Women are more likely than men to have severe asthma and to have symptoms requiring a hospital visit. We observed that severe asthmatic women have more circulating Th2 cells than men with severe asthma, despite taking similar doses of inhaled glucocorticosteroid [1].

Hypothesis
These findings lead us to hypothesize female sex hormones could influence Th2 cell response to glucocorticosteroids.

Materials and Methods
Using whole-mRNA sequencing, we examined gene expression in primary Th2 cells following exposure to glucocorticosteroids (0.1μM) in the presence or absence of an estrogen mimic, PPT (10μM). Gene expression changes were validated by quantitative qPCR. Prostaglandin D2 and IL-5 levels in culture supernatant were determined by ELISA.

Results
Gene expression in primary Th2 cells was examined following exposure to glucocorticosteroids in the presence or absence of an agonist for estrogen receptor alpha (ERα), PPT. While glucocorticosteroids repressed Th2 cytokines, regardless of addition of PPT, many glucocorticosteroid-mediated effects were suppressed or even counter-acted by PPT. These included increased expression of genes identifying a “pathogenic” Th2 subset characterized by high levels of CRTh2, hPGDS and CD161. Validation by ELISA demonstrated a significant increase in prostaglandin D2 in the culture media following treatment with a combination of glucocorticosteroid and PPT compared to glucocorticosteroid alone. Anti-apoptotic genes including BCL2 were also increased by co-treatment with the agonist and glucocorticosteroid.

Discussion and Conclusions
Functional studies are now planned to examine whether the combination of glucocorticosteroid and estrogen treatment results in a feed-forward, pro-survival loop involving PGD2-CRTh2 signalling. These findings suggest that the effects of glucocorticosteroids on Th2 cells are influenced by estrogen signalling which, in women, could represent a mechanism driving steroid insensitivity and development of severe asthma.

References
[1] Palikhe NS, Laratta C, Nahirney D, Vethanayagam D, Bhutani M, Vliagoftis H, Cameron L: Elevated levels of circulating CD4(+) CRTh2(+) T cells characterize severe asthma. *Clin Exp Allergy* 2016, 46(6):825-836.

SALON D - 3:45 p.m.

Shelby Oke
PhD Candidate

Research Areas:
Fetal, Family Development
Early life programming and development

Supervisor(s):
D. Hardy

Postnatal catch-up growth in low protein IUGR offspring leads to elevated hepatic p66Shc: Mechanism of mitochondrial oxidative stress?

Introduction
Undernutrition leading to placental insufficiency is a major cause of intrauterine growth restriction in the developing fetus. Studies have shown that maternal protein restriction (MPR) leads to reduced liver to body weight ratio in the affected offspring, culminating in metabolic impairment of the liver in adulthood. While the restoration of maternal proteins in postnatal life induces rapid weight gain in MPR offspring, this postnatal catch-up growth exacerbates the onset of a poor metabolic phenotype, including impeded longevity and dyslipidemia. Previous in vivo studies suggest that oxidative stress may mediate these adverse outcomes, but the molecular mechanisms by which this stress occurs remain unexplored. More recently, the adaptor protein p66Shc has been demonstrated to cause mitochondrial- induced oxidative stress, apoptosis, and senescence; however, its role in MPR offspring has not yet been fully explored.

Hypothesis
We hypothesize that altered p66Shc expression contributes to hepatic mitochondrial dysfunction in MPR offspring exclusively with postnatal catch-up growth.

Materials and Methods
Pregnant rat dams were fed either a control (20% protein) diet or low (8%) protein diet throughout gestation. Pups born to control mothers were fed a control diet, while pups born to MPR mothers were fed one of three diets: (1) low protein throughout life (LP1), (2) low protein during lactation only (e.g., until three weeks of age; LP2), or (3) normal protein throughout life (LP3). Hepatic mRNA and protein abundance were assessed via qRT-PCR and western immunoblotting, respectively, at three weeks and four months of age.

Results
P66Shc and Pin1 protein abundances were significantly increased exclusively in LP2 offspring at four months, while LP1 and LP3 offspring displayed significantly decreased p66Shc ($p<0.05$). All MPR offspring exhibited significantly increased protein abundance of 4-hydroxynonenal ($p<0.05$), a marker of lipid peroxidation. LP2 offspring displayed a significant increase in protein levels of antioxidants superoxide dismutase (SOD) 1 and SOD2 ($p<0.05$ and $p<0.01$), further indicating increased oxidative stress. In addition, LP2 offspring displayed aberrant markers of aerobic metabolism, as evidenced by significantly increased phosphorylation of pyruvate dehydrogenase ($p<0.05$), significantly decreased citrate synthase ($p<0.001$) and significantly decreased succinate dehydrogenase ($p<0.0001$). At three weeks, p66Shc protein abundance was significantly decreased ($p<0.05$) in LP1/LP2 offspring, while all other markers remain unchanged.

Discussion and Conclusions
Our results suggest that p66Shc may act as a regulator of impaired mitochondrial function in MPR offspring with catch-up growth. The increased protein abundance of p66Shc in LP2 offspring is indicative of mitochondrial stress, leading to oxidative stress and impaired aerobic metabolism. Given that these trends are exclusive to LP2 offspring at four months of age, it appears that a LP diet during perinatal life, a period of liver plasticity, followed by catch-up growth is detrimental to mitochondrial function. Overall, our data suggests that timing of nutritional restoration for IUGR offspring in postnatal life could influence long-term hepatic metabolism via modulation of mitochondrial function.

SALON D - 4:00 p.m.

Alice Shin
PhD Candidate

Research Areas:
Cancer Biology
Mechanisms of disease

Supervisor(s):
S. Asfaha

Role of Lgr5 in Dclk1+ cell-derived colitis-associated colon cancer

Introduction
Colorectal cancer (CRC) is the second leading cause of cancer death, with a major risk factor being chronic inflammation. Thus, patients with inflammatory bowel disease (IBD) are at an increased risk of CRC. Despite the clear association between inflammation and cancer, the mechanism by which colitis leads to CRC is still not well understood. Our recent work has focused on a colonic epithelial cell known as the tuft cell that expresses the protein doublecortin-like kinase-1 (Dclk1). Using Cre-dependent lineage tracing of Dclk1-expressing cells, we previously showed that Dclk1 labels long-lived quiescent cells in the colon that serve as a cellular origin of CRC upon colonic inflammation.

Hypothesis
In this study, we aim to explore the mechanism by which inflammation contributes to tuft cell-derived cancer initiation. We hypothesized that colonic inflammatory insult leads to dedifferentiation of Dclk1+ tuft cells to an Lgr5-expressing stem cell state susceptible to tumour initiation.

Materials and Methods
To generate tamoxifen-inducible Cre transgenic mice that allow for Dclk1+ cell lineage tracing and cell-specific knock-out of the tumour suppressor adenomatous polyposis coli (APC), we first crossed our transgenic Dclk1-CreERT2 mice to both ROSA26-tdTomato and APCfl/fl mice (Dclk1/APCfl/fl). To examine the role of dedifferentiation in colonic tumour initiation, these mice were further crossed to Lgr5-DTR-eGFP mice (Lgr5DTR;Dclk1/APCfl/fl). These mice were given tamoxifen and dextran sodium sulfate (DSS) to induce colitis and subsequent tumourigenesis, and then administered diphtheria toxin (DT) for six weeks post DSS injury to ablate Lgr5-expressing cells. Colonic tumour formation was compared to Lgr5DTR-negative control mice (Dclk1/APCfl/fl).

Results
DT ablation of Lgr5+ cells following DSS-induced colitis significantly reduced the number of colonic tumours but did not affect tumour size in Dclk1/APCfl/fl mice. Lgr5-expressing cells were readily seen in colonic tumours arising from Dclk1+ cells. Interestingly, two weeks post DSS-induced colitis, we could detect rare Dclk1+ cells that co-expressed Lgr5. Interestingly, qRT-PCR analysis of colonic mRNA levels revealed significantly reduced Lgr5 and increased RSPO1 and RSPO3 levels in DSS-treated mice.

Discussion and Conclusions
Our data proves that upon DSS-induced colonic injury, Dclk1+ tuft cells express the stem cell marker Lgr5 prior to initiation of colonic tumourigenesis. This data suggests that dedifferentiation of Dclk1+ cells to a stem cell state may play an important role in colitis-associated CRC and provides insight into the molecular mechanism by which Dclk1+ cell derived colonic tumours arise.

SALON D - 4:15 p.m.

Vasiliki Tellios
PhD Candidate

Research Areas:
Neuroscience
Mechanisms of disease

Supervisor(s):
W-Y. Lu

Bergmann glia morphology and GLAST expression is downregulated in nNOS-/- cerebella

Introduction
Excitotoxicity is the root of a variety of neurological disorders, such as Parkinson's disease, Alzheimer's disease, and movement disorders of the cerebellum. In general, excitotoxicity is caused by an overactivation of glutamate receptors on neurons, causing aberrant synaptic firing leading to pathological influxes of calcium into the cell. Purkinje neurons (PNs) of the cerebellum heavily regulate calcium influx through a variety of mechanisms. PNs receive primary glutamatergic input from parallel fibers (PFs) extending from cerebellar granule neurons – when glutamate is released, transient increases of calcium into the PN occur. PF-PN synaptic firing initiated by glutamate is critical in the formation of coordinated movements during development. Glutamate transmission is mostly regulated by Bergmann glia (BGs) – specialized astrocytes of the cerebellum that closely associate with PF-PN synapses. BGs uptake glutamate through glutamate/aspartate transporters (GLAST) to prevent over activation of the post-synaptic neuron. PF-PN synaptic plasticity is critically regulated by nitric oxide (NO), produced via neuronal nitric oxide synthase (nNOS), abundantly expressed in the cerebellum. In particular, nNOS-/- mice have been shown to demonstrate motor deficits similar to those recorded in cerebellar ataxic patients. Although behavioural deficits have been identified, the developmental morphology of the PN, and subsequently the PF-PN synapse, has yet to be characterized in the absence of nNOS. This project aims to characterize the morphology of the PN and BG in the absence of nNOS, as well as elucidate potential mechanisms that may exacerbate the developmental delays seen in nNOS-/- cerebella.

Hypothesis
We hypothesize that the absence of nNOS/NO signalling in the murine cerebellum will result in delayed and abnormal development of the PN and BG, leading to malformation of the PF-PN synapse.

Materials and Methods
Cerebellar tissues were collected from WT and nNOS-/- mice at postnatal day 3, 7, 14 and adult ages. Immunohistochemical (IHC) analyses visualized by confocal immunofluorescence (IF) were used to examine PN dendritic morphology (using calbindin) as well as expression and localization of mGluR1 and GLAST and quantified using ImageJ. Immunoblotting (IB) techniques were used to determine the protein expression of mGluR1 and GLAST across all time points and groups. Ex vivo cerebellar slice cultures as well as primary BG cell cultures were established and treated with NO-donors and inhibitors and assayed using IB or calcium imaging.

Results
PN dendritic growth in nNOS-/- cerebella is significantly decreased compared to WT controls at all time points. IB shows significantly decreased protein expression of mGluR1 in nNOS-/- cerebella, while GLAST was also downregulated in nNOS-/- cerebella. NO treatment ameliorated the delays seen in ex vivo nNOS-/- cultures as well as primary BG cultures, by increasing GLAST expression on the plasma membrane.

Discussion and Conclusions
Overall, these results show NO can play a novel role in PN development through the regulation of glutamate transporters, specifically GLAST, on the membrane of BGs. This knowledge can further our understanding of cerebellar pathologies as well as the importance of NO in regulating astrocyte function.

SALON D - 4:30 p.m.

Robert Kuiack
MSc Candidate

Research Areas:
Infection and Immunity
Mechanisms of disease

Supervisor(s):
M. McGavin

Evaluating the role of GraS in promoting Staphylococcus aureus adaptation to combined antimicrobial conditions of human skin

Introduction
Staphylococcus aureus is a Gram-positive microbe that asymptomatically colonizes 30% of humans, where it is well adapted to survive on the skin in the presence of innate defense mechanisms, including antimicrobial unsaturated free fatty acids (uFFA), acidic pH, and cationic antimicrobial peptides (CAMPs). Community acquired methicillin resistant S. aureus (CA-MRSA), represented by S. aureus USA300, pose a serious health risk due to their ability to cause severe soft tissue infections with rapid community transmission. To better understand how CA-MRSA colonize skin effectively, we assessed the role of the sensor histidine kinase, GraS, in responding to combined antimicrobial conditions of human skin. While GraS is able to respond to CAMPs, its role in responding to other antimicrobial conditions, namely acidic pH and uFFA, has not been investigated.

Hypothesis
We hypothesized that, in addition to responding to CAMPs through the extracellular sensor loop, GraS can also respond to acidic pH by sensing alterations to the phospholipid membrane. Furthermore, we hypothesized that a response through GraS can provide resistance to not only CAMPs, but also to other antimicrobial conditions found on human skin including uFFA.

Materials and Methods
To investigate this hypothesis, we constructed a graS deletion mutant, as well as a graS mutant with an inactive extracellular loop. We grew the cells in combined conditions of acidic pH, CAMPs, and uFFA, and measured growth patterns, protease expression, membrane surface charge, gene expression, and phospholipid membrane composition, to gain insight into the GraS sensing mechanism and response pathways.

Results
Our data show that in addition to CAMPs, GraS can also signal in response to acidic pH. While the extracellular loop of GraS is critical in responding to CAMPs, mutations in the extracellular loop did not impact the response to acidic pH, indicating GraS senses acidic pH through a novel mechanism. The GraS induced response to CAMPs or acidic pH allows for growth in normally inhibitory concentrations of uFFA. Interestingly, deletion of genes important to uFFA resistance at neutral pH, fakA and farER, had no impact on growth under combined conditions of acidic pH and uFFA. Analysis of the phospholipid membrane composition showed that cells grown in combined conditions of acidic pH and uFFA incorporated high levels of uFFA into the membrane, independent of currently established FakA metabolic pathway. Together, these findings indicate a novel uFFA metabolic pathway that will be investigated further in the future.

Discussion and Conclusions
While the antimicrobial conditions on human skin normally function together to have an additive inhibitory effect on bacterial growth, S. aureus appears to have evolved to thrive in this environmental niche through the use of GraS. Our findings demonstrate the integral and diverse role of GraS in promoting growth of S. aureus exposed to combined conditions of acidic pH, uFFA, and CAMPs. Our results also indicate a novel sensing mechanism for GraS, as well as a novel uFFA metabolic pathway in S. aureus, which will be investigated further in order to better understand S. aureus adaptation strategies. Together, this work sheds insight into the mechanisms used by S. aureus to colonize human skin, which is paramount for new strategies for treatment and prevention of infection.

SALON E - 3:30 p.m.

Jeremi Laski
MSc Candidate

Research Areas:
Cancer Biology
Mechanisms of disease

Supervisor(s):
T. Shepherd

Activated AMPK signalling is required but not sufficient for autophagy induction in epithelial ovarian cancer cells

Introduction
Epithelial ovarian cancer (EOC) is responsible for over 70% of all diagnosed ovarian malignancies, yet the mechanisms governing late-stage disease progression are still poorly understood. One of the hallmarks of EOC metastasis lies in the process of spheroid formation, whereby tumour cells aggregate into 3D structures. Previous literature suggests that as EOC cells form spheroids they undergo bioenergetic stress, activate AMP-activated protein kinase (AMPK) signaling, and thereby force cells to enter a metabolically quiescent state to facilitate survival. We have also shown that EOC spheroids up-regulate autophagy, a process that degrades and recycles intracellular macromolecules and organelles under starvation conditions. Thus, we sought to examine whether AMPK can modulate autophagy induction as a cell survival mechanism in EOC spheroids.

Hypothesis
Activated AMPK signalling is necessary and sufficient to induce autophagy as a cell survival mechanism in metabolically-dormant EOC spheroids.

Materials and Methods
EOC spheroid formation was achieved by culturing iOVCa147-MA, OVCAR8 and COV318 cells in ultra-low attachment dishes (ULA, Corning). Non-malignant human fallopian tube epithelial cells (FT190) were used as controls. Cell lines were stably transfected with the mCherry-eGFP-LC3B reporter to measure autophagic flux. Phosphorylated AMPK (T172) and markers for autophagy induction (LC3I/II and p62) were assessed by western blotting. AMPK was activated by treating adherent EOC cells with oligomycin and metformin. AMPK activity was attenuated in spheroids using compound C, or transient PRKAA1/2 siRNA transfection. We also treated spheroids with STO-609, a selective inhibitor of calcium-dependent protein kinase kinase-beta (CAMKKβ), to block downstream AMPK phosphorylation. Spheroid viability was assessed by Trypan Blue Exclusion and alamarBlue reagent.

Results
Attenuating p-AMPK levels through either pharmacological inhibition or siRNA-mediated knockdown reduced autophagic flux in all EOC spheroids as visualized by fluorescence microscopy. Interestingly, p-AMPK inhibition did not significantly affect spheroid cell viability. In contrast to our findings on AMPK regulation of autophagy in EOC spheroids, it appears that AMPK activation in adherent EOC cells is insufficient to induce autophagy on its own.

Discussion and Conclusions
Our study indicates that activated AMPK signalling is required but not sufficient for autophagy induction in EOC spheroids. Interestingly, we identified that AMPK activation in spheroids is likely regulated by CAMKKβ. The results of this study will further our understanding of the complex mechanisms driving autophagy in late-stage ovarian cancer, and provide the necessary pre-clinical evidence for developing new treatment modalities for this type of malignancy.

SALON E - 3:45 p.m.

Seung Kim
PhD Candidate

Research Areas:
Infection and Immunity
Mechanisms of disease

Supervisor(s):
F. Dick

Investigating the role of repetitive DNA misexpression in immune modulation

Introduction
Nearly two-thirds of the human genome harbours repetitive DNA elements whose expansion and misexpression are a source of deleterious mutations that promote tumourigenesis. Our lab has discovered that the retinoblastoma tumour suppressor protein (RB) with E2F1 and enhancer of zeste homolog 2 (EZH2) form a complex that represses expression of various repetitive elements. Mice with homozygous Rb1S mutation lack this repressive mechanism and eventually succumb to B-cell lymphoma. However, the contextual basis of the oncogenic potential of repetitive elements is poorly understood as acutely inducing misexpression of these elements with inhibitors of other repeat silencing complexes has been shown to activate an anti-viral immune response.

Hypothesis
I hypothesize that pharmacological inhibition of the RB-E2F1-EZH2 complex induces acute derepression of repetitive elements and IFN stimulation that can modulate the immune system.

Materials and Methods
To assess the impact of acute EZH2 inhibition (EZH2i) on immune cells, we treated wild-type splenic lymphocytes with DMSO or 10 μM GSK343 daily in culture. We also characterized any effect in vivo. Young wild-type mice were I.P. injected with vehicle or 100 mg/kg GSK343. Repeat element and IFN expression was quantified by RT-qPCR and splenic lymphocyte composition was quantified by flow cytometry. To gain mechanistic insight, we used CRISPR-Cas9 to generate nucleic-acid sensing PRR triple KO mouse strains, and bred mutants to establish bona fide KO mouse colonies.

Furthermore, we asked if EZH2i can be exploited to activate anti-tumour immunity. We treated B16-F10 melanoma cells daily with DMSO or 2 μM GSK343 in culture. To elucidate the mechanism, we used CRISPR-Cas9 to knock out three cytosolic nucleic-acid PRRs. We isolated six monoclonal mutant cell lines by limiting dilution and performed Western blot to confirm loss of protein expression. Expression in wild-type versus mutant, with or without GSK343, was quantified by RT-qPCR.

Results
GSK343 inhibition of EZH2 robustly increased expression repetitive elements and IFN-γ in cultured splenocytes. Surprisingly, the drug inhibition did not induce misexpression of repetitive elements in the spleen in vivo. IFN- γ expression was significantly reduced in drug treated spleens, contrary to our expectation. H&E stained sections of the spleens showed that GSK343 inhibition induced gross loss of white pulp versus red pulp boundary. We hypothesize that GSK343 treatment activated a pro-inflammatory immune response against repetitive element misexpressing splenocytes in vivo, in line with the loss of defined B-cell follicles. Indeed, the proportion of CD11b+ Ly6G+ neutrophils in the spleen was significantly increased while CD19+ CD45+ B-cells was decreased in drug treated animals.

GSK343 inhibition of EZH2 in B16 cells induced specific misexpression of major satellite pericentromeric repeat, and upregulation of IFN-β. Notably, loss of RIG-I expression abrogated IFN-β upregulation.

Discussion and Conclusions
We will next use PRR triple KO mice to reconcile the differential outcome of GSK343 induced EZH2i in splenocytes in vitro compared to in vivo. We have shown proof-of-principle evidence that EZH2i activates RIG-I-dependent IFN signalling in a cancer cell line. We will next characterize functional consequences in vivo with this syngeneic tumour model.

SALON E - 4:00 p.m.

Ian Villamagna
PhD Candidate

Research Areas:
Musculoskeletal Health and Rehabilitation
Advances in structural and physiological treatment of disease and therapeutic intervention (includes surgery and drugs)

Supervisor(s):
F. Beier, E. Gillies

Preparation of an intra-articular PPAR delta antagonist delivery system for the treatment of OA

Introduction
Osteoarthritis (OA) is a leading cause of disability among adults worldwide. Currently, it is estimated that around 14% of all Canadians are living with OA, and the prevalence is on the rise across populations of all ages. Effective treatment of the disease remains difficult, and currently there are no disease modifying agents available to treat OA. Recently, research has focused on identifying molecular processes contributing to OA, and potential molecular targets for inhibition that would allow the downstream progression of OA to be halted. One such example is the nuclear receptor PPARd, which has been shown to be involved in the progression of OA. PPARd antagonists exist, but cannot be delivered systemically due to potential side effects. Local drug delivery systems for the treatment of OA are one option to deliver a therapeutic such as a known PPARd antagonist, GSK3787. Here, we describe the preparation, characterization and testing of a novel intra-articular delivery system containing the PPARd antagonist, GSK3787.

Hypothesis
If GSK3787 can be encapsulated into poly(ester amide)(PEA) microparticles for intra-articular delivery, sustained release of drug in the joint may be able to halt or slow the progression of post-traumatic OA.

Materials and Methods
Poly(ester amide) particles were prepared using an oil-in-water emulsion method. The resulting particles were characterized by dynamic light scattering (DLS) and scanning electron microscopy (SEM) to determine their size and morphology respectively. Mechanical properties of the particles were measured by atomic force microscopy (AFM). In vitro release studies were performed, as well as cytotoxicity testing on immature murine articular chondrocyte cells. Influence of GSK3787-loaded particles on direct and indirect PPARd genes was assessed by qPCR.

Results
Prepared particles were found by SEM to have a spherical and smooth morphology, with a Z-average diameter of 500 nm. The modulus of the drug loaded particles, in a hydrated state at 37 °C was 2.8 MPa, as compared to the non-drug loaded particles which had a modulus of 7.0 MPa. When tested in vitro, 30% of GSK3787 was released over 30 days, and no burst release was observed. In vitro toxicity testing revealed no dose dependent toxicity from either the drug delivery system alone, or the drug-loaded particles. Confocal microscopy confirmed the presence of particles around the exterior of the cells, but not inside the cells.

Discussion and Summary
The development of new intra-articular drug delivery systems opens up new possibilities in the treatment and management of OA. The particle delivery system described here will allow a new potential therapeutic for OA to be evaluated. The developed system is injectable, and provides a prolonged release of drug, directly at the area of injury, increasing the likelihood of efficacy, while diminishing the chances of systemic side effects.

SALON E - 4:15 p.m.

Yashoda Valliere
Medical Student

Research Areas:
Endocrinology and Metabolism
Prevention of diseases and health conditions and promotion of well-being

Supervisor(s):
J.B. Brown

Beyond the sick role: The many roles of diabetes patients in the management of hypoglycemia

Introduction
Hypoglycemia is a common adverse event for people living with Type 1 and Type 2 diabetes mellitus. The concept of a patient 'role' has previously been introduced in the literature with sociologist Talcott Parsons' description of 'the sick role'; however, the patient role when managing chronic diseases such as diabetes mellitus, and specifically in relation to hypoglycemia, has not yet been conceptualized in the literature. This paper explores specific roles patients assume in preventing or treating hypoglycemia.

Hypothesis
Patients assume specific roles, beyond merely making impromptu decisions, in their management of hypoglycemia.

Materials and Methods
This is a descriptive qualitative study from the InHypo-DM research program. A purposive sample of Type 1 and Type 2 diabetes patients were recruited for semi-structured interviews. There were 16 participants (8 women and 8 men), who were on average 53 years old. Time since diagnosis was on average 15 (Type 1 diabetes) and 21 (Type 2 diabetes) years; all had experienced more than one hypoglycemia event in the past year. Data collection ceased upon reaching saturation in that there were no new themes emerging. All the interviews were audiotaped and transcribed verbatim. Individual and team analysis of interviews were conducted to identify overarching themes and sub-themes.

Results
Participants articulated four roles they assumed in preventing or treating hypoglycemia. As a manager, they take ownership and responsibility for their own glycemic control. As a technician, they identify cause and effect, measure changes, and adjust dosages accordingly. They use both proactive and reactive strategies to always be prepared for a hypoglycemic event. As an educator, they act as a public ambassador for diabetes to the people around them, explaining what hypoglycemia is and what to do if they experience an event. As an advocate, they champion their own needs in the moment. These four roles were in turn influenced by the contexts of work, social settings, exercise, and travel. In different contexts, they must attempt to balance competing spheres of their lives and assume a role appropriate to each setting.

Discussion and Summary
These findings demonstrate that patients' strategies to avoid or reduce the severity of a hypoglycemic event extend beyond merely making impromptu decisions during events. Instead, these roles, dependent on context, enhanced patients' mastery in managing hypoglycemia. What our participants have achieved in assuming these roles is adaptive, giving them a sense of mastery over what was a seemingly daunting event. By fostering patients' awareness of these roles, healthcare providers can empower patients in their self-management of diabetes and hypoglycemia.

Authors: Y. Valliere, C. McLachlan*, J.B. Brown, S.M. Reichert, S. Webster-Bogaert, A. Ratzki-Leewing, B.L. Ryan, S.B. Harris*
**These authors contributed equally to this work.*

SALON E - 4:30 p.m.

Raanan Marants
PhD Candidate

Research Areas:
Medical Biophysics, Engineering and Imaging
Mechanisms of disease

Supervisor(s):
T-Y. Lee, C. McIntyre

Measuring renal blood flow decline during hemodialysis with CT perfusion imaging: A first step towards characterization of dialysis-mediated residual renal function loss

Introduction
The presence and preservation of residual renal function (RRF) in kidney disease patients on hemodialysis (HD) is linked to improved clinical outcomes. However, RRF characteristically declines after HD initiation and the mechanism behind this decline is still not clear. HD reduces perfusion in the heart and brain due to intradialytic hypotension, but dialysate cooling (DC), an effective and low-cost intervention, ameliorates HD-induced circulatory stress and helps preserve global hemodynamics. Some authors postulated that recurrent renal ischemic insults may be responsible for HD-mediated RRF loss. The aim of this work was to measure intradialytic renal perfusion during standard and cooled HD using CT perfusion (CTP) imaging to demonstrate that recurrent HD-induced renal ischemic insults may be the first step towards RRF decline, and DC may be a feasible solution.

Hypothesis
(1) HD leads to renal perfusion decline. (2) DC ameliorates HD-induced changes in renal hemodynamics.

Materials and Methods
29 patients (on HD ≥3 months, urine output <250 mL/day) provided informed consent. 14 patients underwent standard (36.5°C) HD while 15 patients were randomized to receive either standard or cooled (35.0°C) HD first in a 2-visit crossover study design. CTP imaging was performed before, during and after HD on a 256-slice scanner (GE Healthcare) without interrupting HD treatment. Scanning was done without breath-hold for 2 min immediately following a bolus injection of iodinated contrast. Echocardiography was performed during HD to assess myocardial injury. Non-rigid registration and ASIR were used to reduce breathing motion and image noise, respectively, and kidney perfusion maps were generated from the processed images. Statistical analysis was performed using parametric tests (e.g., repeated measured ANOVA with post-hoc tests, baseline-adjusted ANCOVA, Pearson correlation, McNemar's test).

Results
Standard HD (29 patients, 57 kidneys): Baseline renal perfusion was markedly reduced compared to normal (33.2 vs. >200 mL/min/100g) and was related to time on dialysis ($r=-0.35$, $p<0.01$). During HD, renal perfusion dropped 18.4% ($p<0.005$) and was associated with myocardial injury ($r=-0.33$, $p<0.05$). Decreased renal perfusion was observed in 65% of kidneys.

Standard vs. Cooled HD (15 patients, 30 kidneys): Renal perfusion dropped 20.9% and 10.8% during standard and cooled HD, respectively (drops were not different from one another, $F(1,57)=1.814$, $p=0.183$). Decreased renal perfusion was observed in 67% and 50% of kidneys during standard and cooled HD, respectively (not significantly different). Patients without myocardial injury experienced milder declines in renal perfusion for both temperatures.

Discussion and Conclusions
This study is the first to demonstrate that HD-induced circulatory stress is associated with an acute reduction in renal perfusion and that DC can mitigate these effects. Recurrent HD-induced renal ischemia leading to cumulative kidney injury lays the ground work towards pathophysiologically explaining the previously observed relationship between time spent on dialysis and declining RRF. In addition, these findings present a potential therapeutic intervention (DC), already successfully applied in the protection of the brain and heart from HD-induced recurrent injury. Future work should focus on patients with higher RRF and to longitudinally follow incident HD patients with respect to declining RRF.