

MURC

MULTIDISCIPLINARY UNDERGRADUATE RESEARCH CONFERENCE

Program Guide

Saturday March 17th, 2018

8.00am-6:30pm

UBC Vancouver

students.ubc.ca/murc

#UBCMURC

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Be Social

We are excited to be live-streaming any digital conversations that take place throughout the day during the opening and closing keynote sessions. If you want to join the conversation online, use #UBCMURC.

Share the highlight of your day, something new you learned, or even share photos!

Schedule

Get an overview of the day.

8:00 am-8.45 am	Presenter and Attendee Check-in	<i>Brock Hall Concourse - 1874 East Mall</i>
9:00 am-10.30am	First Wave of Poster Presentations	<i>Brock Hall Concourse - 1874 East Mall</i>
	First Wave of Oral Presentations	<i>Buchanan B - 1866 Main Mall B208, B210, B213, B215, B313, B315</i>
10.45 am-12.15 pm	Second Wave of Poster Presentations	<i>Brock Hall Concourse - 1874 East Mall</i>
	Second Wave of Oral Presentations	<i>Buchanan B - 1866 Main Mall B208, B210, B213, B215, B313, B315</i>
1.30 pm-3.00 pm	Third Wave of Poster Presentations	<i>Brock Hall Concourse - 1874 East Mall</i>
	Third Wave of Oral Presentations	<i>Buchanan B - 1866 Main Mall B208, B210, B213, B215, B313, B315</i>
3.15 pm-4.45 pm	Fourth Wave of Poster Presentations	<i>Brock Hall Concourse - 1874 East Mall</i>
	Fourth Wave of Oral Presentations	<i>Buchanan B - 1866 Main Mall B208, B210, B213, B215, B313, B315</i>
5.15pm-6.30 pm	Awards Reception	<i>Irving K. Barber Learning Centre (IBLC) - Golden Jubilee Room 4th Floor</i>

What is MURC?

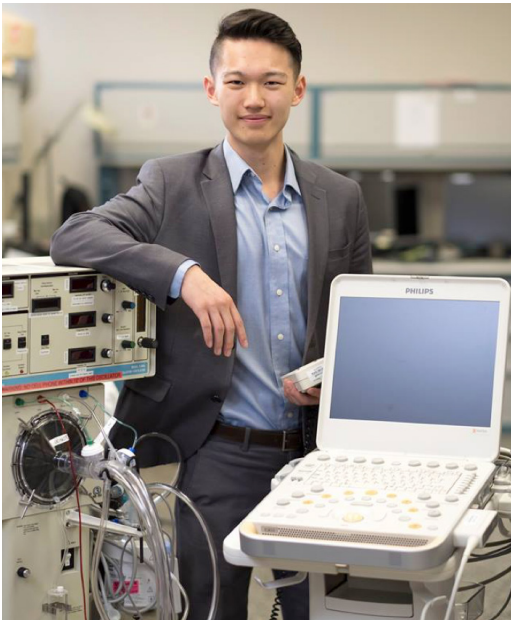
Celebrating exciting and innovative undergraduate research at UBC.

MURC 2018

The Multidisciplinary Undergraduate Research Conference is an annual celebration of undergraduate research happening at the UBC Vancouver and UBC Okanagan campuses. Student researchers showcase their research in either oral or poster presentation format.

MURC presenters are any UBC undergraduate student who is participating in, or has completed their own Faculty-supervised research project. All Faculties and Schools are welcome. This year's Conference features 249 research projects hosted by over 400 presenters.

Reception Speaker



Alec Yu

MD Candidate (UBC)

Alec is a first year MD candidate at UBC, and had previously attended SFU for undergrad. He's worked in the past as an innovation officer at one of Vancouver's tertiary care hospitals, and has also served as a director and the co-founder of a non-profit organization supporting youth engagement with humanitarian issues. Together with two team members, Alec won the Oxford Global Challenge, an international innovation and social entrepreneurship competition, in 2017.

A passionate problem-solver, Alec loves combining his interests with his lived experiences to start grassroots initiatives in his community. His current projects include building a patient-centred discharge pathway for homeless patients at a regional hospital, re-engineering the medical device reprocessing capabilities of British Columbia's children's hospital, and creating a solid waste reduction strategy and intervention for a tertiary care centre.

Reception Speakers

Three Minute Thesis

Rajat Jain (Second Place)

Providing high quality potable water to Indigenous communities in Canada

Program: MASc in Civil Engineering

Supervisor: Dr. Pierre Bérubé

Anna Smith (Honourable Mention)

The smell of fear: The influence of heavy metals on juvenile coho olfaction and behaviour

Program: MSc in Forestry

Supervisor: Dr. Scott Hinch

Pranav Shresta (Finalist)

Injecting into skin through microneedles

Program: MASc in Mechanical Engineering

Supervisor: Dr. Boris Stoeber

Acknowledgements

A big thank-you

Thank-you to all listed below for your support in organising MURC 2018. We appreciate your time and dedication in making the celebration of undergraduate research at UBC a success.

Adjudicators

Alanna Blackall
Anna Smith
Arwa Gazzaz
Avery Lam
Caitlin Pritchard
Chad Fibke
Christina Michalski
Courtney van Ballegooie
Derek Somo
Harry Lee
Jenny Tran
John Dupuis
Joseph English
Joyce Lam
Kate Wahl
Leona Shum
Melissa Armstrong
Neil Armitage
Parisa Sarmadi
Samuel Griffin
Sandra Wan
Sean Naman
Shayan Shakeraneh
Sherri Sadr Karimi
Soheila Zarei
Sonia Lin
Sonia Shirin
Susanne Bradley
Takara Bond
Tony Fang
Alice Guo
Amanda Lee

Arash Shadkam
Jennifer Nagtegaal
Jewel Ocampo
Julian Nguyen
Marlee Vinegar
Nandinee Haq
Natasha Pestonji
Ronak Gupta
Selina Agbayani
Shahid Abrar-ul-Hassan
Shawna Stanwood
Stephen Adebola
Yijian Yang
Danielle Foulger

Ashley Welsh
Philip Matthews
Laura Sly
Kayli Johnson
James Charbonneau
Celina Berg
Suzie Lavallee
Neil Armitage

Workshops & Speakers

Nick Thorne
Neil Armitage

Review Committiee

Gabriel Potvin
Juan Abello
Dave Michelson
Simon Lolliot
Kerry Greer
Bozena Karwowska
Neil Guppy
Siobhan McPhee
Luisa Canuto
Andrew Owen
Kristen Walker
Gail Hammond
Andis Klegeris
Pam Kalas

Prospective Presenters

Are you passionate about a research topic and want to share it with others?

MURC 2019 will be a fantastic opportunity for you to showcase your research, exchange ideas with other student researchers and the UBC community. We offer multiple series of workshops, which are kindly hosted by UBC faculty members to assist presenters in sharpening their oral and poster presentation skills. Volunteer UBC faculty review submitted abstracts to provide you with professional feedback in preparation for the conference, and your future in research.

Student presenters gain valuable experience and transferable skills beneficial to their future in research and other career paths. If you are eager to share your research with others, we suggest you to start putting your ideas together now! Registration to present at MURC 2019 will begin in January, 2019. We welcome all returning and prospective presenters to join us.

We look forward to seeing you in MURC 2019!

MURC 2018 Winners

THEME: Health and Wellness



Jenny Liu (Poster Presentation)

A Triple Combination Approach Involving Nerve Transplantation, Glial Scar Digestion and Passive Exercise Promotes Cardiovascular Recover after Spinal Cord Injury

Supervisor: Rahul Sachdeva

[Abstract on Page 213](#)

Ian Ruiz (Oral Presentation)

Minocycline reduces the severity of cardiovascular dysfunction after experimental spinal cord injury

Supervisor: Dr. Andrei Krassioukov

[Abstract on Page 241](#)

THEME: Sustainability and Conservation



Mitch Syberg-Olsen (Poster Presentation)

Diesel particulate matter induces changes in cellular reactive oxygen species generation and lowers CFTR abundance in human airway epithelial cells

Supervisor: Dr. Christopher Carlsten

[Abstract on Page 100](#)

Zarah Zheng (Oral Presentation)

Inter-annual and spatial variability of methane and nitrous oxide distributions across the North American Arctic Ocean

Supervisor: Philippe Tortell

[Abstract on Page 249](#)

MURC 2018 Winners

THEME: Innovation Technology



Casper Tsai (Poster Presentation)

Temporal and Spatial Patterning of Esrrb Expression During Cerebellar Development

Supervisor: Dan Goldowitz

[Abstract on Page 166](#)

Jamie Magrill (Oral Presentation)

Understanding the Roles of Insulin Signalling and Type-2 Diabetes in Pancreatic Intraepithelial Neoplasia Formation

Supervisor: James Johnson

[Abstract on Page 245](#)

THEME: Individual and Society



Candace Yip (Poster Presentation)

Halloween and fatal pedestrian crashes in the United States

Supervisor: John Staples

[Abstract on Page 52](#)

Ayman Azhar & Yasmin Banga (Oral Presentation)

Does socio-economic status (SES) have an impact on fitness of South Asian children living in Metro Vancouver?

Supervisor: Dr. Tricia Tang

[Abstract on Page 188](#)

MURC 2018 Winners

URO Interdisciplinary Award



Chantelle Ko

TRAVIS - Touch Responsive Augmented Violin Interface System

Supervisor: Dr. Robert Pritchard

[Abstract on Page 189](#)

Wave 1 - Poster Presentation List

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Novel derivatives of kainic acid as inhibitors of neuroinflammation

Morgan Alford

MicroRNA biomarkers for injury Severity in Acute Human Traumatic Spinal Cord Injury

Rishab Gupta

Clinical Effectiveness of Docetaxel for Castration-Sensitive Prostate Cancer in a Real-World Population-Based Analysis

Kevin Zou

Role of the mir-146a gene in inflammatory signaling in hematopoietic stem and progenitor cells

Mahima Kapoor

Specific and Sensitive Quantification of Lung Cancer miRNA from Blood

Valerie Chu, Bridget La Prairie, Chanpreet Mangat, Siddarth Raghuvanshi

Predictors of Attrition in Patients With Metastatic Colorectal Cancer (MCRC)

Arvin Bahrabadi

The effects of eEF2K in MYCN-Amplified Pediatric Neuroblastoma

Simran Sidhu

The Influence of Neuromuscular Training on Preventing ACL injuries in Soccer

Bhav Kang, Niall Johal

A Novel Approach To Managing Diabetes

Farris Kassam, Rehan Jessa

Treatment with acidic electrolysed water combined with 3% levulinic acid to sanitise fresh organic lettuce and stainless steel coupons

Mitchie Zhao

Emergency Surgery Delays- Analysis of Target Time Achievement and Causes of Delay in Surgical Emergency Cases at BC Children's Hospital

Tisha Dasgupta

THEME: Health and Wellness

Profiling genetic interactions among ASD-associated genes that underlie sensory and learning abnormalities.

Julia Mang

Changes in Quality of Life: Before and After Hepatitis C Treatment

Valerie Lai

Preliminary Observations of Increased Sleep Disruption in Alzheimer's Disease Patients

Meghan Chen

Comparative analysis of brace treatment and observation for infants with Radiological Dysplasia of the Hip — A non-inferiority trial

Ashley Jang, Fatma Khudhur

Whole Genome CRISPR-cas9 Screening on Isogenic Cell Line Model Systems to Identify Synthetic Lethal Partners of the Glioma Associated CIC Transcriptional Repressor

Juan Burckhardt, Anand Dhatt, Yumi Wong, Michael Wong

Investigating the Link Between Hypoxia and Epithelial-Mesenchymal Transition as a Possible Therapeutic Target for Metastatic Disease in Breast Cancer.

Gurkamel Gill, Medha Mittal, Louisa Ji, Christine Rehaluk

Intestinal Epithelial Inflammasomes: Frontline Defenders Against Campylobacter Jejuni Infection

Thomas Hoang

Cystic Fibrosis Patients' Attitudes Towards Participation in Research

Marissa Lee

THEME: Sustainability and Conservation

Determining population distribution of invasive mussels *Mytilus galloprovincialis*, *Mytilus edulis*, native *Mytilus trossulus* and their hybrids in Vancouver ecosystems and markets.

Catherine Wong, Jenny Ung, Cameron Tough

The Ecological and Evolutionary Implications of Soil Microbe Presence on Plants Under Drought Stress

Joani Viliunas

The effect of *Myriophyllum aquaticum* on freshwater bodies in British Columbia

Shirvin Lee, Rosalyn Desa

Nanocellulose-based Composites for Applications as Supercapacitor Battery Cells

Evelyn Kuan, Elli Newman, Alicia Elgert, Heping Lu, Yangqian Qi, Tong Ye, Laura Super

Cumulative effects of human impacts on Rainbow Trout in British Columbia: A spatial analysis

Emma Gosselin

THEME: Innovation and Technology

Unconstrained M-dwarf Stellar Processes and the Implications for the Habitability of Earth-like Planets

Sam Young, Bing Liu

Light Controlled Shuttles

Aries Lee, Simrat Chahal

The Effect of pH on the Growth of *Licmophora abbreviata*

Arvin Bahrabadi, Louise Meddings

The effects of Minocycline on CD1d and CD1c expression in Epstein-Barr Virus- infected B cells

Michelle Tse

THEME: Individual and Society

Getting Labelled as Homeless: The construction of hopelessness and helplessness in Homeless life

Kennedy Wong

An Evaluation of the Relationship Between Socioeconomic Status and Young Children's Executive Functioning Skills

Larissa Chiu

Telehealth Use in Port McNeil, British Columbia: Successes and Challenges

Monica McKeown

Intercultural Discourse in Korean theatre: Can Korean Theatre Achieve a Compromise of Eastern and Western Art?

Jenny Kim

The Lived Experience of Receiving Treatment for Alcohol Use Disorder Among Punjabis

Shawna Narayan

To Lie or Not to Lie? Culture and Contexts in Adolescent's Moral Reasoning

Sirian Yang, Saman Fouladirad

An evaluation of the impact of the minimum legal drinking age on lifetime cannabis use in youth living in Saskatchewan.

Nick di Lello, Mason Uim, Claire Benny

Investigating the Effectiveness of the Life After High School Workshop in Inner-City Schools

Hakeem Hussein, Elias Panah, Shawna Narayan

Halloween and fatal pedestrian crashes in the United States

Candace Yip

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Novel derivatives of kainic acid as inhibitors of neuroinflammation

Presenter: Morgan Alford

Alzheimer's disease (AD) is a neurodegenerative disorder that presents in patients as progressive cognitive decline, invariably resulting in dementia. This manifestation causes severe emotional and financial hardship for AD patients and their families. The diseased brain is characterized by the presence of neuritic plaques and tangles. When microglia, the immune cells of the central nervous system, interact with these pathological structures, the microglia become activated. Chronic microglial activation leads to the continuous secretion of pro-inflammatory mediators, which at high concentrations are damaging to neurons.

The goal of this project was to assess the therapeutic potential of two novel kainic acid chemical derivatives as treatments of AD. The first objective was to determine how these derivatives affect activated microglial functions that negatively impact neuronal cell viability. After treatment with either of the derivatives, microglia were activated and their conditioned media was transferred onto neurons. Neurotoxicity of microglia treated with either of the two derivatives was significantly reduced compared to stimulated untreated cells. The second objective was to determine whether these derivatives alter the microglial secretion of pro-inflammatory mediators. Analysis of the microglia-conditioned media confirmed that treatment with either of the kainic acid derivatives caused a downregulation of the potentially harmful monocyte chemoattractant protein-1, reactive nitrogen species and reactive oxygen species.

AD currently affects 40 million people worldwide. This number is predicted to double by the year 2030 as there is currently no effective treatment. This project unveils potential therapeutic strategies, which could impact the lives of AD patients and their families.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

MicroRNA biomarkers for injury Severity in Acute Human Traumatic Spinal Cord Injury **Presenter: Rishab Gupta**

Clinicians today use standardized, baseline measures of spinal cord injury (SCI) severity by asking patients if they can feel specific sensations or move key muscles. By identifying the injury severity, treatment options can then be explored for acute SCI patients. Unfortunately, clinical trials investigating these treatment options have not yet yielded convincing results, in part because of the challenges in recruiting and diagnosing research participants. Identifying biological markers that can act as an indicator of SCI severity in both the blood and cerebrospinal fluid (CSF) of patients would allow for a non-invasive aid in current assessment practices and accelerate the clinical validation of novel therapies for acute SCI.

MicroRNA are small noncoding RNA molecules that function in the cell to control gene expression/protein production. The current body of literature suggest that microRNA orchestrate a wide range of biological processes such as inflammation, memory formation and cell death. In our previous study using a large animal pig model for SCI, serum microRNA showed strong differences in both type and quantity based on SCI severity. In this project, we aimed to validate the results from our preclinical study in human SCI patients using CSF and serum samples. Using Next Generation Sequencing (NGS) technology to identify and quantitate microRNA levels, we found strong differences in microRNA levels between different SCI severities. The analysis was done in parallel to our pig model because it is important to establish if the biomarkers found in our preclinical model can be used clinically in human SCI patients.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Clinical Effectiveness of Docetaxel for Castration-Sensitive Prostate Cancer in a Real-World Population-Based Analysis

Presenter: Kevin Zou

Background: Adding docetaxel to androgen deprivation therapy (ADT) for the treatment of early metastatic castration-sensitive prostate cancer (mCSPC) is known to be effective, with an overall survival benefit in Phase III clinical trials. However, the clinical effectiveness of docetaxel with ADT in the general patient population remains undefined. Patients and Methods: We conducted a population-based retrospective review using the British Columbia Provincial Pharmacy Database. To be included, patients had to have castration-sensitive prostate cancer not previously treated and have received at least one cycle of docetaxel, with complete records available for review. Results: From April 2015 to February 2017, we identified 183 cases; 156 met inclusion criteria. Most patients had high-volume disease (80%). All 6 planned docetaxel cycles were delivered in 126 cases (81%). Dose reductions and delays were required in 39% and 16% of cases. Grade 3-4 adverse events were noted in 40% of cases, with no treatment-related deaths. The rate of febrile neutropenia was 18% and it was significantly associated with the number of bone metastases ($p=0.038$). Also, patients with greater numbers of bone metastasis have a much higher chance of progressing to treatment failure (hazard ratio = 8.3, $p<0.001$). Castration resistance (CRPC) was seen in 41% within 1 year, with a median time to CRPC of 14.3 months. Conclusions: The effectiveness of docetaxel with ADT in a general population of patients with mCSPC was associated with poorer outcomes and high rates of toxicity compared to the published studies. Specifically, patients with high numbers of bone metastasis develop higher rates of febrile neutropenia and progress earlier to treatment failure. We recommend the use of alternative, less toxic agents, such as abiraterone, in the treatment of mCSPC in these patients.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Role of the mir-146a gene in inflammatory signaling in hematopoietic stem and progenitor cells

Presenter: Mahima Kapoor

Myelodysplastic syndrome (MDS) is a myeloid malignancy that leads to decreased production of mature blood cells in the bone marrow. MDS results from dysfunctional hematopoietic stem cells (HSCs), which are immature cells that are capable of lifelong production of mature blood cells. To protect their lifelong integrity, HSCs must maintain quiescence until mature blood cells are required.

Our lab previously identified miR-146a as a disease gene with decreased expression in MDS. Depletion of miR-146a is known to activate innate immune signaling, but its effect on HSC function is incompletely understood. Using a miR-146a knockout mouse model, we investigated whether loss of miR-146a alters HSC cell cycle quiescence/proliferation via activation of pro-inflammatory signaling. Preliminary findings suggested that loss of miR-146a in mice decreases HSC cell cycle quiescence and increases proliferation. In addition, gene expression analysis identified upregulation of the pro-inflammatory Tumor Necrosis Factor (TNF) signaling pathway in HSCs lacking miR-146a. Thus, loss of miR-146a may directly contribute to the HSC dysfunction observed in MDS, and be mediated by pro-inflammatory signaling.

In this project, we addressed two problems: (1) our current assay for HSC cell cycle quiescence was very labour-intensive so we aimed to develop a more efficient assay; and (2) we wished to investigate the hypothesis that loss of TNF can rescue the proliferation/quiescence defects observed in miR-146a KO HSCs using our new assay. Overall, loss of TNF partially rescued the cell cycle defects of miR-146a single KO HSCs. Therefore, miR-146a appears to protect HSC function at least in part by inhibiting the pro-inflammatory TNF signaling pathway.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Specific and Sensitive Quantification of Lung Cancer miRNA from Blood

Presenter: Valerie Chu, Bridget La Prairie, Chanpreet Mangat, Siddarth Raghuvanshi

Non-small cell lung cancer (NSCLC) is a highly diagnosed and aggressive form of cancer that is difficult to detect in the body. NSCLC also has a high fatality rate that rises dramatically as the cancer progresses. One physiological change that occurs at the onset of various cancers, including this one, is a fluctuation in microRNA (miRNA) concentrations in the bloodstream. miRNAs are short, single-stranded RNA molecules that regulate cells. In the case of NSCLC, specific miRNA concentrations in the blood change at an early stage, making miRNA an excellent biomarker. A quantitative procedure was developed to measure miRNA concentrations in blood. A “dog-bone” shaped probe made of DNA was designed to change its configuration in the presence of the target miRNA. This change in configuration allows phi29 enzyme to replicate the DNA sequence on the probe continuously until there is a detectable amount of DNA. To measure the amplified DNA, a restriction enzyme first cuts the long strands of DNA into small pieces to make a homogenous solution; they are then stained to produce detectable fluorescence signals. The assay's capability of working directly with blood was confirmed by testing human blood samples containing a known amount of added miRNA. Through our experiments, we have created an assay that through further development can be used to diagnose non-small cell lung cancer before the mortality rate rises dangerously.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Predictors of Attrition in Patients With Metastatic Colorectal Cancer (MCRC)

Presenter: Arvin Bahrabadi

In the treatment landscape of cancer, positive impacts of new therapies may be limited by attrition and ultimately non-exposure to later therapy lines. Using a population-based cohort of MCRC, our aims were to characterize rates of attrition and determine factors associated with failure to receive lines of treatment. Medical records of British Columbia's MCRC patients from 2008-10 were merged with systemic therapy data from the provincial pharmacy database. We classified patients into mutually exclusive treatment categories: a) receipts of all MCRC treatments; b) attrition directly attributable to disease; c) attrition attributable to other clinical factors (toxicity/comorbidities), and d) attrition secondary to nonclinical factors (personal/social). Multivariate logistic regression models were constructed to identify predictors. We identified 525 eligible MCRC patients: median age 64 years, 57% men, 55% Caucasian, 68% ECOG 0/1. The attrition rate was 40% (95% confidence interval [95% CI], 36%-44%) for first line treatment, 25% (95% CI, 19%-31%) for second line treatment and 14% (95% CI, 5.5%-22.5%) for third line. Cancer progression (31%) and chemo toxicity (30%) were the most common attrition causes. On multivariable analysis, first-line treatment attrition was associated with worse baseline ECOG (odds ratio [OR], 1.92; $p < 0.001$) and older age at diagnosis of MCRC (odds ratio [OR], 1.04; $p < 0.001$). When we examined attrition over all lines, it was significantly correlated with worse ECOG (odds ratio [OR], 2.44; $p < 0.001$). Treatment attrition is a prevalent problem in MCRC, hindering benefits of sequential treatment algorithms. Some attrition causes are potentially modifiable and may maximize exposure to all therapy lines.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

The effects of eEF2K in MYCN-Amplified Pediatric Neuroblastoma

Presenter: Simran Sidhu

MYC oncogenes (tumor-causing genes) contribute to more than 50% of human cancers, but blocking them has proven challenging. *MYCN* is the variant found in childhood neuroblastoma, one of the most deadly pediatric tumors. Approximately 20% of neuroblastoma cases have *MYCN* gene amplification. Gene amplification is when there is an increase in the number of copies of a gene without a proportional increase in other genes. This *MYCN* gene amplification in neuroblastoma causes aggressive disease and high mortality rates, underlying the need for novel and effective therapies. *MYCN*-amplification induces cell death in tumors in the absence of nutrients. Nutrient-shortage is common in tumors since they lack a constant blood supply. We recently learned eEF2K (eukaryotic elongation factor-2 kinase) is a protein crucial in assisting tumor cells to withstand and be able to grow in nutrient-deprived conditions. We therefore hypothesized that eEF2K facilitates the adaptation of *MYCN*-amplified neuroblastoma to withstand nutrient deprivation, and that inhibiting this pathway could impair tumor progression. We tested our hypothesis with various techniques such as immunohistochemistry, xenograft transplants into mice, and si-RNA transfections followed by q-PCR and western blotting. We observed that *MYCN*-amplified tumors had higher eEF2K levels, and patients had poorer outcomes. We also saw that by inhibiting eEF2K the tumors grew significantly less in volume. We concluded that eEF2K is a critical mediator in the response of *MYCN*-amplified neuroblastoma to nutrient deprivation. Combining eEF2K-inhibiting drugs with medication that induces nutrient shortage for the cancer could be a potential new therapy in treating *MYCN*-amplified neuroblastoma.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

The Influence of Neuromuscular Training on Preventing ACL injuries in Soccer

Presenter: Bhav Kang, Niall Johal

Anterior cruciate ligament (ACL) injuries of the knee are common in sports that require jumping and rotational movements such as gymnastics, basketball, soccer, volleyball, football, and handball. Treatment for an ACL injury can be expensive, requires extensive amounts of rehabilitation, and increases the risk of early osteoarthritis in individuals. In addition, recovering from an ACL injury comes at a physical, emotional, and mental cost and therefore, early prevention is important in reducing the rates of ACL injuries. One method hypothesized to reduce ACL injuries in non-contact sports is neuromuscular training (NMT). This review aims to summarize the current published research on NMT as a preventative intervention for ACL injuries in female soccer players. In this review, the most recent research on neuromuscular training (NMT) will attempt to provide a better understanding of what a NMT program is, how it can be measured, and the effects it has on reducing ACL injuries. It will also attempt to identify gaps in the current literature for future advancements in research regarding NMT.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

A Novel Approach To Managing Diabetes

Presenter: Farris Kassam, Rehan Jessa

A demographic shift towards high fat diets and low physical activity has caused a rapid rise in the rates of Type 2 Diabetes on both a national and global scale. The Canadian Diabetes Association reports that Type 2 Diabetes prevalence in Canada has increased by 72% since 2006. Unfortunately, Type 2 diabetes disproportionately affects various ethnic groups. Be it genetic or lifestyle factors, South Asians are among the highest risk groups for developing Type 2 Diabetes. Limited access to culturally tailored health care has escalated the burden of this disease among the Lower Mainland South Asian community. With the expansive development of innovative technology, diabetes preventative care and management can reach a larger audience. PLEASED (Peer Lead Empowerment-Based Approach to Self-Management Efforts in Diabetes), (Supporting Physical Activity, a Community Effort) and Project Bhangra are three initiatives developed by Dr. Tricia S. Tang of the UBC Department of Medicine. Each project focuses on diabetes prevention and management, and all have the potential to connect Type 2 diabetes patients with experienced diabetes educators and specialists. Each project provides innovative culturally tailored care to the Vancouver South Asian community. Each study is currently at the halfway mark and results indicate that technology can be effective in connecting those affected by diabetes with the tools they need to improve their diabetes related health outcomes and overall health.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Treatment with acidic electrolysed water combined with 3% levulinic acid to sanitise fresh organic lettuce and stainless steel coupons

Presenter: Mitchie Zhao

Potential organic sanitisers acidic electrolysed water (AcEW), 3% levulinic acid (LVA) and AcEW combined with 3% LVA were applied on fresh-cut organic lettuce for 7 min to evaluate their microbiocidal effect. Treated organic lettuce was then refrigerated at 7 °C for 1, 3, 5, and 7 days to analyse microbial growth, weight loss, colour and texture changes. The combination of AcEW and 3% LVA caused the highest reductions of both aerobic mesophilic counts (AMC, 4.1 log CFU/g) and yeasts and moulds (4.4 log CFU/g) on lettuce samples after 7 days of storage. In terms of weight loss, colour and firmness change, no significant difference was found among different treatments and the control group (treated with deionised water). AcEW, 3% LVA and the combination were also applied on stainless steel coupons with air-dried *Escherichia coli* ATCC 25922 and *Listeria innocua* Seeliger ATCC 33090, to investigate the influence on bacterial cells after treatments. Atomic force microscopy (AFM) images showed severe damage on bacterial cells of both *E. coli* and *L. innocua* after the treatments. The combination of AcEW and 3% LVA displayed better inhibitory effect against air-dried bacterial cells on stainless steel coupons than using AcEW or 3% LVA individually. While the activity of traditional chlorine-based sanitisers is largely reduced by organic matters, the combined sanitiser showed better sanitising effect on organic lettuce. Overall, AcEW combined with 3% LVA is considered as a promising sanitiser to enhance the food safety of organic lettuce products during processing.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Emergency Surgery Delays- An Analysis of Target Time Achievement and Causes of Delay in Surgical Emergency Cases at BC Children's Hospital

Presenter: Tisha Dasgupta

Introduction: Many patients across Canada experience delays in surgical wait times. Concerns have been raised that patients requiring emergency surgeries, when delayed, may have an increased risk of morbidity or mortality.

Objective: The purpose of this study was to analyze the occurrence and patterns of delays of emergency surgery and correlation between surgical delay and risk adjusted outcomes. Methods: In a prospective study, four classes of emergent surgeries were evaluated: Class 1 (target <1 hour), 2A (<6 hours), 2B (<24 hours) and 3 (<72 hours). Data was collected for three months (May 21st-Aug 21st, 2017). Prospective Operating Room (OR) databases as well as patient charts were reviewed to determine the amount of delay (time and frequency), causes of delays, morbidity and mortality.

Results: There were a total of 342 cases (8.2% exclusion rate due to incomplete data). Of the 314 cases analyzed, 43.5% of Class 1, 10.6% of Class 2A, 11.5% of Class 2B and 12.8% of Class 3 cases were delayed beyond their target time, with a total delay rate of 13.7% for all emergent surgeries. The most common reason for delay as reported by the surgeons was lack of available OR facilities. An increase in target time achievement and decrease in median time to OR was observed. No correlation between morbidity and surgical delay was found. 42.4% surgeries occurred out of regular hospital hours, 15.7% having complications. Conclusion: The sickest children needing the most urgent surgeries are most likely to be delayed, often due to limited resources.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Profiling genetic interactions among ASD-associated genes that underlie sensory and learning abnormalities

Presenter: Julia Mang

Autism Spectrum Disorder (ASD) is a group of neurodevelopmental disorders characterized by social interaction and communication difficulties, restrictive repetitive behaviours, and sensory processing abnormalities. Recent sequencing studies have associated several hundred genes with ASD but the biological functions of many of these genes and how they interact to mediate behavioural phenotypes remains largely unknown. In order to better understand the function of ASD-associated genes our lab recently characterized sensory and learning phenotypes of 87 strains of *C. elegans* each carrying a loss of function mutation in a different ASD-associated gene. Using hierarchical clustering based on similarity of learning and sensory phenotypic impairments we predicted novel potential interactions among 11 ASD-associated genes. Notable genes predicted to display genetic interactions are *nlg-1*, *bar-1*, *spas-1*, *chd-7* and *rme-6*. For confirmation of the independent roles of each of the genes and their potential interactions with one another, we are currently generating double mutants. This is achieved using crossing techniques with worms carrying the appropriate mutant alleles in the putative molecular pathway, followed by validation for the amplification of the genes of interest with PCR and sequencing technology. By comparing the phenotypes of double mutants to single mutants using epistasis analysis we will be able to order the genes into a molecular pathway underlying learning and sensory phenotypes. These conserved gene networks can be leveraged to identify novel treatments that counteract loss of a particular ASD-associated gene.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Changes in Quality of Life: Before and After Hepatitis C Treatment

Presenter: Valerie Lai

New direct acting anti-viral (DAA) medications for Hepatitis C have significantly changed the treatment landscape. DAAs are all oral, have little side effects and very high efficacy in clinical trials (>95%). Inner-city populations marginalized by substance use and mental health conditions carry the largest burden of HCV infection, but were often excluded from previous interferon-based therapies. With the DAAs, HCV treatment uptake has increased and recent data supports the effectiveness of DAA treatments in inner-city populations including people who inject drugs (PWIDs). However, little is known about the effects of new HCV treatments in these groups beyond virologic response.

Quality of life (QoL) scores (using Eq-5D-3L) were measured before and after HCV treatment in an inner-city population undertaking HCV treatment in three Vancouver community health centers. Baseline and on-treatment factors were also assessed.

Overall there was no significant change in QoL scores from beginning to end of treatment. However, participants who attended an optional HCV support group most frequently (defined as every week or more) experienced significant improvements in the “usual activities” ($p=0.020$) and in the “global scores” ($p=0.006$) categories of the EQ5D questionnaire.

Frequent HCV group attendance had a positive effect on QoL within a complex DTES Vancouver population. Higher attendance in-group may represent more social connectedness, increased engagement in care and may provide a support network for patients. While the cure rates of the DAAs are promising, social factors are likely to play a significant role, and it is important to ensure that such services are offered alongside medications.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Preliminary Observations of Increased Sleep Disruption in Alzheimer's Disease Patients

Presenter: Meghan Chen

Sleep disruption is commonly associated with Alzheimer's disease (AD), and may contribute to AD pathophysiology. To assess whether AD patients experience more disrupted sleep than age-matched healthy control subjects, we compared rest and activity measured over a period of 5 days using an ambulatory actigraphy watch (Condor). The watches continuously recorded physical activity, environmental light, and body temperature. Data were used to calculate various sleep statistics, such as number of nighttime awakenings and time spent asleep. Participants pressed a button to record bedtime and wake time, and raters confirmed these times by comparing to when lights were turned on and off. Based on previous research, we hypothesized that AD patients would show increased napping, time required to fall asleep, and number of nighttime awakenings relative to age-matched healthy controls, and decreased sleep efficiency and nocturnal sleep relative to age-matched healthy controls. Our data indicate that measuring long-term rest and activity through ambulatory actigraphy is feasible and well-tolerated in patients with AD. Preliminary analysis of recorded data show no statistical difference between patients with AD and age-matched healthy controls, but there is a trend towards altered rest and activity in AD patients (AD patients (n=18) and age-matched healthy controls (n=10)). Recruitment is ongoing and the final analysis is expected to include 40 subjects per group.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Comparative analysis of brace treatment and observation for infants with Radiological Dysplasia of the Hip — A non-inferiority trial

Presenter: Ashley Jang, Fatma Khudhur

Introduction: Developmental Dysplasia of the Hip (DDH) is a condition in which the hip, a ball-and-socket joint, is formed abnormally during development. Radiological dysplasia is a milder form of DDH but when undetected, may cause pain, limping and development of osteoarthritis in early adulthood. Newborns diagnosed with radiological dysplasia can be treated by a brace, but little evidence exists to determine if this is any more effective than simple observation. The purpose of this study is to comparatively assess bracing and observation for treatment of radiological dysplasia in infants.

Methods: A clinical study will be conducted with infants diagnosed with radiological dysplasia. Infants will be randomly assigned to undergo brace treatment or observation alone. Both groups will be observed weekly via ultrasound for 6-weeks. If sufficient improvement is seen in the brace group, the brace will be discontinued, and both groups will be re-examined by physical exam and X-ray at 6 months, 1 and 2 years of age. The primary outcome measure is the acetabular index (AI). At 2 years, an AI—the angle indicating depth of the hip socket—under 22° is considered normal. A difference of less than 5° is within measurement error.

Predicted results: Results are hypothesized to show no significant difference between brace and observation groups, indicating observation alone is likely comparable to brace treatment.

Significance: This study should allow physicians to determine whether observation and careful monitoring is sufficient to limit potential complications and drawbacks associated with brace treatment during early developmental stages.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Whole Genome CRISPR-cas9 Screening on Isogenic Cell Line Model Systems to Identify Synthetic Lethal Partners of the Glioma Associated CIC Transcriptional Repressor

Presenter: Juan Burckhardt, Anand Dhatt, Yumi Wong, Micheal Wong, Jiahao Niu

The capicua gene (CIC) encodes a transcriptional repressor that is observed to harbour mutations in 70% of patients with Type 1 Low Grade Glioma. These mutations are hypothesized to inactivate CIC, implicating a tumour suppressor role, though CIC's involvement in tumour progression is not well understood. Synthetic lethal (SL) interactions refer to the phenomenon in which simultaneous inactivation of a gene pair results in lethality while individual loss of either does not. Thus, SL interactions highlight genes that function in parallel pathways to keep a cell viable. We will exploit this biological concept by identifying SL partners of CIC in order to gain insight into the cellular pathways that CIC may be involved in. A whole genome CRISPR-Cas9 knockout screen will be performed on isogenic CIC-wildtype and CIC-knockout cell lines derived from HEK293 and glioma derived cell lines HOG and BT054. These isogenic cell line models will be infected with a library of barcoded guide RNAs to knockout every targetable gene in the genome and the barcoded regions will be sequenced at several time points post-infection. Depletion of specific guides in CIC-knockout cells and not in CIC-wildtype cells will indicate CIC SL partner candidates. Since CIC mutations are mutually exclusive with mutations in TP53 and ATRX, we suspect that these and other functionally related genes will be identified as SL partners of CIC. In the long term, we anticipate that our findings will unveil novel insights into CIC's role in tumourigenesis and thereby provide possible therapeutic options for patients with CIC mutations.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Investigating the Link Between Hypoxia and Epithelial-Mesenchymal Transition as a Possible Therapeutic Target for Metastatic Breast Cancer.

Presenter: Gurkamel Gill, Medha Mittal, Louisa Ji, Christine Rehaluk

Approximately 80,000 Canadian men and women die every year as a result of a cancer diagnosis. However, it is not often the primary disease that kills a patient, but the metastatic disease, whereby cells migrate away from the primary tumour site and invade into a variety of microenvironments within the body. It is widely accepted that epithelial-mesenchymal transition (EMT) contributes to metastatic disease, as cells undergoing EMT become more migratory and invasive. Previously, EMT has been linked to hypoxia, a microenvironment in which cells surpass their glucose and oxygen consumption, which is also a marker for poor prognosis in patients. Therefore, it is possible that tumour hypoxia leads to an increase in the propensity for invasion through EMT. Metastatic human and murine breast cancer and non-cancerous epithelial cell lines have been chosen in order to compare epithelial to mesenchymal phenotypes and gene regulation by using Tgfb-1. The cells will be incubated in normoxia or hypoxia. A scratch-wound assay will be performed and imaged using Incucyte ZOOM®, in order to determine the rate of cell migration. Additionally, the RNA and protein levels of these cells will be assessed using qPCR and western blotting, in order to observe any differentially expressed EMT- or hypoxia-induced genes. If there is increased expression in the cells, then a knock-out will be performed. Using this approach we hope to identify a link between EMT and hypoxia, allowing for the development of a therapeutic target in hypoxic metastatic tumours.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Intestinal Epithelial Inflammasomes: Frontline Defenders Against *Campylobacter jejuni* infection

Presenter: Thomas Hoang

Campylobacter jejuni is the leading cause of bacterial gastroenteritis in the developed world. Commonly acquired through consumption of contaminated water or poultry, it triggers symptoms of cramps, fever and bloody diarrhea. Past research has identified *C. jejuni*'s ability to invade intestinal epithelial cells (IECs), an important virulence trait, in vitro, but little is known regarding cell invasion in vivo, and its effect on disease progression and the immune response. Our work focuses on IEC inflammasome activation in controlling *C. jejuni* pathogenesis.

Knockout mice lacking inflammasome components ASC^{-/-}, Caspase-1^{-/-}, and Caspase-1/11^{-/-}, were inoculated with *C. jejuni* 81-176. Colonic and cecal samples collected 1 and 7 days post-infection had their pathogen burdens, *C. jejuni* cell invasion, and histopathology assessed, along with changes in expression of pro-inflammatory cytokines interleukin-1 β and interleukin-18.

Although no significant differences in luminal colonization were observed, there was a drastic increase in *C. jejuni* present and replicating intracellularly within Caspase-1^{-/-} and Caspase-1/11^{-/-} IECs. Wild-type mice produced significantly more IL-1 β and IL-18 relative to knockouts, despite more intracellular bacteria and worsened inflammation in inflammasome-deficient mice.

We propose inflammasome-mediated cleavage of Caspase-1, which releases IL-18, is responsible for combating *C. jejuni* invasion and replication in IECs. IL-18 induces IFN- γ release by IELs, ultimately limiting *C. jejuni* infection through an enhanced immune response. Failure to control IEC invasion worsens downstream pathology and elevates virulence and persistence in the gut. These results highlight the importance of IEC inflammasome activation in combating *C. jejuni* infection and the consequences of failure to combat cell invasion.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Health and Wellness

Cystic Fibrosis Patients' Attitudes Towards Participation in Research

Presenter: Marissa Lee

Introduction: Many clinical trials are being conducted at the St. Paul's Hospital Adult Cystic Fibrosis Clinic but we do not currently understand the factors that influence patient participation. The purpose of this study is to understand the types of research that our patients are most interested in and to identify barriers or facilitators to participation.

Methods: Ninety-five CF patients have completed a survey consisting of 68 questions covering a variety of factors potentially influencing patients' decisions to participate.

Results: Although most patients (71%) feel they are receiving sufficient information regarding clinical trials, many patients (61%) do not actively look for information. Patients are most interested in trials that target the root cause for CF, infection, and inflammation. Barriers to participation including being too busy and living too far from CF clinic. Facilitators include study visits conducted in the participant's home town, access to the drug after trial completion, and belief that the study drug being tested is the best. We also found that patients are least comfortable with providing stool samples and receiving treatments in the form of an injection.

Conclusion: This important patient-derived information will allow us to prioritize the selection and design of studies to enhance the likelihood of achieving success in research studies.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Sustainability and Conservation

Determining population distribution of invasive mussels *Mytilus galloprovincialis*, *Mytilus edulis*, native *Mytilus trossulus* and their hybrids in Vancouver ecosystems and markets.

Presenter: Catherine Wong, Jenny Ung, Cameron Tough

The purpose of our study was to determine the population distribution of invasive Mediterranean blue mussel *Mytilus galloprovincialis*, invasive Atlantic *Mytilus edulis*, native North-Pacific *Mytilus trossulus* and their hybrids in Vancouver. The introduction of invasive species can displace the native mussels species and alter the biota of the ecosystem. DNA isolation, polymerase chain reaction (PCR) and electrophoresis gel techniques were employed on three different populations to determine the species types. Twelve replicates were taken from each local population: the Jericho Beach Pier, the Maritime Market Pier in Granville Island and a local seafood market in Granville Island from a stock labelled "Gallo Mussels". Results show that there were five individuals confirmed to be *M. edulis* and six individuals confirmed to be *M. trossulus* in the Jericho Beach Pier. This suggests that both invasive and native species are present. Additionally, there were six individuals confirmed to be *M. edulis* in the Maritime Market Pier. This suggests that only the invasive species is present the location. In the local seafood market, there were two individuals confirmed to be *M. edulis*, three individuals confirmed to be *M. galloprovincialis* and six individuals confirmed to be *M. trossulus*. This suggests that some of the samples were mislabeled. No hybrids were found in any of the populations. Our results show a potential population distribution of the *Mytilus spp.* in Vancouver and this may indicate that an invasive species has out competed our native population of mussel.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Sustainability and Conservation

Novel derivatives of kainic acid as inhibitors of neuroinflammation

Presenter: Joani Viliunas

Plants have evolved sophisticated methods to maintain biological fitness under drought stress. In addition to the plant mitigating this abiotic stress, recent studies suggest the symbiotic relationship with below-ground microbial communities provides additional support under adverse environments. Here, we examined the ecological and evolutionary effects of 42 genotypes of *Arabidopsis thaliana* after manipulating water availability and microbial presences. Flowering time was found to be genotype specific and not influenced by either manipulation (microbe presence water availability), or the relationship of between them. Mean lifetime fitness across all accessions was decreased by microbe presence in well-watered conditions but increased when microbes were present under drought. Additionally, individual genotypic responses were significantly altered by microbes under drought stress. Our findings suggest that under drought, soil microbes may influence the evolutionary response of plant populations. This unanticipated effect of microbes on plant biological fitness could have future agricultural applications for regions facing ubiquitous drought stress.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Sustainability and Conservation

The effect of *Myriophyllum aquaticum* on freshwater bodies in British Columbia

Presenter: Shirvin Lee, Rosalyn Desa

Many organisms in freshwater environments, including plants, require oxygen to grow and survive. *Myriophyllum aquaticum* is an invasive plant species originating from the Amazon River and is currently found in British Columbia. Aside from its ability to out-compete native species and deplete nutrients in the water bodies it grows in, *Myriophyllum aquaticum* is able to weave into nets, which prevents the normal flow of water through streams and rivers, thereby lowering dissolved oxygen content in freshwater sources with *Myriophyllum aquaticum* (Stiers, Josens & Triest, 2011). During our experiment, 40 water samples were collected from four freshwater sites: Serpentine Fen (Surrey, B.C.), Nicomekl River (Surrey, B.C.), Alpine Garden Pond and Meyer Glade at the University of British Columbia Botanical Garden (Vancouver, B.C.). Serpentine Fen had *Myriophyllum aquaticum* while the other three sites did not, acting as our control sites. We measured the dissolved oxygen content (mg/L) with an oxygen meter and recorded for comparison. When comparing the data from Serpentine Fen to Nicomekl River, Alpine Garden Pond and Meyer Glade, we used a paired t-test. The values we obtained from the paired t-test showed that the differences were significantly different and *Myriophyllum aquaticum* decreases the dissolved oxygen content in freshwater bodies. It is important to understand the effects of *Myriophyllum aquaticum* as dissolved oxygen levels in freshwater sources negatively impacts plants and organisms by restricting growth, which may impact water quality and industries such as agriculture and food.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Sustainability and Conservation

A Proposed Study: The Effects of Asymmetric Warming on Nematode Communities in Regions of High Versus Low Understory Vegetation

Presenter: Evelyn Kuan, Elli Newman, Alicia Elgert, Yangqian Qi, Heping Lu, Tong Ye, and Laura Super

In recent years, the scientific community has proposed to enact policies (e.g. Paris Climate Agreement), which aim to prevent a two degree Celsius rise in global atmospheric temperature (Schreurs, 2015) – an event estimated to exceed thresholds for biological processes (Wall, 2007). Our research highlights the potential impacts of this temperature increase on soil-based ecosystems, with regard to asymmetric warming – a process whereby soils experience an elevated rate in temperature increase and severity during the night-time, as opposed to the day (Yan et al., 2017). Although it is widely accepted that climate change has negative consequences on soil-based ecosystems (Simmons, 2009; Yan, 2017), we support the hypothesis that high quantities of understory vegetation will alleviate the negative impacts of warming, as it buffers against the direct absorption of heat into soil (Jonathan et al., 2016) – a phenomenon we have termed the ‘umbrella effect’. Our methods advise to collect root-eating nematodes from the Malcolm Knapp Research Forest and analyze their ability to thrive under varying temperatures and quantities of vegetation in a laboratory setting – high nematode density will signify adequate soil health (i.e. successful buffering), while reductions in nematode density will infer the degradation of soil conditions (i.e. unsuccessful buffering). We predict that understory vegetation does prove a key element for the protection of soil-based ecosystems; therefore, we encourage its use as a preventative tool against the effects of climate change and recommend that anthropogenic removal of such foliage be considered in the Environmental Impact Assessment (EIA) process.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Sustainability and Conservation

Cumulative effects of human impacts on Rainbow Trout in British Columbia: A spatial analysis

Presenter: Emma Gosselin

Rainbow trout are a key species in recreational angling, which has a participation rate of 10-20% of North America's population and an economic impact 5 times that of commercial fishing. Human activities (e.g., agriculture, forestry) and the effects of global climate change are altering freshwater habitats and creating severe challenges for rainbow trout. While many empirical studies have demonstrated impacts from various stressors to rainbow trout, there is a need for a province-wide analysis of cumulative impacts to aid in sustaining rainbow trout fisheries in British Columbia. In this study, an extensive literature review was conducted to identify and characterize human activities and their impacts on trout populations and habitat. Following the literature review, a spatial analysis procedure was developed to assess the cumulative effects of human activities on rainbow trout based on hazards. Through this analysis, maps were derived showing the footprint of human activities related to stressors for all watersheds within British Columbia. Another set of maps were produced to show an illustrative set of examples of impacts on rainbow trout life history for the stressors that are well described in the literature. This set of footprint maps can be used to facilitate regional comparisons within BC and shows the mechanisms and severity of impact of human activities on trout at the population level. In partnership with several public agencies, these findings will contribute to the proactive management and conservation policy development for a sustainable recreational fishery in an uncertain future.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Innovation and Technology

Unconstrained M-dwarf Stellar Processes and the Implications for the Habitability of Earth-like Planets

Presenter: Sam Young, Bing Liu

Earth-like planets are being discovered around M-dwarf stars at an increasing rate. With future telescopes such as the James-Webb Space Telescope (JWST) and the Transiting Exoplanet Survey Satellite (TESS) right around the corner, the rate of new discoveries will continue to surge. Determining whether these exoplanets are habitable can be challenging. In addition to the orbital distance of the planet, various stellar processes can have great implications on the habitability of the orbiting planets. For example, strong stellar winds could potentially strip an otherwise habitable planet's atmosphere. Our project focuses on the two M-dwarfs in the HD 141569 Triple system, particularly their radio emission, with aims to build an accurate spectral profile of these stars. In order to gain insight into the stellar activity of the stars we will fit various models such as gyrosynchrotron, stellar flares and electron cyclotron maser instability models using existing radio data collected from the Atacama Large Millimeter Array (ALMA) and the Very Large Array (VLA). These models will help us build a more accurate spectral profile of M dwarfs. Using these models, we can study how space weather and other stellar activities may affect habitable zones around M-dwarfs so that improved habitability models may be developed for further investigation of Earth-like exoplanets.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Innovation and Technology

Light Controlled Shuttles

Presenter: Aries Lee, Simrat Chahal

A rotaxane is a class compound that contains both a macrocycle component and a linear one. The entire compound is mechanically interlocked due to non-covalent attractive forces between the two components and the spatial arrangement of the atoms. Over recent decades, rotaxanes have become an increasingly popular topic in the scientific community, so much so that in 2016 Nobel Peace Prize in Chemistry was awarded to scientists who used rotaxanes in producing molecular machines. This class of compound has also found application in molecular shuttles and peptide synthesizers, to name a few. Molecular switches contribute to the possible production of smaller computers and cell imaging devices. Although many rotaxanes have been prepared, very few have been used as photo switches. In our study, we hope to prepare a rotaxane that can function as a molecular switch after it undergoes an intramolecular reaction. Herein, we present some predicted results.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Innovation and Technology

The Effect of pH on the Growth of *Licmophora abbreviata*

Presenter: Arvin Bahrabadi, Louise Meddings

Licmophora abbreviata is a species of diatom, which plays a crucial role in not only contributing to atmospheric oxygen supply, but also as a primary producer supporting the dietary supply of the salmon. Given the growing scientific evidence that ocean acidification is occurring, the sensitivity to pH of the diatoms was tested in this study. Our experiment was conducted over a two-week period, where solutions of *L. abbreviata* were exposed to three different medias of pH: 7, 8 and 9. Every second day, cultures were sampled in Eppendorf tubes and the cell counts were calculated using a hemocytometer. Using the observed counts, cell concentrations and growth rates were calculated and a one-way ANOVA was performed, yielding a p-value = 0.875, meaning that the mean growth rates between treatments were not significantly different. The results may have been influenced by the changing pH of the media, resulting from the metabolic activities of the diatoms in vitro, as well as the relatively short time period over which the study was done. In conclusion, there was no association found between pH and the average growth rate of *Licmophora abbreviate*.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Innovation and Technology

The effects of Minocycline on CD1d and CD1c expression in Epstein-Barr Virus- infected B cells

Presenter: Michelle Tse

Epstein-Barr Virus (EBV), is a herpes virus that infects 90-95% of the adult population in Western Countries. Multiple Sclerosis (MS) pathogenesis is thought to be linked with virus infections as environmental triggers. While a mechanism of infection is still unclear, EBV infection and Multiple Sclerosis have long been suspected to have a common relationship, where almost 100% of MS patients are EBV seropositive.

In this project, we investigate the effect of Minocycline (MI) on CD1d and CD1c, surface antigen- presenting molecules in EBV- infected B cells. We compare MI to AM580, a drug that was found to re-establish CD1d expression, as both are common anti-acne drugs that have shown positive results in treating Multiple Sclerosis. This study aims to consider whether the mechanism of action overlap between AM580 and MI, and if they do, whether they have the same effects on CD1d in EBV- infected LCLs. Using non-spontaneous and spontaneously- infected lymphocytes, MI and AM580 were added at different dosages over a 3-day period, and then flow cytometry was used to measure changes in CD1d and CD1c levels. There were no changes in regulation or dosage dependence in either surface marker levels when MI was added. This led to the conclusion that CD1d is not the marker associated with MI in the same way as AM580. MI needs to be studied further in order to understand its mechanism against MS, and possibly its relationship with EBV.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Society

Getting Labelled as Homeless: The construction of hopelessness and helplessness in Homeless life

Presenter: Kennedy Wong

Over the past ten years, Hong Kong and Vancouver have seen a rocketing increase in their homeless populations alongside a rising housing cost. Those people, who could not afford the rent, sleep in shelters, tents, McDonald's, allies, and on benches. They suffer from material deprivation, substances overdose, mental issue, social exclusion and discrimination, which in turns, disempowers their lives. This study relies on narratives collected from people who are experiencing homelessness (or who have recently been housed) in Hong Kong and Vancouver to test a theoretical model of homelessness that posits that homelessness begins as a temporary state, but becomes confirmed and entrenched as the individual experiences discrimination and is labeled as a social deviant. This leads to a secondary state, one where the individual becomes permanently homeless, and situated in a culture of poverty and begin to conform to the cultural construct of being homeless. These narratives show how hopelessness and helplessness are constructed in homeless life, in which affect an individual's identity, redefines their life history, and influences their present outlook of the future. Attention is directed at the experience of discrimination, and how individuals resist the stereotypes and labels of homelessness. This study examines how individuals the state welfare apparatus, including social services, religious, and non-profit organizations that seek to address issues of poverty, and how these organizations work to empower (or not) the individual.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Society

An Evaluation of the Relationship Between Socioeconomic Status and Young Children's Executive Functioning Skills

Presenter: Larissa Chiu

The purpose of this research was to increase understanding regarding the relationship between poverty, parenting, and children's executive functioning (EF) skills. EF skills are a set of higher mental functions, composed of inhibitory control, working memory, and cognitive flexibility, that enables us to perform goal-orientated behavior. A total of 60 children ages 2 to 6 years and their caregivers from around the Greater Vancouver region participated in this study. Each participating caregiver completed a questionnaire covering socioeconomic status (SES) variables and parental stress, while each child performed the Children's Stroop (Day-Night) task. This task required the children to inhibit their automatic response to a series of cards (with suns and moon on them), and say the opposite response (i.e., "Day" for the moon card), which means this task measures inhibitory control. A positive relationship was identified between SES and children's inhibitory control such that better inhibitory control was observed in children as their family's SES increased. Additionally, parenting variables were correlated with both children's EF and SES; specifically, parental stress significantly contributed to a model predicting children's inhibitory control, with inhibitory control performance decreasing as parental stress increases. These findings demonstrate the importance of early intervention efforts targeting children from low SES backgrounds, aiming at closing the developmental gap these children can experience. They also accentuate the need for the British Columbia provincial government to put in place a poverty reduction plan.

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Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Society

Telehealth Use in Port McNeil, British Columbia: Successes and Challenges

Presenter: Monica McKeown

Telehealth has many applications to improve the health of Canadians in rural areas. However, relatively little is published regarding physician's views on the implementation of telehealth services into their practices, particularly in British Columbia. Additionally, the province currently lacks a standardized implementation approach. This is a qualitative study in which semi-structured interviews were conducted with five physicians from Port McNeil, British Columbia and two individuals from the Telehealth Team at the Provincial Health Services Authority regarding current telehealth practices and barriers to further implementation, aiming to inform quality improvement, improve patient experience, and direct future research. Emerging themes include increased accessibility of health care, enhanced communication and relationships, and educational utility. Common challenges included lack of funding, lack of trained individuals at the receiver site to facilitate the clinical encounter, and technological challenges. Future directions include the need to implement interoperable systems; increasing education for individuals at the receiver site; and increasing the scope of telehealth to include a multidisciplinary team. Further research will be needed to determine whether these themes persist across other rural communities. Considering these viewpoints when directing future growth assists in implementing effective standardized telehealth services that can best meet the needs of British Columbians.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

Intercultural Discourse in Korean theatre: Can Korean Theatre Achieve a Compromise of Eastern and Western Art?

Presenter: Jenny Kim

The research critically analyzes whether and how the National Theatre Company of Korea practices intercultural theatre in its production of *The Crucible*. Intercultural theatre is a theatrical academic discourse that examines creations of a hybrid performance of different cultures. The National Theatre Company of Korea (hereafter NTCK) attempted to communicate its 2015 theme of 'Celebrate Liberation, Beware of Subjugation' through the production of American playwright Arthur Miller's *The Crucible*. Using the theory of theatrical interculturalism, the research first criticizes NTCK's scenographic choices that do not promote its theme. It involves reflections on my multiple live theatre experiences of the NTCK's *The Crucible* once from the audience and once from the special seats on stage, in addition to online interviews with the audience and my conversation with the staff. For further discussion, the research adopts Bertolt Brecht's theory of historicization and discusses whether the actors and the play director interpret the production as an intercultural production. It involves text analysis of press interviews, a program, editorials published by the directors, and my conversation with actor Jaejin Jung. The research aims to answer the following question: Can Korean theatre achieve a successful, balanced compromise of Eastern and Western art, or will it further diminish an 'endangered' Korean theatre? Finally, the research concludes that the performance neither incorporates Korean cultural concepts nor includes significant efforts to promote interculturalism. In acknowledgement of the limitations of contemporary intercultural theatre, the research encourages a broadening of cross-cultural understanding to enrich world culture and Korean theatrical art.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

The Lived Experience of Receiving Treatment for Alcohol Use Disorder Among Punjabis Presenter: Shawna Narayan

Alcohol use disorder (AUD) is a chronic relapsing illness that is growing in Canada. Most current literature and policy on AUD lacks relevance when applied to Canada's multicultural populations. In Surrey BC, where South Asians make up 34% of the population, many patients struggle to remain engaged in the continuum of care for problematic alcohol use. The lived experience of being Punjabi, having an alcohol use disorder, and accessing the health care system in Surrey, BC, is explored using phenomenological analysis of semi-structured one-on-one interviews. Discussed is the validation process and methods of acquiring data since it has not been optimized for multicultural populations.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

To Lie or Not to Lie? Culture and Contexts in Adolescent's Moral Reasoning **Presenter Sirian Yang, Saman Fouladirad, Harleen Gill**

In recent decades, social-developmental psychologists have shown that children and youth's opinions of verbal deception vary, depending on their cultural background and age. Generally, children and youths mainly exposed to Western cultures tend to absorb more individualistic beliefs, while those that grow up in Eastern cultures incline toward collectivistic beliefs. The present cross-cultural research explores the relationship between Chinese and Canadian youths' moral judgements of verbal deception and the cultural contexts in which they are situated. A total of 296 Canadian and Chinese youths (100 Han-Chinese, 96 Multicultural-Canadian, 100 Euro-Canadian) were asked to evaluate six competitive moral-dilemma scenarios based on their values. Testing collective or individualistic values of adolescents, these scenarios require participants to (a) classify deceptive or truthful statements made by protagonists and (b) offer their judgements and justifications of these judgements. Like the story-characters, participants were asked to contemplate protecting or exposing either friends or compatriots in a situation of a misdemeanor associated with a sports competition. Canadian students excused lying to cover for an individual (best friend) over lying to protect a collective (their nation). This effect was reversed in the Chinese adolescent sample. This individualistic view suggests that they prefer to compromise values of honesty for personal friendship over collectivist honor. Participants also evaluated harsh truths that exposed a compatriot more positively than honesty that exposed friends. These findings could enhance an awareness of the diverse values in our environments and help reduce intercultural misunderstandings and eventually promote cultural tolerance.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

An evaluation of the impact of the minimum legal drinking age on lifetime cannabis use in youth living in Saskatchewan.

Presenter: Nick di Lello, Mason Uim, Claire Benny

Background: Cannabis is the commonly used illicit drug among 15 to 24 year olds in Canada, with approximately 43% of people ages 15 and older having used cannabis in their lifetime (1). This is important because of the upcoming legalization of recreational-use cannabis in Canada. Little is known about the relationship between alcohol use, cannabis-use and minimum legal ages of access (2). Saskatchewan is unique to other provinces in that the minimum legal drinking age (MLDA) and age of tobacco sales are different, allowing us to isolate the impact of MLDA on cannabis-use. Methods: This cross-sectional study uses data from the Canadian Tobacco Alcohol and Drugs Survey, 2015 (3). The sample includes 16-18 (n = 160) and 19 (n = 57) year olds in Saskatchewan who have either used or never used cannabis in their lifetime. A Chi-square test was used to calculate the difference in lifetime cannabis usage between those younger (16-18) and older than the MLDA (19). Results: There were no statistically significant differences between the two age groups ($p = 0.643$) and an odds ratio of 1.16 (95% CI = 0.61-2.21). Conclusion: The results show no sufficient evidence on the impact of release from drinking age restrictions on use of cannabis. A limitation of this study includes the social desirability of the voluntary survey responders. Due to the insignificant findings of this work and previous studies, it is evident that more research is necessary to evaluate the relationship between MLDA and cannabis-use.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

Investigating the Effectiveness of the Life After High School Workshop in Inner-City Schools

Presenter: Hakeem Hussein, Elias Panah, Shawna Narayan

The Lower Mainland is home to over 200,000 students. Several of the schools that students attend are designated inner city where low average incomes, high ESL, single parent family rates, and low standardized test scores challenge staff daily to address both the basic needs of students and their educational departments. High school students within inner-city schools experience a lack of support in the difficult transition from high school to post-secondary school. The study investigates whether the Life After High School workshops are effective in providing support for students to overcome the challenges for post-secondary school. The workshop included five key topics: dealing with financial stress, finding credible information on post-secondary institutions, entering the workforce, benefits of volunteering, and caring for yourself. A pre-workshop and post-workshop survey was used to collect data from students in grades 10-12 in inner-city high schools in Surrey, British Columbia. The results show an increasing trend in preparedness and confidence in some topics associated with life after high school graduation.

Wave 1 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

9.00am-10.30am

THEME: Individual and Technology

Halloween and fatal pedestrian crashes in the United States

Presenter: Candace Yip

Background: Throughout North America, children celebrate Halloween by walking through residential neighborhoods at dusk while wearing costumes that limit peripheral vision and visibility to drivers. Few studies have considered traffic injury risks on Halloween.

Methods: We performed a population-based retrospective study using data on all fatal traffic crashes occurring in the United States between 1975 and 2016. The number of pedestrians involved in fatal crashes between 5:00pm to 11:59pm on October 31st was compared to the number of pedestrians in crashes during identical time intervals on control days one week earlier and one week later. Additional analyses examined factors influencing crash risk.

Results: Fatal pedestrian crashes were significantly more likely to occur on Halloween (678 crash-involved pedestrians on Halloween evenings versus 912 crash-involved pedestrians on control evenings; odds ratio, 1.48; 95% confidence interval, 1.36 - 1.64; p-value, < 0.001). Pedestrians aged 4 to 8 years old exhibited the greatest risk increase (odds ratio, 9.00; 95% confidence interval, 5.05 - 16.06; p-value < 0.001). Risks were highest from 5:00pm to 7:59pm. Relative risks remained stable over the 42-year study interval despite small decreases in absolute risk.

Conclusions: Parents and policymakers may wish to develop strategies to reduce risk of childhood traffic injury on Halloween. These may include the incorporation of reflective patches on Halloween costumes and the elimination of traffic within trick-or-treating areas.

Wave 1 - Oral Presentation List

Buchanan (BUCH) - 1866 Main Mall

9.00am-10.30am

THEME: Health and Wellness

BUCH B208

Probability of Cancer in Incident Pulmonary Nodules Detected on Screening Computed Tomography

Andrew Golin

Isolation of Language-Specific Functional Brain Networks During Lexical Decision

Samantha Wong

Screening *Cryptococcus neoformans* mutants for sensitivity to drugs Brefeldin A and Curcumin, and followed-up studies on genes Trs85, Yor1 and Phs1

Sunny Chen

Adolescent and Young Adult Central Nervous System Tumor and Sarcoma Survivors: An assessment of the documentation of late-effects risks and screening recommendations

Jordan Tran

BUCH B213

Protocol for the Evaluation of the Nutritional Status of Ugandan Pediatric Surgical Patients

Cyrus Bhiladvala

Changes in the incidence and surgical treatment of ankyloglossia in Canada

Michelle Lisonek

THEME: Individual and Society

BUCH B210

Understanding the Journey to Care for Ugandan Children with Rare Surgical Diseases

Iris Liu

Reasons for refusal - why patients say 'no' to participation in stroke clinical trials

Lauren Quong, Zoe O'Neill, Halina Deptuck

Emperor Huizong's Political Hint of Slender Gold Calligraphy

Ran Zhou

A Deal with the Devil: The Role of Financiers on University Boards

Albina Gibadullina

BUCH B215

Yours vs Mine: How reward and the self affect memory

Keah Sully-Daniels

Menstrual Cycle and Moral Evaluation

Bitá Zareian

Implications of Privacy-Preserving Technologies in the Absence of Net Neutrality through an Interdisciplinary Legal Perspective

William Chen

THEME: Innovation and Technology

BUCH B313

Analyzing Brain Connectivity with Manifold Regression: Can Genes Predict Intelligence?

Nam Hee Kim

2D NMR Analysis of Aurein 2.2 Derivatives

Ethan Lee

Embarrassingly Parallel, Total-Internal Analysis: Exploring probabilistic and numerical methods to analyze T immune cell membrane receptor kinetics and reduce computational complexity

Tommi Muller

Researcher perceptions of laboratory rats

Maria Chen

THEME: Sustainability and Conservation

BUCH B315

Developing Better Species Distribution Models for Climate Change: Bromeliads as a Model System

Shaan Aroeste

Cellulose Synthase 7 (CESA7) Mutants Display A Loss In Cellulose Patterning In Arabidopsis thaliana Cell Walls

Jan Xue

Bison Reintroduction to Banff National Park

Patrick Gibeau

Caprellid amphipods (Caprella spp.) are vulnerable to both physiological and habitat-mediated effects of ocean acidification

Emily Lim

Wave 1 - Oral Presentation Abstracts

BUCH B208

9.00am-10.30am

THEME: Health and Wellness

Probability of Cancer in Incident Pulmonary Nodules Detected on Screening Computed Tomography

Presenter: Andrew Golin

BACKGROUND: Current lung nodule management guidelines recommend lowering the size threshold from 6mm to 4mm for a repeat CT scan if the solid lung nodule is new. Incident nodules are defined as nodules not visible on the baseline CT, even in retrospect. The recommendation assumes higher malignancy probability of incident lung nodules. We sought to determine the probability of cancer in new lung nodules $>1\text{mm}$. **METHODS:** 2537 individuals were enrolled through 8 centres across Canada based on a $\geq 2\%$ 6-year risk of developing lung cancer estimated by the PanCan model. Individuals were screened at baseline and 1 and 4 years post-baseline. A patient-specific analysis was performed where only the nodule with the largest mean diameter was included for each nodule type (solid, semisolid, ground glass opacity). **RESULTS:** 2015 participants with nodules were screened in the PanCan study. 30/733 and 129/2670 incident and prevalent cancerous nodules were recorded respectively from 158 participants. One participant had two cancers from two different nodule types. Solid incident nodules $<8\text{mm}$ had a higher probability of lung cancer than solid prevalent nodules (OR 2.43 95%CI 1.26-4.67). However, incident nodules $\geq 10\text{mm}$ had a lower malignancy probability than prevalent nodules (OR 0.22 95%CI 0.11-0.42). **CONCLUSION:** New solid nodules $<8\text{mm}$ have a higher probability of malignancy. They require closer surveillance than prevalent solid nodules. New nodules $\geq 10\text{mm}$, appearing within 2 years of a prior negative CT are less likely to be malignant than prevalent nodules. A short interval surveillance low dose CT scan, rather than immediate tissue sampling may be appropriate for large incident nodules.

Wave 1 - Oral Presentation Abstracts

BUCH B208

9.00am-10.30am

THEME: Health and Wellness

Isolation of Language-Specific Functional Brain Networks During Lexical Decision

Presenter: Samantha Wong

Visual cognitive tasks involving linguistic and semantic processing can recruit multiple brain networks due to various facets of the task. The goal of this study on functional networks during a lexical decision task was to separate cognitive-load-dependent from linguistic-load-dependent networks through multivariate analysis of functional brain networks. 58 healthy adults were recruited to perform a task requiring participants to decide whether four-letter sequences were words or non-words using functional magnetic resonance imaging (fMRI). Task blocks with two levels of linguistic difficulty were randomly presented. Our multivariate analysis revealed three components of functional brain networks in this task: default mode network (DMN) response was cognitive-load dependent, language (LAN) response was linguistic-load-dependent, and response (RESP) was not responsive to linguistic or cognitive load. These results differentiate the role of DMN and LAN in lexical and cognitive processing at various levels of difficulty and differentiates the two from the condition neutral RESP. By visualizing how various functional networks respond to a lexical task, this study contributes to clarifying the function and responsivity of these task-related networks that underlie most cognitive task states.

Wave 1 - Oral Presentation Abstracts

BUCH B208

9.00am-10.30am

THEME: Health and Wellness

Screening *Cryptococcus neoformans* mutants for sensitivity to drugs Brefeldin A and Curcumin, and followed-up studies on genes *Trs85*, *Yor1* and *Phs1*

Presenter: Sunny Chen

As a pathogenic fungus, *Cryptococcus neoformans* can cause life-threatening meningoencephalitis in immunocompromised people, including HIV/AIDS patients. Some of the major virulence factors associated with this pathogen include the ability to grow at human physiological temperature (37°C), iron acquisition from the host, melanin production and capsule formation. In this study, a forward genetic approach was taken to identify novel genes that potentially contribute to the elaboration of virulence factors. A total of 4,334 mutant strains of *C. neoformans* from different deletion sets were screened in a 96-well microtitre format against the drugs brefeldin A (BFA, a trafficking inhibitor), and curcumin (CCM, an iron chelator) for identification of novel genes likely involved in intracellular transport processes and/or the homeostasis of iron. The screen identified 84 strains that possessed hypersensitivity to BFA and/or CCM in growth assays, among which 79 were archived and 3 were chosen for further studies. The collection of 79 mutants lays the foundation for future studies of potential virulence mechanisms, and the mutants chosen for detailed analysis, namely *Trs85*, *Phs1*, and *Yor1*, all represent previously uncharacterized genes in *C. neoformans*. Overall, initial results suggest that *Trs85* has potential functions in cell cycle and transport-related processes, *Yor1* may function in membrane trafficking, and *Phs1* is likely involved in the biosynthesis of very long chain fatty acids (VLCFA). For VLCFAs, I hypothesize that some of these products may function as signals that regulate various biological processes such as cell wall synthesis and repair, the response to stress, endocytosis/exocytosis, and protein trafficking.

Wave 1 - Oral Presentation Abstracts

BUCH B208

9.00am-10.30am

THEME: Health and Wellness

Adolescent and Young Adult Central Nervous System Tumor and Sarcoma Survivors: An assessment of the documentation of late-effects risks and screening recommendations

Presenter: Jordan Tran

Cancer patients diagnosed during their adolescent or young adult (AYA) years (ages 15-39) have unique cancer care needs that may not be adequately met through pediatric or adult oncology services. Many survivors are at risk for late effects, treatment-related health problems occurring more than 5 years after therapy. AYA cancer survivors are generally followed in the community after discharge from oncology care, but it is unclear what information is available to primary care providers to guide follow-up care. The objective was to assess the documentation of late effects risks and screening recommendations in the medical charts of AYA cancer survivors. The BC Cancer Agency charts of all patients treated with radiation for a CNS tumor or sarcoma between 1985 and 2010 were identified, information describing late effects and screening recommendations extracted. Charts for 132 CNS tumor survivors and 94 sarcoma survivors were analyzed. Among the CNS tumor group, 55% of patient charts had documentation of late effects and 25% had screening recommendations. Among the sarcoma group, 65% of patient charts had late effects risks documented and 8% had screening recommendations. Patients treated in more recent years appeared to be more likely to have specific late effects risks documented. Documentation has improved somewhat in recent years perhaps reflecting increased awareness of health challenges experienced by cancer survivors. However, a discharge summary that includes a survivorship care plan to screen for and manage potential late effects are likely essential for the care of cancer survivors in the community.

Wave 1 - Oral Presentation Abstracts

BUCH B213

9.00am-10.30am

THEME: Health and Wellness

Protocol for the Evaluation of the Nutritional Status of Ugandan Pediatric Surgical Patients

Presenter: Cyrus Bhiladvala

Undernutrition in pediatric surgical patients is a systemic issue which can lead to child mortality. This problem can be solved via the administration of dietary supplements. Failure to provide an affordable solution will result in higher incidences of disease, stunting, and mortality. The World Health Organization (WHO) has announced its 2025 goal to maintain wasting at less than 5%, and reduce stunting by 40% for children under the age of five.¹ The aim of this study is to collect and report on qualitative and quantitative data pertaining to the nutritional status of surgical patients aged between six and 59 months over the course of surgical camps and hospital visits in Eastern and Central Uganda. Cross-sectional data collection and a pre-operative survey will be conducted on consenting patients who come to these camps, in order to amass a relevant dataset. Our first dataset will be collected this February. We will compare our collected data with a 2016 study of the general population in order to note any discrepancies. Results will then be used to advocate for nutritional aid to this region in the future.

Wave 1 - Oral Presentation Abstracts

BUCH 213

9.00am-10.30am

THEME: Health and Wellness

Changes in the incidence and surgical treatment of ankyloglossia in Canada

Presenter: Michelle Lisonek

Background: Reports show increases in rates of ankyloglossia (a congenital anomaly characterized by a tight lingual frenulum) and frenotomy (a surgery that cuts the frenulum) in British Columbia. We carried out a study to determine temporal trends and regional variations in ankyloglossia and frenotomy in Canada.

Methods: The study included all hospital-based live births in Canada (excluding Quebec) between April 2002 and March 2015, with information obtained from the Canadian Institute for Health Information. Temporal trends and provincial/territorial variations were quantified by comparing rates (rate ratios). Statistical significance was evaluated using 95% confidence intervals (CI).

Results: Ankyloglossia rates increased from 6.86 in 2002 to 22.6 per 1000 live births in 2014 (P for trend<0.001), while frenotomy rates increased from 3.76 in 2002 to 14.7 per 1000 live births in 2014 (P for trend<0.001). Frenotomy rates among infants with ankyloglossia increased from 54.7% in 2002 to 63.9% in 2014 (RR: 1.18, CI: 1.13-1.24). Compared with British Columbia, rates of ankyloglossia were over three-fold higher in Saskatchewan (RR: 3.40, CI: 3.16-3.67), Alberta (RR: 3.50, CI: 3.29-3.72) and the Yukon (RR: 3.62, CI: 2.67-4.92), while rates of frenotomy were three- to four-fold higher in the Yukon (RR: 3.41, CI: 2.28-5.10), Alberta (RR: 4.01, CI: 3.71-4.33) and Saskatchewan (RR: 4.12, CI: 3.76-4.52).

Conclusion: A desire to increase rates of breast feeding initiation and absence of standardized criteria for the diagnosis of ankyloglossia have resulted in runaway rates of frenotomy for newborn infants in some parts of Canada.

Wave 1 - Oral Presentation Abstracts

BUCH B210

9.00am-10.30am

THEME: Individual and Society

Understanding the Journey to Care for Ugandan Children with Rare Surgical Diseases

Presenter: Iris Liu

Purpose: To describe the current state of the referral system for children with rare surgical diseases at two referral hospitals in Uganda.

Methods: This study in Uganda was completed at two hospitals: Mulago National Referral Hospital and Soroti Regional Referral Hospital from April to June 2017. The two arms of the study were: a patient questionnaire and a focus group discussion concerning referral and care for these children. The list of rare surgical diseases considered for this study have incidences of less than 5 per 10,000 live births and was compiled by pediatric surgeons experienced in the Uganda setting.

Summary of Results: A total of 70 patient families and 24 health care professionals participated in the study. The median time elapsed between the first symptom and the final diagnosis ranged from 0 to 120 days. Approximately 93% of diagnoses were delivered in person with the majority being well-delivered and accompanied by psychological support. Although both hospitals in this study are government hospitals and theoretically provide general hospital care for free, 70% of study respondents at both hospitals paid out of pocket for medical tests. The focus group responses at both hospitals suggest that the greatest challenges in referring patients with rare surgical diseases are in transportation and financial constraints whereas the greatest challenge in receiving referrals is lack of supportive manpower.

Conclusion: While the majority of respondents received a well-delivered in-person diagnosis, financial barriers present significant hardships for patients and families within a government hospital care setting.

Wave 1 - Oral Presentation Abstracts

BUCH B210

9.00am-10.30am

THEME: Individual and Society

Reasons for refusal - why patients say 'no' to participation in stroke clinical trials

Presenter: Lauren Quong, Zoe O'Neill, Halina Deptuck

Objective: Stroke is the third most common cause of mortality and the most common cause of acquired disability in Canada. Approximately 62,000 strokes occur yearly and over 426,000 Canadians live with long-term disability from stroke. Utilizing clinical trials to increase understanding of stroke and to improve treatment is critical. Determining reasons for refusal to participate in stroke trials provides insight into improving recruitment methods, increasing overall participation in clinical research and improving our knowledge of stroke. Since only anecdotal evidence exists for why patients refuse participation, we wished to identify and quantify these reasons to determine significant enrolment barriers.

Methods: We assessed refusal data from screening logs and research coordinator notes for four clinical trials recruiting from the Vancouver Stroke Program (VSP): two randomized, double-blind antithrombotic trials, one randomized surgical intervention trial and one observational trial using a non-invasive external device.

Results and Conclusions: Over 2 years, 210 patients were approached for clinical trials recruited through the VSP. Of the patients approached, 47% consented to antithrombotic trial enrolment; 41% consented to the surgical intervention study; 86% consented to the device trial. The primary refusal reason in antithrombotic trials was concern about study medication side effects. Patients primarily refused a study involving possible surgical intervention due to discomfort with the randomization process. Device trial refusals were mainly due to disinterest. More men were approached overall; men were more likely to consent than women. Whether patients were approached by a physician and research coordinator versus a research coordinator alone significantly influenced mean consent rate across all trials.

Wave 1 - Oral Presentation Abstracts

BUCH B210

9.00am-10.30am

THEME: Individual and Society

Emperor Huizong's Political Hint of Slender Gold Calligraphy

Presenter: Ran Zhou

In ancient China, calligraphy serves not only as an aesthetic art form, but has close connections with moral authority and the political order. On the one hand, the style of a man's calligraphy determines his personality and moral in traditional Chinese standard; on the other hand, the propaganda of calligraphy style is usually made for certain political purposes. Imperial calligraphy, for no matter an emperor's personal preference or further consideration, usually became a way for scholars to investigate the culture and political environment of that period. Therefore, the unitarity between an empire and his calligraphy is always traceable, and we cannot discuss calligraphy without considering its political background. However, Emperor Huizong of the Song dynasty is a special one in academia that his calligraphic achievement and political failure is usually explored separately: he was outstanding in his artistic achievement, especially his unique style of calligraphy; yet he is also known as a political failure who lost the throne to Jurchen invaders and died their prisoner. Although people usually discuss Huizong from the view of decadent and negligent, many historical evidences prove that Huizong had strong political ambition in pursuing glory for his flourishing realm. Starting from the existing research from both English and Chinese scholarship regarding Huizong's calligraphy, this presentation will consider the relationship between Huizong's unique Slender Gold calligraphy and his identity as an emperor, and to what extent the Slender Gold calligraphy functions as a tool to strengthen his imperial power.

Wave 1 - Oral Presentation Abstracts

BUCH B210

9.00am-10.30am

THEME: Individual and Society

A Deal with the Devil: The Role of Financiers on University Boards

Presenter: Albina Gibaldullina

Through a time-series analysis of 70 American research universities, this study captures the vocational changes in make-up of the governing boards of universities between 2000 and 2017, and examines the extent to which representation of financiers affects university operations. I find that the representation of financiers on governing boards has increased from 21% to 33% at private universities while remaining at 11-12% at public universities, and that it is negatively correlated with the representation of higher education, public sector and non-finance business professionals. I also find empirical evidence for the consequences of financialized governance. First, higher representation of financiers leads to labour restructuring, particularly: (1) growing executive compensation for university presidents and a growing gap between their own salaries and the average salaries of faculty, (2) less funding allocated towards research in comparison to instruction, and (3) overall less spent on labour. Secondly, it leads to financial restructuring, including lower university indebtedness, higher reliance on investment income, and increasing spending towards infrastructure. Thirdly, it leads to commodification of education captured through rising tuition costs and more funding allocated towards student services. While universities seek to attract financiers to assist them in becoming more financially self-sufficient during periods of austerity, the increased presence of bankers in the primary decision-making organ of the university fosters the embedding of their ideological values within it. In turn, this leads to the corporatization of universities through the processes of labour, financial and operational restructuring.

Wave 1 - Oral Presentation Abstracts

BUCH B215

9.00am-10.30am

THEME: Individual and Society

Yours vs Mine: How reward and the self affect memory

Presenter: Keah Sully-Daniels

People show a bias for their own objects: they have a better memory for them and rate them as having a higher value. In this experiment, we examined how much incentive it takes for a person to remember objects owned by others just as much as their own. We hypothesized that when memorization of other-owned objects (objects that are owned by the experimenter) is paired with higher reward, the bias for self-owned objects (objects that are owned by you) will be reduced. After being told they would be rewarded for each item later remembered, participants learned that objects were either owned by themselves or by the experimenter. Reward payout was either equal (10/10 cents) for self-owned or other-owned objects, or unequally weighted (10/15 cents) so that memory of other-owned objects earned the participant more money. All money earned could be spent on candy in the lab. In the subsequent 'old/new' memory test, self-owned objects were recognized significantly more than other-owned objects in both conditions. Reward payout had no effect on recognition. Possible explanations are that participants were not reminded of the reward pattern, or that the magnitude of the reward may have been too low. Further research could examine introducing a loss paradigm to increase salience towards other-owned objects.

Wave 1 - Oral Presentation Abstracts

BUCH B215

9.00am-10.30am

THEME: Individual and Society

Menstrual Cycle and Moral Evaluation

Presenter: Bitá Zareian

Past research has shown that moral evaluation is influenced by sex hormones. However, previous studies have primarily focused on the 'male' sex hormone, testosterone, and have demonstrated that testosterone can cause more utilitarian moral evaluation. This raises the question of whether the 'female' sex hormones, estradiol and progesterone, which fluctuate naturally during the female menstrual cycle, affect women's moral evaluations. To address this question, we recruited more than 500 female participants from the UBC Human Subject Pool. During the experimental session, participants were asked to answer a demographic questionnaire, respond to several moral evaluation dilemmas, and provide a saliva sample, which will be analyzed for estradiol and progesterone levels to confirm self-reported cycle phases. Each moral dilemma included one of the following scenarios: non-harm, intentional harm, accidental harm, and attempted harm, of which the latter two are of particular interest in this study. We expect to find that moral evaluations will differ between the early follicular and the mid-luteal cycle phase. More specifically, because previous studies have shown that elevated progesterone is associated with increased sensitivity to potential threats, we expect that females will show stricter moral evaluation in the mid-luteal phase of their menstrual cycle. The relationship between menstrual cycle phases (i.e., early follicular phase and mid-luteal phase) and the mean on the two moral evaluation scenarios of interest (accidental harm and attempted harm) will be assessed using two-way ANOVA. The results of this study will provide evidence on the relationship between moral evaluation and menstrual cycle phase.

Wave 1 - Oral Presentation Abstracts

BUCH B215

9.00am-10.30am

THEME: Individual and Society

Implications of Privacy-Preserving Technologies in the Absence of Net Neutrality through an Interdisciplinary Legal Perspective

Presenter: William Chen

Privacy-preserving technologies such as the Tor Network and Virtual Private Networks have become increasingly vital in the protection of privacy and the evasion of censorship in recent years, branching out from their original purpose to solely protect the privacy of users. However, these technologies face an increasingly uncertain future in regards to dynamically changing legal and regulatory regimes in the United States, especially with recent trends that reverse existing precedents and commitments of the United States government to defend and uphold net neutrality, or the principle that all content on the internet should be treated equally and without discrimination. In this sense, privacy-preserving technologies serve as tools to counteract legal forces that go against the interests of an open internet and attempts to otherwise regulate and limit the use of the internet. This study analyzes the implications of the deterioration of net neutrality within the United States legal and regulatory regimes on privacy-preserving technologies, and how privacy-preserving technologies can otherwise hinder the deterioration of net neutrality. Using an interdisciplinary legal perspective that analyzes geographical notions of place, political constructs of society and freedoms, and public policy perspectives on the effectiveness of law in regulating technology, it can be asserted that in the absence of net neutrality, technologies will emerge in direct opposition to key threats to the freedom of the internet. However, such privacy-preserving technologies inherently face key challenges, such as adoption, usability and societal belief systems in challenging the legal authority of governments. These findings address a clear gap in knowledge for telecommunications policy and the effectiveness of public policy efforts with regards to net neutrality.

Wave 1 - Oral Presentation Abstracts

BUCH B313

9.00am-10.30am

THEME: Innovation and Technology

Analyzing Brain Connectivity with Manifold Regression: Can Genes Predict Intelligence?

Presenter: Nam Hee Kim

IQ is a multi-factorial human trait that is influenced by both genetic and environmental factors. Genome-wide association studies (GWAS) have had limited success in identifying genetic loci associated with IQ, likely due to the layers of intermediate biological processes that are ignored in GWAS analysis. A number of studies have shown that connectivity between brain regions of specific subnetworks is correlated to brain development and fluid intelligence. Hence, connectivity of brain subnetworks can serve as an intermediate trait to increase sensitivity in identifying IQ-related genetic variants. However, current analysis methods that allow subnetworks as response variables do not scale up to genome-wide analysis. To tackle this problem, I propose a computationally efficient approach for associating genetic variants to brain subnetworks that respects the manifold properties of subnetworks. I first apply this approach to the IMAGEN consortium's neuroimaging data to identify IQ-relevant brain subnetworks. I then evaluate this approach on synthetic data generated from real genotype data. Several IQ-relevant subnetworks are successfully identified when the Wechsler Intelligence Scaling for Children (WISC) of a thousand European teenagers are used as input. Signaling genetic variants are also successfully identified on synthetic data while achieving benchmarks superior to the state-of-the-art methods. Equipped with scalability and statistical power, this approach presents an exciting opportunity to explore the genetic contributions to intelligence, which will help expand our current knowledge of the relationship between genetics and neurosciences.

Wave 1 - Oral Presentation Abstracts

BUCH B313

9.00am-10.30am

THEME: Innovation and Technology

2D NMR Analysis of Aurein 2.2 Derivatives

Presenter: Ethan Lee

Previous studies show that amphibian skin contains biologically active amines, alkaloids and peptides that play integral roles in regulating the physiological functions of the skin, as well as defend the organism from harmful predators and microorganisms. The peptides act as the first line of defense against bacterial infections, serving as effector molecules of innate immunity. The antimicrobial peptides studied in the past are mainly cationic, which allow for the interaction with the anionic phospholipids of bacterial membranes. The disturbance of bacterial and cancer cell membranes can lead to either cell death or the inhibition of growth. This study is focused on the derivatives of the antimicrobial peptide Aurein 2.2 from *Litoria aurea*, named peptides 73 and 77. Aurein proteins create pores in bacterial membranes, which allow for the reduction of the membrane potential and allow ions and small molecules to pass through the lipid bilayer. These pores display ion selectivity and disturb the natural metal cation concentrations in bacterial cells and reduce the energy supply through the reduction in the membrane potential, eventually leading to cell death. Total correlation spectroscopy (TOCSY) and nuclear Overhauser enhancement spectroscopy (NOESY) are used in tandem to identify spin systems in the peptides. The aim of this study is to determine if peptides 73 and 77 act similarly to Aurein 2.2 with regards to ion selectivity and ion leakage. Several cations are titrated in separate experiments into solutions of peptides 73 and 77 and the results are compared to control titrations using Aurein 2.2.

Wave 1 - Oral Presentation Abstracts

BUCH B313

9.00am-10.30am

THEME: Innovation and Technology

Embarrassingly Parallel, Total-Internal Analysis: Exploring probabilistic and numerical methods to analyze T immune cell membrane receptor kinetics and reduce computational complexity

Presenter: Tommi Muller

The dynamics of the T immune cell membrane and the motion of its surface-bound receptors can be analyzed using a sophisticated microscopy technique called Total Internal Reflection Fluorescence Microscopy (TIRF), where receptors can be tagged with light-emitting particles that are illuminated by a laser. Methods in probability and numerical analysis, such as Hidden-Markov models and the Metropolis-Hastings algorithm, were applied to the trajectories of the receptors from the microscopy images using single-particle tracking to estimate parameters such the diffusivity and Markov state transition probabilities of the receptors. This, however, is very computationally expensive, taking days on a supercomputer for the data analysis to complete. In this presentation, we will explore TIRF, the Metropolis-Hastings Algorithm, and an approach to reduce computation time: an Embarrassingly Parallel Monte Carlo Markov Chain (MCMC) heuristic.

Wave 1 - Oral Presentation Abstracts

BUCH B313

9.00am-10.30am

THEME: Innovation and Technology

Researcher perceptions of laboratory rats

Presenter: Maria Chen

Rats are one of the most commonly used animals in research; their welfare is important both in and of itself, and for ensuring good experimental results. The One Welfare framework sees human and animal welfare as interlinked and heavily dependent on each other. In the laboratory, improvements to both human and animal welfare may come from further understanding the relationship between the two. Despite increasing interest in human-animal relationships in recent years, little research has focused on laboratory users and their relationship with laboratory animals, and almost none has focused on their perceptions of the animals they work with. Our aim is to better understand laboratory users' perceptions of rats and rat-human interactions, and the relationship between rats and laboratory users. We interviewed thirteen participants in semi-structured interviews, with questions relating to how they perceive rats and their interactions. We then used analytic tools from Grounded Theory as described by Kathy Charmaz (specifically line-by-line and focused coding) to analyze the interviews. The two themes I will be sharing are pet-like relationships and an animal's purpose. By further understanding the rat-human relationship, and how laboratory users perceive and interact with rats, we can better identify areas to help improve One Welfare in the laboratory.

Wave 1 - Oral Presentation Abstracts

BUCH B315

9.00am-10.30am

THEME: Sustainability and Conservation

Developing Better Species Distribution Models for Climate Change: Bromeliads as a Model System

Presenter: Shaan Aroeste

Climate change poses one of the greatest threats to biodiversity, impacting ecological communities by altering their composition. Studying environmental tolerances of different species is often the preferred method for predicting future changes in species distributions, and this forms the basis of most conventional species distribution models. However, these models often overlook the importance of altered species interactions, the importance of which is increasingly being recognized and may have even greater impacts in restructuring communities faced with climate change. Tropical, epiphytic bromeliads contain phytotelmata (naturally occurring water-filled cavities) which have complex insect food webs. These communities are small, contained, and stationary, making them an excellent model system for studying both the direct physiological impacts of climate change and the indirect effects from altered species interactions, as well as the interplay between the two, all within a natural setting. Bromeliad food webs were studied along a climatic gradient of varying temperature and humidity by surveying bromeliads at different elevations in Monteverde, Costa Rica. I present preliminary findings of the temperature and drought resistance of five focal species sampled from bromeliads at varying altitudes. I also discuss the future of this ongoing study, which aims to create a model explaining community turnover from both direct and indirect effects of climate change.

Wave 1 - Oral Presentation Abstracts

BUCH B315

9.00am-10.30am

THEME: Sustainability and Conservation

Cellulose Synthase 7 (CESA7) Mutants Display A Loss In Cellulose Patterning In *Arabidopsis thaliana* Cell Walls

Presenter: Jan Xue

Cellulose, the most abundant biopolymer on earth, is economically important in forestry, agriculture, and as a renewable biofuel feedstock. Cellulose deposition in secondary cell walls provides structural support to plants by reinforcing water transporting vessels and fibers. The cellulose is produced in specific banded patterns along the plasma membrane (PM) by cellulose synthase (CESA) enzyme complexes guided along microtubule tracks. The CESA complexes are composed of three types of CESAs: CESA4, CESA7, and CESA8, all of which are necessary for normal cellulose synthesis in secondary cell walls (SCWs). However, the role that each CESA plays in cellulose deposition remains unknown. We asked whether the CESA7 subunit is particularly important in complex formation/stability and interactions with microtubules by testing if CESA7 is required for association of the complexes with cortical microtubules at the PM to result in the production of banded patterns of cellulose. To achieve this, *Arabidopsis* plants with mutated CESA7 were imaged using confocal microscopy. By imaging multiple CESA7 mutants we found that cellulose was not in banded patterns. Loss of this patterning indicates that CESA7 is necessary for CESA complexes to associate with microtubules. Understanding cellulose deposition is imperative as cellulose is a critical biopolymer and it is used in many industrial processes.

Wave 1 - Oral Presentation Abstracts

BUCH B 315

9.00am-10.30am

THEME: Sustainability and Conservation

Bison Reintroduction to Banff National Park

Presenter: Patrick Gibeau

Historically bison occupied much of North America, ranging from the Arctic Circle to Mexico, in 1889 their populations declined from an estimated 25,000,000 to just over 1,000 individuals. Through conservation initiatives, North American bison populations have increased to 500,000 and are now considered near threatened but stable. With such wide-spread disappearance, grassland ecosystems have lost a critical keystone species. For those reasons Banff Parks began a process to evaluate the feasibility of a reintroduction of bison to Banff National Park. A five-year pilot project has been undertaken to implement steps towards a proposed reintroduction of wild, free-roaming bison herd. To discourage the movement of bison outside of the reintroduction zone, fencing, coupled with natural topographical barriers, will be used along key pinch points along the fringes of the reintroduction area. However, some fence designs can have significant impacts on wildlife connectivity, access to critical resources (water, cover, and forage) or can cause impact and entanglement injuries. This study was undertaken to assess the impact of fencing on wildlife in response to the bison reintroduction. Five fence types along three different fence-lines were created within the reintroduction zone and were monitored with a total of 31 camera traps. From June 2015 to September 2017, 4696 individuals across 13 species were detected for a total of 3399 fence interactions. Basic relative crossing rate indices were then analyzed using this data. Preliminary analyses have shown that a two-wire permeable design has the highest crossing rates across species and meets Parks Canada's permeability targets. Further indepth analyses are currently being undertaken.

Wave 1 - Oral Presentation Abstracts

BUCH B315

9.00am-10.30am

THEME: Sustainability and Conservation

Caprellid amphipods (*Caprella* spp.) are vulnerable to both physiological and habitat-mediated effects of ocean acidification

Presenter: Emily Lim

Ocean acidification (OA) is one of the most significant threats to marine life, and understanding the effects of this global phenomenon will be crucial for anticipating and understanding changes in marine communities. Although OA impacts will be the sum of direct effects mediated by alterations of physiological rates and indirect effects mediated by shifts in species interactions and biogenic habitat provision, direct and indirect effects are rarely considered together for any given species. Here, we assess the potential direct and indirect effects of OA on a ubiquitous group of crustaceans: caprellid amphipods (*Caprella laeviuscula* and *Caprella mutica*). Direct physiological effects were assessed by measuring caprellid heart rate in response to acidification in the laboratory. Indirect effects were explored by quantifying caprellid habitat dependence on the hydroid *Obelia dichotoma*, which has been shown to be less abundant under experimental acidification. We found that OA resulted in elevated caprellid heart rates, indicating a negative effect. We also found a strong, positive association between caprellid population size and the availability of OA-vulnerable *O. dichotoma*, suggesting that future losses of biogenic habitat may be an important indirect effect of OA on caprellids. For species such as these, a consideration of only direct or indirect effects could potentially underestimate the full impact of ocean acidification.

Wave 2 - Poster Presentation List

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Characterizing the molecular pathway of Gp78-mediated mitophagy

Manaswi Yerrabattini, Fei Ying, Amritpal Maniani, Gurwinder Sidhu

The importance of cell health in clinical assays measuring immune cell responses

Grace Zheng

Characterizing protein-protein interactions of the Sec61 complex, an essential protein involved in Type 1 diabetes

Jenny Zhong, Thomas Dalhuisen

Inflammation in the gut of a new progressive rat model of PD.

Daniel Kim

Investigating the inflammatory state of astrocytes during early onset of amyotrophic lateral sclerosis (ALS)

Negin Imani Farrahani, Mikki Li

How can understanding the placental genetic makeup help develop cancer therapeutics?

Puloma Kaushal, Daryna Lebed, Tavleen Kaur Ramgarhia, Elena Mitevska

The Mini Gut Evolution: Using organoids to characterize innate signaling in intestinal epithelial cells

Navjit Moore

Immunogenicity of 13 valent-pneumococcal conjugate vaccine versus 23 valent -pneumococcal polysaccharide among immunocompetent adults: a systematic review and meta-analysis

Kamalpreet Parhar, Enzo Malana, Amy Kang

Control of human regulatory T cells by tumour necrosis factor alpha receptor 2 (CD120b)

Uyen Nguyen

To what extent do biochemical and clinical outcomes change after a one month toe-out gait modification program in people with knee-osteoarthritis

Muskan Tuli, Mahtab Singh Gill, Christy Lau

The Effects of Neonatal Vitality in Dairy Calves

Cheryl Linaksita

Analysis of post-stroke microglial activity after optogenetic astrocyte stimulation

Farhang Ahadzadeh, Michael Newberry, Crystal Ma

Talin Autoinhibition in Hepatocellular Carcinoma (HCC)

Michelle Hwang, Sana Aghakeshmiri, Dei Macaspac, Kate Zhu, Peter Koncarevic

Structural Investigations into STAC Adaptor Proteins and Their Binding Partners

Darren Christy

Cholinergic Regulation of Heart Rate in Daphnia Pulex

Nancy Manhas, Joanna Xia

Identification of Immune Cell Composition of Four Subgroups of Medulloblastoma

Wesley Hunt

An Ideal Nanoparticle for Active Drug-delivery in Rheumatoid Arthritis

Anmol Dosanjh, Michael Halim, Ann Chen

Cellular Senescence of Lung Cells and the Effect of Atmospheric Particulate Matter on the Rate of Telomere Shrinkage

Rafi Meher, Atbeen Rezazadah, Beth Samson

THEME: Sustainability and Conservation

How does pH impact the growth of *Chlamydomonas reinhardtii*?

Gurkim Grewal, Sally Newton-Mason

Diesel particulate matter induces changes in cellular reactive oxygen species generation and lowers CFTR abundance in human airway epithelial cells

Mitch Syberg-Olsen

Determining the Mechanism of Alternative Frame Translation in the Black Queen Cell Virus (BQCV)

Dora Xiong

Effect of photoperiod on exponential growth rates of *Chlamydomonas reinhardtii* and the downstream impacts on juvenile salmon populations

Nick Hsieh, Shayan Molaei, Pavneet Virk, Shaylen Young

THEME: Innovation and Technology

Nanocellulose-based Composites for Applications in Supercapacitor Battery Cells

Joyce Li, Nicole Bostan, Rex Chen, Chris Leong

How Will Young Dairy Cattle Use the Brushes That Farmers Provide Them?

Savannah Goldstein

THEME: Individual and Society

Take this Pill for the Rest of My Life? - Medication Adherence Simulation Activity for First Year Pharmacy Students

Derek Chan

Looking for temporal changes in dietary practices in Southern Britain using stable isotopic data

Bettina Rillera, Georgia Yee, Brian Thomson

Hurt, Unsure, and Insecure: The Relationship Between Psychological Pain and Physical Pain

Alicia Wong

Investigating the Impact of Emotion and Sensory Modality on Localization

Sara Samani

A Case Study in Creating an Orthography for an Endangered Language

Anna Mylvaganam, Laura Griffin

The effect of twelve-week exercise programs on fitness, pain levels, enjoyment, and exercise continuation in chronic obstructive pulmonary disease patients with chronic pain.

Eric Lyall, Amy Wang

The expression of emotions in Bamileke-Medumba

Melina Albanese, Hannah Lin

Cultural Myths About Menstruation

Kero Daowd

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Characterizing the molecular pathway of Gp78-mediated mitophagy

Presenter: Manaswi Yerrabattini, Fei Ying, Amritpal Maniani, Gurwinder Sidhu

Mitophagy is an evolutionarily conserved process by which cells remove their damaged mitochondria. Defects in mitophagy are associated with pathological states such as cancer and neurodegenerative disorders. We showed in the past that Gp78, an integral endoplasmic reticulum membrane ubiquitin E3 ligase, mediates mitophagy independently of Parkin. In this study, we aimed to further characterize the mechanism of Gp78-mediated mitophagy. PINK1 is a protein that accumulates in mitochondria when the mitochondrial membrane potential is dissipated and has been reported to activate multiple mitophagy pathways. When PINK1 was knocked down, Gp78 mitophagy was blocked. This study suggests that PINK1 acts upstream of Gp78 and regulates the initiation of Gp78-mediated mitophagy. Furthermore, to identify the potential substrates of Gp78 that are ubiquitinated during mitophagy, we modeled a method involving the beneficial use of mass spectrometry (MS) based proteomics. Particularly, a model that expresses biotinylated ubiquitin (BioUb) was utilized, where subsequent isolation and analysis of the BioUb conjugates was performed through MS. Finally, to find the autophagy receptors involved in Gp78 dependent mitophagy, we knocked out various receptors and added them individually to prevent receptor redundant pathways. Findings show that Gp78 recruits OPTN and NDP52 autophagy receptors as they are recruited by PINK1. Overall, this study sheds light on the cellular mechanism underlying Gp78-dependent mitophagy as a non-canonical pathway which was hitherto unknown.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

The importance of cell health in clinical assays measuring immune cell responses **Presenter: Grace Zheng**

Inflammatory bowel disease (IBD) is thought to be caused by inappropriate immune responses to commensal gut flora. In recent years, treatment of IBD has shifted from non-specific immune suppression to personalized, targeted suppression of specific immune cell signaling pathways. Thus, clinical assays for measuring the activity of these signaling pathways (e.g. cytokine production) in immune cells are of increasing importance. These assays are typically performed on peripheral blood mononuclear cells (PBMCs) that have been isolated from patient blood and cryopreserved until use. Interpretation of these functional assays is complicated by the fact that cell health severely impacts the results. In this study, we examined the effects of cell health on PBMC stimulation assays in order to set a minimum viability requirement of the cells required to obtain a reliable response. This ensures that low functionality is due to patient-specific cell phenotype and not damage during the freeze thaw process. To induce varying degrees of cell death, we systematically mistreated the cells (e.g. prolonged incubation) from healthy donors and cryopreserved them. We determined that cell health after 24h of incubation and cytokine responses are best predicted by the proportions of phosphatidylserine, live cell dye+ (%LAN). After thawing, we determined the %LAN and quantified production of cytokines after 24-48h stimulation using either flow cytometry- or ELISA-based assays. We found that post-thaw cell health ceases to affect cytokine production at a %LAN of 60% or higher, and that distinct cell subsets in PMBCs are differentially affected by suboptimal cryopreservation or incubation conditions.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Characterizing protein-protein interactions of the Sec61 complex, an essential protein involved in Type 1 diabetes

Presenter: Jenny Zhong, Thomas Delhuisen

Sec61 is a highly conserved multi-subunit transmembrane protein complex found embedded in the membrane of the endoplasmic reticulum (ER), a major organelle in most living cells. It plays an indispensable role in global cellular protein synthesis, cell membrane stability, and calcium homeostasis.

In 2010, Loyd et al. discovered a mutation in the main subunit of the Sec61 complex which results in type 1 diabetes (hyperglycemia) and fatty liver (hepatosteatosis). However, the mechanism by which this mutation leads to a disease phenotype is unknown. Elucidating this mechanism would help design new treatments to relieve type 1 diabetes, a genetically-related condition that affects up to 300,000 Canadians.

Previous studies have demonstrated that this mutation in the Sec61 protein disrupts the interaction between Sec61 and the immunoglobulin heavy-chain binding protein BiP: a protein that resides in the ER and regulates Sec61 activity. This disruption may indicate that interactions between Sec61 and its other regulatory proteins might be disrupted as well. The aim of this project is to assess how this diabetes mutant affects the interaction of Sec61 with its regulatory proteins. The experimental approach comprises a wide variety of techniques aimed at identifying protein-protein interactions in conjunction with mass-spectrometry. By comparing wild-type and mutant Sec61 cell lines, we hope to identify which protein-protein interactions are altered with the diabetes disease mutant. The results of this study will provide new insight into possible mechanisms of this mutation in type 1 diabetes and hepatosteatosis, potentially leading to the development of effective treatments.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15am

THEME: Health and Wellness

Inflammation in the gut of a new progressive rat model of PD.

Presenter: Daniel Kim

Pathophysiology of the gastrointestinal tract is increasingly being explored as a possible means to diagnose and to measure the progression of Parkinson's Disease (PD). Recent publications theorize that gut inflammation may serve as a reliable indicator and precipitating condition of PD as well (1). To explore the hypothesis that gut inflammation is a reliable indicator of PD, we ran a small pilot experiment in a progressive new rodent model of PD induced by transient injection of a naturally occurring dietary toxin (BSSG) (2): the gut of 13 experimental BSSG rats and of 11 placebo rat were prepared as swiss rolls, paraffinized, sectioned, and immunohistochemically stained using an anti-CD-68 primary antibody and a goat anti-mouse secondary antibody visualised using Vector Red. Preliminary results demonstrated that elevated inflammation was present in the submucosa in the colon of all 12 out of 13 experimental rats in comparison to only 4 out of 11 control rats. These data support further exploration of increased inflammation of gut submucosa in PD as well as in this novel progressive rodent model of PD. Further experiments to evaluate the colonic colocalization of synuclein aggregates in BSSG rat model are ongoing in larger subgroups. These data further support the hypothesis that gut submucosa inflammation is indicative of PD development as much as brain inflammation. This will be a first step to map the progression of inflammation in the gut along the timeline of the development of other pathophysiological symptoms.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15am

THEME: Health and Wellness

Investigating the inflammatory state of astrocytes during early onset of amyotrophic lateral sclerosis (ALS)

Presenter: Negin Imani Farahani, Mikki Li

Amyotrophic lateral sclerosis (ALS) is characterized by the progressive degeneration of motor neurons, with the most common mutation in familial ALS occurring in the C9orf72 gene. In the central nervous system, astrocytes are glial cells critical to maintaining homeostasis and trophic support for motor neurons. Astrocytes switch to a reactive pro-inflammatory state during ALS pathogenesis, losing their supportive neuronal functions. Astrocytic pro-inflammatory cytokines, or immune signaling molecules, have been implicated in ALS, although their specific role in disease onset is currently unknown. We hypothesize that astrocytes exist in a pro-inflammatory state during early disease pathogenesis. We will use transgenic zebrafish, with astrocytes labeled by a green fluorescent protein. To model the ALS-like phenotype in zebrafish, we will introduce the C9orf72 gene mutation. To examine the reactivity of astrocytes during early pathogenesis, we will use live imaging techniques to characterize their reactive morphology. To investigate the inflammatory state, we will isolate astrocytes using fluorescence-activated cell sorting (FACS) at three time points during early disease pathogenesis. We will quantify levels of pro-inflammatory and anti-inflammatory cytokines to determine the inflammatory state of astrocytes at each time point. We expect to observe that astrocytes will be in a reactive morphology during early stages of ALS pathogenesis and will present a predominantly pro-inflammatory phenotype. These results will elucidate the inflammatory profile of astrocytes underlying pathogenesis which may provide novel insights regarding initiating factors in ALS. Future research may lead to therapeutic strategies targeting the pro-inflammatory state of astrocytes during early stages of motor neuron degeneration.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

How can understanding the placental genetic makeup help develop cancer therapeutics?

Presenter: Puloma Kaushal, Daryna Lebed, Tavleen Kaur Ramgarhia, Elena Mitevka

The human placenta formed during pregnancy is a crucial organ which provides nourishment and support to the developing fetus. Early placenta development requires proper functioning of placental cells called trophoblasts, which invade the uterine wall anchoring the embryo to the uterus. These cells possess characteristics of increased cell division, immune tolerance and evasion as well as locally increased blood supply - similar to cancer, which constitutes the largest health burden. However, unlike cancer, the placenta stops dividing at the end of pregnancy, indicating presence of biological checkpoints in placental cells that control growth. DNA methylation is an epigenetic mechanism for gene expression regulation, which is accomplished by the methylation of cytosine residues on recurring CG dinucleotides (CpG islands). Notably, both placental and tumor development are associated with decreased global methylation compared to normal somatic cells. Understanding how DNA methylation patterns are altered during the duration of the pregnancy and comparing these patterns to those in cancer cells can help identify mechanisms that can be targeted to control cancer. The proposed study will examine DNA methylation patterns in isolated and cultured trophoblast cells from first and third trimester of pregnancy using an Illumina Microarray platform. These expression patterns will be compared to known DNA methylation patterns in cancer cells from publicly available databases. This study will allow us to identify how DNA methylation patterns that promote life in the placenta, promote disease susceptibility in cancer, adding to the body of literature on potential cancer therapeutics.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

The Mini Gut Evolution: Using organoids to characterize innate signaling in intestinal epithelial cells

Presenter: Navjit Moore

Inflammatory Bowel Disease is characterized by chronic inflammation within the gastrointestinal tract. The intestinal epithelial cells (IEC) are the primary interface between the host and microbes, creating a formidable barrier to protect against bacteria. While many groups have studied IEC response to bacteria in vitro, they have always used transformed IEC lines. Our lab is now using cutting edge technology to grow organoids (mini-guts) comprised of primary IEC derived from mice/human gut samples. These mini-guts form 3D-structures mimicking the organization/function of in vivo guts. While a striking advancement, this model needs a deeper characterization to define the IEC intrinsic immune responses elicited by bacteria. The objective is to characterize mouse intestinal organoid response to bacterial products and cytokines. Mice organoids were grown in specific media for 2 weeks and treated with the bacterial product FLIC or the cytokine IL-1B for 4h. Immunostaining of 4h IL-1B intestinal organoids showed an increased nuclear localization of Nfkb and Ki67 proteins relative to the untreated group for both cecum and colon. qPCR analysis also showed an increased expression in Cxcl1 and Tnfa in the 4h FLIC and IL-1B stimulated groups relative to the untreated groups. The results demonstrate that we can mimic in vivo inflammatory response in mouse intestinal organoids, however the study only captures IEC behavior and does not account for the physiology of the tissue. The new optimized mini-gut technique allows us to do similar analysis in human intestinal organoids and helps our understanding of the relationship between bacteria, inflammation, and IEC.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Immunogenicity of 13 valent-pneumococcal conjugate vaccine versus 23 valent - pneumococcal polysaccharide among immunocompetent adults: a systematic review and meta-analysis

Presenter: Kamalpreet Parhar, Enzo Malana, Amy Kang

Objective: To determine immunogenicity and safety of 13- valent pneumococcal conjugate vaccine compared with 23-valent pneumococcal polysaccharide in adults.

Design: Meta-analysis.

Setting: Systematic review and meta-analysis of randomized controlled trials comparing a single dose of PCV13 and PPV23 vaccine in adults assessing opsonophagocytic assay (OPA) geometric mean titers (GMTs) response at 1-month post-vaccination considered for inclusion.

Results: Five randomized trials were included with 4561 subjects ranging 50 to 95.5 years consisting of 49% males. The pooled immunogenicity OPA GMTs ratio (GMTR) of PCV13 arm were statistically significantly higher for 10/13 serotypes (14, 5, 6A, 6B, 9V, 18C, 19A, 19F and 23F) compared to PPV23. While the pooled GMTR for the unique serotype, 6A is 7.58 (95% CI: 4.68, 12.26), for combined 13 serotypes GMTR is 2.05 (95% CI: 1.77, 2.37). Overall pooled risk ratios (RR) for local and systemic reactions did not differ between PCV13 and PPV23, but local reactions were significantly differed based on prior pneumococcal vaccine experience. The pooled RR is 1.09 (95% CI: 0.94, 1.26) for local reactions and RR is 0.96 (95% CI: 0.91, 1.02) for systemic reactions. In three studies with pneumococcal naïve subject, 3/3 reported higher local reactions in PCV13 recipients whereas in two studies with pneumococcal experienced subjects reported lower local reactions in PCV13 recipients compared to PPV23.

Conclusions: A single dose of PCV13 appears to be safe and well tolerated, elicits better immune response among adults compared to PPV23. A single dose of PCV13 appears to be elicit better immune response among adults compared to PPV23. PCV13 was generally well tolerated and safe with overall comparable local reactions and systemic reactions as PPV23.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Control of human regulatory T cells by tumour necrosis factor alpha receptor 2 (CD120b)

Presenter: Uyen Nguyen

Tumour necrosis factor alpha (TNF α) is a small signaling protein that is required for the normal development of the immune system and defense against pathogens and cancer. TNF α has also been linked to the development of Type 1 diabetes (T1D). Regulatory T cells (Tregs) play a central role in maintaining self-tolerance and preventing autoimmunity development. TNF α can have both “good” and “bad” effects on Treg function. There are two different TNF α surface receptors, CD120a and CD120b. Some evidence suggests that CD120a stimulation induces cell death and CD120b promotes survival. We hypothesised that changes in the balance of signaling through CD120a versus CD120b may contribute to the Treg failure seen in T1D. To study the role of CD120b in human Treg function, we developed and optimized a method using the CRISPR-Cas gene editing technology to knock out (KO) CD120b expression in primary human Tregs. Then, we assessed Treg proliferation in response to T cell receptor (TCR) stimuli and in the presence/absence of TNF α . Readouts included cell proliferation dye dilution, and Treg signature proteins including Ki67, FOXP3, and CD25. We found that while Tregs with CD120b exhibited a marked increase in proliferation with the addition of TNF- α in response to TCR stimulus, the CD120b KO Tregs did not increase proliferation with addition of TNF α . Moreover, Ki67 expression by CD120b KO cells was also lower than CD120b+ Tregs in the same stimulation treatments. Overall, these data indicate that CD120b plays an important role in Treg proliferation, and thus could be a target for developing therapeutics aim at re-establishing immunoregulatory balance.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

To what extent do biochemical and clinical outcomes change after a one month toe-out gait modification program in people with knee-osteoarthritis

Presenter: Muskan Tuli, Mahtab Singh Gill, Christy Lau

Amidst the various treatments for knee osteoarthritis (KOA), gait modifications are beginning to gain interest as a viable conservative treatment. One such gait modification involving the external rotation of the foot (toe-out), has shown promise in altering key factors of KOA, like knee joint load - the force exerted on the load-bearing joint during activity. The knee adduction moment (KAM) specifically, is accepted as a proxy for the distribution of load across the knee joint. Furthermore, greater KAM magnitudes have been associated with increased risk of disease. Previous research has shown that through gait modification, the load experienced by the knee joint can be significantly reduced and symptoms related to KOA can be lessened. Nonetheless, greater amounts of research are required to learn how toe-out walking can be catered for an individual suffering from knee osteoarthritis to maximize comfortability and effectiveness of the treatment. To determine this essential balance, a sample of 50 individuals who have radiographic KOA will undergo gait analysis through high-speed motion tracking cameras and floor mounted force platforms during a baseline and a one month follow-up testing session. Over the month, participants will be instructed to modify their natural toe-out angle. Pain and physical function assessments will be made through the WOMAC scale along with self-reports completed by participants themselves. From this research, we expect to see a correlation between the implementation of various gait modifications in participants suffering from KOA and a reduction in KAM leading to mitigated symptoms.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

The Effects of Neonatal Vitality in Dairy Calves

Presenter: Cheryl Linaksita

Neonatal vitality is defined as having the capacity to live and grow with physical and mental energy and strength, and is crucial for survival and development. The aim of this study was to determine the effects of calf vitality in the hours immediately following birth on pre-weaning feed intake and body weight gain. Calves (n=40) were observed for 5 h or until they first suckled from the dam. Specific behaviours scored included latency to reach sternal recumbency, number of standing attempts, latency to successfully stand, latency to walk, and latency to suckle from the dam. After 5 h, the calves were separated from the dam and moved to a group pen (8 calves per pen) where they were allowed up to 12L/d of milk and ad libitum access to grain and water through automated feeders. Individual milk and grain intakes of each calf were recorded electronically from the computerized feeders. Calves were weighed twice per week until weaning was complete (i.e. consume 1300 g/d of grain). Calves that exhibited high vitality after birth (shorter latencies to reach sternal recumbency, stand, walk, and suckle and fewer stand attempts) consumed more milk and grain during the pre-weaning period, and subsequently gained more weight. These results indicate that calves with high vitality after birth perform better during the pre-weaning period and thus are likely to experience a higher level of welfare compared to calves with low vitality. Future research should investigate if early-life vitality could be a predictor of future performance and productivity.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Analysis of post-stroke microglial activity after optogenetic astrocyte stimulation

Presenter: Farhang Ahadzadeh, Micheal Newberry, Crystla Ma

Astrocytes and microglia communicate with one another to produce inflammatory responses in the presence of brain tissue injury(1). Post stroke inflammation has been shown to cause tissue damage in different regions of the brain including the peri-infarct zone. One potential countermeasure to such inflammation is the production of anti-inflammatory cytokines from microglia. Optogenetics, the manipulation of genetically altered cells through stimulation of light-sensitive ion channels, allows for the stimulation of astrocyte activity and fluorescence via knockin-mediated enhanced gene expression. Microglia express a gene called c-FMS, which encodes for a receptor called CSF1R, which is sensitive to the CSF1 cytokine released by astrocytes (2,3). If astrocytes communicate with microglia through such cytokines, stimulation of astrocytes should indirectly activate microglial anti-inflammatory response and decrease the negative effects of chronic inflammation. In order to test this theory and manipulate astrocytes non-invasively, the knockin-mediated enhanced gene expression approach will be used to generate transgenic mice that express both a strain of tetracycline-controlled transcriptional activator (tTA) expressing allele and a tTA-dependent promoter (tetO), which drives the expression of channelrhodopsin-2 (ChR2)(4). As a result, it will be possible to stimulate the transcription of c-Fos using light exposure through the skull, and the effectiveness can be measured through the microglial response through c-FMS tagging. Whether the microglial anti-inflammatory response is reinforced or unaffected, this experiment will contribute to an understanding of the relationship between microglia and astrocytes in a post-stroke environment.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Talin Autoinhibition in Hepatocellular Carcinoma (HCC)

Presenter: Michelle Hwang, Sana Aghakeshmiri, Dei Mscaspac, Kate Zhu, Oeter Koncarevic

Hepatocellular Carcinoma (HCC), a cancer reported with 780,000 cases per year, is particularly fatal due to high metastatic potential. Previous studies have shown that expression levels of Talin-1 in different HCC cell lines is correlated with metastatic ability and has been noted as a promising indicator for HCC. Talin-1 is an essential adaptor protein that mediates the linkage between integrins and actin cytoskeleton, thus acting as a master regulator of cell-ECM adhesion and migration. Talin-1-mediated integrin activation can induce survival of tumor epithelial cells and tumor-associated endothelial cells, resulting in protection from anoikis and cancer progression to metastasis. Though promising as a marker of metastatic potential, the specific roles of Talin-1 in HCC have yet been clearly identified. In this study we will examine the role of Talin-1 autoinhibition in several HCC derived cell lines (MHCC-97L, MHCC-97H and BEL-7402), as well as in normal liver cells (HL-7702). Talin-1 activity has been shown to be regulated by autoinhibition, or self-binding. When autoinhibition is disrupted by introducing a single point mutation (E1770A) at the self-binding site, cell-ECM adhesion becomes over-active and cell motility is decreased. We hypothesize that disrupting Talin-1 autoinhibition in these cell lines will result in increased cell-ECM adhesion and less dynamic cell motility. Overall disrupting Talin-1 autoinhibition will provide protection from HCC high metastatic potential and serve as a possible therapeutic target for future study. We will test our hypothesis by characterizing Talin-1 activity levels, sub-cellular adhesion structures, cell migration, and metastatic tumor formation through the use of xenograft models.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Structural Investigations into STAC Adaptor Proteins and Their Binding Partners

Presenter: Darren Christy

Excitation-contraction (EC) coupling is a tightly orchestrated event involving the functional and mechanical coupling between two membrane proteins: L-type voltage gated calcium channels (CaV 1.1) located on the plasma membrane, and the ryanodine receptor (RyR1) located on the sarcoplasmic reticulum (calcium storage center). How these two membrane proteins associate to facilitate their interaction has remained a mystery, but STAC adaptor proteins (3 different isoforms) have been identified as an essential component in this process. It has been demonstrated that STAC adaptor proteins bind a specific region of L-type voltage gated calcium channels called the II-III loop. Here we report the structure of STAC2 in complex with the binding region of the CaV1.2 II-III loop to 1.5-angstrom resolution. Furthermore, we report the crystal-structure of the tandem-SH3 domain of a STAC3 stabilization mutant to 2.1-angstrom resolution and initial co-crystallization trials with the Cav1.1 II-III loop peptide. The structures show tight association between the domains modulated by a hydrophobic interface which is conserved in the other STAC isoforms (STAC1/STAC2) and the presence of peptide binding confers slight conformational changes. Lastly, we further characterize the interaction between STAC3 and the CaV1.1 II-III loop through isothermal titration calorimetry to determine thermodynamic and kinetic binding constants. Together this structural investigation characterizes the functional interaction between the L-type voltage gated calcium channels and STAC adaptor proteins providing insights into areas of interest where mutations might cause disease.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Cholinergic Regulation of Heart Rate in *Daphnia Pulex*

Presenter: Nancy Manhas, Joanna Xia

In mammals, the parasympathetic nervous system is important for the body's 'rest and digest', with one of its main effects being the slowing of heart rate. For parasympathetic stimulation to occur, it requires a signal called a neurotransmitter, to be sent from cells in the nervous system. One neurotransmitter, acetylcholine (ACh), is involved in the slowing down of heart rate (HR). ACh is released from the parasympathetic nerve to create a downstream effect on the pacemaker cells of the heart. The most important receptor that receives the signal from ACh to decrease HR is called muscarinic receptor. To see if we could manipulate this regulation, we decided to use *Daphnia pulex* as our model organism. *Daphnia pulex* has similar responses to ACh like humans, however it is still unclear whether this is due to ACh binding to the muscarinic receptor in the heart. The aim of our study is to determine whether this mechanism for the parasympathetic nervous system is conserved. We used a pharmacological approach to test whether the ACh-mediated decrease in HR is abolished by the addition of atropine, an ACh blocker. A decrease in average HR of daphnia at all ACh concentrations was observed. In the presence of atropine, we found that a higher concentration of ACh is required to achieve the same reduction of HR. Therefore, studying the effects of ACh and Atropine on the heart rate of *Daphnia*, could give insights into whether the parasympathetic regulation of HR is evolutionarily conserved.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Identification of Immune Cell Composition of Four Subgroups of Medulloblastoma

Presenter: Wesley Hunt

Identification of immune cell profiles of four subgroups of medulloblastoma, a highly malignant childhood brain tumour, is important for designing effective and specific treatment. In particular, it plays a role in understanding the microenvironment and homogeneity of the tumour subgroups. Currently, the treatment for medulloblastoma is non-specific. This means a developing child is subjected to radiation and chemotherapy in an attempt to treat an entire tumour as a single target, imposing debilitating short- and long-term effects on his or her health. It is challenging to design a specific treatment without knowing whether all subgroups of medulloblastoma have a similar physiology. It is well established that an immune response both actively attacks a tumour and plays a role in its initiation and propagation. This study analyzes immune cell composition of medulloblastoma subgroups to suggest microenvironment from an immunological perspective. This information could potentially provide correlation with prognosis or predict response to treatment. By using CIBERSORT, an analytic tool developed by Newman et al. at Stanford University, gene expression data of 763 primary samples of different medulloblastoma subgroups from The Arthur and Sonia Labatt Brain Tumour Research Centre was analyzed to determine immune cell profiles. The results were compared to healthy cerebellum to determine a difference between normal brain and tumour physiologies. The analysis determined that there is no significant difference in immune cell composition among four medulloblastoma subgroups suggesting that they are immunologically homogenous. This result is of significant interest to treatment research as it provides another indication of immunologically similar microenvironments of medulloblastoma subgroups.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

An Ideal Nanoparticle for Active Drug-delivery in Rheumatoid Arthritis

Presenter: Anmol Dosanjh, Michael Halim, Ann Chen

Rheumatoid arthritis (RA) is an autoimmune disease that affects almost 1% of the world. Inflammation of synovial membranes leads to progressive joint damage and loss of function. Although there is no known cure for RA, medications, such as non-steroidal anti-inflammatory drugs (NSAIDs) and disease modifying anti-rheumatic drugs (DMARDs) focus on pain relief and symptom control. However, these drugs have low solubility, poor bioavailability, and are non-specific, which could cause potentially life-threatening side effects when administered at high dosage. Nanomedicine has promising applications in the treatment of RA. The use of nanocarriers in a drug-delivery system, such as liposomes, polymer-drug conjugates, or dendrimers, is beneficial to decreasing widespread toxicity, while increasing drug solubility and bioavailability. Current challenges that exist with nanomedicine drug-delivery systems include uptake by the reticuloendothelial system (RES), reduced drug accumulation caused by inflamed vasculature, and limited efficiency due to non-specificity. The research regarding properties that make nanoparticles effective for RA treatment is still ongoing. This study investigates some of these properties and how they enhance efficient active delivery of anti-arthritic drugs. A literature review of different types of nanocarriers used for RA treatment was conducted and evaluated. Our findings suggested that an ideal nanoparticle is 10-100 nm in size with a neutral surface charge, possesses a surface coating to prevent RES uptake, and has the addition of a ligand that can target overexpressed receptors in inflamed joints. A nanoparticle with these properties allows for longer circulation times, increased bioavailability, successful targeting, and decreased side effects of RA drugs.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Health and Wellness

Cellular Senescence of Lung Cells and the Effect of Atmospheric Particulate Matter on the Rate of Telomere Shrinkage

Presenter: Rafi Meher, Atbeen Rezazadeh, Beth Samson

Natural cellular processes causing eventual tissue decay are often exacerbated by environmental factors such as increased particulate matter in the atmosphere. While life expectancy has increased, limiting factors continue to impede the optimization of healthspan and longevity. The telomere is a section with repeating DNA sequences on the ends of chromosomes. During DNA replication, base pairs are lost from the telomere regions. One purpose of the telomere cap is to prevent loss of important genetic code during cell division. Research has stated telomere shortening as an important biomarker for aging and cellular senescence, the irreversible process where morphological, biochemical, and functional changes occur in cells leading to a proliferation of damaged cells. These senescent cells don't follow the natural cell cycle and while metabolically active, fail to perform necessary tasks within the tissue. An accumulation of these cells characterizes aging by causing tissue decay and increasing susceptibility to disease. Research has shown toxins in smoke to cause an accelerated rate of telomere shortening. Currently, insufficient data exists on the relationship between atmospheric particulate content and telomere length of those living within these polluted environments. Our study aims to determine the impact of atmospheric pollutants on the rate of cellular senescence in tissue. We analyzed past datasets containing telomere length of those living in varying atmospheric particulate content to determine the effect of air pollution on the rate of telomere decay and propose a comprehensive study comparing data from cities on both ends of the PM level spectrum.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Sustainability and Conservation

How does pH impact the growth of *Chlamydomonas reinhardtii*?

Presenter: Gurkim Grewal, Sally Newton-Mason

Ocean acidification impacts various marine species, including salmon. In order to understand the ecological effects of ocean and river acidification on salmon, it is essential to understand its effects on *Chlamydomonas reinhardtii*, a primary producer in the salmon's food chain. This study examines the impact of pH variation on the growth of *C. reinhardtii*. The experiment was conducted over an 11 day period. On four set days, 10 μ L of a fixative, iodine potassium iodide (IKI), was added to 100 μ L samples containing *C. reinhardtii* from an acidic, basic, and control treatment. The number of cells per mL were counted on the last day using a hemocytometer and a compound microscope. The results show that the *C. reinhardtii* population increased from 2.0×10^5 cells/mL to 4.18×10^5 cells/mL in the basic medium of pH 8 and decreased to 0.46×10^5 cells/mL in the acidic medium of pH 5. Statistical analysis using a two-way analysis of variance (ANOVA) shows that the organism's growth between treatments is significant and that there is an interaction between the pH levels and time at $p < .05$, while the difference in growth over time is not significant at $p < .05$.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Sustainability and Conservation

Diesel particulate matter induces changes in cellular reactive oxygen species generation and lowers CFTR abundance in human airway epithelial cells

Presenter: Mitch Syberg-Olsen

Air pollution is a major cause of mortality and disease worldwide. Specifically, research has suggested particles from traffic-related air pollution, such as diesel exhaust, to account for much of this. These particles have been linked to incidence of asthma, deteriorating lung function, cardiovascular death, heart attack and atherosclerosis. Although it is known that air pollution causes respiratory disease, the specific mechanisms are complicated and not fully understood. However, it is known that cells lining the lung are among the major cells that contact these particles. The biological effects of fresh diesel exhaust particles generated in-house were compared against a standard reference material. In vitro biological response was quantified by measuring the effects of (1) reactive oxygen species (ROS) generation and (2) cystic fibrosis transmembrane conductance regulator (CFTR) internalization.

(1) ROS are a normal part of cell signaling, but high levels can cause inflammation, cellular damage, and have been linked with incidence and exacerbation of asthma. ROS response was quantified using H2DCFDA, a colourless compound that becomes fluorescent when oxidized.

(2) CFTR is a chloride channel protein in epithelial cells that is responsible for regulating fluid and electrolyte levels. Malfunction of CFTR in the lining of the lung leads to build-up of thick mucous that is the hallmark of cystic fibrosis. CFTR levels were measured via western blot.

Ultimately this study has shown that diesel exhaust particles can either significantly increase or decrease ROS generation in the lung epithelium depending on the dosage and exposure time. After a 24 hour exposure, in-house diesel particles significantly reduced CFTR levels.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Sustainability and Conservation

Determining the Mechanism of Alternative Frame Translation in the Black Queen Cell Virus (BQCV)

Presenter: Dora Xiong

Dicistroviruses are a family of single-stranded, positive-sense RNA viruses which infect arthropods. A number of these viruses including the Israeli acute paralysis virus (IAPV), Kashmir bee virus (KBV), and Black queen cell virus (BQCV) are known to infect honey bee populations, and thus may cause drastic implications within the agricultural industry. Dicistroviruses contain two open reading frames (ORFs) and employ an intergenic internal ribosome entry site (IGR IRES) to direct protein synthesis from the second ORF with a mechanism that requires no canonical translation initiation factors. A subset of these viruses have demonstrated the ability to translate in the +1 reading frame to varying degrees. BQCV is one such virus, and has been shown to produce a +1 frame (ORF_x) polypeptide at a frequency of 80% relative to the 0 frame. Although the mechanism behind this process remains not well understood, the selective pressures of these viruses to maintain this alternative frame translation strongly suggests that it imparts biological significance. Here, we have used a bicistronic reporter construct to discern the mechanism of ORF_x translation. To determine the translational start site of the ORF_x product, we have inserted stop codons at various sites of the sequence downstream from the IGR IRES. Initial results show that ORF_x translation is dependent on the 1st codon of the 0 frame and begins after the 14th codon in the +1 frame. These findings suggest that the mechanism follows a frameshifting model, with ribosomes first initiating in the 0 frame and shifting frames downstream.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Sustainability and Conservation

Effect of photoperiod on exponential growth rates of *Chlamydomonas reinhardtii* and the downstream impacts on juvenile salmon populations

Presenter: Nick Hsieh, Shayan Molaei, Pavneet Virk, Shaylen Young

Chlamydomonas reinhardtii are photoautotrophic green algae. Given this characteristic, the purpose of our experiment was to determine if photoperiod has an effect on the growth of *C. reinhardtii*. Our experiment consisted of our Control, Treatment 1, and Treatment 2, for which the algae were kept in incubators and exposed to 8-hour, 3-hour, and 21-hour photoperiods, respectively. We collected cell concentration data for all treatment replicates over a nine day period. The growth curves obtained show a trend of increasing cell concentration with increased photoperiod. Statistical analysis using one-way ANOVA and Tukey HSD test showed a significant difference between Treatment 1 and 2 maximum growth rates ($p=0.0395$); as such, we rejected our null hypothesis, providing support for the alternate hypothesis that *C. reinhardtii* exponential growth rate changes as photoperiod changes. These results demonstrate that the exponential growth rate of *C. reinhardtii* is significantly higher at a 21-hour photoperiod, compared to a 3-hour photoperiod. This suggests that during spring months, when juvenile salmon emerge from the nest and photoperiod is high, increased growth rates of *C. reinhardtii* will be observed. This affects upper trophic levels, as zooplankton and invertebrates feed on green algae, such as *C. reinhardtii*; newly emerged juvenile salmon will in turn feed on the zooplankton and invertebrates. We conclude that that *C. reinhardtii* exponential growth rates are significantly higher at a 21-hour photoperiod compared to a 3-hour photoperiod; this poses a profound implication on the surrounding ecosystem.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Innovation and Technology

Nanocellulose-based Composites for Applications as Supercapacitor Battery Cells

Presenter: Joyce Li, Nicole Bostan, Rex Chen, Chris Leong

In the age where battery development is coming to a halt, new concepts have emerged which takes advantage of nano-scale technology. Supercapacitors are batteries in which energy is stored electrostatically, contrasting to the common redox-based electrochemical cells. These batteries however, pale in comparison to conventional batteries due to poor electrical potential, and cost of construction. In an attempt to mediate these shortcomings, alterations to the nanocomposite can be made. An emerging bio-material derived from natural sources, nanocellulose – nano-structured cellulose – has proven to display electrical capabilities suitable for small-scale supercapacitors. A literature survey was conducted to assess the electrical properties and characteristics of nanocellulosic composites for use as supercapacitor batteries. One study introduced a polypyrrole (PPy)/cellulose nanocrystal (CNC) whose production yielded a light, conductive, cost-effective, and environmentally-friendly material. In another study, graphene oxide was treated with MnO₂ nanocrystals, producing sheets of graphene oxide that displayed enhanced electrochemical properties, which in turn could enhance the potential of supercapacitors. Biochemical pretreatment of nanocellulose is essential to ensure its functionalization and preserve its conductive properties, while reducing chemical waste and energy. Emerging studies propose the use of genetically modified proteins to target specific areas of nanocellulose, modifying it biochemically to be adsorbed on the supercapacitor's surface. Concerns with current cellulose-based nanocomposites arise mainly due to low voltage output from prototype supercapacitors. It is possible that a nanocomposite with RuO₂ will provide higher power densities, while taking advantage of the high capacitance properties of nanocellulose.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15am

THEME: Innovation and Technology

How Will Young Dairy Cattle Use the Brushes That Farmers Provide Them?

Presenter: Savannah Goldstein

Some dairy farmers have modified their barns to enable the expression of natural behaviours by cattle, for example by mounting brushes in pens. These brushes facilitate grooming behaviour and are intended to improve the cow's comfort while living indoors. Previous research has shown that pregnant and lactating cows use a brush daily when one is provided but little is known about brush use in younger animals. The aim of this study was to characterize the use of stationary, wall-mounted brushes by heifers (pre-lactation cattle, 4-5 months of age). Eight groups of four heifers were provided four mounted brushes per pen. The body parts that the heifers chose to groom, their preferences for bristle stiffness, brush orientation and location within the pen as well as patterns of brush use over time were monitored using a 24-hour surveillance system over six days per group. Heifers made daily use of the brushes, predominantly by sniffing them and manipulating them with their mouths. The body part groomed most often was the head. Brush use was highest on day 1 (mean 53 min/24hrs) and then remained constant between days 2 and 6 (means 25 and 27min/24hrs respectively). Preliminary results indicate heifers preferred to use brushes placed closest to their feed. Analysis of other preferences is in progress. These results suggest that farmers may consider providing brushes to heifers to allow them to express natural object-directed grooming and exploratory behaviour indoors.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

Take this Pill for the Rest of My Life? - Medication Adherence Simulation Activity for First Year Pharmacy Students

Presenter: Derek Chan

Medication adherence, the extent to which patients take medications, is a critical issue facing Canada's overburdened healthcare system. Recent research suggests that up to 50% of patients are non-adherent, leading to increasing disease progression and complications, costing \$7-9 billion dollars annually. As the most accessible healthcare provider, pharmacists are in a unique position to identify and resolve barriers to adherence. In the United States, medication adherence activities for health professions students include a variety of pill-taking activities. Preliminary survey data indicates that Canadian pharmacy education addressing medication adherence is limited to didactic teaching without including pill-taking simulations. It is important for pharmacy students to experience taking a chronic medication first-hand to develop empathy for their patients. To address these issues, this study has the sole objective to implement an adherence simulation activity in the pharmacy program at UBC.

This activity has been conducted for first-year classes of pharmacy students at the University of British Columbia since 2013. Students were provided with a medication vial filled with 28 lactose-filled gelatin capsules. Each vial had a prescription label with the individual students' name and the directions, "Take 1 capsule twice daily for the rest of your life". Students were asked to complete the activity over a two-week period then submit a count online on the number of capsules they had remaining. The response rate for 2013W, 2014W, 2015W, and 2016W was 66%, 82%, 92% respectively, and 63%; and the overall average adherence was 79%, 70%, 63%, and 77% respectively.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

Looking for temporal changes in dietary practices in Southern Britain using stable isotopic data

Presenter: Bettina Rillera, Georgi Yee, Brian Thompson

This study monitors dietary changes throughout the Neolithic, Iron Age, Roman, Anglo-Saxon, and Medieval periods in southern Britain, by examining the fluctuations in stable carbon and nitrogen isotope ratios in archaeological human and fauna from the region. Between 1000 BC to 1500 AD, southern Britain has been at the forefront of cultural change, where new cultural practices and ideas were brought in by waves of invaders and migrants. New dietary practices, in particular, were introduced, and integrated into the local diets. As a result, many studies have reported that sites dated to different periods in the region had culturally-distinct dietary practices. However, these papers often focus on examining the dietary practices of a single site or sites dating to a certain period, thus failed to provide a holistic perspective on the overall temporal trend in dietary practices of the region. Here we collect and combine stable carbon and nitrogen isotope data from published papers to look for dietary variations between different periods. By providing an overview of dietary changes over a period of 2500 years in southern Britain, the results of this study will have significant implications for understanding the complex socio-cultural dynamics of the region.

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

Hurt, Unsure, and Insecure: The Relationship Between Psychological Pain and Physical Pain

Presenter: Alicia Wong

Past behavioral and neurological research reveals a shared neural circuitry between psychological pain and physical pain (Eisenberger, 2015; Noll-Hussong et. al, 2013). How does this affect the way we feel pain? In this study, we explore the relationship between psychological pain and physical pain and hypothesize a bidirectional relationship, such that individuals with pain will have stronger reactions to uncertainty, and uncertainty leads individuals to experience a greater sensitivity to physical pain.

In studies 1a and 1b, we investigate whether people who feel more pain also feel more uncertain. In the uncertainty condition, participants think about an unresolved dilemma, and we determine if that leads them to report more physical pain and if physical pain is greater among people who are more sensitive to uncertainty as compared to control group participants.

In studies 2a and 2b, we examine whether people with chronic pain experience more sensitivity to uncertainty. We looked at how pain predicts uncertainty, which in turn affects compensation for uncertainty in the form of worldview defense. This is in line with past research that physical pain predicts higher uncertainty, leading to a stronger worldview defense as compensatory behavior (Proulx & Inzlicht, 2012). Preliminary data trends in study 1 shows that people reporting more physical pain and have greater pain catastrophizing also report less tolerance for uncertainty and a greater need for cognitive closure. In study 2, individuals with chronic pain also experience less tolerance for uncertainty, and a greater need for cognitive closure.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

Investigating the Impact of Emotion and Sensory Modality on Localization

Presenter: Sara Samani

Emotional processes can influence sensory perception. In particular, emotional context may impact our ability to localize visual and auditory targets in our immediate environment. This may be influenced by the senses involved, and the timing of the emotion information presented. To assess spatial perception, participants localized a neutral target (dots or beeps) with emotional distractors, (human faces and vocalizations), presented during the localization response. As outlined above, both targets and distractors could be either visual or auditory in nature. We hypothesize that both positive and negative compared to neutral stimuli presented to the same modality as a target will disrupt localization, but when presented in a different modality, it will facilitate localization. This prediction stems from earlier neuroimaging work where competition of intra-modal features occurs in early sensory cortices, while binding of cross-modal information occurs in later association cortices. With the current sample size, no significant effects of emotion on localization performance were identified. Preliminary results, however, demonstrated that auditory distractors facilitated visual target localization compared to auditory target localization, while no significant impact of visual distractors was identified between target types. Upon completion of data collection, we will further investigate the impact of emotion on target localization.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

A Case Study in Creating an Orthography for an Endangered Language

Presenter: Anna Mylvaganam, Laura Griffin

Cifungwa is an endangered West Kainji language with approximately 1000 speakers in the Niger state, Nigeria. Cifungwa is categorized as a “threatened” language per Ethnologue’s Language Status Intergenerational Disruption Scale, meaning while the language is still used among different generations (Whalen and Simons, 2012), it is losing users rapidly due to dominating pressures to learn Hausa, the lingua franca of the region. This project examines the roles students can play to assist communities with revitalization practices. A prototype orthography was designed by Laura Griffin and Anna Mylvaganam in collaboration with Samuel Akinbo, based on principles of orthographic representation: representing only contrastive sounds, harmonizing the orthographic system with neighbouring languages (Alfred, 2016), and using familiar symbols (Williamson, 1984).

Orthographies can function to prevent language shift by increasing literacy and visibility in the target language (Jones and Mooney, 2017), requiring extensive community involvement and input to ensure success. Factors such as selection of a script, extent of diacritics, and intended usage were influenced by community input. However, the most successful integration of the orthography requires more direct access to the community and their needs. Although technology is a powerful tool bridging vast distances, it cannot completely replace the necessity of consistent face-to-face interaction. Thus, the role of students must involve active support rather than attempted leadership. Personal measures of supporting the community include preparation of an educational primer and flashcards, with a native speaker teaching the orthography to the community and analysis of feedback from the community via online questionnaire.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

The effect of twelve-week exercise programs on fitness, pain levels, enjoyment, and exercise continuation in chronic obstructive pulmonary disease patients with chronic pain.

Presenter: Eric Lyall, Amy Wang

Physical activity is a key element for chronic obstructive pulmonary disease (COPD) rehabilitation and is linked to many benefits [1]. However, 70% of COPD patients experience pain [2], which is a barrier to physical activity [3]. Additionally, there is a current lack of research on the types of exercise which are best tolerated, effective for, and adhered to by COPD patients with chronic pain. This study will evaluate the relationship between exercise type and pain levels during exercise, enjoyment of the activity, overall pain and fitness, and rates of long term exercise continuation in patients with mild to moderate COPD and chronic pain. Participants will be randomly assigned to aerobic, resistance, or combined exercise groups. They will participate in 30 minutes of low-intensity exercise three times a week for twelve weeks. At the beginning and end of twelve weeks, patients will complete a six minute walking test, the Clinical COPD Questionnaire (CCQ) [4], and the Brief Pain Inventory (BPI) [5]. The Borg Rate of Perceived Pain [6] and the Physical Activity Enjoyment Scale (PACES) [7] will be conducted weekly immediately after activity. An anonymous follow-up survey after four months will determine the levels of continued exercise. Exercises which combine aerobic and resistance factors are likely to produce the most enjoyment, and improvement of physical fitness and pain levels. We expect to see a correlation between activities which are more enjoyable and less painful to rates of long activity continuation. Our results will provide insight into the most suitable exercise program for COPD patients with chronic pain.

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Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

The expression of emotions in Bamileke-Medumba

Presenter: Melina Albanese, Hannah Lin

This presentation focuses on the expression of emotions in Bamileke-Medumba, a grassfields Bantu language spoken in the western region of Cameroon, Central Africa. We attempt to determine how various emotions are expressed in the language and which expressions are characteristic of Bamileke-Medumba. While specific emotion words are primarily used in Western languages, metaphorical or idiomatic expressions referencing body parts may be a common method of emotion conveyance in non-Western languages (Dzokoto & Okazaki 2006). Such structure has been found in African languages, including Fante, Dagbani, and Ewe (Dzokoto & Okazaki 2006). We found that idiomatic expressions are used in the description of many emotions in Bamileke-Medumba, many of which reference the heart (1). We also observe the most common strategy in introducing opposite emotions in Medumba is negation of an already existing emotion (2) as opposed to introducing a new word in the construction (3).

(1) ntǃú ám bwòó

Heart 1poss be good

My heart is good

"I am happy."

(2) ntǃú ám kúú? bwò

Heart 1poss NEG be good

My heart is not good

"I am sad."

(3) a. nù-tsá báǵ ám

The news of it "bads" me

"I am disappointed."

b. nù-tsá bhwò ám

The news of it "goods" me

"I am proud of it."

Wave 2 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

10.45am-12.15pm

THEME: Individual and Society

Cultural Myths About Menstruation

Presenter: Kero Daowd

Throughout history menstruation has been viewed as a blessing or a curse that may impact a woman's approach to her daily activities and restricts her social relations. Indeed, menstrual taboos are among the most inviolable in many societies often reflecting a fear of the powers of a woman's menstrual blood and its potential effects on those around her. In the late 19th century, Victorian doctors developed an elaborate set of explanations and prescriptions to offset what they believed were the deleterious effects of menstruation, and the effects of a woman's 'thirty-year pilgrimage'. Since menstruation was seen to deplete her store of vital energy, women were discouraged from physical activity and the energy drain of higher education. Apparently, the natural process of menstruation demonstrated women's inferiority rather than their phenomenal ability to provide life. These views pertained largely to western society's myths and permitted for the development of scientific misunderstandings about the impact of menstruation on women and society. In an effort to gain a global perspective on the cultural teachings about menstruation beyond the western lens, this research will conduct personal interviews with individuals who reside, or were educated, in Middle Eastern countries. To initiate this exploration, a review of the literature from other cultural sources will be conducted. This may help us understand the cultural similarities and differences and how beliefs about women and menstruation impact(ed) societies.

Wave 2 - Oral Presentation List

Buchanan (BUCH) - 1866 Main Mall

10.45am-12.15pm

THEME: Health and Wellness

BUCH B208

Exploring the Perception of Stroke Clinicians (Nurses and Health Staff) About Stroke Patient Education in the Hospital

Megan Lee, Adrienne Holland, Jenny Zhang, Priya Manackadath

The undergraduate co-op student: A simple pilot intervention to improve stroke clinical trial participation

Zoe O'Neill, Lauren Quong, Halina Deptuck

An Analysis of spatial sampling bias in tsetse fly distribution in Tanzania

Tracy Wang

BUCH B213

Sex differences in neurogenesis

Daria Tai

Structure-function analysis of missense mutations in the autism spectrum disorder-associated gene PTEN

Aaron Loewen

Single cell transcriptome comparison between mouse and hESC-derived pancreatic β -cells

Michelle Lee

Effects of a Maternal High-Sucrose Diet on Offspring Metabolism, Brain, and Behavior

George Kachkovski

THEME: Individual and Society

BUCH B210

Stressful life events, combined with sleep, as determinants of weight-related outcomes in young women and young men

Sherry Guo

Wellbeing in Learning Environment: Does Extra-Curricular Activity Engagement Contribute to Academic Success in First Year Science Students?

Daisy Li

Gotta Catch'em all: Pokémon Go as an innovative health intervention

Niall Johal, Bhav Kang

BUCH B215

Syntactical Disorder, Storm Detritus: A Stylistic Analysis of Hart Crane's "The Air Plant"

Claire Lloyd

Helping or Hurting? The Cross-Country Effect of Refugees on Economic Growth

Lindsey Ogilvie

Japan's ODA policy into Vietnam after the 20th century

Helen Tran

Contemporary Trends and Issues in Medication Non-Adherence: A Narrative Review

Enav Zusman

THEME: Innovation and Technology

BUCH B313

Integration of a carboxylic acid concentration sensitive Programmable Bio-containment Switch into Engineered E.coli to control in-field Escherichia coli population spread through expression of toxin gene.

Samarth Bhadrwaj, Hank Lendvoy

A Qualitative Descriptive Study of Consumer Perspectives on Smartphone Medication Adherence Apps: A Content Analysis of User Reviews

Jamie Park

Modelling the Motion of Polygonal Prisms Down Inclined Planes

Liheng Chen, Will Wei

Developing Biomarkers for Major Depressive Disorder Using Structural Magnetic Resonance Imaging

Farhad Ghaseminejad

THEME: Sustainability and Conservation

BUCH B315

The Downsides to Bike Lanes: An Analysis of Greenhouse Gases by a Green Initiative

Christina Cheung

Disaster Degradation: How Anthropogenic Climate Change May Affect Natural Marine Bioremediation Processes

Ana Clouatre, Amy Antonsen

The differing effects of low salinity on feeding rates of invasive Carcinus maenas and native Cancer productus

Sophia Kontou

Investigation of Seasonal and Environmental Influences on Carbon Sequestration and Leaf Senescence of Cercidiphyllum japonicum

Rosie Savage

Wave 2 - Oral Presentation Abstracts

BUCH B208

10.45am-12.15pm

THEME: Health and Wellness

Exploring the Perception of Stroke Clinicians (Nurses and Health Staff) About Stroke Patient Education in the Hospital

Presenter: Megan Lee, Adrienne Holland, Jenny Zhang, Priya Manackadath

Background: The number of patients affected by a stroke each year is becoming more prevalent thus compromising the lifestyle of both stroke survivors and caregivers because of the various daily care and support requirements. Health care professionals play a major role in communicating stroke knowledge and management plans, however research has indicated that their time is very limited to effectively deliver this information. Additionally, previous studies have shown that clinicians provide too much information at once resulting in the lack of retention among stroke patients and caregivers. Objective: The objective of this study is to explore the perception of health-care professionals in delivering information to patients in the hospital via a qualitative approach. Methods: We will conduct focus group interviews with the clinicians working on an acute stroke unit in a Vancouver hospital. There will be a total of four focus groups, each consisting of five health care professionals with prior experience in delivering stroke patient education; each focus group will be audio-taped. We will use a thematic analysis to determine the themes pertained to the focus of the study, and assess areas of improvement. Contribution to the field: Exploring the perceptions and challenges of health care professionals in delivering stroke education may assist administrators in designing effective educational strategies that enhance the satisfaction of professionals, stroke survivors and their families, reduce the chance for recurrent strokes, and improve the overall lifestyle of stroke survivors and caregivers.

Wave 2 - Oral Presentation Abstracts

BUCH B208

10.45am-12.15pm

THEME: Health and Wellness

The undergraduate co-op student: A simple pilot intervention to improve stroke clinical trial participation

Presenter: Zoe O'Neill, Lauren Quong, Halina Deptuck

Clinical trial participation is essential to improving standards of care, and advances in the treatment of acute stroke and secondary stroke prevention have dramatically improved rates of stroke recurrence, morbidity, and mortality over the last three decades. However, trial participation remains suboptimal in the context of acute cases and high clinical volumes. Evidence for interventions to enhance recruitment into stroke trials remains limited. Low participation can cause clinical trials to stop prematurely, effectively preventing physicians from developing a better understanding of how to best treat stroke. The Vancouver Stroke Program conducted a pilot project where an undergraduate Science Co-op student was engaged in the screening and initial approach of potential research participants. We examined historical and monthly rates of recruitment using descriptive statistics and Chi-square tests, and compared recruitment rates during the historical 1-year pre-intervention period with that of the 2-year post-intervention period. During the pre-intervention period (Jan 2015 - Dec 2015), there were a maximum of 8 trials recruiting patients. The stroke service received 1588 consults, of which 40 patients (2.5%) were approached for participation in a clinical trial. On average during this time period, two patients provided informed consent per month. In total, 24 patients consented and enrolled into studies during the pre-intervention period. During the post-intervention period (Jan 2016-Dec 2017), there were also a maximum of 8 trials recruiting patients. Of 2976 consults, 238 (8%) were approached for participation in trials during this time and 157 people were enrolled; an average of 6 patients recruited per month. The addition of an undergraduate student to the research team whose sole responsibility was to screen for eligible patients and encourage recruitment led to a 3.4-fold increase in identification of eligible study patients, and tripled mean monthly recruitment ($p < 0.0001$).

Wave 2 - Oral Presentation Abstracts

BUCH B208

10.45am-12.15pm

THEME: Health and Wellness

An Analysis of spatial sampling bias in tsetse fly distribution in Tanzania

Presenter: Tracy Wang

Human African trypanosomiasis, commonly known as sleeping sickness, is a vector-borne disease transmitted by tsetse flies. Although the disease remains a threat to millions of people in sub-Saharan Africa, it still remains a neglected disease with scarce and biased datasets on tsetse sampling locations and sleeping sickness cases. In this study, we investigate spatial sampling bias in georeferenced tsetse fly records in the United Republic of Tanzania in two different time periods. Environmental data (e.g. temperature, elevation, etc.) were extracted from NASA satellite imagery. Sleeping sickness data points were taken from the World Health Organization (WHO). Tsetse fly 2000 to 2003 (c. 2001) presence points were taken from the Tsetse and Trypanosomiasis Research Institute, while the 2009 to 2011 (c. 2010) presence points were taken from the Ministry of Livestock and Fisheries Development in Tanzania. We use Maxent, a species distribution modelling program, to perform four sampling bias correction techniques proposed by previous studies. Two of these techniques alter the species' sample locations while the other two alter the background data used for model building. We hypothesize that the distribution maps produced by the sample-corrected models will be similar and those produced by background-corrected models will be similar. The distribution models are currently being compared between techniques and years using various niche overlap metrics and validated using the WHO data. Results are underway.

Wave 2 - Oral Presentation Abstracts

BUCH B213

10.45am-12.15pm

THEME: Health and Wellness

Sex differences in neurogenesis

Presenter: Daria Tai

Adult neurogenesis is a process that involves the addition of new neurons and this process occurs in the dentate gyrus (DG) of the hippocampus of most mammalian species studied to date. Cognitive training can increase hippocampal neurogenesis. While cognitive training increases neurogenesis in males it does not do so in females. This sex difference may be reflected in the differences in learning task performance, or it may be due to different maturation rates of new neurons between the sexes. However, activation and number of new neurons are more strongly associated with performance in females, thus it is plausible that the new neurons mature at a different rate in females. The current study aims to determine whether there are sex differences in the processes of neurogenesis including the ability to produce new neurons, survival rates, and/or maturation speeds of the new neurons in the DG. Male and female rats received one injection of bromodeoxyuridine (BrdU) and were sacrificed one, two or three weeks after the injection. The number of developing cells was visualized using a staining technique called immunohistochemistry for a cell marker protein. Neurons in DG were co-labelled using immunohistochemistry for BrdU and markers for mature and immature neurons. To examine maturation, the percentages of BrdU/NeuN and BrdU/DCX double-labelled cells will be calculated. Preliminary results suggest that cell generation in the DG is greater in males, but the percentage of BrdU/DCX co-labeled cells is not significantly different between sexes in the dorsal DG.

Wave 2 - Oral Presentation Abstracts

BUCH B213

10.45am-12.15pm

THEME: Health and Wellness

Structure-function analysis of missense mutations in the autism spectrum disorder-associated gene PTEN

Presenter: Aaron Loewen

Autism spectrum disorder (ASD) is a group of neurodevelopmental disorders that are characterized by impaired communication and social interaction, repetitive behaviours, and sensory processing abnormalities. The biological mechanisms involved are largely unknown, although recent advances in sequencing technology have shown that ASD has a strong genetic component with approximately 50-100 genes associated with the disorder. Within these genes there are numerous variations with different mutations including missense mutations that alter the structure of the protein produced. The majority of missense mutation variants in these genes are of unknown functional significance. Currently, there is a need for in vivo functional assays that determine whether a particular ASD-associated mutation is strongly function altering to inform future treatment options. One of these genes of interest is phosphatase and tensin homolog (PTEN), which is implicated in both ASD as well as cancer. Our aim is to perform a precise structure-function analysis of ASD-associated missense mutations in PTEN. In the roundworm *Caenorhabditis elegans*, the worm-specific version of PTEN (daf-18) is necessary for naïve attraction to NaCl, which the worms sense as an indicator of food. We generated transgenic lines expressing human PTEN containing specific missense mutations and observed their effects on their attraction to NaCl to gauge if the mutations altered PTEN function. Using a novel machine vision tracking system, we demonstrated that daf-18 function is conserved such that nervous-system-specific expression of PTEN can substitute functionally for loss of daf-18 and restore normal sensory behaviour. The majority of the variants tested showed a complete loss of function, with one variant (Y176C) showing a partial loss of function, demonstrating that ASD-associated missense mutations in human PTEN result in loss of function. This approach can be adapted to numerous genes with variants of unknown significance.

Wave 2 - Oral Presentation Abstracts

BUCH B213

10.45am-12.15pm

THEME: Health and Wellness

Single cell transcriptome comparison between mouse and hESC-derived pancreatic β -cells

Presenter: Michelle Lee

Currently, 415 million people are living with diabetes and this number is growing rapidly. Although human pancreatic islet transplantation is successful for the treatment of diabetes, the islet availability does not meet patient needs. To address this need, human embryonic stem cell (hESC)-derived insulin-producing beta-cells (β -cells) are an unlimited source of islets to treat diabetes. However, current hESC-derived β -cells are immature and more knowledge about pancreatic endocrine cell maturation is needed to generate functional β -cells. In this study, single-cell RNA sequencing (scRNA-seq) was performed on mouse cells, which represent the development of functional β -cells, and on hESC-derived cells, which are immature β -cells that require more understanding about. ScRNA-seq offers the opportunity to study a specific cell type in a heterogeneous tissue as the pancreatic islet contains a high number of different cell types. Mouse and human pancreatic cells were sequenced and divided into several clusters based on gene expression. Multiple cell types, including β -cells, were observed in both mouse and human libraries, which confirms the capability of scRNA-seq of capturing multiple cells types in a heterogeneous environment. A human and mouse comparison was also done and hESC-derived endocrine cells were found to cluster with mouse β - and α -cells, suggesting although the hESC-derived endocrine cells are immature, there are highly similar to the functional mouse endocrine cells. Also, by performing gene comparison analysis on the human and mouse cells within the same cluster, a list of genes that may contribute to the development of functional β -cells were uncovered.

Wave 2 - Oral Presentation Abstracts

BUCH B213

10.45am-12.15pm

THEME: Health and Wellness

Effects of a Maternal High-Sucrose Diet on Offspring Metabolism, Brain, and Behavior **Presenter: George Kachkovski**

The prevalence of obesity and other metabolic diseases have greatly increased over the last few decades, partly due to a rise in sucrose (i.e., table sugar) consumption. There is increasing evidence that a maternal diet high in sucrose during prenatal and early postnatal periods can increase the risk of adulthood obesity and metabolic disease in offspring. Using a rodent model, the present study explores the effects of a high-sucrose maternal diet on offspring metabolic health, behavior, and their brains. Adult female rats were placed on either a high sucrose diet (25% of the kcal from sucrose) or an iso-caloric diet (0% sucrose) for 10 weeks, and then mated. Upon weaning, all offspring were placed on standard, nutritionally-balanced lab chow. Offspring underwent behavioral testing to explore their dietary preferences, as well as a progressive ratio operant conditioning paradigm to measure their willingness to work for a sugar reward. Male offspring showed an increased preference for energy dense diets (those high in fat or sucrose) over the control diet, as well as a greater motivation to obtain a sugar reward. There is evidence to suggest that these behavioral changes may be rooted in alterations of the mesocorticolimbic circuit. To assess this, brain dopamine circuits were assessed using IHC, levels of steroidogenic enzymes were measured using qPCR, and ongoing work is exploring steroid levels using Liquid Chromatography-Mass Spectrometry. The results show that a high sucrose maternal diet produces changes in the reward circuit of the brain by desensitizing it, which may be leading to increased consumption of rewarding, energy dense foods, ultimately resulting in detriments in metabolic health. These results suggest that a sucrose rich maternal diet could be another important factor that increases the risk of metabolic disorders in adults.

Wave 2 - Oral Presentation Abstracts

BUCH B210

10.45am-12.15pm

THEME: Individual and Society

Stressful life events, combined with sleep, as determinants of weight-related outcomes in young women and young men

Presenter: Sherry Guo

Overweight and obesity in adolescence remains a global health concern and importantly, tracks into adulthood. Adolescence is a unique developmental period of changing stress reactivity, coupled with greater exposure to stressful life events, which may have differential effects depending on gender. However, evidence on the metabolic consequences of specific life events in this population is lacking; even less is known about the interaction effects between stressful events and sleep deprivation, which also increases during adolescence and is an independent determinant of obesity. Using complete self-reported data on 904 adolescents (13-17 years) from a BC population-based cohort (BASUS), we studied the longitudinal gender-specific association between stressful life events and obesity and, secondarily, the potential effect modification by sleep deprivation. Data were analysed by multivariable logistic regression conditioning on known confounders and using an interaction term between sex and each predictor. We found that boys reporting multiple life events were twice as likely of developing obesity at 6-month follow-up (OR 2.69 [95%CI 1.07, 6.78]), compared to those without. Although more girls than boys reported multiple stressful life events, we found no association with obesity in girls. We also found a more pronounced association between stressful events and obesity among those, who reported being sleep deprived (versus not deprived), particularly among boys. Our findings highlight the importance of taking a gender perspective when studying the development of obesity in adolescence, as well as the need for more robust longitudinal studies looking at stressful events and obesity in adolescence.

Wave 2 - Oral Presentation Abstracts

BUCH B210

10.45am-12.15pm

THEME: Individual and Society

Wellbeing in Learning Environment: Does Extra-Curricular Activity Engagement Contribute to Academic Success in First Year Science Students?

Presenter: Daisy Li

Objectives: Previous research indicate a positive association between student engagement and academic success, especially when health promotion was integrated within learning environments. In this study, we implemented a pilot program to examine whether engaging student in extra-curricular activities at UBC influenced academic achievement in the context of a first-year biology class.

Methods: To promote engagement and sense of belonging in students, the Academic Scholars Program (ASP) was developed and integrated into a first-year biology class. The certificate program contained activities targeting academic, social and personal aspects of wellbeing; organized into three "Bucket-lists". Under each category, activities were assigned one, two or three points depending on the time commitment involved. Students were then invited to complete six points worth of activities under each bucket-list and write a brief reflection for each activity done. Upon completion, participants were rewarded with 3% participation grade and a certificate. Student experience surveys were conducted at the beginning and end of the term, and made available to all students in the course to explore the impact of program participation.

Results: The program had 56% participation (N=180) and 35% completion (N=111) from the class (N=319). Preliminary results showed that student use and awareness of UBC resources increased with participation and that students responded positively to the program and found it useful for transitioning to university life academically. We are currently analysing survey responses and activity reflections to further understand students' sense of belonging, their success in the course and the impact of the Academic Scholars Program.

Wave 2 - Oral Presentation Abstracts

BUCH B210

10.45am-12.15pm

THEME: Individual and Society

Gotta Catch'em all: Pokémon Go as an innovative health intervention

Presenter: Niall Johal, Bhav Kang

Currently ranked as the most downloaded app in the world, Pokémon GO (PG) has explosively raised Nintendo's stock through the roof by adding nearly \$7.5 billion to the company's market value. PG utilizes geographical data to create an augmented reality that enables players to actively search for, catch, and train virtual Pokémon characters. Mobile gaming applications (apps) and standard videogames have been historically known to promote sedentary lifestyles, thus ameliorating risk for obesity, diabetes, and other comorbidities. This study will explore the capability interactive mobile apps (Pokémon Go) have as potential physical and mental health wellness tools for university students. Data will be collected by monitoring the daily number of steps of ten university students through a smartphone step-tracking app both before and after the download of the PG app. Mental health information will also be gathered by administering a mental health questionnaire before and after the installation of PG. Ultimately, this study hypothesizes that students who actively engage with the PG app will show an increase in their daily physical activity, thus improving their cardiovascular health, in conjunction with a decrease in psychological distress.

Wave 2 - Oral Presentation Abstracts

BUCH B215

10.45am-12.15pm

THEME: Individual and Society

Syntactical Disorder, Storm Detritus: A Stylistic Analysis of Hart Crane's "The Air Plant"

Presenter: Claire Lloyd

Hart Crane has been distinguished by critics as a literary genius, but compared to American Modernist contemporaries such as William Faulkner and T. S. Eliot, little research exists on Crane's work—even less on his shorter poems. In one of the few (if not, only) published analyses of "The Air Plant," a typical Crane-like poem in its length and complex figurative language, critic M. D. Uroff claims that Crane cannot find metaphors to describe the title air plant. I pursue a stylistic analysis of the poem through its foregrounded elements—that is, those parts made especially perceptible due to parallelism (repetition with deviation, as seen in alliteration or rhyme) and deviation from a norm (changes from the expected, as with metaphor or irony). Metaphor and syntax are especially complex, used unconventionally in this poem. I use linguistic diagrams to represent, visually, the structure of Crane's sentences. By parsing the poem, its grammatical (dis)organization becomes clear. As the poem progresses, and we move towards the final image of the hurricane, the poem's earlier neat grammar deteriorates. With the hurricane comes a ravaging of the shoreline, and a disordering, too, of the linguistic landscape. This study indicates the value of a stylistic analysis, and shows how syntax, often assumed to be a background feature, can be foregrounded to contribute to a poem's meaning.

Wave 2 - Oral Presentation Abstracts

BUCH B215

10.45am-12.15pm

THEME: Individual and Society

Helping or Hurting? The Cross-Country Effect of Refugees on Economic Growth

Presenter: Lindsey Ogilvie

The world is currently experiencing some of the largest and fastest growing refugee crises in history. Thousands of people are being forced to leave their homes for indefinite periods of time in search of safer places to stay. Yet, many countries view hosting refugees as an economic burden, arguing that refugees displace local labour while putting a strain on social programs. After spending the summer in Uganda, which has one of the most refugee friendly policies in the world despite being a relatively poor country, I began to wonder if this common opinion is actually unfounded. Previous regional studies find that an increase in the stock of refugees in a country leads to lower economic growth when refugees and host labourers are substitutes, but leads to an increase in economic growth when they are compliments. Using a long-run growth accounting model, I test the hypothesis that across countries refugees behave as compliments to host labourers and consequently increase economic growth. I find that overall refugees have no significant effect on income per capita. However, in OECD countries — most of which currently have diminishing labour forces — refugees have a positive and significant effect on economic growth, as they serve to replenish the labour forces of these countries. Contrarily, in non-oil countries refugees have a significant negative effect on economic growth, suggesting that in these countries refugees behave as substitutes to native labourers. These findings may help to inform host countries about the potential labour market impacts of hosting refugees, and better prepare them to assist refugees while also protecting the economic interests of their own people.

Wave 2 - Oral Presentation Abstracts

BUCH B215

10.45am-12.15pm

THEME: Individual and Society

Japan's ODA policy into Vietnam after the 20th century

Presenter: Helen Tran

Japanese foreign aid policy was first enacted in 1954 as a result of Japan's membership into The Colombo Plan. Since then, the foreign aid policy has experienced various changes in its motives and characteristics. In the 1990s, Japan surpassed the U.S. to become the world's largest aid-giving nation with billions of dollars invested into Asia, especially Southeast Asia. Therefore, many Southeast Asian countries benefited from both economic and social development, including Vietnam.

This research looked back at the trajectory of Vietnam-Japan relations since the 1970s when the diplomatic relations were established. It also assessed the factors and motives that had driven Japan to put forth foreign aid policy. Furthermore, it looked at the dynamic interaction between Japan - China - Vietnam. As China has become a more dominant economic player on the world stage, its influence in Southeast Asia has grown significantly, especially in terms of foreign relations. Since the beginning of the 21st century, China has been more aggressive in foreign affairs leading to concurrent territorial disputes in South China Sea and East China Sea. With China's rising regional power, Japanese ODA policy in Vietnam, under Japan's perspective, is regarded as a mechanism for Japan to counterbalance China's power, yet contains a very solid economic foundation originated from Japanese nationalism.

Wave 2 - Oral Presentation Abstracts

BUCH B215

10.45am-12.15pm

THEME: Individual and Society

Contemporary Trends and Issues in Medication Non-Adherence: A Narrative Review

Presenter: Enav Zusman

Background: For many patients living with lifelong diseases, managing conditions and taking medications as prescribed (“adherence”) is a challenge. In 2003, the World Health Organization has declared medication non-adherence as an epidemic, costing billions of dollars in wasted health care resources. Our objective was to conduct a review of the research on medication non-adherence in the past 20 years to identify trends and issues. Methods: We conducted a search of MEDLINE, EMBASE, CINAHL and SPORTDiscus for original research studies that meet the following criteria: 1) reporting adherence measurements; 2) measuring the burden of non-adherence; 3) assessing the impact of non-adherence on patient and societal outcomes and 4) evaluating adherence interventions. We limited our search for papers published between the years 2000-2017. Results: We identified 23,330 medication adherence publications since 2000. Our search results show an increasing trend in number of articles over time, from 356 papers in 2000 to 1578 papers in 2017 with a peak of 2431 papers in 2014. Our review informed issues and trends in five topical areas of HIV, elderly patients, pediatric patients, mental health, and digital health technologies. Conclusion: Medication non-adherence is a complex and perplexing health problem and research in the field is challenged by inconsistent terminologies, multiple measurement approaches, and lack of effective interventions. We observed an increase in the number of articles over time, likely reflecting the consideration of the importance of this health problem and urgent need to address it.

Wave 2 - Oral Presentation Abstracts

BUCH B313

10.45am-12.15pm

THEME: Innovation and Technology

Integration of a carboxylic acid concentration sensitive Programmable Bio-containment Switch into Engineered E.coli to control in-field Escherichia coli population spread through expression of toxin gene.

Presenter: Samarth Bhardwaj, Hank Lendvoy

Bioremediation of environmental contaminants is essential to the bioeconomy and sustainable development. Synthetic biology has catapulted Genetically Engineered Microorganisms (GEMs) as the principal choice for bioremediation on account of its passiveness and low expenditures. Nevertheless, deployment of these engineered microorganisms into the environment requires a secure means to confine their spread. One approach to biocontainment is to use gene circuits that express toxin genes only upon the escape of the microbial host outside of the of the remediation environment. While these circuits can be combined with environmental signals, their lack of programmability limits their use under non-laboratory conditions. Herein, we report the successful development of a biosensor that can detect specific environmental contaminants as the inductive signal for the biocontainment circuit. The biosensor was discovered through screening a well-characterized Escherichia coli promoter library with oil industry wastewater samples. We subsequently constructed a gene circuit modularized with both sensing and degradation elements using a logic gate. The biosensor produces survival state through expression of toxin gene repressor in the presences of carboxylic acids contaminants. We demonstrate that integration of this biocontainment switch into E. coli effectively improves environmental decision-making leading to more sustainable on-site bioremediation processes. This synthetic gene circuit can be simply reprogrammed to alter the environmental signals, regulatory design and killing mechanism.

Wave 2 - Oral Presentation Abstracts

BUCH B313

10.45am-12.15pm

THEME: Innovation and Technology

A Qualitative Descriptive Study of Consumer Perspectives on Smartphone Medication Adherence Apps: A Content Analysis of User Reviews

Presenter: Jamie Park

Background: Medication non-adherence negatively impacts patient's health, increases hospitalizations and places a great financial burden on the healthcare system. With ubiquitous cellular phone use and ease of accessibility, smartphone apps may represent valuable tools to support patient adherence. With numerous medication adherence apps on the market and the associated challenges in the app selection process, valuable insight can be gained from understanding the personal experiences and needs of current consumers.

Objective: To explore consumer perspectives on their user experience as well as beneficial, unhelpful and desired functions of medication adherence apps.

Methods: Content analysis on consumer reviews was conducted for medication adherence apps on the official iOS (n=10) app store that were quality assessed in a previous study. App reviews were abstracted and team-based, open-coded analysis was conducted. The analysis included construction of categories and abstraction into themes.

Initial Results: A total of 363 iOS eligible user reviews were analyzed. The following themes emerged from our qualitative analyses: (1) Beneficial functions including the ability to set-up customized reminders, support health care visits, and manage multiple people or pets; (2) Criticisms including cost, dosage schedule inflexibility, confusing app navigation, updates and glitches; (3) Desired functions related to versatility of information input and extensive connectivity with different devices and apps.

Conclusion: Present findings offer mostly positive feedback as well as insight into current limitations and improvements that could be addressed in medication adherence apps. The findings can be incorporated for future development of an evidence-based, user-centred app to enhance medication adherence.

Wave 2 - Oral Presentation Abstracts

BUCH B313

10.45am-12.15pm

THEME: Innovation and Technology

Modelling the Motion of Polygonal Prisms Down Inclined Planes

Presenter: Liheng Chen, Will Wei

Our project explores the rolling motion of polygonal prisms down inclined planes. The concept of rolling is applicable not only to balls and cylinders, but also to objects that span a vast range of scales – from hexagonal pencils that roll on a table, to boulders that fall down a cliff. Modelling these systems may shed light on mechanics underlying the rotational and collisional interactions of common objects. We aimed to program a mathematical model that accurately predicts the time taken for a prism to travel a certain distance down an incline, given initial conditions. Square, hexagonal, and circular prisms were rolled down a ramp inclined to various angles and videos were recorded to determine times of descent. The same initial conditions were inputted into the model and predicted times of descent were obtained. Animations of the prisms' motion were made according to the model. The model predicts the rolling time reasonably well for prisms with more sides such as hexagonal prisms and circular cylinders whose number of sides is infinite. Predicted times deviate most from the experiment for the square prisms. Discrepancies may be attributed to “double bouncing”, in which one edge of the prism collides with the ramp twice consecutively in the actual experiment. In addition, a more accurate approximation of the energy loss in each collision would lead to improvement in model prediction. The deconstruction of the rolling motion is fascinating on its own and the paper has been published in the Stem Fellowship Journal.

Wave 2 - Oral Presentation Abstracts

BUCH B313

10.45am-12.15pm

THEME: Innovation and Technology

Developing Biomarkers for Major Depressive Disorder Using Structural Magnetic Resonance Imaging

Presenter: Farhad Ghaseminejad

Major Depressive Disorder (MDD) is a prevalent disorder characterized by low mood, inability to feel pleasure and cognitive impairments. According to the WHO, MDD is predicted to be the leading cause of the global burden of disease by 2030, which makes this disorder a critical condition to explore. Despite this high increase in prevalence, there is limited efficacy of current treatments, with only 30-40% of patients achieving remission after an initial treatment. Nonetheless, the level of treatment resistance is in part due to large subject-specific differences, requiring special biomarkers to personalize treatments. MDD specifically is found to be associated with structural brain abnormalities, such as reduction in hippocampal volume. Therefore, structural changes of the hippocampus may be excellent biomarker candidates to predict treatment response and response monitoring. For this study, high resolution MRI scans were used to ascertain structural features of the hippocampus in MDD patients and Healthy Controls. After passing through the inclusion/ exclusion criteria, 60 MDD patients and 27 Healthy Controls were considered. At baseline, the mean volume of the hippocampus in MDD patients was found to be significantly smaller than healthy controls. The generalized linear model univariate analysis of covariance illustrated a significant difference ($p=0.005$) in volume between the right hippocampus in MDD patients compared to healthy controls, considering intracranial volume and sex as covariates. This reduction in volume however, was not statistically significant in the left hippocampus ($p=0.314$). Overall, our results support the hypothesis that MDD is associated with specific structural change in the hippocampus.

Wave 2 - Oral Presentation Abstracts

BUCH B315

10.45am-12.15pm

THEME: Sustainability and Conservation

The Downsides to Bike Lanes: An Analysis of Greenhouse Gases by a Green Initiative Presenter: Christina Cheung

As many developed cities push for a greener vision, policy makers have implemented bike lanes to change the city landscape. Such infrastructure, however, usually displaces existing vehicle lanes. What this implies is that the regular vehicle flow in these areas may congest the road, imposing financial costs on stores that rely on car traffic and societal costs on the neighbourhood in terms of noise and air pollution. The purpose of this study is to investigate whether having bike lanes in major cities, although proclaimed to be environmentally friendly, actually contributes to higher greenhouse gas emissions due to the congested nearby traffic it causes. Using computer simulation and Markov chain methods, I estimate the amount of air pollution bike lanes cause on one, two, and three lane neighbourhoods. The results will be compared to real-time traffic data. The application of this study is vast because it may influence how bike lanes will be built in cities, as many plan to implement more in residential and business districts. This is a working project, and I will have my results by February.

Wave 2 - Oral Presentation Abstracts

BUCH B315

10.45am-12.15pm

THEME: Sustainability and Conservation

Disaster Degraders: How Anthropogenic Climate Change May Affect Natural Marine Bioremediation Processes

Presenter: Ana Clouatre, Amy Antonsen

When oil is spilled into the ocean, the primary method of bioremediation occurs naturally as microorganisms consume the oil particles. However, ocean pH has dropped approximately 0.1 units over the past 200 years due to climate change and is predicted to drop another 0.4-0.5 units by the end of the century. This may have severe effects on the physiological function of these microorganisms, resulting in changes in their ability to digest spilled oils. Oceans will be more vulnerable to oil spill disasters if ocean acidification adversely impacts the microorganisms' ability to clean up a spill, yet few studies have addressed this growing concern. *Rhodococcus jostii* RHA1, a relative of marine bioremediating bacteria, is a soil-dwelling bacterium capable of degrading certain hydrocarbon molecules similar to those present in oil. By measuring population growth of *R. jostii* over time in an environment containing the hydrocarbon n-hexadecane, changes in degradation rate relative to the pH of their environment were observed. At pH 6.2, 7 and 8, growth was measured through optical density absorbance spectroscopy. Colonies grown at pH 6.2 reached a significantly higher growth maximum than colonies grown at pH 8, and remained larger in population throughout all subsequent measurements. These results predict an effect on bacterial growth due to changes in pH and indicate a need for further studies investigating effects of ocean acidification on bioremediation.

Wave 2 - Oral Presentation Abstracts

BUCH B315

10.45am-12.15pm

THEME: Sustainability and Conservation

The differing effects of low salinity on feeding rates of invasive *Carcinus maenas* and native *Cancer productus*

Presenter: Sophia Kontou

Changing climate as a result of anthropogenic impact will shift oceanic salinities; specifically, the Pacific Northwest expects freshening of its coastal waters. Abiotic environmental shifts such as this may increase an ecosystem's suitability to invasive species thereby promoting range expansion and growth. Invasive species can disrupt interspecific interactions and induce prey competition with native species. To explore this, changes in feeding rates were examined of invasive European green crabs (*Carcinus maenas*) and endemic red rock crabs (*Cancer productus*) in response to experimentally relevant low salinities (100, 75, and 50 percent seawater). Previous studies have yet to directly compare feeding rates of these two species under such conditions. An opposite relationship of feeding rates in decreasing salinity was exhibited – *C. productus*' feeding rate decreased with decreased salinity whereas *C. maenas*' feeding rate increased. Both species showed different trends in feeding rates when the three parameters salinity, species, and carapace width were used in a predictive model of the population average. *C. productus*' feeding rate was best described by salinity and carapace width whereas *C. maenas*' feeding rate could not be predicted by any of the variables. These results suggest that *C. maenas* has a greater adaptive ability in lower salinity conditions than *C. productus*. Their breadth of abiotic tolerance provides insight into their invasive capabilities and the likelihood that they will outcompete native crab species who share similar prey preferences in a shifting marine environment.

Wave 2 - Oral Presentation Abstracts

BUCH B315

10.45am-12.15pm

THEME: Sustainability and Conservation

Investigation of Seasonal and Environmental Influences on Carbon Sequestration and Leaf Senescence of *Cercidiphyllum japonicum*

Presenter: Rosie Savage

As climate change and accumulation of greenhouse gases progress, maximizing plants ability to remove CO₂ from the atmosphere is important. While urbanization and human development are growing, the number of plants and trees introduced to urban environment is also increasing. Conditions, like soil compaction, can be stressful for species due to limited water and nutrient availability. The objective of this study is to investigate the influences of soil compaction and seasonal changes on the rates of senescence and carbon sequestration of the ornamental tree species, Japanese Katsura (*Cercidiphyllum japonicum*). Japanese Katsura trees experiencing relatively high soil compaction on the University of British Columbia campus were monitored in terms of morphology (leaf morphology and leaf area), physiological (photosynthesis and transpiration rates), and molecular (photosynthetic proteins and chlorophyll content) parameters. These parameters were used to observe the pattern of senescence. Overall, trees experiencing high soil compaction showed faster rate of chlorophyll and photosynthetic protein degradation, lower average leaf area which resulted in decreased photosynthetic rates. It was concluded that trees planted under pavement were experiencing faster rates of senescence, reducing the overall ability to sequester carbon. The likely mechanism(s) of soil compaction-induced changes in leaf senescence and carbon sequestration will be discussed.

Wave 3 - Poster Presentation List

Brock Hall Concourse, 1874 East Mall

1.30pm- 3.00pm

THEME: Health and Wellness

The Effects of Resistance Training and Vitamin D on Strength and Mobility in Older Adults with Sarcopenia: A Randomized Controlled Feasibility Study

John Park, Rachel Kao

The Concussion Awareness Training Tool (CATT): Shining a Light on the Mystery of Concussions

Faraz Damji

Association of Iodine Levels with Placental Abruption in IVF conceived births

Lutfiyya Devji, Simran Grewal

Refining the Structure and Function of CrPV 3'UTR

Helen Tran

A Program Evaluation of First Link

Sonali Sharma

For university students with similar exercise routine, does the frequency of progression have an effect on injury risk?

Arvin Bains, Jacques Chen

Assessing and Improving the Clinical Decision Making of UBC Medical Students: A Pilot Project

Colin Tan

Impact of 13-Pneumococcal Conjugate Vaccine among Adults: A Systematic Review and Meta-Analysis

Anna Chen

Optical Monitoring of Spinal Cord Subcellular Damage After Acute Spinal Cord Injury

Allan Fong

Can regular access to a playpen improve the welfare of standard housed laboratory rats?

Sarah Tan

The role of Ataxin-2 cleavage in enterovirus infection

Mila Sempere

Macrophage Polarization: Using the body's natural defenses to fight tumours

Fiel Dimayacyac, Alice Man, Ceren Gulhan, Chris Breden

Target Trial Emulation Comparison of Short (5-day) vs. Long (10-day) Duration Antibiotic Treatment for Outpatient CAP in Adults

Abigale MacLellan, Zeynap Asadi Lari, Kira Tosefsky

Review of the influence of p16 knockout on PanIN deterioration

Dorsa Khormali, Hanlin Wang, Lydia Li, Juan Gomez

Investigating dopamine inhibition of regulatory T cells in breast cancer

Cathy Yan, Matthew Tsui-Ladd, Nhi Le, Alex Vanderput

Effects of Minocycline Administration on Spatial Learning and Memory Performance Following Prenatal Alcohol Exposure

Srishti Sarkar

Utilization of Health Literacy Assessment Tools by Pharmacists to Tailor Patient Counselling

Sara Chan

Immediate Full Fluid Diet versus Post-Surgical Transition Diet in Colorectal Surgery Patients

Elaine Fung

Brain-behaviour relationship changes in adults with traumatic brain injury following a six-month cognitive intervention program

Zahra Rajwani, Maya Willms

Role of lymphoid monocytes in peripheral nerve regeneration

Nicholas Salterio

THEME: Sustainability and Conservation

Investigating the genetic basis of emerging pesticide resistance in the bacterial apple fire blight pathogen *Erwinia amylovora* using genomics

Vivian Morley-Senkler

Diversifying Energy Storage: Zinc-Nickel Flow Batteries

Shams Elnawawi, Caleb Enns, Taij Taggar, Amelia Dai

THEME: Innovation and Technology

Using the Cellular Potts Model to Simulate Cellular Behaviours

Justin Cruz, Ryan Konno, Zachary Pellegrin

Deletion of p53 gene in determining acinar cell being the more-likely cell of origin in pancreatic cancer as opposed to ductal cells.

Yalda Hosseini, Arifa Ang, Judy Fan, Jennifer Tang

Temporal and Spatial Patterning of Esrrb Expression During Cerebellar Development

Casper Tsai

The IT Factor: Effect of Density and Polarity on Visual Search

Sarah Thongprasert, Christopher Calao, Tiffany Wu

The maternal embryonic leucine zipper kinase as a therapeutic target for prostate cancer

Marisa Dorling

Is Edited MRS of GABA SNR Limited?

Rachelle Loo

THEME: Individual and Society

Portrayals of LGBTQ Older Adults in Canadian Newspapers and Magazines

Suzanne Ng

To what extent has trade been the sole contributing factor to the Izumo's role as a cultural centre during Japan's Yayoi period?

Kelly Chan

Examining the effectiveness of Cognitive Behavioural Therapy in treating psychiatric disorders in Downtown Eastside Vancouver

Tanvi Krishna, Vanisha Sodhi

Effect of overexposure to sunlight and development of breast cancer

Mohammed Khamseh

The influence of physiological arousal on appetitive emotional learning

Niki Yaw

Family Perceptions of the Delegated Diabetes Care Plan: Evaluation of a BC-wide Program that Supports Children Living with Type 1 Diabetes in the School Setting

Alex Fung

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

The Effects of Resistance Training and Vitamin D on Strength and Mobility in Older Adults with Sarcopenia: A Randomized Controlled Feasibility Study

Presenter: John Park, Rachel Kao

Sarcopenia is a condition of age-related loss of muscle mass and strength, which affects nearly 50% of older adults over the age of 80 years. Patients with sarcopenia commonly experience decrease in physical function, strength, and overall health. Resistance training has been shown to improve muscle mass and function. Recent evidence suggests deficiency of vitamin D is associated with muscle loss and poor function. However, positive effects of vitamin D on muscle function in patients with sarcopenia appear limited. Therefore, our objective is to investigate the effects of vitamin D along with resistance training on muscle strength and mobility in patients with sarcopenia. We conduct a randomized controlled feasibility study in 60 older adults over 65 with sarcopenia from three assisted-living facilities by randomly assigning them into three groups: a control group with usual care, an intervention group with vitamin D supplementation (1000 IU/d), and an intervention group with resistance training and vitamin D. The resistance training will be delivered by well-trained instructors with 12 weeks in total, 3 times per-week, and 45 minutes per-session. All participants will be measured with hand grip strength, quadriceps strength, standing balance, gait speed, and fall efficacy at baseline and completion of the study. We anticipate participants in the intervention group with resistance training and vitamin D would show significant improvements in muscle strength and physical performance, compared to the control group and the group with vitamin D alone. Our results may help develop treatment plans for older adults with sarcopenia in assisted living.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

The Concussion Awareness Training Tool (CATT): Shining a Light on the Mystery of Concussions

Presenter: Faraz Damji

Concussions in sport are a common incident that are often reported and have gained significant media attention. This invisible epidemic is also observed in those who have suffered falls, car crashes and bike accidents. The negative consequences of this mild traumatic brain injury have created a significant burden on families and society. In today's society there are many misconceptions amongst the general public regarding concussions. Furthermore, there is a lack of consistency in the way concussions are being handled by clinicians. The Concussion Awareness Training Tool (CATT) is a series of online educational modules and resources with the goal of standardizing concussion recognition, diagnosis, treatment, and management. The BC Injury Research and Prevention Unit has conducted evaluation studies to determine the effectiveness of CATT. Physicians from across the province (n=32) were recruited to complete the Medical Professional Course offered on the CATT website. Pre and post-intervention surveys with self-reported data were used to measure changes in knowledge, attitudes and practices around concussion management. Physicians had a statistically significant positive change in practices ($p=0.001$) and of those who reported seeing more than 10 concussions per year, a statistically significant positive change in knowledge was detected ($p=0.039$). The implementation of CATT, a sophisticated training toolkit, shows promise to revolutionize concussion care. It could play a role in decreasing the risk of brain damage and long-term health issues in those who have suffered a concussion, with potential to reduce the rate of occurrence. CATT also caters to parents, players, coaches, and school professionals.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Association of Iodine Levels with Placental Abruption in IVF conceived births

Presenter: Lutfiyya Devji, Simran Grewal

Placental abruption is a condition where the placenta partially or completely detaches from the uterus prior to birth. Iodine is required for the natural development of the fetus and for lactation within the mother. Iodine levels lower than 150-249 ug/L are considered insufficient for pregnant women and can result in birthing complications, such as miscarriage and stillbirth. Patients who underwent (in-vitro fertilization) IVF had a 1.6% chance of more likely experiencing a placental abruption. For this reason, it was hypothesized that if iodine is deficient during pregnancy, then placental abruption may arise, with a greater risk to IVF born children. Iodine levels were measured in four groups (each n=100) of pregnant women: naturally conceived singleton pregnancies, naturally conceived twin pregnancies, IVF conceived singleton pregnancies and IVF conceived twin pregnancies. This longitudinal study recruited pregnant women in their first trimester. To measure iodine levels, urine samples were collected every three weeks throughout their pregnancy to test for an increase in transportation of maternally-produced thyroid hormone to the fetus. Binomial logistic regression models were used to determine the association between iodine concentration and placental abruption, controlling for health-related covariates. Four such models were fitted, one for each experimental group. The increasing prevalence of artificial reproductive technologies suggests that further research is needed into the requirements for healthy born children. Insufficient iodine levels during pregnancy and its association to placental abruption should serve as an indication to clinicians that iodine levels must be monitored more frequently throughout gestation.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Refining the Structure and Function of CrPV 3'UTR

Presenter: Helen Tran

The Dicistroviridae are a family of positive-sense RNA viruses with two open reading frames (ORFs) which infect arthropods, including agriculturally and economically relevant honey bees and penaeid shrimp. The Cricket paralysis virus (CrPV), which infects flies, has served as a model organism to provide valuable insight into understanding viral-host interactions. CrPV has developed advanced mechanisms to maximize use of their genomes to facilitate hijacking of their host cell machinery, specifically through untranslated regions in their 5' and 3' ends, and an intragenic region (IGR). Research by previous investigators has revealed distinct elements of CrPV located in its 5' UTR and IGR, which enables it to direct host translational machinery to synthesize components necessary for its survival. However, little is known about how the 3'UTR of CrPV influences its life cycle. We hypothesize that the 3'UTR of CrPV forms a hairpin structure that is rich in uracil residues, which resembles an expression and nuclear retention element (ENE) observed in other viruses. Here, I present preliminary characterization of a proposed RNA structure in the 3'UTR of CrPV through mutational analysis and secondary structure probing. Mutational analysis of the proposed RNA hairpin structure sequence appears to reduce viral protein production and expression of a reporter gene, however, compensatory mutations were not observed to recover the expression of either. In addition, our findings suggest the 3'UTR may play a role in replication instead of translation. The exact mechanism of its regulation remains elusive, and analysis with DMS probing will provide further secondary structure information.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

A Program Evaluation of First Link

Presenter: Sonali Sharma

The development of government and community healthcare programs has the potential to significantly improve quality of life and care of people with dementia and their caregivers. Through these programs, people with dementia and their caregivers are increasingly able to benefit from accessible, prompt, and customizable healthcare services tailored to their needs and wants. These interventions can act as a gateway to autonomy, allowing people with dementia to be more involved in their own care. However not much research has been done on the direct impact of these such interventions. Therefore, to evaluate the benefits and harms of these interventions we conducted a program evaluation on First Link created by the Alzheimer's Society of B.C. First Link is a support network aiming to assist persons with dementia and their caregivers through all stages of the diagnosis and journey of dementia. A total of one hundred participants including persons with dementia, caregivers and physicians completed a survey on their experience with First Link. The survey questions aimed to evaluate topics on mental health, physical health, program relevance, support network effectiveness, service quality and accessibility. Preliminary findings from this both qualitative and quantitative study indicated that First Link was looked upon favorably and aided patients and caregivers in navigating the journey of dementia.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

For university students with similar exercise routines, does the frequency of progression have an effect on injury risk?

Presenter: Arvin Bains, Jacques Chen

The purpose of the study is to investigate the relationship between progression in the gym and musculoskeletal injuries (MSIs). For university students, MSIs can interfere with studying, social life, and other extra-curricular activities. Additionally, injuries lead to increased spending in healthcare. The hypothesis of the study is that progressing either too slowly or too quickly will lead to an increased risk in MSIs. Frequency of progression in weight-lifting exercises is defined by how quickly a person switches from their current weight for the exercise to a heavier weight. This study will go about testing our hypothesis by constructing a prospective analysis using a sample size of around 60 university students, including both male and female. All participants will take part in the same fitness routine involving weightlifting exercises four times a week for three months. The participants will be randomly split into three groups: each group will progress to heavier weights at different rates, either slowly, moderately, or quickly. Participants will be examined weekly through medical examinations to evaluate the frequency and severity of injuries. Upon completion of the study, results will be gathered from participants and the injury risk from each group will be determined. Limitations of this study include not having complete control over the health and athletic background of participants, which may affect their injury risk. Additionally, only one looking at one variable, frequency progression, is being investigated, but other factors such as improper technique, sleeping time, and diet may also have an effect on MSIs.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Assessing and Improving the Clinical Decision Making of UBC Medical Students: A Pilot Project

Presenter: Colin Tan

The transition between classroom to clinic learning, whether it be through practicum placements during 1st year or clerkship rotations in 3rd year, is a major teaching component of medical education. Many different schools across Canada have tried to integrate new pedagogical techniques in order to bridge this gap between the foundational knowledge and clinical application that medical students face as they progress further into their studies. Despite these efforts, studies have shown there are still shortcomings in the preparation of students for their clinical rotations. This could lead to suboptimal learning and even adverse outcomes for patients. Clinical decision making, or CDM, sessions are a new component of the renewed UBC MD curriculum. The objective of this study is to learn more about and understand the effectiveness of these interactive CDM seminars in the first and second year of medical school. This qualitative study was piloted with students from the UBC MD Class of 2019; semi-structured, one-on-one interviews were conducted before their third year began. A follow-up interview on the same participants was completed halfway through their clerkship training to re-assess how they feel the CDM seminars have or have not helped them thus far. A thematic analysis is currently being completed to draw patterns within the data. The findings from this pilot study will help identify a methodology to more thoroughly examine perspectives on the CDM education, as well as identify the strengths and weaknesses in clinical teaching in the new curriculum.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Impact of 13-Pneumococcal Conjugate Vaccine among Adults: A Systematic Review and Meta-Analysis

Presenter: Anna Chen

BACKGROUND: Annually over 1.6 million deaths occur worldwide due to *Streptococcus pneumoniae*. Adults over 50 years of age are at greatest risk. Since 2004, the 7 valent- Pneumococcal Conjugate Vaccine (PCV7) was incorporated in childhood national immunization programs (NIP) of many countries, including but not limited to Canada, followed by the 13 valent vaccine (PCV13) in 2010.

AIMS: This systematic review and meta-analysis summarizes available data on the incidence of invasive pneumococcal disease (IPD) in adults due to introduction of PCV13 in childhood immunization programs.

METHODS: We conducted a systematic literature search from January 1946 to May 2017 in Cochrane, Embase and Medline. We included all randomized controlled trials (RCT) and observational studies (OBS) that reported cases and incidence rate of IPD in adults for the periods before and after the introduction of PCV13 into the childhood NIP. Incidence rate ratio (IRR) pooled across studies using random-effects models.

RESULTS: Data pooled from 21 OBS studies (n = 113,399 cases) from high vaccine uptake population reporting the risk of IPD among 18 and above before and after the introduction of PCV13. In adults, under 65 years of age, the reduction in IPD rates was 23% (95%CI: 16-29%, $p < 0.0001$) after introduction of PCV13 and among aged 65 years of age or older, reduction was 14% (95%CI: 9-19%, $p < 0.0001$).

CONCLUSIONS: The results of this study revealed a significant impact of PCV13 in reducing invasive pneumococcal disease among adults for culture confirmed disease.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Optical Monitoring of Spinal Cord Subcellular Damage After Acute Spinal Cord Injury Presenter: Allan Fong

Sudden physical trauma to the spinal cord (SC) results in acute SC injury, leading to SC tissue destruction, acute inflammation, increased SC pressure, reduced blood flow and cell death. The ability to monitor SC tissue viability at subcellular level, using a real-time noninvasive method, would be extremely valuable to clinicians for estimating acute SCI damage, and adjusting and monitoring treatment in the intensive care setting. This study examined the feasibility and sensitivity of a custom-made near infrared spectroscopy (NIRS) sensor to monitor the oxidation state of SC mitochondrial cytochrome aa3 (CCO), which reflects the subcellular damage of SC tissue, in an animal model of SCI. Non-invasive NIRS monitoring of six anesthetized Yorkshire pigs reflected changes in SC tissue CCO and hemoglobin saturation following acute SCI. A consistent decrease in SC tissue CCO concentration was observed following SCI, indicating progressive SC cellular damage at the injury site. Elevation of mean arterial pressure can reduce SC tissue damage as suggested by different researchers and observed by significant increase in SC tissue CCO concentration in this study. This pilot study indicates that a novel miniaturized multi-wave NIRS sensor has the potential to monitor post-SCI changes of SC cytochrome aa3 oxygenation state in real time. Further development of this method may offer new options for improved SCI care.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Can regular access to a playpen improve the welfare of standard housed laboratory rats?

Presenter: Sarah Tan

Current standard cages for laboratory rats do not provide sufficient space for healthy levels of mobility or expression of natural behaviours. This study assessed whether giving standard housed laboratory rats regular access to a playpen would improve indicators of welfare. The playpens are larger cages, with multiple levels furnished with hammocks, tubes, access to water and burrowing substrate, providing opportunities to exercise, climb, run, and play. One welfare indicator is stretching, since it has been shown that rats perform this behaviour to relieve stiff joints and muscles, reduce soreness, and promote blood circulation. Therefore, the aim of this study is to compare the frequency of stretching in rats with and without access to a playpen to determine whether playpens provide sufficient opportunity to exercise to improve welfare. The study observed ten cages of standard housed SpragueDawley rats, randomly assigned to either the control or playpen treatment. Each cage was placed in their assigned treatment for 50 minutes, four times per week for five weeks. Rats were filmed in their home cages and videos will be analyzed to score the frequency of stretching between the two treatment groups. While the data showed a higher stretching frequency in the control group after the treatment, the difference was not significant. This could indicate that although playpens may be enjoyable, 50 minutes of playpen access is not enough to alleviate stiffness they experience in standard cages, and this alternative housing can be used as a lowcost and easy refinement for rats in research.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

The role of Ataxin-2 cleavage in enterovirus infection

Presenter: Mila Sempere

Viral encoded proteinases, such as 3Cpro and 2Apro, play a central role in enteroviral infections. In addition to polyprotein processing, 3Cpro cleaves specific host proteins to prevent antiviral responses and facilitate viral replication. The 3Cpro catalytic core is highly conserved amongst enteroviruses and therefore studying the importance of these host targets using a model virus could provide insight into the mechanism of many. Previous research has identified Ataxin-2 as a poliovirus 3Cpro target through Terminal Amine Isotopic Labeling of Substrates (TAILS). Ataxin-2 is a ubiquitously expressed protein known to be involved in RNA processing and stability, but has not been studied within the context of enteroviruses thus far. Following in vitro and in vivo confirmation of Ataxin-2 cleavage, we hypothesize that this event is important for enteroviral infection and assessed this using poliovirus as a model. The approach was to alter Ataxin-2 expression in HeLa cells and measure the effect this may have on poliovirus infection. We optimized Ataxin-2 knockdown and observed no significant decrease in viability. Knockdown of Ataxin-2 resulted in an increase in the extracellular but not intracellular viral titer. In addition, it had no noticeable effect on viral protein production. Overall these results suggest that cleavage of Ataxin-2 may contribute to poliovirus infection through a separate mechanism. This is currently being assessed through expression of cleavage-resistant Ataxin-2 and evaluation of the same parameters.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Macrophage Polarization: Using the body's natural defenses to fight tumours

Presenter: Fiel Dimayacyac, Alice Man, Ceren Gulhan, Chris Breden

Current cancer statistics indicate that one in two Canadians will be diagnosed with cancer and that one in four will die from the disease. Therefore, it is imperative that more effective treatment options be designed. One area of interest for treatment is utilizing the patient's immune system to fight off cancer. In this sense, we propose to utilize the immune system, specifically macrophages. Macrophages can either be tumour-promoting (M2) or tumour-obstructing (M1) depending on their microenvironment. Tumours often recruit M2 cells to aid in their growth and progression; these M2s are referred to as tumour associated macrophages (TAMs). To increase the number of M1 macrophages in tumours, we propose to use superparamagnetic iron oxide nanoparticles (SPIONs) with a targeting ligand to polarize M2 macrophages into M1 macrophages. One of the major advantages of this strategy is that SPIONs are non-toxic due to the fact that cells can safely metabolize the particles. In order to facilitate the uptake of the particles purposely to M2 macrophages, we suggest decorating the surface of the SPIONs with a CD163-targeting ligand, which is found in high concentrations on M2 macrophages. Upon cellular intake of the CD163 decorated SPIONs, M2s begin to display M1 properties. Having a higher proportion of M1s results in an increase in immune activation and, therefore, a predicted decrease in tumour volume. By targeting the immune system with iron oxide nanoparticles, it is hoped that the conversion of macrophages to be tumor obstructing will improve patient outcomes.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Target Trial Emulation Comparison of Short (5-day) vs. Long (10-day) Duration Antibiotic Treatment for Outpatient CAP in Adults

Presenter: Abigale MacLellan, Zeynab Asadi Lari, Kira Tosefsky

Community Acquired Pneumonia (CAP) is a serious lung infection acquired outside of hospitals or extended-care facilities. A recent retrospective cohort study estimated that 70% of antibiotic therapies for uncomplicated CAP in hospitalized adults between 2012-2013 exceeded the necessary course duration. Provided equal effectiveness, shorter antibiotic courses reduces cost, improves patient compliance and is thought to reduce susceptibility to antibiotic resistant infections. This proposed study seeks to investigate whether 5-day antibiotic therapy is non-inferior to >10 day therapy, with respect to successful treatment of the CAP episode within 30 days of beginning treatment, and rates of hospitalization for *Clostridium difficile* infection within 15 days of terminating treatment. We will create a cohort of adults (18-65 years) treated for CAP with antibiotics in the outpatient setting from September 2015 to September 2017 from British Columbia's centralized administrative databases. Individuals who received antibiotics or were hospitalized in the 3 months preceding CAP diagnosis and those with relevant comorbidities will be excluded. We will use a target trial emulation approach to estimate the intention-to-treat effect and logistic regression to analyze both outcomes, adjusting for confounding based on the standardized CAP severity score, Curb-65. Target trial emulation methodology enables us to mimic randomization using administrative data. While ambiguity in data codes and reliance on physician diagnostic decisions present potential limitations to this approach, assuming validity of data codes and physician diagnostic criteria, target trial emulation methodology enables us to draw causal inferences under financial and temporal constraints.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Review of the influence of p16 knockout on PanIN deterioration

Presenter: Dorsa Khormali, Hanlin Wang, Lydia Li, Juan Gomez

The research was aimed at investigating the chances of Pancreatic Intraepithelial Neoplasia (PanIN) turning into Pancreatic Cancer in the absence of p16. KRAS is one of the most frequently activated oncogenes in tumors and KRAS activation can be found in early stages of PanIN, which is very likely to develop into Pancreatic Cancer. However, other mutations such as the inactivation of tumor-suppressor genes p16, p53 and SMAD4 are also required to promote PanIN deterioration. The study focused on the influence of p16 on PanIN development. Mice having KRAS activation were used to explore the role of p16 and cre-flox method was utilized on these mice to create p16^{-/-} and p16 flox/flox groups, then the mortality rate in two groups were measured to investigate the degree p16 knockout. The results showed that in combination with expression of KrasG12D, pancreas specific disruption of p16 in LSL- KrasG12D; Pdx1-Cre mice promoted progression of PanIN to invasive PDA and significantly shorten their median survival from >13 months to 4-6 months, indicating that p16 played an important role in preventing PanIN development.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Investigating dopamine inhibition of regulatory T cells in breast cancer

Presenter: Cathy Yan, Matthew Tsui-Ladd, Nhi Le, Alex Vanderput

Regulatory T cells promote self-tolerance by suppressing other immune cells, but can also, consequently, inhibit the elimination of cancer cells by cytotoxic T cells. In vitro, regulatory T cell activity can be suppressed by the neurotransmitter dopamine, which inhibits adenylyl cyclase, an enzyme responsible for increasing intracellular concentrations of cyclic adenosine monophosphate (cyclic AMP). Intracellular cyclic AMP is necessary for regulatory T cell suppressive function. The primary receptors involved in this process are the D2 family members DRD2, DRD3, and DRD4. It is unclear, however, whether dopamine-mediated inhibition of regulatory T cells is an important factor in limiting cancer progression. We will investigate the role of dopamine signaling on regulatory T cells in the context of breast cancer. For this study, we will use Cre/lox recombination to generate mice with a regulatory T cell-specific D2 deletion. Breast cancer will be induced by xenografting human cancer cell lines, and cancer progression will be monitored by extent of metastasis as well as tumour size. We hypothesize that mice with D2-deficient regulatory T cells will exhibit faster cancer progression, and that cytotoxic T cells in these tumours will be suppressed to a greater extent, compared to wild-type mice. If successful, our results may support novel therapeutic approaches involving modulation of dopamine activity in Tregs.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Effects of Minocycline Administration on Spatial Learning and Memory Performance Following Prenatal Alcohol Exposure

Presenter: Srishti Sarkar

Prenatal alcohol exposure (PAE) results in a wide range of physical, cognitive and behavioural deficits in the offspring, collectively included under the umbrella term of Fetal Alcohol Spectrum Disorders (FASD). Children with FASD show deficits in immune function, demonstrating a higher incidence of infections, and alterations in immune organ development, and immune cell responses. In animal models of PAE, cytokines, critical immune signaling factors released by microglia, have been shown to be altered. Cytokine disturbances have been detected in the developing brain, including in the hippocampus. Due to the role of cytokines in shaping brain development, alterations in their balance, through the mechanism of increased microglial activity, are hypothesized to have long-term consequences for learning and memory. To test this hypothesis, pregnant Sprague Dawley rats were assigned to either a PAE (liquid ethanol diet) or Control diet. Next, to determine whether dampening of microglial activity, through minocycline administration, can reverse some of the deficits associated with PAE, offspring were further assigned to either minocycline administration during lactation (postnatal day; P1-15), minocycline administration during adolescence (P33-43) or water control group. Rats were tested in the Barnes Maze, a task of spatial learning and memory. Results demonstrate that untreated PAE rats show deficits in retaining the location of the target hole following a two-week delay, and minocycline administration either during lactation or adolescence normalizes these impairments. A combination of minocycline administration with intensive educational interventions in children with FASD may be advantageous to rescue PAE related deficits in spatial learning and memory.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Utilization of Health Literacy Assessment Tools by Pharmacists to Tailor Patient Counselling

Presenter: Sara Chan

Background: Approximately 60% of all Canadian adults are reported to have inadequate health literacy, which can result in decreased understanding of their medications. Use of screening tools to identify patients with inadequate health literacy can enable pharmacists to provide tailored medication counselling to improve their understanding and adherence. Objectives: The primary objective is to characterize pharmacists' understanding of health literacy screening tools. The secondary objective is to identify barriers to their use and possible preferred support tools. Methods: A survey was administered electronically to pharmacists in British Columbia before and after completion of an online educational module regarding use of health literacy screening tools and counselling strategies. Results: 35 pharmacists completed the pre-module survey and 11 pharmacists completed the post-module survey. Before completing the module, 80% of participants reported they understood what health literacy is; however, 60% reported performing health literacy assessment and 49% stated being aware of tailored counselling strategies. After completing the module, 91% stated they had a better understanding of health literacy, 91% reported performing health literacy assessment, and 55% reported an increase in effectiveness of assessments. A limitation is that not all pharmacists who participated in the pre-module survey also participated in the post-module survey. Time constraints were the most frequently reported barrier and small group interactive meetings with colleagues was the most frequently preferred intervention to encourage health literacy screening. Conclusion: Addressing issues such as time constraints, educating pharmacists with modules, and providing interactive group meetings may promote use of health literacy screening tools and counselling strategies.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Immediate Full Fluid Diet versus Post-Surgical Transition Diet in Colorectal Surgery Patients

Presenter: Elaine Fung

BACKGROUND: Currently, there is no evidence on immediate full fluid (FF) intake on having any benefit following colorectal surgery. Although the FF diet to regular diet advancement has been the nutritional course of choice, the immediate post-surgical transition (PST) diet characterized by patient food preferences after surgery consisting of small serving low fibre meals and a bedtime snack (Yeung et al., 2009) is still unclear. The purpose was to compare patient tolerance of PST diet and FF diet on postoperative day (POD) 1.

METHODS: A survey was conducted on 56 elective colorectal surgery patients at St. Paul's Hospital, Vancouver which comprised of FF patients (n=29) and PST patients (n=27). The survey consisted of Likert Scale questions, asking patients to rate the level of hunger, nausea, and pain on a scale of 0 to 10 (0 being the lowest and 10 being the highest level) on POD 1.

RESULTS: The survey showed that hunger averaged significantly lower ($P=0.01$) in PST diet patients. Nausea and pain averaged 0.06 and 0.46 higher respectively, however, there was no significant difference between FF and PST diets with a 0.05 significance level.

CONCLUSION: Immediate start of the PST diet seems well tolerated in colorectal surgery patients. The PST diet significantly reduces hunger, while having no negative impact on nausea or pain compared to FF patients. Continued implementation of the PST diet may reduce postoperative hunger. However, if complications arise, a change in nutritional course may be required.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Brain-behaviour relationship changes in adults with traumatic brain injury following a six-month cognitive intervention program

Presenter: Zahra Rajwani, Maya Willms

A key goal of neurorehabilitation is to promote functional recovery from brain injury. Objectively measuring changes in functional brain networks following neurorehabilitation is essential in understanding how they correlate to cognitive measures. Currently, little is known about how functional brain connections change after traumatic brain injury (TBI). This follow-up study aimed to evaluate the effectiveness of a six-month cognitive intervention program in adults with chronic TBI by measuring changes in behavioral outcomes and the associated modifications in brain network organization. Network measures were determined from resting state electroencephalographic (EEG) recordings evaluated at baseline, three months, and six months from 10 adult participants with TBI and 11 gender and age-matched healthy controls. Graph theory was used to assess changes in local and global metrics of brain connectivity following the intervention. Neuropsychological testing was performed to assess cognitive skills and global composite scores of cognitive tests were measured throughout the program. Statistically significant increase was seen in fluid composite scores of brain cognition following three months of intervention with parallel significant decrease in functional brain connectivity in the right inferior frontal gyrus. However, no significant changes in composite cognitive scores or local brain connectivity metrics were found between three and six months post intervention. Results from this study show that an intensive cognitive intervention program for adults with TBI is initially associated with improvements in cognitive scores that are correlated with changes in brain network characteristics; these changes are maintained but do not show further improvement following six months of continuous intervention.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Health and Wellness

Role of lymphoid monocytes in peripheral nerve regeneration

Presenter: Nicholas Salterio

Macrophages are cells that patrol the internal environment in search of pathogenic or damaged tissue. Their response is determined by where along a phenotypic spectrum the macrophage exists. The pro-inflammatory side leads to consumption and destruction of the pathogen. Conversely, the anti-inflammatory side of the spectrum is associated with wound healing. After peripheral nerve injury, macrophages are important for regeneration as they clear axonal and myelin debris from the distal stump. These macrophages can originate in the damaged tissue or infiltrate from other areas of the body through the circulation - termed "hematogenous". It is still unclear from which lymphatic tissues these hematogenous macrophages originate, or whether they are derived from monocytes in the circulation itself. The spleen has been shown to be a lymphatic tissue that deploys monocytes en masse, developing into anti-inflammatory hematogenous macrophages at the site of myocardial infarction. However, the role and origin of hematogenous macrophages after peripheral nerve injury remains an unresolved issue. We further explore the spleen as a site of origin for injured peripheral nerves by splenectomizing adult male mice before crushing the sciatic nerve. This allowed for assessment of splenic macrophages in the early stages of regeneration. Data is presented comparing early regeneration two days after sciatic nerve crush between splenectomized and non-splenectomized mice. Future study plans, including a new transgenic model will also be presented.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Sustainability and Conservation

Investigating the genetic basis of emerging pesticide resistance in the bacterial apple fire blight pathogen *Erwinia amylovora* using genomics

Presenter: Vivian Morley-Senkler

Erwinia amylovora (*Ea*), a gram-negative bacterium, is one of the most destructive pathogens of apples worldwide. One main control method is foliar applications of the antibiotic streptomycin to which *Ea* has been developing resistance. Other chemical controls are also used, including the antibiotic kasugamycin and copper oxychloride. This study assessed the effectiveness of these compounds on *Ea* isolates collected from several regions, including BC where isolates resistant to streptomycin were identified in the 1990's. Resistance to the compounds was tested using the spiral platter technique to find minimally inhibiting concentrations. Results showed that although resistance to streptomycin has decreased over time in BC, there are still resistant strains present. Many of the BC isolates were found to be resistant to the copper compound, possibly due to its common use as a control agent. None of the areas surveyed appear to harbor isolates with resistance to kasugamycin. Resistance to streptomycin has been attributed to changes in the *RpsL* gene, whereas resistance to copper and kasugamycin may involve several genes, possibly including *CueR*, *CueO*, *copA*, *soxS*, *arcB*, and *galF*. To correlate resistance to mutations, the genomes of 63 *Ea* isolates were sequenced using the Illumina platform, assembled and analyzed. A previously-described mutation in the *RpsL* gene was present in all the genomes of isolates that were resistant to streptomycin. In preliminary analyses, no conclusive genetic changes were identified for the other phenotypes. Identifying resistance to such compounds in the population and their genetic basis are needed for apple orchard management practices.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Sustainability and Conservation

Diversifying Energy Storage: Zinc-Nickel Flow Batteries

Presenter: Shams Elnawawi, Caleb Enns, Taij Taggar, Amelia Dai

Solar and wind energy generation have been gaining momentum due to increasingly strict environmental regulations. However, there remain numerous obstacles to widespread adoption of these systems. The intermittency of solar and wind energy creates demand for a sustainable energy storage solution that can compete with existing technology. Pump storage and lithium-ion batteries are the market standards for energy storage technology (especially in B.C.) despite their high-risk drawbacks. Pump storage is cost-effective but requires large reservoirs that reshape the local environment. Li-ion batteries are efficient and energy dense but are also toxic and flammable. Both technologies have the potential to cause irreversible environmental damage. At UBC Envision, we study an emerging technology that mitigates these risks while maintaining the potential for high efficiency and durability: Zinc-Nickel flow cells. They use Zinc-, Potassium- and Nickel-based materials that are non-toxic, non-flammable and abundant in nature, giving the flow cell an innate potential for safe, cheap energy storage. Additionally, all of these materials are readily recyclable. Our research aims to characterize the parameters affecting Zinc-Nickel flow cell performance and to find the optimal configuration for microgrid production. The UBC Envision Flow Cell Project will help to create a safe, sustainable, and reliable energy storage solution that will assist widespread adoption of clean energy generation technologies.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

Using the Cellular Potts Model to Simulate Cellular Behaviours

Presenter: Justin Cruz, Ryan Konno, Zachary Pellegrin

Cells exhibit a wide variety of behaviours in experimental and living systems such as collective organization, polarization, chemotaxis, and aggregation. How can cellular physics and the cell signalling that regulate these behaviours be simulated? We use mathematical models and computer simulations using the Cellular Potts Model (CPM), to describe cell signalling and physics and to generate computer simulations of three example cell behaviours. Using open-source software (CompuCell3D) for simulations, cell polarization can result from protein signalling that accumulates at one end of the cell, we find that cell sorting can result from the relative adhesion strengths between cells, and cell aggregations can result when cells move toward areas of high chemoattractant concentration. Simulations of these three cell behaviours illustrate how mathematical models and computer simulations using the CPM can provide a virtual “sandbox” to generate and test biological hypotheses.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

Deletion of p53 gene in determining acinar cell being the more-likely cell of origin in pancreatic cancer as opposed to ductal cells.

Presenter: Yalda Hosseini, Arifa Ang, Judy Fan, Jennifer Tang

The deletion of the p53 gene accompanied by KRAS mutation was investigated to identify the cell of origin in pancreatic cancer. Almost all pancreatic cancer is pancreatic ductal adenocarcinoma (PDAC) and is very lethal because of its poor prognosis. In most cases, KRAS is the root of PDACs and has been shown to drive pancreatic neoplasia. With the deletion of a single allele of the p53 gene accompanied with the KRAS mutation, PanIN formation and therefore PDAC was observed in acinar cells of the pancreas, but was not sufficient in ductal cells. Induced deletion of both alleles of the p53 gene accompanied by KRAS activation did show signs of PDAC in pancreatic ductal cells without signs of PanIN formation due to the higher proliferative rate of PDAC formation in ductal cells compared to acinar cells. We have used mice ranging from healthy p53 gene to the complete deletion of p53 gene to study the rate of growth of pancreatic cancer. The findings found can be used to understand the growth and development of pancreatic cancer due to the deletion of p53 gene and KRAS mutation. With the findings obtained, further research can be developed to improve the prognosis of pancreatic cancer.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

Temporal and Spatial Patterning of Esrrb Expression During Cerebellar Development

Presenter: Casper Tsai

The cerebellum is a part of the brain responsible for fine motor skills such as balance and coordination. Defective cerebellar development can often cause impairment of motor functions. While we have a good understanding of the anatomical changes during cerebellar development, genetic regulation that drives these changes are largely unknown. We previously collected mRNA transcripts from developing mouse cerebellum and sequenced them to obtain gene expression levels at several time points. A gene expression network was then constructed using this data in hopes of identifying important genes during cerebellar development. Among the genes in the network, Estrogen-related receptor beta (Esrrb) was determined through a list of biological criteria to likely be involved in cerebellar development. To understand the role of Esrrb in cerebellar development, we sought to identify the spatial distribution of Esrrb and Esrrb-expressing cell-type in the developing cerebellum. In-situ hybridization (ISH) and immunofluorescence staining of Esrrb were performed on embryonic cerebellum to determine the spatial distribution of Esrrb at different time points in cerebellar development. ISH confirmed Esrrb expression in the cerebellum while immunofluorescence localized Esrrb expression to the ventricular zone at early embryonic stages and to the Purkinje cell layer at late embryonic stages. In addition, Esrrb was co-stained with other cell-type specific markers to identify the cell-type of Esrrb-expressing cells. Positive immunofluorescence co-staining with Ptf1a suggested Esrrb expression in GABAergic cells. Furthermore, co-staining with other markers suggest that Esrrb is specific to Purkinje cell progenitors in the developing cerebellum, a cell-type important in normal cerebellar function.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

The IT Factor: Effect of Density and Polarity on Visual Search

Presenter: Sarah Thongprasert, Christopher Calao, Tiffany Wu

The elements that make up an image are essential in creating a dynamic mental representation of the external environment. These components govern the speed at which we can infer meaning from a scene, thus influencing our ability to respond appropriately. Our research sought to investigate the effects of item density and display polarity on reaction time. We employed a visual search paradigm to test the effects of item density and display polarity of a target stimulus on reaction time. We hypothesized that search speeds would increase as the density of the image increases and that positive polarity (light on dark background) displays would improve search speeds. We found that search speeds increased with higher density arrays whereas serial search was unaffected by manipulated polarity. These results add to the growing body of knowledge on the effects on display polarity and search speed, reinforcing the notion that visual performance is not influenced by changes in this feature. Currently, little work has been done to quantify the magnitude of each element in regards to its impact on visual search. Our study looks to systematically define the degree of affect to which various components of a visual framework have on visual perception. With manipulations of these components, a map of the extent and limitations of mental representations can be formed.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

The maternal embryonic leucine zipper kinase as a therapeutic target for prostate cancer

Presenter: Marisa Dorling

Prostate cancer is the second leading cause of death in men. Understanding the mechanisms of prostate cancer progression is crucial to designing better therapies. Kinases phosphorylate proteins to regulate their activity, including ones that are important for cell survival and proliferation. Inhibiting kinases overexpressed in tumours exclusively can prevent proliferation and induce apoptosis, while keeping normal cells healthy.

The purpose of this study was to identify an overexpressed kinase in prostate cancer as a potential therapeutic target. Recent literature reports that the maternal embryonic leucine zipper kinase (MELK) is overexpressed in triple negative breast cancer, which closely resembles aggressive, hormone- therapy resistant prostate cancer (PCa). MELK inhibition was shown to induce apoptosis and inhibit proliferation in triple negative breast cancer, suggesting that MELK is important to the disease's progression. Due to disease similarities and its role in triple negative breast cancer, our study aimed to investigate MELK expression in PCa. Analyzing public data, we show MELK to be highly overexpressed in patients with aggressive PCa with a high Gleason score. Further investigation revealed MELK to phosphorylate the EZH2 protein, which has been established as a key driver of cell survival and proliferation in many cancers. Western blot confirmed that EZH2 is a key phosphorylation target of MELK. This preliminary data suggests that MELK may be an important driver of PCa progression. Further studies involving MELK knockout cell lines can elucidate its role in PCa tumour progression.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Innovation and Technology

Is Edited MRS of GABA SNR Limited?

Presenter: Rachelle Loo

As the main inhibitory neurotransmitter in the human brain, γ -aminobutyric acid (GABA) is increasingly studied in developmental neuroscience research. GABA imbalances are observed in disorders including schizophrenia and epilepsy. Magnetic resonance spectroscopy (MRS) is a non-invasive method used to detect GABA in vivo. Scan times for GABA-edited MRS are lengthy, spanning ~10mins due to its low relative concentration and other overlapping metabolites in the spectrum. There is a desire to reduce scan times to improve participant compliance. While signal-to-noise ratio (SNR) of spectra is improved by increasing scan duration, longer scans increase the risk of movement. GABA-edited MRS experiments acquire 320 averages. As this value has not yet been experimentally validated, it may be possible that fewer averages are required, favorably reducing scan times. In the present study, eighteen healthy volunteers (age: 27.8 \pm 4.0y; 11 females/7 males) were scanned on a 3T Philips MRI scanner. Voxels were placed in the auditory cortex, dorsal lateral prefrontal cortex, frontal eye field, occipital cortex, and sensorimotor cortex. The effect of averages on SNR, GABA measurements, and signal fit error have been analyzed in vivo and will be statistically modeled. Although SNR increases and fit error decreases with increasing number of averages, GABA concentration measurements remain relatively constant with >200 averages. These findings indicate that the GABA-edited MRS is not SNR limited, as further increases in SNR do not improve GABA measurements. Scan times may be prospectively shortened to ~7 minutes while preserving data quality.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

Portrayals of LGBTQ Older Adults in Canadian Newspapers and Magazines

Presenter: Suzanne Ng

Most of the media research that has examined how Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) individuals are depicted has focused on television and film portrayals. Little scholarly attention has been paid to the representation of LGBTQ individuals in the news media, and, to our knowledge, none of the existing studies have examined the depiction of LGBTQ older adults. Striving to better understand the social construction of gender and age in print and online media, we collected data from three English-language, Canadian national newspapers, one or two of the most widely read print newspapers in each province, one national online news website, and five popular Canadian magazines that included and/or targeted mature readers. We selectively collected articles that were published between July 2016 and July 2017 and that either mentioned or exclusively focused on LGBTQ individuals aged 50+. We thematically analyzed our sample of 82 stories. This process led to the identification of three overarching ways that LGBTQ older adults were portrayed. The first category, "discrimination and social exclusion", entailed stories about the historical and current struggles faced by LGBTQ older adults for inclusion and recognition. The second thematic category, "resilience", entailed stories about LGBTQ older adults finding strength within the community and inspiring others. Finally, "increasing visibility", included stories about high profile LGBTQ older individuals, such as those in the entertainment industry and politics, who were challenging heteronormative societal norms. We discuss our findings in relation to Queer theory and intersectionality theorizing.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

To what extent has trade been the sole contributing factor to the Izumo's role as a cultural centre during Japan's Yayoi period?

Presenter: Kelly Chan

Japan's Yayoi period was from approximately 700 BCE to 300 CE, and it is divided into early Yayoi, middle Yayoi and late Yayoi. A main topic associated with this period in time is the significance of Izumo as a cultural centre. Izumo is a region in Japan that faces the Japan Sea, and it is a region of significance partly because of the "land-pulling myth," which is Izumo fudoki. It is about the "pulling" of land from elsewhere to enlarge Izumo. According to Anders Carlqvist, one way to interpret this "land-pulling myth" is to simultaneously consider Izumo's connections to a particular land during the late Yayoi period. This may indicate interactions with surrounding regions. Initially, according to Richard Torrance, historians have not placed much significance on the role of Izumo in the Yayoi period because as a province, it was quite insignificant in size as a domain, but there is more archaeological evidence speaking to its significance. Some of the artifacts found included swords and bronze ritual vessels, and Joan R. Piggott says that historians debate whether these items were locally manufactured or obtained through trade. Another possible contributing factor to the growth of Izumo's growth as a cultural centre is local innovation. A major local innovation was the way in which weapons were formed. The extent to which trade was the sole contributing factor—in comparison with local innovation—to Izumo's role as a cultural centre in Yayoi Japan will be determined by examining maps and artifacts.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

Examining the effectiveness of Cognitive Behavioural Therapy in treating psychiatric disorders in Downtown Eastside Vancouver

Presenter: Tanvi Krishna, Vanisha Sodhi

Cognitive behavioral therapy is a problem oriented therapy and assessing its effectiveness can further help develop treatment techniques. Currently, there is insufficient insight into gender differences in the effectiveness of this treatment on social functioning (an individual's ability to interact with others). This study aims to fill this critical gap by investigating the following two research questions: First, what impact does CBT have on social interaction for individuals who access mental health treatment in Downtown Eastside Vancouver (DTES)? Second, does this impact differ for men and women? The sample for this study includes 60 adult patients with a psychiatric disorder: 15 men and women each in the treatment groups. Treatment group 1 includes patients enrolled in CBT through Vancouver Coastal Health's Assertive Community Treatment program. Treatment group 2 includes those accessing another type of psychotherapy within the program. We will use a matched pairs design for the analysis, to test for group differences in social interaction by gender and treatment. Quantitative data will be gathered through 30-60 minute structured, in-person interviews with participants between April-December 2018 at baseline and after 10 and 20 therapy sessions. The main outcome for analysis is the social interaction score. Additionally, analyses will examine treatment effects by age, ethnicity, socio-economic status, geographical location. Treatment related variables including number of sessions, therapeutic alliance and activities, treatment history, age of onset, type of psychiatric disorder and comorbidity will also be controlled for.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

Effect of overexposure to sunlight and development of breast cancer

Presenter: Mohammad Khamseh

Breast cancer is the most commonly diagnosed cancer in women worldwide. Among women, breast cancer has been identified as the second leading cause of cancer death in western countries and as the primary cause in Muslim countries. Although many preventative actions are being taken in the western counties to decrease the rate of breast cancer occurrence, majority of Muslim countries still show significantly less breast cancer occurrence per 100,000 women. Many sources and researches have linked this difference to industrialization, living in a "western lifestyle", being less active, eating more processed and less natural food. A few inconclusive studies have also shed some light on an underexposure to sunlight and the lack of sufficient of vitamin D with an increased breast cancer development rate. The possible link between an overexposure of the breasts to sunlight and an increased rate of breast cancer occurrence is investigated in this research project. This link is investigated by comparing the difference in the mean sunlight intensity between countries with the highest and lowest breast cancer occurrence rates along with the difference in the clothing of the women, resulting in different amounts of exposure to sunlight. This is done through conducting literature reviews and analyzing data of experiments previously done by researchers regarding breast cancer statistics and sunlight level exposures in specific countries. Through this comparison a positive correlation has been detected between overexposure to sunlight though open clothing and an increased rate of breast cancer occurrence.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

The influence of physiological arousal on appetitive emotional learning

Presenter: Niki Yaw

Appetitive emotional learning describes the acquisition of emotional relevance of objects or actions through repetitive pairing with rewards. While this process is highly adaptive, abnormally enhanced emotional learning has been related to psychopathological conditions such as addiction. Thus, it is important to understand environmental factors influencing reward learning processes. Previous research found that stress can impair very simple forms of appetitive learning. However, it remains to be investigated how stress affects more complex forms of reward learning.

The aim of the current study was to investigate the relationship between acute stress and operant conditioning. Participants were randomly assigned to either stress or control condition of a commonly used stress test. Subsequently, participants completed a computer-based emotional learning task in which they learned to choose those symbols that are associated with a higher probability of reward.

Preliminary results show that participants learned the reward associations in both the control and the stress condition. However, no difference in learning was found between stress and control group likely due to insufficient power as a result of ongoing data collection. The full targeted sample size will allow us to test the hypothesis that delayed acute stress impairs appetitive emotional learning.

The results that are obtained will help us better understand the effects of stress on emotional learning and hence biases towards reward. Thus, this research program provides a first step towards understanding which factors contribute to the development of adaptive and maladaptive attentional biases that are characteristic of some mental disorders and addictive behaviors.

Wave 3 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

1.30pm-3.00pm

THEME: Individual and Society

Family Perceptions of the Delegated Diabetes Care Plan: Evaluation of a BC-wide Program that Supports Children Living with Type 1 Diabetes in the School Setting

Presenter: Alex Fung

BC students with type 1 diabetes (T1D) who are unable to self-manage at school are supported by Nursing Support Services (NSS) through the Delegated Diabetes Care Plan (DDCP). We collected data from parents of children with a DDCP (N=160; Patients: 56% female, 9.4 ± 2.7 years (mean, SD), duration of having DDCP 2.3 ± 1.6 years, most recent Hemoglobin A1c $7.7 \pm 0.9\%$) to evaluate the effectiveness of this program. We analyzed qualitative data for emergent themes using NVivo-11. The results show that 91.5% of parents understand the information outlined in the DDCP, 82% believe the DDCP describes their child's T1D care needs in the school well, 39.5% and 46.4% would not make any changes to the way information is shared or how the DDCP is formatted, respectively. Some areas for improvement suggested by parents include condensing the information by introducing a one-page summary, for which 81% of parents believe would be beneficial. 75% would like to see the integration of Health Canada-approved technology, such as CGM devices, so that DDCPs can be better tailored. To allow for even safer care of children at school, parents recommend ensuring that all school staff are familiar with T1D and the necessary level of care, as well as introducing more flexibility in managing a child's blood glucose, such as by allowing for more than one dose of rapid insulin to be given at school for children using Multiple Daily Injections. Overall, 85% of parents are satisfied with how the current DDCP supports safe care of children at school.

Wave 3 - Oral Presentation List

Buchanan (BUCH) - 1866 Main Mall

1.30pm-3.00pm

THEME: Health and Wellness

BUCH B208

Seizures in Chronically Demyelinated MS Rodent Models May Follow PV+ Neuronal Loss in the Hippocampus

Mohammad Asadi Lari

Measurement of 11-dehydrocorticosterone, a corticosterone metabolite, in the blood and immune tissues of mice

Melody Salehzadeh

BUCH B213

The significance of Dpy30 in mature beta cells and the development of diabetes

Priya Suresh

Gender, ethnic identification and obesity: a longitudinal study of diverse young women and men in the BASUS cohort, B.C.

Alex Tam

The role of tissue-specific brummer expression on sex differences in fat storage in Drosophila

Vivian Huang

THEME: Individual and Society

BUCH B210

Discussing how Activists Justify their Stance on Police in Vancouver's Pride Parade

Andy Holmes

A study of austere economic policies in Australia, Brazil, and India and its impact on population health

Paula von Sperling, Derek Xu, Christine Wu

Transgender Health-Information-Seeking Behavior

Tarang Mahapatra, Pardis Roshanzamir, Danielle Van der Pant

BUCH B215

Together Alone: A qualitative analysis of social media commentary about loneliness and mental health of gay, bisexual, and queer men

Annabella Feeny, Yining Wang, Phoenix Wang, Lia Yu

Does socio-economic status (SES) have an impact on fitness of South Asian children living in Metro Vancouver?

Ayman Azhar, Yasmin Banga

THEME: Innovation and Technology

BUCH B313

TRAVIS - Touch Responsive Augmented Violin Interface System

Chantelle Ko

A novel gene causes an intriguing time-dependent habituation profile in *C. elegans*.

Joseph Liang

Convolutional Neural Networks: Estimating Relations in the Ising Model

Andrei Gavrilov, Alex Jordache, Jack Deng, Maya Vasdani

THEME: Sustainability and Conservation

BUCH B315

Effects of seed density, fertilization and cytokinin application on the stress response of *Fagopyrum esculentum* seedlings

Christina Jewell

The Development of Tooth Replacement Patterns in Reptiles

Jamie Carthew

Discovery of Mud Dragons in BC

Evgeniya Yangel

Economic Viability of Microalgae-Sourced Biodiesel

Alina Chalanuchpong, Manisha Walia, Bryce Harrison, Noor Adil

Effects of Climate Change on Suitable Thermal Stream Habitat for Rainbow Trout in BC

Carolina Sanchez

Wave 3 - Oral Presentation Abstracts

BUCH B208

1.30pm-3.00pm

THEME: Health and Wellness

Seizures in Chronically Demyelinated MS Rodent Models May Follow PV+ Neuronal Loss in the Hippocampus

Presenter: Mohammad Asadi Lari

A commonly described characteristic of multiple sclerosis (MS) is immune-mediated damage to the myelin sheath. Myelin regeneration can occur in MS but often fails to adequately repair lost myelin leaving axons chronically demyelinated. The failure to remyelinate has been correlated with increased axonal damage and ultimately, neuronal death. Rodent models of MS typically have effective remyelination and do not result in the chronic demyelination of axons, making it difficult to demonstrate a causative relationship between remyelination failure and increased axon loss. Previously, the Tetzlaff Lab found that the inducible knockout (KO) of myelin regulatory factor (Myrf) from oligodendrocyte progenitor cells (OPC)s impaired remyelination following focal demyelination. Chemical demyelination resulting from a Cuprizone-containing diet in tamoxifen induced Myrf-KO mice has been used to simulate chronic demyelination. During the fifth week of the diet, these mice exhibited significantly elevated levels of seizures compared to controls. However, it is not clear if and how a remyelination failure after cuprizone-induced demyelination could be contributing to this effect. The loss of GABAergic interneurons in the hippocampus, in particular a subgroup of high-spiking neurons characterized by parvalbumin (PV), has previously been attributed to demyelination-linked seizures. In this study, through immunohistochemical analysis, we found a loss of PV+ interneurons following chronic demyelination. Through analysis of axonal damage markers and changes in transcription levels of related genes, we hope to further investigate how chronic demyelination could potentially be leading to the loss of the PV+ interneurons. This could further our understanding of how seizures develop in MS patients.

Wave 3 - Oral Presentation Abstracts

BUCH B208

1.30pm-3.00pm

THEME: Health and Wellness

Measurement of 11-dehydrocorticosterone, a corticosterone metabolite, in the blood and immune tissues of mice

Presenter: Melody Salehzadeh

Glucocorticoids (GCs) are steroid hormones secreted by the adrenal glands into the blood in response to a variety of stressors. GCs act on virtually every cell in all vertebrates and are critical in life, such as for proper regulation of the immune system. It is essential to understand the source and concentration of GCs in the body to better understand their role. Interestingly, some immune organs, traditionally thought of as passive recipients of adrenally-produced GCs, have been shown to locally produce their own GCs. Recent data suggest that local production of GCs relies more heavily on regenerating inactive GC metabolites, rather than synthesizing them. Corticosterone is the predominant adrenal GC in mice. Dehydrocorticosterone (DHC) is the inactive metabolite of corticosterone and remains largely understudied. My research entailed developing one of the first sensitive and specific immunoassays for measurement of DHC in mouse immune tissues. We measured DHC and corticosterone levels in blood, thymus, bone marrow, and spleen, at 5, 24 and 87 days after birth. At day 5, DHC levels were elevated in the bone marrow in comparison to blood, similarly to corticosterone. Local elevation of DHC and corticosterone in the bone marrow may indicate their importance for cell differentiation during development. This study provides crucial data in determining how GCs are locally produced from metabolites and begins to understand their concentrations in various tissues. This project allows novel insights about DHC in mice, with broad implications for all vertebrates, and are of interest to both endocrinologists and immunologists.

Wave 3 - Oral Presentation Abstracts

BUCH B213

1.30pm-3.00pm

THEME: Health and Wellness

The significance of Dpy30 in mature beta cells and the development of diabetes

Presenter: Priya Suresh

The pancreas is responsible for the production of beta cells which store and release insulin, a hormone capable of decreasing blood glucose concentrations. Irregularities in the functioning of these beta cells affect the production of insulin, leading to the development of diabetes. Methylation of histone H3 on lysine 4 (H3K4) is a chemical modification process that is suggested to activate the transcription of genes. The gene Dpy30 is required for H3K4 methylation; however, its significance in mature beta cells is unknown. The deletion of dpy30 in mature beta cells is hypothesized to cause an absence of H3K4 methylation, which causes the dysregulation of gene expression in beta cells. The purpose of this study was to determine the effects on the expression of two membrane proteins in beta cells when Dpy30 was deleted in mouse models. The genes Slc2a2 and Slc30a8 encode membrane transport proteins that play a role in glucose sensing and insulin secretion respectively. These genes are normally marked by H3K4 methylation to activate transcription. To measure the expression of these membrane proteins, pancreas tissue sections were obtained from wild type and Dpy30 knock out mice. The genes of interest were stained using fluorescent antibodies, and the presence and amount of expression of these membrane proteins were detected via immunofluorescence. Preliminary experiments indicate a decrease in expression of both membrane proteins suggesting that deletion of Dpy30 will cause inadequate sensing of glucose and release of insulin by beta cells. Implications from these findings can be used in further research towards diabetes.

Wave 3 - Oral Presentation Abstracts

BUCH B213

1.30pm-3.00pm

THEME: Health and Wellness

Gender, ethnic identification and obesity: a longitudinal study of diverse young women and men in the BASUS cohort, B.C.

Presenter: Alex Tam

Overweight and obesity among young people is rising and presents a major public health problem across the globe. For instance, over 20% of Canadian youth (12–17 y) have excess weight, with higher prevalence in young men than young women. In addition to gender, we know that there are strong ethnic group differences in the prevalence of excess weight. Some research reports a positive association between ethnic identification—the exploration and affirmation of one’s membership to an ethnic group—and health-related quality of life. To date, we know little about how weight among young people is affected by the strength of a person’s ethnic identification. We therefore used two waves of data on self-reported ethnic identification and obesity status from 795 adolescents in a population-based cohort in BC (BASUS). We report gender-specific findings from multivariable logistic regression analyses of the association between ethnic identification and short-term obesity, which we also analysed by ethnic group. Results showed that young men reporting stronger ethnic identification had about a 50% greater likelihood of being obese at follow-up (OR 1.53 [95%CI 1.02, 2.27], $p=0.038$), compared to those with weaker identification. The positive association was much smaller in young women. Findings differed by ethnic group depending on the component of ethnic identification. Beyond the protective psychosocial properties of ethnic identification, it appears to have unintended effects on other aspects of health.

Wave 3 - Oral Presentation Abstracts

BUCH B213

1.30pm-3.00pm

THEME: Health and Wellness

The role of tissue-specific brummer expression on sex differences in fat storage in *Drosophila*

Presenter: Vivian Huang

Sex differences in fat storage are present in most animals, where females normally store more fat than males. The metabolic genes downstream of sex hormones that create these differences in fat storage are unknown, and the fruit fly is a model to identify them. Unpublished studies show that the brummer (bmm) gene is critical for sex differences in fat storage. Although males normally store less fat, males with whole-body loss of bmm have as much fat as females. This project aims to find the tissue in which bmm acts to control sex differences in fat storage, and investigate the resulting impact on starvation resistance and lifespan, both related to fat storage. If bmm expression knockdown, or turning off, in specific tissues such as the fat body, neurons, etc. eliminates differences between male-female fat storage, starvation resistance, and lifespan, bmm expression in the targeted tissue plays a role in these sex-associated differences. This project involves various GAL4 gene drivers to target tissues for bmm knockdown by RNA interference. Starvation resistance is measured by counting fly deaths on nutrient-lacking agar, lipid levels after starvation by triglyceride kits, and lifespan by counting fly deaths on nutritious food. Data show that bmm is needed in the fat body to establish sex differences in fat storage, and future efforts are to investigate whether fat mobilization is also affected. Understanding sex differences in fat storage provides insight into the sex-biased risks of diseases linked with abnormal fat storage (e.g. cardiovascular disease, obesity, type 2 diabetes).

Wave 3 - Oral Presentation Abstracts

BUCH B210

1.30pm-3.00pm

THEME: Individual and Society

Discussing how Activists Justify their Stance on Police in Vancouver's Pride Parade

Presenter: Andy Holmes

How do activists defend their opinions regarding uniformed police marching in Vancouver's Pride parade? Twelve semi-structured in-depth interviews were conducted in Vancouver, Canada with purposive sampling of six people who supported the presence of uniformed police and six people unsupportive of uniformed police in Vancouver's Pride parade. Participants were recruited for this study through both direct contact and snowball sampling and included primarily activist members of Vancouver's queer community who had strong opinions about uniformed police in Pride parades. I analyzed my transcripts using an iterative procedure that alternated between open and analytic coding. My findings show six discursive claims used by people to explain their stance on uniformed police in Pride parades. Those who support the presence of police in Pride parades justify their stance with three arguments: historical progress, the transnational versus local resonance of social movements, and the cultural effects of uniforms. Activists who do not support the police invoke three different arguments: Memory of historical marginalization, pinkwashing, and intersectionality. These findings show that first, what feels like an incommensurable debate about uniformed police in Pride parades is in fact a function of the different scales that both sides espouse. People who support police in Pride parades focus on positive social change, in broad strokes, that the LGBTQ2+ community has achieved, while those who are unsupportive focus on the specific ongoing oppression of members of the LGBTQ2+ community by the police. Secondly, this study contributes to social movement theory with strong evidence of path dependence: activists on both sides of the debate identify the importance of a central event, the historical roots of LGBTQ2+ activism, to justify their views for the future of Pride parades.

Wave 3 - Oral Presentation Abstracts

BUCH B210

1.30pm-3.00pm

THEME: Individual and Society

A study of austere economic policies in Australia, Brazil, and India and its impact on population health

Presenter: Paula von Sperling, Derek Xu, Christine Wu

There is an important debate in the literature of political economy of health about the impacts of macroeconomic policy on the health of populations. The relationship between economic growth or recession and health indicators has been widely studied, especially after the 2008 crisis. However, the majority of these studies did not focus on countries like Australia, Brazil, or India, which all exhibited high growth even during the recession. Hence, these three countries were in more favourable positions to pursue macroeconomic stimulus policies. Nevertheless, as heavily export-driven economies dependent on China's trade, this held true only until 2014-2015, when the slowdown of the Chinese economy and the sharp decline of oil prices led the governments of these countries to implement austerity measures.

This study aims to investigate the impact of macroeconomic policy on the health of populations in Australia, Brazil, and India after the global economic crisis, during both the years of stimulus packages and the more recent period of austerity. We will specifically focus on all-cause mortality indicators across age-groups (e.g. adult, infant, neonatal, postneonatal mortality). In addition, we will investigate these outcomes stratified according to social class, race, and geographic region. The proposed research project represents an important endeavor in understanding how government macroeconomic decisions impact the health of populations, in particular vulnerable groups. Apart from contributing to a better comprehension of the topic within the scientific literature, our work also aims to generate evidence to help governments enhance population health with macroeconomic decision-making.

Wave 3 - Oral Presentation Abstracts

BUCH B210

1.30pm-3.00pm

THEME: Individual and Society

Transgender Health-Information-Seeking Behavior

Presenter: Tarang Mahapatra, Pardis Roshanzamir, Danielle Van der Pant

In this investigation, we attempt to answer the following questions: 1) What is the current extent of the literature concerning transgender health-information-seeking behaviour? 2) Where do transgender people access health information? and 3) What are the health contexts of these studies? In order to answer these questions, we first do a scoping review to know the current state of knowledge. We also look at internet forums such as Reddit and classify comments. This helps us to know the quality of information on such forums when accessed by transgenders.

Wave 3 - Oral Presentation Abstracts

BUCH B215

1.30pm-3.00pm

THEME: Individual and Society

Together Alone: A qualitative analysis of social media commentary about loneliness and mental health of gay, bisexual, and queer men

Presenter: Annabella Feeny, Yining Wang, Phoenix Wang, Lia Yu

REX mentor: Travis Salway Background: Rates of suicide attempts, depression, and substance abuse in the gay, bisexual, and queer (GBQ) community remain high compared to straight males. Gay people are twice as likely to have a depressive episode and two to ten times more likely than straight people to take their own lives. In March 2017, a long-form report was published in the Huffington Post, detailing what the author described as 'an epidemic of gay loneliness.' Despite changes in legal status and the growing support for gay marriage among North American Adults from 27% in 1996 to 61% in 2016, this feeling of unfulfillment and emptiness continues to be a pervasive physio-psychological issue amongst GBQ men, as this community remains stigmatized and marginalized. Following the publication of the article, an overwhelming response surfaced on social media with GBQ men sharing their personal stories and perspectives on the article. Research Questions How do GBQ men describe the "epidemic of gay loneliness", as it affects them and their community? And what do they think should be done about this problem? Methods: Using inductive qualitative research methods to anthologize series of media commentary online regarding the issues described above, through platforms such as YouTube, Reddit, new media online commentaries, podcasts, and blogs. A thematic analysis will then be carried out to descriptively answer the research questions with the goal of identifying prevalent or prominent themes in the data. Results: [in progress]

Wave 3 - Oral Presentation Abstracts

BUCH B215

1.30pm-3.00pm

THEME: Individual and Society

Does socio-economic status (SES) have an impact on fitness of South Asian children living in Metro Vancouver?

Presenter: Ayman Azhar, Yasmin Banga

Canadian South Asians (SA) are the largest visible minority group and projected to represent 28% of the population in 2031. This ethnic group also has a higher prevalence of cardiovascular disease, diabetes, and hypertension compared to White Canadians. Not surprisingly, these health concerns are evident early in youth. SA children are twice as likely to be overweight and physically inactive compared to their non-SA counterparts, putting them at greater risk for developing type 2 diabetes. Socio-economic factors (SES) including parental household income, education level, and employment have been found to be predictors of child health outcomes including fitness. While previous studies have reported a positive correlation between child fitness and parental SES, these questions have been under-investigated in the SA community. This study investigates the relationship between fitness levels of SA children and parental SES. SES variables include household income, education level, and employment status. Morphological, musculoskeletal, and cardiorespiratory fitness will be measured using the body mass index, vertical jump and 20-meter shuttle run, respectively. Bivariate analyses will be conducted to examine the correlations between individual fitness indices to individual SES variables. A composite fitness score will be calculated, and multiple regression analyses will identify significant predictors of fitness from SES measures and other socio-demographic variables (e.g., age, country of birth, marital status, years living in Canada, English proficiency, religion, number of children in household). By exploring these associations, we can better understand how the social and economic environment children live in can influence their fitness and activity-related health.

Wave 3 - Oral Presentation Abstracts

BUCH B313

1.30pm-3.00pm

THEME: Innovation and Technology

TRAVIS - Touch Responsive Augmented Violin Interface System

Presenter: Chantelle Ko

New Interfaces for Musical Expression (NIMEs) are musical instruments that allow users to control digital audio and interactive media in performance. NIMEs tend to fall into one of two categories: a) custom built instruments that require the development of new performance techniques, and b) interfaces that augment the use of existing instruments. For string instruments like violins, many interfaces focus on creating data from the activity of the right hand and bow. TRAVIS bridges the two NIME categories, and focuses on generating data from the left hand rather than the right. TRAVIS has two touch sensor strips attached to the fingerboard (underneath the outer strings), and two round sensors on the body of the instrument. The violin's traditional performance techniques are still utilized to play the instrument, but the sensors allow the performer to control interactive media. The placement of the sensors means that the user can also use extended techniques to play both sensor strips simultaneously, while the sensors on the body allows the user to change presets in mid performance. Some of what TRAVIS can now achieve, in real time, includes controlling parameters for sound effects, scrubbing pre-recorded samples, live recording and playback, and manipulating live video. In the TRAVIS prototype, the data is interpreted by an Arduino microcontroller that is mounted onto the violin, and then it is sent to a computer via a micro USB cable. However, current research is to complete a wi-fi connection for TRAVIS, so that the performer can move freely in performance.

Wave 3 - Oral Presentation Abstracts

BUCH B313

1.30pm-3.00pm

THEME: Innovation and Technology

A novel gene causes an intriguing time-dependent habituation profile in *C. elegans*.

Presenter: Joseph Liang

Defined as a decreased response with repeated stimulation, habituation is agreed by many to be the simplest form of learning. This basic behavior of learning is disrupted in a host of neuropsychiatric diseases including schizophrenia, Autism Spectrum Disorder, attention-deficit hyperactivity disorder and many more, suggesting that molecular mechanisms underlying habituation may be implicated in these diseases. Because *C. elegans* has only 302 neurons, a mapped connectome and sequenced genome it is possible to determine the role of a gene in identified neurons that play known roles in behaviour. In a screen for genes that are expressed within the tap-habituation neural circuit in *C. elegans*, AVR-14 mutants present a unique behavioral pattern in which habituation is affected in a time-dependent manner: compared with wild-type worms, we see faster habituation at short inter-stimulus intervals and slower habituation at long inter-stimulus intervals. This phenotype can be masked by directly activating the mechanosensory neurons, suggesting that AVR-14 operates at a sensory neuron level. While glutamate is conventionally seen as an excitatory neurotransmitter in the nematode nervous system, AVR-14 encodes a glutamate-gated chloride channel subunit that suggests that here glutamate performs as an inhibitory neurotransmitter. Interestingly, the closest human homolog of this gene has recently been implicated in ASD. The aim of this project is to design molecular markers to confirm both the cellular and sub-cellular localization of AVR-14 to ultimately realize the function of this gene. Altogether, the findings of this project will further our understanding on the molecular mechanisms underlying habituation and how altered inhibitory neurotransmission may cause sensory and learning deficits in patients.

Wave 3 - Oral Presentation Abstracts

BUCH B313

1.30pm-3.00pm

THEME: Innovation and Technology

Convolutional Neural Networks: Estimating Relations in the Ising Model

Presenter: Andrei Gavrilov, Alex Jordache, Jack Deng, Maya Vasdani

In our modern world, machine learning has taken a rise as a form of artificial intelligence where computers can discover patterns from collected data and make autonomous decisions. A CNN (Convolutional Neural Network) is a class of deep machine learning that can be applied to forms of image recognition such as recognizing products for consumers or identifying key chemical structure in drug development. Data set training has a large influence on the accuracy of a network, and hence it is paramount to create a network architecture that prevents overfitting (when a trained model cannot differentiate newly input data from its test data) and underfitting (the inability of a model to find relationships among inputs). By randomly trimming the data set during training, the network can become less reliant on similar pieces of data, and hence improve its overall capability.

Our research first compares the statistics of CNN image recognition algorithms to the Ising model. The Ising model consists of magnetic dipole moments that can be in one of two states: +1 or -1. Using a two-dimensional square-lattice array, we then determine how the statistical mechanics of the Ising model phase transition are used in tuning parameters of the CNN to best fit the data. Once a training set of such data is complete, we explore the convolutional layers that propagate the neuron values, similar to the propagation of spins. Lastly, we observe the impact of Dropout, which is a methodology of managing overfitting in a CNN.

Wave 3 - Oral Presentation Abstracts

BUCH B315

1.30pm-3.00pm

THEME: Sustainability and Conservation

Effects of seed density, fertilization and cytokinin application on the stress response of *Fagopyrum esculentum* seedlings

Presenter: Christina Jewell

Microgreens are an emerging health food trend largely because of their high nutrient density compared to full-size leafy greens. They are made from several different crop species that are cut before they reach two weeks of age. Cultivated buckwheat, *Fagopyrum esculentum*, is a commonly grown commercial microgreen. Cultivation requires managing stress-output tradeoffs, with physiological stress in seedlings being reflected in various physiological and growth parameters, which could be used as indicators for the severity of the plant stress response. This study will test various treatment effects on the stress levels of the *F. esculentum* plants in their first weeks after sprouting, including the density with which the seeds are planted, as well as the amount of fertilizer added to the plants. Physiological parameters that will be used to investigate stress levels are chlorophyll concentration, protein profiles, the photosynthesis rate, and the transpiration rate. Growth parameters that will be measured are biomass of the leaves and stem. The antioxidant content of the plant matter was also measured, to add more commercially-relevant data to the study. Measurements will be taken throughout the experiment in order to gain a better understanding of how the stress response evolves through time. This experiment will give commercial horticulturalists, among other stakeholders, a better picture of how to optimally grow these plants.

Wave 3 - Oral Presentation Abstracts

BUCH B315

1.30pm-3.00pm

THEME: Sustainability and Conservation

The Development of Tooth Replacement Patterns in Reptiles

Presenter: Jamie Carthew

Most Reptiles have a cycle of tooth replacement, so when an old tooth falls out or is resorbed a new tooth will take its place. Initiation of this pattern begins in the embryo, but it is currently unknown how the pattern changes from initiation to replacement. The central question of this research is whether the tooth development pattern changes from initiation in the embryo to replacement in the juvenile and adult. Two methods were used for analysis, both requiring data from CT scans of Leopard Geckos from late embryo stages to one-week-old. The first method used was relative spatial analysis to cover if the pattern changed spatially during development. The second method used was analyzing tooth size changes from volumetric CT data to tie in tooth volumes to the development of the pattern. These two methods both find that the initiation pattern does not change and therefore fits within the replacement model.

Wave 3 - Oral Presentation Abstracts

BUCH B315

1.30pm-3.00pm

THEME: Sustainability and Conservation

Discovery of Mud Dragons in BC

Presenter: Evgeniya Yangel

The Kinorhyncha, also known as “mud dragons”, is a phylum of understudied marine microscopic invertebrates that inhabit sandy or muddy sediments across the globe. Despite cosmopolitan distribution, only few species have been described from the northeastern Pacific Ocean. All the records are a product of scattered samplings mainly performed by a single researcher during the sixties. The coast of British Columbia is well known for being biologically active, harbouring very diverse fauna. However, area has never been surveyed for mud dragons, thus becoming a region of interest. In this study, a pristine area of BC (Calvert Island) was selected for a kinorhynch survey. Specimens were extracted from subtidal sediments (ranging from 100 to 300 m depth), prepared and imaged using light and scanning electron microscopies, and sequenced targeting the mitochondrial gene COI (also known as barcode marker). Examination resulted in description of a new species, *E. hakaiensis* sp. nov, and redescription of one of the oldest species - *E. pennaki*. Both belong to the genus *Echinoderes*, one the most species-rich genera within the phylum. Our contribution rounds up the number of *Echinoderes* species to a hundred and also provides a species checklist of mud dragons in British Columbia for the first time.

Wave 3 - Oral Presentation Abstracts

BUCH B315

1.30pm-3.00pm

THEME: Sustainability and Conservation

Economic Viability of Microalgae-Sourced Biodiesel

Presenter: Alina Chalanuchpong, Manisha Walia, Bryce Harrison, Noor Adil

Deriving fuel from microalgae has the potential to alleviate the current global reliance on fossil fuels. Microalgal biofuels, however, must overcome challenges before they can compete in the fuel market. There are important constraints to algae-sourced biodiesel commercialization owing to the high cost and energy consumption of biomass cultivation and lipid extraction. This study focuses on improving the economics of microalgal biofuels. *Chlorella vulgaris* will be grown in a freshwater and wastewater medium. Waste water streams provide the nitrates and phosphates needed for algae growth, reducing the need for nutrients addition. Lipids and carbohydrates from the algae can be processed into biodiesel and ethanol respectively. Furthermore, cost-effective protic ionic liquids (PILs) will be used to separate the carbohydrates and lipids from the biomass. The biodiesel and bioethanol yields of *Chlorella vulgaris* grown in the two mediums will be compared to understand the extent to which biomass productivity and oil yield must be improved for this process to be economically viable. The study will also compare the nutrient and biofuel yield from ionic liquid extraction to that of traditional chemical extraction methods. The ultimate objective is to reach cost parity with fossil fuels in order for algal fuels to be economically sustainable in the long term and to help the algae industry develop to its full potential.

Wave 3 - Oral Presentation Abstracts

BUCH B315

1.30pm-3.00pm

THEME: Sustainability and Conservation

Effects of Climate Change on Suitable Thermal Stream Habitat for Rainbow Trout in BC **Presenter: Carolina Sanchez**

Climate change threatens to severely alter streams in British Columbia and decrease their suitability as habitat for a variety of species, including Rainbow Trout. This is of great concern not only because of its ecological but also social and economic implications given Rainbow Trout is one of the key species that supports the recreational fishing industry in BC, which annually involves around 400,000 anglers and contributes \$957 million in direct and indirect economic benefits for the province. My research aims to understand this threat better by modelling how temperature changes under different climate change scenarios could affect the amount and distribution of suitable thermal stream habitat for Rainbow Trout in BC. Watershed, hydrological and climatic variables were derived from measured or modelled GIS coverages and used in a multiple linear regression model to calculate current and projected Maximum Weekly Average Stream Temperatures (MWAT) for all watershed units in the province. Measurement of changes in habitat suitability considered how the MWAT compared to both physiological lethal thermal limits of rainbow trout as well as temperature ranges in which rainbow trout are the least affected by competitive interactions with other fish species. These findings will play a crucial role in understanding what mitigation and adaptation measures should be implemented across the province to limit the potential severity of climate change impacts to this species and the recreational fishery it supports.

Wave 4 - Poster Presentation List

Brock Hall Concourse, 1874 East Mall

3.15pm-4:45pm

THEME: Health and Wellness

Molecular genetics involved in the regulation of TGF- β and complexation of SMAD protein can lead to the identification and potential treatment of HHT and similar symptom disorders.

Jeni Hsing, Arman Mojtabavi, Gura Gill

Glutamine synthesis inhibitors as a novel adjuvant to asparaginase therapy in the treatment of paediatric T-cell acute lymphoblastic leukaemia

Lorenzo Lido, Oscar Xu, Apaar Chahal

Nystatin Degradation Explains Failure to Exhibit Drug Resistance in *Saccharomyces cerevisiae*

Lesley Miller

Effects of Hypoxia on NLRC5 Mediated MHC Class I Expression

Jason Gravett

Cost-effectiveness of 13-Pneumococcal Conjugate Vaccine Among Adults: A Systematic Review

Sahar Zandi Nia, Molly Voltz

Examining different machine learning models to predict seizures with EEG datasets

Daphne Liu, Jason Wong

Post-Traumatic Stress Disorder and Cardiovascular Disease: How the comorbidity of these conditions affect adherence to stroke treatment

Amanda Lillico-Ouachour, Avneet Johal, Lucaz Rempel, Armita Payombarnia

Role of the non-homologous end-joining pathway in cell response to the CX-5461

Dylan Zhao

The effects of an acute bout of exercise on visuomotor adaptation and interlimb transfer

Jennifer Ma

The study of knee injuries caused by figure skating practice and the preventive effect on wearing knee support during practice

James Feng

Association of Neuroligin mutations with ASD

Jennifer Huang, Jasmine Chagan, Yan Kuan Chen

The delicate relationship between Artemisinin derivatives and Folic acid in treating uncomplicated malaria in pregnant women

Zahra Fazal, Morris Huang, Sachini Jayasinghe

A Triple Combination Approach Involving Nerve Transplantation, Glial Scar Digestion and Passive Exercise Promotes Cardiovascular Recover after Spinal Cord Injury

Jenny Liu

Investigating Potential Postsynaptic Location of Neurexins using Expansion Microscopy and Colocalization Analysis

Enoch Yau, Hamidreza Ayremlou, Anna Madsen

Understanding the role of PPP2R2A in ER-positive breast cancer cells

Leo Huang

Movement-Related Tactile Suppression: Sensory Gating

Sarv Heirani Moghaddam

The effects of increasing blood pressure after spinal cord injury on blood flow, oxygenation, and biological responses using a porcine model

Martin Keung

ECG R peak Analysis for Arrhythmia

Ahmed Hussain

THEME: Sustainability and Conservation

Using Textual Analysis to Examine Trends in the Discussion of Sustainability in 10-K Reports

Silken Kleer, Jenna Cheng, Shirley Feng

Impact of fertilizer on the growth rate of the non-toxic diatom *Licmophora abbreviata*

Geraldine Hernandez, Callee Yuen, Camille Boileau-Locas, Rowan Harris

THEME: Innovation and Technology

The osmo-respiratory compromise in killifish: salinity preference in normoxia vs. hypoxia

JJ Hum

Method seeking to find genes that directs cell migration during cerebellum development

Rhein Mi, Michelle Lu, Emilia Chen

Predicting facial and paw movement from cortical mesoscopic calcium activity in head-fixed mice

Brandon Forsys, Rene Tandun, John Cookson, Jerry Liu

Investigating the Immune System of Newborn Babies

Antonia Bellefleur, Shelly Lu, Angela Wong

How the infographics in a search engine might oversimplify information

Shahar Yar, Aziz Alimov, Shabnam Raufi, Bill Wan

THEME: Individual and Society

Domestic work: Psychological effects of domestic work on the children left behind

Alicia Margono

Factors Associated with Mood Disorder Among University Students in Canada

Michelle Liang, Flora Zhang, Jonathan Gui, Jenny Pan

Is it a Match?: The Tinder Experience

Sarah Wong, Harsuman Benipal, Supreet Rai

Exploring the Relationship between Trust in the Internet and Trust in Doctors as Sources of Health and Medical Information

Gaurav Vasudev, Amanda Szeto, Leo Chen

Mean Girls: Investigating the Effects of Sexism Perpetrated by Other Women

Jennifer Angelucci

Implicit Memory: The Ouija Project

Daniel Toro Jimenez, Sara Taylor

Exploring student pharmacist's experiences of learning medicinal chemistry in a new E2P PharmD program

Kane Larson

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Molecular genetics involved in the regulation of TGF- β and complexation of SMAD protein can lead to the identification and potential treatment of HHT and similar symptom disorders.

Presenter: Jeni Hsing, Arman Mojtabavi, Gura Gill

Hereditary Hemorrhagic Telangiectasia (HHT), also referred to as Rendu-Osler-Weber Syndrome, is a vascular dysplasia characterised by symptoms such as arteriovenous malformations (AVM) and epistaxis. It is transmitted as an autosomal dominant condition affecting approximately 1 in 10,000 people. 85% of diagnosed cases show mutations in 4 genes of the transforming growth factor-beta (TGF- β) signalling pathway, Activin receptor like kinase (ACVRL1/ACVRL1/ALK1), Endoglin (ENG), SMAD 4, GDF2. However, cases that satisfy the Curaçao criteria have been reported without the predicted mutations in the normally suspected genes. We hypothesise an epigenetic factor in the transcription regulation of the genes in the TGF- β pathway, specifically in the complexation of SMAD proteins in regulatory regions resembling those found in patients with Juvenile hemochromatosis patients. Genomic samples from patients with HHT and those without were obtained and mutagenised in regulatory upstream and non-coding regions were compared with healthy control samples to investigate correlations with the changes in sequence and severity of the disease. Expected results included identification of mutations in genes involved in transcriptional regulation that affect the downstream sequence to produce the same phenotypes of those described in the Curaçao criteria.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Glutamine synthesis inhibitors as a novel adjuvant to asparaginase therapy in the treatment of paediatric T-cell acute lymphoblastic leukaemia

Presenter: Lorenzo Lido, Oscar Xu, Apaar Chahal

The use of L-asparaginase (ASNase) has been a mainstay in the treatment of paediatric T-cell acute lymphoblastic leukaemia (T-ALL) for the past 40 years. This method of treatment relies on the fact that most T-ALL cells are low or negative in asparagine synthetase (ASNS) and consequently dependent of extracellular asparagine, which is in turn depleted by ASNase. Recent findings have shown that a major source of chemotherapeutic resistance occurs due to the presence of ASNS positive T-ALL cells, which are able to produce their own asparagine and counteract the effects of ASNase. Additionally, glutamine synthetase (GS) has been found to be a necessary component in this resistance pathway via synthesis of glutamine as a substrate for ASNS-mediated amidation of aspartate to asparagine, thereby providing an endogenous source of asparagine for malignant cells. Recently, methionine L-sulfoximine (MSO), a GS inhibitor, has been shown to sensitize human sarcoma cell lines to ASNS treatment. In this study, we explored the effect of the L-asparaginase either alone or combined with the glutamine synthetase inhibitor, MSO, in different T-ALL cells lines (low or high in ASNS). We observed that treatment of T-ALL cell lines with ASNase in combination with MSO results in increased inhibition of cancer growth in vitro when compared to treatment using ASNase alone, and thus should be considered as a potential novel combination therapy for paediatric T-ALL.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Nystatin Degradation Explains Failure to Exhibit Drug Resistance in *Saccharomyces cerevisiae*

Presenter: Lesley Miller

Characterization of microbial drug resistant mutants obtained through evolution experiments, allows the elucidation of evolutionary mechanisms. Numerous antifungal agents are used during evolution experiments to place selective pressure on the common baker's yeast, *Saccharomyces cerevisiae*, to evolve drug resistance. Acquisition of drug resistance mutations ensures the cell's survival when they are inoculated into antifungal drugs.

The cell environment must remain selective to ensure that non-resistant cells do not survive when they have not evolved drug resistance. In previous experiments in the lab using the antifungal, nystatin, potentially drug resistant strains later failed to exhibit resistance when assayed in fresh nystatin. It was hypothesized that nystatin concentration declined over the time the potential mutants were acquired. The current experiment investigates whether the effectiveness of the antifungal, nystatin, declines over a 12 day experiment at 30°C.

The growth of cells known to be resistant to nystatin was compared to cells known to be sensitive in both an environment with nystatin and one without. Fresh cells were inoculated into nystatin media that was 0, 4, 8 and 12 days old. Non-resistant cells took at least 5 days to grow in fresh nystatin media. In contrast, non-resistant cells grow after only one day in media containing no drug. When inoculated into older drug media (8 or 12 days old), non-resistant cells show immediate growth. The results of this experiment indicate that nystatin does decay over time under the conditions used in the original experiment, explaining why putatively resistant cells failed to show resistance when placed in fresh media. In conclusion, when isolating drug resistant cells, one must test the efficacy of the selective medium to ensure acquisition of reliable mutants.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Effects of Hypoxia on NLRC5 Mediated MHC Class I Expression

Presenter: Jason Gravett

Immunotherapy is a cancer treatment that uses the immune system to selectively eliminate cancer cells. Immunotherapy depends on the expression of the Major Histocompatibility Complex I (MHCI), an essential protein involved in antigen presentation. MHCI antigen presentation results in the activation of CD8+ T-cells, crucial effectors of the cytotoxic immune response responsible for the elimination of cancer cells. Although cancer cells become antigenic as they accumulate mutations, some cancer cells are able to escape MHCI-mediated immune responses through a variety of different mechanisms. This renders immunotherapies ineffective and correlates with bad prognosis. One mechanism by which cancer cells escape immune control involves the downregulation of MHCI itself. NLRC5 is a transcriptional regulator of MHCI associated genes. Low NLRC5 expression results in reduced levels of MHCI gene expression, and tumor cells with low NLRC5 expression have been shown evade immune regulation. In addition to the effects NLRC5 has on MHCI transcription, hypoxic tumor microenvironments have also been associated with reduced levels of MHCI expression and the downregulation of a variety of gene products. The current project aims to investigate the potential role for hypoxia in regulating NLRC5-mediated MHCI expression in cancer. Understanding the relationship between NLRC5 expression and hypoxic tumor microenvironments will provide a better understanding of the mechanisms underlying immune invasion in cancer, which will ultimately lead to improve immunotherapies.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Cost-Effectiveness Of 13-Pneumococcal Conjugate Vaccine Among Adults: A Systematic Review

Presenter: Sahar Zandi Nia, Molly Voltz

BACKGROUND: *Streptococcus pneumoniae* causes excess morbidity and mortality among the elderly. To prevent disease burden from *S. pneumoniae* ("pneumococcus"), the use of 13-valent pneumococcal conjugate vaccine (PCV13) in adult vaccination programs is under review in many countries.

AIMS: This review summarizes the literature available on the cost-effectiveness of PCV13 vaccination in adults and key issues for decision makers to consider when deciding on the reimbursement of vaccination.

METHODS: A systematic search of English articles reporting on the cost-effectiveness of PCV13 among adults conducted in PubMed, Embase, as well as a manual search of referenced articles. Studies summarized and evaluated on basis of the model and input parameters used, comparative arms (23-valent polysaccharide vaccine (PPV23) or no vaccine), costing, incremental cost-effectiveness ratio (ICER), and payer perspective.

RESULTS: Eighteen of the 25 included studies concluded a single dose of PCV13 or sequential dosing after PPV23 to be cost-effective compared to no vaccine or PPV23. Of the 18 studies, eight were in adults >65 years of age; seven studies in those aged >50 years and three in individuals > 18 years. The ICERs ranged from US\$797 to US\$70,937. The sensitivity analyses showed the ICER to be sensitive to age at vaccination, chronic diseases, pneumococcal disease prevalence, herd immunity, payer perspective, cost of vaccine and hospitalization.

CONCLUSIONS: While these studies were heterogeneous, the majority found PCV13 to be cost-effective among those who are above 50 years of age.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Examining different machine learning models to predict seizures with EEG datasets

Presenter: Daphne Liu, Jason Wong

In our study, we compared two different machine learning models, Support Vector Machine (SVM) and Logistic Regression, in their accuracy as seizure forecasting systems.

Epilepsy is the fourth most common neurological problem worldwide and is characterized by recurrent seizures. Complete control over epilepsy remains elusive, so seizure predictions will help mitigate epilepsy's unpredictable nature.

Electroencephalography (EEG) is a test to track electrical signals in the brain, which drastically change during a seizure. Our primary goal is to differentiate EEG data into interictal (between seizures) or preictal (prior to seizures) states to allow time for interventions prior to seizure onset.

We utilized raw EEG data for patient "Dog1" from Kaggle and preprocessed the dataset into different time windows and frequency bands in MATLAB. We selected spectral power (EEG signal magnitude) as the differentiating feature. We proceeded with python and scikit-learn to find hyperparameters for each model to test on Dog1 or a different patient Dog2 to assess the accuracy.

When we tested our model on "Dog2", hyperparameters of 64.0 for C and 5.66 for Gamma yielded 56% accuracy for SVM; 1024 for C yielded 52% accuracy for Logistic Regressions. Testing on Dog1 was 95% accurate for both models.

We concluded that seizure prediction with the same patient gives significantly more precise results, and that it is inconclusive which model is more accurate. In the future, we would investigate into other factors that affect classification and build a personalized wearable seizure prediction medical device with knowledge of the appropriate model.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Post-Traumatic Stress Disorder and Cardiovascular Disease: How the comorbidity of these conditions affect adherence to stroke treatment

Presenter: Amanda Lillico-Ouachour, Avneet Johal, Lucas Rempel, Armita Payombarnia

Post-Traumatic Stress Disorder (PTSD) can be a consequence of acute medical events such as stroke and the comorbidity of these conditions could have an effect on treatment outcomes. Some studies have suggested that PTSD is a factor contributing to non-adherence of stroke medication. Non-adherence to stroke medication has many negative implications as it could increase the risk of recurrent strokes and subsequently add economic burden to the healthcare system. This study examines the prevalence of PTSD diagnosis on stroke survivors and investigates its impact on patients' adherence to stroke medication based upon a review of the literature from diverse sources. We anticipate that the results will show that increasing communication between PTSD-associated and stroke-associated healthcare professionals will increase stroke medication adherence in PTSD-stroke patients.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Role of the non-homologous end-joining pathway in cell response to the CX-5461

Presenter: Dylan Zhao

Breast cancer is the most common type of cancer in women, and many therapeutic drugs are being developed to combat this disease. CX-5461 is a drug that was recently found to be a DNA G-quadruplex stabilizer that selectively targets tumor cells which lack key genetic breast cancer proteins, BRCA 1 and 2. G-quadruplex stabilizers are therefore promising targets for cancer treatment, and breast cancer cells deficient in dsDNA repair pathways are being studied in detail to better understand the mechanism of CX-5461. An important dsDNA damage repair pathway, the non-homologous end-joining pathway (NHEJ), is stimulated in cells under treatment of CX-5461, and key proteins from this pathway are shown to be active through in vitro cytotoxic assays followed by western blotting. Activation of specific proteins in this pathway support a hypothesized mechanism of CX-5461. The two main dsDNA damage repair pathways, NHEJ and homologous recombination (HR) are also suspected of working synergistically through WST-1 cell viability assays using wild-type and dsDNA damage repair pathway deficient cells, and preliminary results show support for this hypothesis. CX-5461 is currently part of clinical trials in phase I/II to confirm the recommended dosage and measure anti-tumour activity in patients. Good results will help to show that CX-5461 is a viable alternative for tumours that are resistant to the PARP inhibitor therapeutic approach.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

The effects of an acute bout of exercise on visuomotor adaptation and interlimb transfer **Presenter: Jennifer Ma**

Visuomotor adaptation is an important form of motor learning that allows humans to adapt movements continually in response to visual feedback in their environment. Training reaching movements of the arm in response to rotated visual feedback has been shown to promote visuomotor adaptation and subsequently enhance the motor performance of the opposite, untrained arm, a phenomenon known as interlimb transfer. Acute exercise has been implicated in facilitating cortical excitability, decreasing intracortical and interhemispheric inhibition, and enhancing motor skill acquisition and retention. Thus, aerobic exercise may enhance the neural mechanisms underlying interlimb transfer and improve motor learning in an untrained arm. This study investigates the effect of moderate-intensity aerobic exercise on visuomotor adaptation and interlimb transfer using the KINARM Endpoint robot. It has been hypothesized that aerobic exercise will enhance visuomotor skill acquisition and retention in the trained arm and improve the transfer of visuomotor adaptation in the untrained arm. We observed that moderate-intensity aerobic exercise increases the acquisition and 24-hour retention of visuomotor adaptation in the trained arm. However, exercise did not appear to affect interlimb transfer of the motor skill to the untrained arm. We observed interlimb transfer immediately after training and following a 24 hour retention period, which is consistent with previous findings, however we saw no difference between the exercise and rest conditions. Overall, aerobic exercise enhanced the acquisition and retention of visuomotor adaptation, but appeared to have no effect on interlimb transfer.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

The study of knee injuries caused by figure skating practice and the preventive effect on wearing knee support during practice

Presenter: James Feng

A combination of skill and power, Figure skating is one of the most artistic winter sports. However, the training required to become a competitive figure skater may cause serious damage to skaters' bodies. Many skaters who practice high revolution jump, suffer from knee pains like patellofemoral pain syndrome (PPS) or patellar tendinopathy (PT) as well as injury to the medial collateral ligament (MCL) or anterior cruciate ligament (ACL). The resulting pain will terribly affect skaters' training, their professional careers and the rest of their lives. Different from Idiopathic Osteoarthritis which develops for unknown reasons, the post-traumatic OA always follows an injury and can be effectively prevented. The manufacturers of knee supports claim that their products help reduce the instant pressure on knees during hiking or trail running. Will they have the same effect on figure skating by reducing the impact force caused by gravity and angular momentum? The proposed study focuses on evaluating the effectiveness of knee supports on reducing impact force during landing of high revolution jumps in figure skating. The study will use technology like high speed camera and pressure sensitive film to compare the difference on the effectiveness of reducing impact force among Prophylactic knee braces (PKBs), functional knee braces (FKBs), normal knee sleeves and control group (no protective equipment). If an effective way of preventing knee injuries in figure skating is found, the study will then investigate on the user acceptance, trying to give athletes a safer way for their progressive training.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Association of Neuroligin mutations with ASD

Presenter: Jennifer Huang, Jasmine Chagan, Yan Kuan Chen

The synapse is a structure located between neurons and is a central component of communication between neurons within the nervous system. Found at the synapse are two types of adhesion proteins, Neurexins (Nrxn) and neuroligins (NLgn), both of which contribute significantly to synaptic formation and maintenance. Autism spectrum disorders (ASD), which include idiopathic autism, Asperger's syndrome and other developmental disorders have been associated with mutations in genes coding for neurexins and neuroligins, however, insufficient evidence exists to determine the exact protein mutations behind each diagnosed case. Therefore, the objective of this study was to conduct a targeted approach in identifying crucial regions at the binding site important for NLgn-Nrxn interaction and their implication for ASD. Two amino acid residues are chosen for study, E397 located inside the Nrxn-NLgn1 Ca²⁺ ion binding site, and G500 located outside. The approach we chose to pursue is the targeted mutagenesis of the E397 and G500 amino acids in mice, for which representative results show only the mutation of E397 resulted in NLgn failing to bind Nrxn. To identify phenotypic expression of autistic behaviors of the E397 mutant mice, we proposed to use two types of behaviour assays, the three-chamber sociability test and the caged adult social interaction test. It is expected E397 mutant mice will spend significantly less time than wild type controls when interacting with stranger mouse, which represents social interaction defects, indicating the E397 gene mutation is strongly associated with the expression of ASD. These hypothetical results illustrate potential direct connections between NLgn-Nrxn interaction, the formation of functional synapse and how this may be impaired in ASD, thus allowing more targeted approaches to identify and correct proteins related to ASD.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

The delicate relationship between Artemisinin derivatives and Folic acid in treating uncomplicated malaria in pregnant women

Presenter: Zahra Fazal, Morris Huang, Sachini Jayasinghe

Malaria is one of the leading causes of death in Africa. A particular strand of malaria called Plasmodium Falciparum is responsible for 99% of all malaria related cases in Africa. However, during pregnancy the susceptibility towards malaria increases in women, particularly to P. Falciparum. This can result in maternal illness, low birth weight, and infant mortality. Currently pregnant women at risk of malarial infection are being given the drug SP-IPT, however, there are signs of increasing resistance. Our theory is that this resistance is a result of folic acid supplements that are also being taken, since it is already known that folic acid counteract the effects of SP-IPT. Folic acid is necessary for fetal brain and spinal development. Therefore, both of these treatments are necessary for pregnant women, the issue lies in finding a way to administer them both effectively. Recently, a new drug called DHA-PPQ has been approved to be substituted for the SP-IPT, however there is little research in the interaction of this new drug with folic acid. Our experimental goal is to test the effective dosage ratio of DHA-PPQ in pregnant women that are also taking folic acid. We will be manipulating the amount of folic acid after the administration of the DHA-PPQ drug. We will measure if this has any effect on the malaria count in mice thereby establishing the effective dosage regime. The control in this experiment will be treating the mice with a placebo in place of folic acid after administering DHA-PPQ.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

A Triple Combination Approach Involving Nerve Transplantation, Glial Scar Digestion and Passive Exercise Promotes Cardiovascular Recover after Spinal Cord Injury

Presenter: Jenny Liu

Spinal cord injuries (SCI) disrupt crucial cardiovascular control. Impaired cardiovascular control after SCI results in life-threatening conditions such as autonomic dysreflexia (AD). During AD, peripheral stimuli can instigate uncontrolled surges in blood pressure (BP). Episodes of AD are typically unpredictable and difficult to control. Therefore, BP can rise up to 300 mmHg in response to a stimulus like urinary bladder expansion in people with AD. The sudden surge in BP can cause seizures or even death. The mechanism purported to underlie cardiovascular dysfunction after SCI relate to changes within the rostral ventrolateral medulla (RVLM) and raphe nucleus. Here, we performed complete spinal transections at the third thoracic segment in adult rats followed by peripheral nerve graft transplantation, growth-inhibitory glial scar digestion, and cycling exercise. The treatments are accompanied with telemetric blood pressure monitoring and retrograde neuronal tracing. Cardiovascular function (i.e. BP and heart rate) in response to colorectal distension was assessed to determine functional recovery. Retrograde neuronal tracing was performed to determine the 'neuronal origin' of regenerating axons during recovery. The regeneration of RVLM neurons and raphe nucleus neurons was observed. This study discusses the cardiovascular consequences of SCI and the therapeutic potential of regenerative and rehabilitative approaches to promote functional autonomic recovery and to improve the quality of life after SCI. The combined approach significantly mitigates AD severity (significant reduction in BP elevation and abolishment of CRD-induced bradycardia).

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Investigating Potential Postsynaptic Location of Neurexins using Expansion Microscopy and Colocalization Analysis

Presenter: Enoch Yau, Hamidreza Ayremlou, Anna Madsen

As the nervous system develops, connections between neurons called synapses form, a process mediated by the cell adhesion proteins neurexin and neuroligin. Initially it was thought that neurexin and neuroligins were found on the presynaptic and postsynaptic side respectively, but new research indicates that neurexins might also localize on the postsynaptic side. Using a new technique known as expansion microscopy, or ExM, we can observe whether neurexins are found on the postsynaptic side of synapses. Hippocampal rat neurons were immunostained using the presynaptic marker synaptophysin and the postsynaptic marker Homer and neurexin. A polymer network was then overlaid on the sample and expanded for visualization. We show representative results for efficient 4x expansion of neurons grown in culture as well as high resolution co-localization of presynaptic marker Bassoon and postsynaptic marker Homer at synaptic junctions (adapted from Chozinski et al. 2016). We expect that if neurexin is located postsynaptically, it will show co-localization with Homer. Further research on the role and location of neurexins and neuroligins may provide more insight into neurological disorders thought to be linked with disruptions to these proteins' function.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Understanding the role of PPP2R2A in ER-positive breast cancer cells

Presenter: Leo Huang

Protein Phosphatase 2A (PP2A) is an enzyme within the serine/threonine phosphatase family, and has roles in cell proliferation, apoptosis, and signal transduction. PPP2R2A, a gene encoding a regulatory subunit of PP2A, has been found to be a deletion hotspot in breast cancer genomes, according to genomic and transcriptomic analysis done on 2000+ cases as part of the METABRIC (Molecular Taxonomy of Breast Cancer International Consortium) genomic landscape. Furthermore, this event was found to be present in 63% of the Estrogen Receptor-positive (ER+) breast cancer cases. The ER+ Luminal B breast cancer subtype is characterized by its poor response to hormone therapy, and therefore, is one of the subtypes most in need of therapeutic advances. Using a breast cancer cell line with PPP2R2A knockdown to simulate the gene's loss in cancer, we have shown that PPP2R2A is involved in ER signaling. PPP2R2A knockdown was found to alter phosphorylation of ER, change ER binding sites, and differentially expressed ER response genes. We are currently working to identify the genes that are differentially expressed in PPP2R2A knockdown, while also working on improving our understanding of the mechanism behind the changes in ER phosphorylation during PPP2R2A knockdown. An improved understanding of PPP2R2A in these capacities may provide insights into why the luminal B subtype responds poorly to hormone therapy, and hopefully open routes for treatment.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

Movement-Related Tactile Suppression: Sensory Gating

Presenter: Sarv Heirani Moghaddam

Our central nervous system (CNS) is normally presented with vast amounts of sensory information, particularly when we are moving. It is therefore crucial that our CNS is able to tune relevant sensory information and filter out non-relevant information. Consider reaching out to grab your coffee mug. As you reach, sensory information (e.g. from vision, muscle, skin) floods your CNS. Your CNS filters out some of this sensory input. For example, as you reach out to grab your mug, your ability to detect tactile stimulation on different parts of your limb (e.g. fingers, hand, forearm) is decreased in comparison to when your limb was at rest. This phenomenon is known as movement-related tactile suppression. It is an example of the CNS tuning down some of the sensory input bombarding the system during movement. Recent research has shown that sensory input from different parts of the moving limb could be suppressed to different degrees depending on their relevance to the task. For example, during reaching and grasping, tactile input from the fingers is likely more important than input from the forearm. Thus, input from the fingers shows less movement-related suppression. We explored whether changing the importance of other parts of the moving limb to the task would also change the degree of sensory suppression. Specifically, we examined whether making the forearm relevant to a reaching task (by making tactile forearm stimulation signify a change in movement direction) would change the degree of movement-related tactile suppression typically observed.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

The effects of increasing blood pressure after spinal cord injury on blood flow, oxygenation, and biological responses using a porcine model

Presenter: Martin Keung

There are limited immediate treatment options for patients who suffer acute spinal cord injury (SCI). Increasing mean arterial blood pressure (MAP) with vasopressors is one of the few treatment options available. However, the effect of vasopressors on spinal cord blood flow, oxygenation, and biological responses needs to be considered. Therefore, the focus of this study is to determine the timing and effect of increasing MAP on blood flow, oxygenation, and biological responses during the compressed and decompressed states of the cord. Using a porcine model, a SCI was induced at T10, followed by 2-hours of compression, and then 2-hours of decompression. Norepinephrine was administered to increase MAP by 20 mmHg for 1.5 to 3.0 hours while the cord was compressed, decompressed, or during both states. Specific probes were used to measure spinal cord blood flow, oxygenation, and spinal cord pressure. Biological responses were measured by collecting microdialysis samples to analyze for lactate, pyruvate, glucose, glutamate, and glycerol. Our data suggests that increasing MAP during compression or after decompression modestly restores blood flow and oxygenation to the cord. However, increasing MAP during both states may result in deleterious effects due to increased total bleeding observed near the injury site.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Health and Wellness

ECG R peak Analysis for Arrhythmia

Presenter: Ahmed Hussain

The purpose of this research project is to design a method for analyzing patient R peak electrocardiogram data in order to identify cases of arrhythmia. Through trial and error experimentation of various equations using R peak data, we have arrived at an equation that very accurately distinguishes between normal R peaks and premature (atrial and ventricular) beats, and through the method of linear discriminant analysis (LDA) on MatLab, we peaked at an accuracy of exactly 93.56% by using this equation. The equation is, simply, $R1R2$ vs $R2R3$, where $R1R2$ is the algebraic difference between R peak 2 and R peak 1, and $R2R3$ is the algebraic difference between R peak 3 and R peak 2, taken separately in groups of 3 peaks. This was used to graph a single excel chart, which was then statistically transformed in various ways and analyzed on MatLab to obtain the peak accuracy possible through LDA. This result means that 93.56% of the time, we would obtain the correct diagnosis for heart beat condition (which correlates with heart health), and that far outweighs any current R-peak-related methods to classify heart conditions. This would prove useful as a mobile application to use for medical purposes, and we plan to create an application that uses this equation in the near future. We also plan to create more methods to classify normal R peaks (normal beats) against various other arrhythmic beats (non-atrial/non-ventricular).

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Sustainability and Conservation

Using Textual Analysis to Examine Trends in the Discussion of Sustainability in 10-K Reports

Presenter: Silken Kleer, Jenna Cheng, Shirley Feng

Incorporating sustainable practices within the business operations of firms has progressively assumed greater importance. This is primarily driven by an increase in public awareness on environmental issues such as pollution and climate change. An average of 86% of a firm's total emissions are from its supply chain which can motivate suppliers to increase its appearance of sustainability on paper to appeal to its sustainability-conscious customers. We hope to compare the environmental claims versus the actions of businesses toward greening their supply chain by implementing natural language processing techniques such as textual analysis and topic modelling on financial reports (10-K reports) and sustainability reports from 1995-2010. Through this analysis we also hope to determine the amount of greenwashing, the practice of firms creating misleading claims about their products or policies to appear environmentally friendly.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Sustainability and Conservation

Impact of fertilizer on the growth rate of the non-toxic diatom *Licmophora abbreviata*

Presenter: Geraldine Hernandez, Callee Yuen, Camille Boileau-Locas, Rowan Harris

This study examined the effect that increasing concentrations of diluted fertilizer at 0%, 20%, 40% and 60%, has on the organism *Licmophora abbreviata*, a non-toxic benthic diatom (microalgae). They play a vital role in marine ecosystems as primary producers, and in Salmon's food chain. We aimed to understand the effects of agricultural fertilizer runoffs on rivers, and its surrounding environment. Diatoms were grown in four different concentrations for a period of two weeks, in an incubator (T=20°C), with three replicates per treatment. The growth rate (cells/mL/day) was measured by counting the number of cells per volume with a hemocytometer slide. The data was analyzed with a one-way ANOVA. Results showed significant evidence to support that there is a difference in the growth rate of diatoms between the 0%, 20%, 40% and 60% treatments. The cell count in the 0% treatment increased with time, analogous to their natural growth in rivers. The 20%, 40% and 60% treatment conditions experienced a decline in cell count from days 0 to 7, and then showed an increase from days 10 to 14. We explain this decline as caused by the disturbance from the fertilizer on the diatoms optimal ratio of nutrients (Danielsson, 2008). The increase is explained by the adaptation of diatoms to their new environment, as they alter their affinity for nutrients (Rogato, 2015). We conclude that fertilizer runoffs have an initial negative impact on the growth rate, but the diatoms' adaptability makes it possible for them to recover.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Innovation and Technology

The osmo-respiratory compromise in killifish: salinity preference in normoxia vs. hypoxia

Presenter: JJ Hum

The killifish, *Fundulus heteroclitus*, can tolerate a wide range of salinities as well as low oxygen (hypoxic) conditions. The tolerances for salinity changes and hypoxia intersect in what is called the osmorepiratory compromise. The conditions that improve gas exchange also result in increased ion movement across the gills, making it difficult for fish to regulate ion exchange with the environment. Therefore, there is a trade-off in maximizing oxygen uptake in hypoxic conditions and minimizing ion gain/loss in non-isosmotic conditions (salinities at which ion concentrations in the fish body and external environment are not equal).

The present study aimed to examine how acclimation salinity and water oxygen concentration affect the salinity preference of killifish in order to better understand how they approach the osmorepiratory compromise. Fish were given a choice between their acclimation salinity and their isosmotic point, and their behaviour was recorded and analyzed over 2 hours of normoxia followed by 2 hours of hypoxia. We hypothesized that fish would spend more time at their acclimation salinity under normoxic conditions, but would spend more time at their isosmotic point under hypoxic conditions in order to maximize oxygen uptake. Killifish did not display the expected salinity preferences, but instead displayed height-based preference due to hypoxia. Fish generally preferred the lower zone of the tank in normoxic conditions, and had no preference in hypoxic conditions. These findings suggest that killifish may take an alternative approach to the osmo-respiratory compromise, where salinity preference is behaviourally neglected in order to maintain optimum oxygen uptake.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Innovation and Technology

Method seeking to find genes that directs cell migration during cerebellum development

Presenter: Rhein Mi, Michelle Lu, Emilia Chen

The cerebellum is a key player that is located inferior to the cerebrum and is responsible for motor controls and cognitive functions. Proper cerebellum development relies on the programmed gene expression during embryonic and postnatal stage. Improper expression may cause illnesses with impaired movements and cognitive abilities. Understanding gene regulation is critical in discovering causes and cures for cerebellar disorders. While progenitor cells' movements were well studied, the genes involved in directing their migration still remain unknown. Transcription factors are proteins regulating gene expression levels known to initiate or terminate cell migrations and other developmental processes. This study aims to discover and investigate the roles of a novel transcription factor in cell migration during embryonic cerebellum development. Mice were used as the model organism. The gene expression at selected time points was quantified by cap analysis gene expression (CAGE). The data were sorted by expression patterns into clusters assuming genes in each cluster contribute to similar developmental processes. A cluster with peaked expression level during periods of cell migration was picked and a set of biological criteria was utilized on selecting the gene of interest. In situ hybridization and immunofluorescence staining were then used to determine the location of transcription factor expression and types of progenitor cell it differentiated from, suggesting its possible function. The hypothesized function is validated by comparing cell migration and maturation in knockout mice to wild-type mice. This theoretical study strives for a better understanding of the role novel transcription factors have in cerebral embryonic migration.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Innovation and Technology

Predicting facial and paw movement from cortical mesoscopic calcium activity in head-fixed mice

Presenter: Brandon Forys, Rene Tandun, John Cookson, Jerry Liu

Our goal is to examine how machine learning can help in understanding the linkage between brain activity and muscular movements. We do this by using calcium imaging techniques, which offer high temporal and spatial resolution, and which have enabled functional connectivity maps to be discerned in mice brains. Additionally, new computer vision methods allow us to use machine learning to classify facial and paw movements and functional connectivity patterns. To relate facial and paw movement to calcium activity in the brain, we track facial and paw movement before inputting movement data and calcium images into a machine learning model. By examining the models' prediction of facial and paw movement categories, we are able to identify whether calcium activity in the brain is temporally associated with facial and paw movement. We expect a positive correlation between activations in facial and paw movements and increased cortical calcium activity. These results would contribute greatly to our understanding of how motor movement is encoded in the brain; it would also allow us to computationally understand patterns of activity in the neural circuitry related to observable movement.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Innovation and Technology

Investigating the Immune System of Newborn Babies

Presenter: Antonia Bellfleur, Shelly Lu, Angela Wong

Worldwide, a million newborns die from infection every year (WHO). These deaths can be prevented by administering appropriate vaccinations, however, current knowledge is mostly focused on adult immune systems. This raises concern that traditional vaccines may not provide sufficient immunity during the high-risk neonatal period. Human T helper (Th) cells play an important role in the development of long-lasting immunity after vaccination. Immature T cells called Naïve CD4⁺ T cells can differentiate into four different T helper cell lineages, Th1, Th2, Treg and Th17, each associated with different roles in the immune system. Our study is focused on Th17 cells that are crucial for host defense against extracellular bacteria and fungi. Differentiation of Th17 cells are controlled by the signaling proteins IL-6 and TGF- β , and the regulatory protein STAT3. Since STAT 3 is downstream of IL-6 in the differentiation pathway, deficiency in IL-6 leads to an impaired innate and adaptive immune response. We investigate the differentiation of Th17 cells from neonatal naïve CD4⁺ T cells by stimulating them with IL-6 to determine the level of STAT3 production. Peripheral and umbilical cord blood mononuclear cells (PMBC and CBMC, respectively) are stimulated by adding IL-6. Then, the cells are incubated, spun, and washed in buffer solution. Using flow cytometry, we can detect the level of STAT3 in PBMC and CBMC after IL-6 stimulation. The results suggest that the STAT3 gene is downregulated in neonates from low level of STAT3 production even after IL-6 stimulation, leading to defective Th17 cell development in newborns.

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Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Innovation and Technology

How the infographics in a search engine might oversimplify information

Presenter: Shahar Yar, Aziz Alimov, Shabnam Raufi, Bill Wan

There is currently a debate in science communication on whether infographics effectively communicate science. Some visualizations can hinder communication, including some visualizations of science controversies. Illustrations of the “ozone hole,” for example, that summarize discourse over the role of fluorocarbons in altering our atmosphere may dramatize the phenomenon (D.N. Gordin et al. 1994). This study explores whether people who recognize the importance of communicating a science controversy believe infographics on the science topic should mention the controversy as well. As all sorts of visualizations, including those that spread misinformation, are becoming increasingly prevalent, and are shared up to eight times faster than textual summaries (Ibrahim AM, Lillemoe KD, Klingensmith ME, et al. 2017), we feel that exploring ways to improve these visualizations is important. Hence, the purpose of our study is to explore whether professionally created infographics should reflect controversy.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Domestic work: Psychological effects of domestic work on the children left behind.

Presenter: Alicia Margono

Domestic work makes up a significant portion of the global workforce. Domestic work is an unglamorous job that often requires workers to move outside their hometowns, sometimes even overseas, for months at a time in unsatisfactory conditions. This poster examines several papers on the subject of psychological effects on children of domestic migrant workers that are left behind, with focus on the Southeast Asian region where domestic workers make up a large percent of the working population. Migrant workers work away from home for long stretches of time, often having to leave their young children in the care of others. One study completes a survey on the viewpoints of children of MWs in Indonesia, a Southeast Asian country with a prominent migrant worker task force. When asked on their feelings on their parents' work, a majority of the children replied with *suka ga suka, harus suka* – a common saying that roughly translates to 'whether I like [my situation] or not, I must like it.' However, the research also suggests that despite their spoken acceptance, the children exhibit strong feelings of abandonment, community anxieties and shame at their parents' absence, particularly when the parents do not earn enough to send back for the child to obtain adequate care. A similar study gathered data on Indonesian and Filipino children of MW further revealed that the children lacked social support in many cases. In addition, many of the children had to maintain additional duties that would normally be done by their parents (such as maintaining household cleanliness, farm duties, etc.) and were exhausted. Another study done in Hong Kong notes that while MWs are responsible for their employer's children's care and education, their own children usually lack the means for higher education. Future prospects for these children are also limited, due to lack of resources or education. Many turn to domestic work in continuation of their parents. Many still are recruited as child laborers. By focusing on the effects of the domestic work system on children of domestic workers, this paper contributes to the discussion of children's rights and well-being.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Factors Associated with Mood Disorder Among University Students in Canada

Presenter: Michelle Liang, Flora Zhang, Jonathan Gui, Jenny Pan

Mood disorder is a group of mental conditions characterized by depression or mania, whereby those diagnosed display prevailing feelings of disorientation non-representative of their current life circumstances. Experiencing periods of elevated highs and devastating lows, individuals with mood disorder often face distorted self-perceptions as a result of impaired mental functioning. University students, being a group that is commonly subject to academic-related stress in addition to other personal responsibilities, are particularly susceptible to developing mental health problems, specifically mood disorders. As such, mental health among university students has recently received much attention in both academic literature and public spheres. In this study, a statistical model was developed to identify the most significant factors associated with mood disorder among university students. We used simulated data and applied basic machine learning (forward, backward, exhaust, etc.) variable selection techniques in refining our final statistical model. The resulting model achieves the following objectives:

- 1) Understanding and assessment of the factors associated with mood disorders in students.
- 2) Predicting the probability of an individual developing mood disorders.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Is it a Match? The Tinder Experience

Presenter: Sarah Wong, Harsuman Benipal, Supreet Rai

As the popularity of online dating apps like Tinder rise (Global Web Index, 2014), one may question whether or not the chance of finding love is equal for everyone. Sarah A. Spell suggests that one's opportunities may be influenced by racial hierarchy, beauty standards, and sexualization along with ethnicity and gender. (Spell 174). Our study seeks to provide more knowledge on how gender and ethnicity may influence how individuals are approached on Tinder. This is done in this study by constructing male and female Tinder profiles to depict Black, White, and Asian ethnic backgrounds. These 6 fake profiles (3 male and 3 female) were analyzed over a 6-day period, looking at how many messages and matches each profile received, the content of the messages, and what types of people sent them. The aim of this study is to determine if gender disparity in messaging and preference of ethnicity is prevalent in online dating. Our research suggests that females receive significantly more matches and messages than males, particularly Asian females. However, the White male received the most messages out of the male profiles. This indicates a preference towards certain ethnicities and perpetuation of traditional gender roles in online dating. More research can be done to determine if location influences these findings, as well as to expand the sample size of this study in order to sufficiently generalize the results. In continuation to this initial study, we intend to expand our research by using a larger and more complete sample.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Exploring the Relationship between Trust in the Internet and Trust in Doctors as Sources of Health and Medical Information

Presenter: Gaurav Vasudev, Amanda Szeto, Leo Chen

The internet has provided patients today with unprecedented access of health and medical information (HMI). This easy access to both accurate and inaccurate HMI online can lead to decreased reliance on doctors for information, and even reduce patient trust in doctors. The relationship between trust in the internet (TI) and trust in doctors (TD) is explored in this study of Americans who have ever sought cancer information. Methods: This study examines the Health Information National Trends Survey (HINTS-5) data published July 2017 by the National Cancer Institute (NCI). A nationally representative sample was generated from 3,285 HINTS-5, and analyses included 1,873 participants who had ever sought cancer information. A nationally representative sample was generated from responses by applying survey weights generated by the NCI. Survey weighted linear regression was used to evaluate associations between TD for HMI as the outcome and TI for HMI as the primary exposure. Multivariate analysis adjusted for potential confounders such as gender, education, age, and household income. Trust was measured on a Likert scale, from 1 (not at all) to 4 (a lot). Results: Univariate analysis found that each unit increase in TI for HMI is associated with a 0.086 increase in TD ($p < 0.005$). Multivariate analysis demonstrated that each unit increase in trust in internet (TI) for health and medical information (HMI) was associated with a 0.072 unit increase ($p=0.006$) in TD for HMI. Increasing age was associated with decreasing TD (-0.002 per year, $p=0.045$) and increasing household income showed a borderline non-significant association with increasing TD ($+0.026$ per higher income category, $p=0.054$). Conclusion: Increased trust in the internet for HMI is associated with increased trust in doctors for HMI, which suggests that the availability of online health and medical information compliments the patient-physician relationship.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Mean Girls: Investigating the Effects of Sexism Perpetrated by Other Women

Presenter: Jennifer Angelucci

As overt and hostile sexism has become increasingly denounced in modern society, researchers argue that women are now confronted with subtler, but insidious forms. Existing research has predominantly focused on instances of such sexism as perpetrated by men, but we know that women can also act in a sexist manner. To date, little research has directly examined how women identify and react to sexist remarks when they come from a woman (vs. a man). We were especially interested in how perpetrator gender affected a) identification of sexism, b) influence on self-efficacy, and c) the ability of one's own egalitarian attitudes to protect from effects of sexism. A sample of 225 undergraduate women participated in what they thought was a pilot test of a "peer-reviewed, course-rating website". One of the reviews participants read contained subtle sexist remarks and differed between two conditions: male perpetrator sexism vs. female perpetrator sexism. Our results showed that women reported the sexist comment as more invalid and inappropriate when the source was a man. While perpetrator gender did not affect expected self-efficacy for the class directly, emergent patterns suggest that acute awareness of gender stereotypes and personally rejecting gender stereotypes protected self-efficacy against the negative effects of sexism when the sexist perpetrator is male, but not when the perpetrator is female.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Implicit Memory: The Ouija Project

Presenter: Daniela Toro Jimenez, Sara Taylor

There are two classifications of long-term memory: implicit and explicit. Implicit memory describes memory that is unavailable to conscious awareness or automatic responses; whereas explicit memory can be retrieved, recollected and reflected upon consciously. Due to the nature of implicit memory, it is difficult to study using traditional methods, since lack of awareness of the unconscious behaviour means an inability to self-report memory acquisition. The ideomotor effect is the unconscious subtle movements or behaviour that convey nonconscious thoughts. Our research aims to study the recollection of implicit memories by hypothesizing that semantic long-term implicit memories can be revealed via ideomotor actions on the Ouija board. Previous results have shown that participants believe they know the answer had a response similar between a volitional report and Ouija report. Guessed answers showed a higher rate of accuracy on the Ouija board by 65% whereas the volitional report accuracy was 50%. Future application of this study will benefit areas of cognitive impairment such as Alzheimer's, where patients have difficult accessing explicit memory. A further study would be conducted examining the demographic background of participants and the effect on the trivia questions and ideomotor effect.

Wave 4 - Poster Presentation Abstracts

Brock Hall Concourse, 1874 East Mall

3:15pm-4:45pm

THEME: Individual and Society

Novel derivatives of kainic acid as inhibitors of neuroinflammation

Presenter: Kane Larson

To better prepare student pharmacists for contemporary practice the Faculty of Pharmaceutical Sciences introduced a new entry-to-practice Doctor of Pharmacy degree program in September 2015 to focus more on clinical training. One of the foundational sciences in the program is medicinal chemistry, a subject students often find challenging and have long-standing perceptions of irrelevance in their training. To address this issue, a full-year study was designed with two aims: [1] to evaluate student's perceptions of learning medicinal chemistry in Year 1 of the new program, and; [2] to improve the medicinal chemistry curriculum and teaching practices where necessary. Surveys comprising of numeric response and written comment questions were developed and administered throughout the 2017W academic year. The first-term results are presented here. Initial findings (response rate: 97%; 216/224) indicated that the Year 1 medicinal chemistry curriculum and teaching practices were well received. Approximately 95% of students "agreed" or "strongly agreed" that medicinal chemistry was relevant to their education as pharmacists, scoring 4.4 on a 5 point (strongly agree/strongly disagree) scale; 64% of students felt the medicinal chemistry curriculum and teaching practices had positively impacted their perceptions about the importance of the subject in their education (3.9 on a 5 point scale). Analysis of student comments indicated that initial anxiety and nervousness about learning medicinal chemistry shifted towards an overwhelmingly positive perception of its relevance and usefulness in their understanding of drugs, education and future careers. The curriculum design, practice problem sets and in-class active learning strategies were cited as particularly useful for student engagement and learning. Findings from this study will be shared with students and Pharmacy instructors.

Wave 4 - Oral Presentation List

Buchanan (BUCH) - 1866 Main Mall

3.15pm-4.45pm

THEME: Health and Wellness

BUCH B208

Medial orbitofrontal-striatal projections optimize risk/reward decision-making in rats

Olivia Li

Identifying New Biomarkers for Mesonephric Cancers of the Endometrium

Evan Gibbard

The Effects of Zika Virus-Induced Microcephaly on the Microstructural Development of the Fetal Brain

Lana Hui, Nicky Lin, Luxcia Kugathasan, Michelle Lam

BUCH B213

Overcoming a Challenge in Solving Bacterial Protein Structure

Ian Yen

Morphological changes in sympathetic pre-ganglionic neurons after spinal cord injury

Gillian Hutton

Minocycline reduces the severity of cardiovascular dysfunction after experimental spinal cord injury

Ian Ruiz

THEME: Individual and Society

BUCH B215

Ethnicity, Language & Multigenerationality?

Emily Lam

Decolonizing Fashion: Methods of Resistance at the Vancouver Indigenous Fashion Week

Paige Loughheed

Ethnic Stereotypes and the Peloponnesian War

Sarah Thomas

THEME: Innovation and Technology

BUCH B313

Understanding the Roles of Insulin Signalling and Type-2 Diabetes in Pancreatic Intraepithelial Neoplasia Formation

Jamie Magrill

How the brain chooses between working and slacking: Investigating the circuitry involved in allocation of cognitive effort

Leili Mortazavi

Low-cost innovations of wearable-technology

Prashi Mawalagedara, Natic Aggarwal

Making beets blue: A multi-disciplinary approach to chemical modification of betanin

An Goto

THEME: Sustainability and Conservation

BUCH B315

Inter-annual and spatial variability of methane and nitrous oxide distributions across the North American Arctic Ocean

Zarah Zheng

Summer 2017 Eukaryotic Phytoplankton Dynamics in the Jericho English Bay

Katarina Kusa

Wave 4 - Oral Presentation Abstracts

BUCH 208

3:15pm-4:45pm

THEME: Health and Wellness

Medial orbitofrontal-striatal projections optimize risk/reward decision-making in rats

Presenter: Olivia Li

Decision-making relies on our ability to evaluate the costs and benefits associated with different options to make choices that maximize benefits. In situations where rewards are uncertain, decisions are mediated by regions within the mesocorticolimbic system, including the medial orbitofrontal cortex (mOFC) and the nucleus accumbens (NAc). Patients with mOFC damage display risky patterns of decision-making. Likewise, inactivating the mOFC in rats increases risky choices even when the odds are unfavourable. Conversely, inactivating the NAc in rats reduces risky choices. Given that the mOFC sends dense projections to the NAc, we investigated how interactions in the mOFC→NAc circuitry regulate risk/reward decision-making in adult rats. This was assessed on a probabilistic discounting task, in which rats chose between a small/certain lever that delivered 1 sugar pellet with 100% probability, and a large/risky lever that delivered a 4-pellet reward, but which likelihood of delivery decreased systematically across blocks of trials (100%, 50%, 25%, 12.5%, 6.25%). In well-trained rats, unilateral asymmetrical intra-mOFC and NAc infusions of GABA agonists were administered to temporarily inhibit neural activity and to disconnect communication between these two regions. Preliminary results revealed that inactivating activity within mOFC→NAc projections significantly reduced large/risky choices in the 100% block, but increased the risky choices in the 12.5% and 6.25% blocks, where the odds of receiving rewards were unfavourable. This finding suggests that activity within mOFC→NAc projections optimizes decision-making strategies, which provides novel insights into the role of the mOFC and its functional location within the mesocorticolimbic system, and furthers our current understanding of neuroeconomics.

Wave 4 - Oral Presentation Abstracts

BUCH B208

3:15pm-4:45pm

THEME: Health and Wellness

Identifying New Biomarkers for Mesonephric Cancers of the Endometrium

Presenter: Evan Gibbard

Cancer is an abnormal proliferation of cells that invade other tissues. Cancers from different tissues are biologically distinct and considered to be different diseases. As such, they have different recommended treatments and patient life expectancies. Mesonephric carcinomas of the endometrium are rare uterine tumours that lack an evidence-based, tumour-specific treatment regimen. These cancers also represent a diagnostic challenge, because on examination they often appear similar to other endometrial cancers. Endometrial mesonephric carcinomas arise from developmental remnants of male tissues inside of the endometrial lining of the uterus. Due to their distinct tissues of origin, it is likely that there are protein markers that can distinguish mesonephric tumours from other endometrial tumours. The ability to accurately diagnose and differentiate mesonephric cancers from other endometrial cancers will facilitate further research into treatments. We set out to identify and test candidate biomarkers for mesonephric carcinomas. To this end, we examined all proteins expressed in normal tissue, comparing nine mesonephric tumours to fifty-four endometrial tumours of various subtypes. From this, proteins were identified that are expressed at higher levels in mesonephric carcinomas relative to other endometrial cancers. Antibodies targeting the most promising candidates were found and used to stain normal tissues, endometrial mesonephric carcinomas, and other endometrial tumours. Four promising proteins that are more highly expressed in mesonephric carcinomas have been identified and male-tissue-specific expression has been observed. The sensitivity and specificity of the antibodies as diagnostic markers of mesonephric tumors will be investigated.

Wave 4 - Oral Presentation Abstracts

BUCH B208

3:15pm-4:45pm

THEME: Health and Wellness

The Effects of Zika Virus-Induced Microcephaly on the Microstructural Development of the Fetal Brain

Presenter: Lana hui, Nicky Lin, Luxcia Kugathasan, Michelle Lam

In 2015, the outbreak of the ZIKA virus (ZIKV) in South and Central America raised significant health concerns for newborns of infected mothers due to its link to neurological conditions such as microcephaly, a brain growth abnormality characterized by a head circumference two standard deviations below the mean for age and sex. ZIKV is thought to induce microcephaly during prenatal development by disrupting the growth and proliferation of neural progenitor cells (NPCs), resulting in their cell cycle arrest and death. NPCs are multipotent stem cells that give rise to neurons and glial cells important for early brain development. However, while viral infection of NPCs appears to be a central mechanism behind ZIKV-induced microcephaly, few studies have assessed the microstructural impacts of disrupted fetal brain development. In this study, we will investigate neuronal connectivity and maturation in infants born to mothers who tested positive for a contemporary strain of ZIKV (VEN/2016) in their first trimester of pregnancy using diffusion tensor imaging (DTI) at 28-weeks' gestation and 1 month postnatally. DTI is an MRI technique used for assessing white matter connectivity and microstructure in vivo. We expect to observe reduced neuron connectivity and delayed microstructural development in various regions throughout the cerebrum, thus leading to the smaller brain phenotype. Studying the effects of maternal ZIKV infection on the microstructural development of the fetal brain may provide new insight on the developmental mechanisms underlying ZIKV-associated microcephaly, which may contribute to improved monitoring and clinical management of mothers and their developing fetus.

Wave 4 - Oral Presentation Abstracts

BUCH B13

3:15pm-4:45pm

THEME: Health and Wellness

Overcoming a Challenge in Solving Bacterial Protein Structure

Presenter: Ian Yen

Background: One of the challenges when attempting to solve a protein structure using X-ray crystallography is overcoming a phenomenon known as twinning. Twinning occurs when a protein crystal of the same species is microscopically packed in various non-parallel orientations as opposed to an organized lattice network; thus, creating difficulties during data software processing in resolving the structure. An example is observed when previously attempting to structurally characterize O-acetylpeptidoglycan esterase (Ape1), a bacterial cell wall protein of *Campylobacter jejuni* involved in altering cell shape during pathogenesis.

Methods: To overcome twinning, flexible loops at the N-terminus of Ape1 were truncated to generate a shorter construct, specifically from residues 41-392 (Ape141-392). The resulting gene construct was cloned into an expression plasmid pET28a, then transformed into expression *E. coli*, and ultimately induced for protein expression. Ape141-392 was purified to homogeneity from lysed cells using affinity column and confirmed through SDS-PAGE gels, then subsequently placed within 20mM Tris-HCl, 150mM NaCl, pH 7 buffer.

Results: Ape141-392 crystallized at room temperature at a concentration of 14mg/ml under the following crystallization condition: 200mM NaCl, 100mM CAPS pH 10.5, 20% PEG8000, and 10% PEG3350. After shooting X-rays through the protein crystal, a good diffraction resolution was observed (2.8Å) and data was collected. The data displayed no signs of twinning during software processing.

Conclusion: The results indicate that proper truncation of flexible loops in the protein sequence can overcome twinning, thus setting a successful path to solving the Ape1 structure.

Wave 4 - Oral Presentation Abstracts

BUCH B213

3:15pm-4:45pm

THEME: Health and Wellness

Morphological changes in sympathetic pre-ganglionic neurons after spinal cord injury

Presenter: Gillian Hutton

Spinal cord injury (SCI) not only causes sensorimotor paralysis but also more devastating cardiovascular dysfunction, which is among the leading causes of death in this population. The majority of individuals with high thoracic SCI suffer from autonomic dysreflexia, a pathological condition where daily activities (e.g. bowel routine) can lead to life-threatening surges in blood pressure. The goal is to understand the mechanisms that lead to the development of autonomic dysreflexia after SCI. We use a male rat model of SCI at thoracic segment three (T3) to examine the morphological changes in spinal sympathetic pre-ganglionic neurons (SPN), (controllers of cardiovascular function within the spinal cord), which lose their regulatory input from the brainstem. The experiment was carried out via, (1) animal surgeries to induce the SCI and survival for various time points, (2) the spinal cord was dissected out, sectioned, stained using NADPH-Diaphorase and imaged under a bright-field microscope, and (3) Sholl analysis was used to perform extensive neuron morphometric analysis. Analysis showed significant morphological differences in the injured group. A significant increase in SPN arborization was measured above and below the injury. Soma area and total dendritic length per neuron were significantly larger above the injury. The number of primary dendrites was significantly higher below the injury. These morphological changes create opportunity for new neuronal connections, which have the potential to form appropriate or inappropriate rewiring after injury. Knowledge of these mechanisms is crucial in the development of therapeutic interventions to mitigate the negative effects of SCI on cardiovascular health.

Wave 4 - Oral Presentation Abstracts

BUCH B213

3:15pm-4:45pm

THEME: Health and Wellness

Minocycline reduces the severity of cardiovascular dysfunction after experimental spinal cord injury

Presenter: Ian Ruiz

Damage to the nervous system, as occurs after spinal cord injury (SCI), alters the function of the heart and blood vessels, manifesting in a variety of conditions. One such condition, autonomic dysreflexia, results in episodes of extremely high blood pressure and dramatically increases this population's odds for stroke and heart disease. The severity of nervous system dysfunction is thought to be proportional to the loss of axons (neuronal tissue) at the injury site. Minocycline is a common antibiotic known for its ability to protect the outer coating of axons. As such, we aimed to investigate the effect of minocycline on the preservation of axons after SCI and its impact on both the motor (e.g. walking) and cardiovascular (e.g. blood pressure) systems in an animal model. 42 Male rats were randomized to either a treatment group (n=20) or a control group (n=22), and were followed for 2 months after receiving a standardized SCI. Resting blood pressure, the severity of autonomic dysreflexia, density of axon preservation, and motor function were all assessed at 2 months post-injury. We found that minocycline improved resting blood pressure, and reduced the severity of autonomic dysreflexia by 33%. Moreover, these animals also had a greater preservation of axons. However, there were no differences in motor function between the minocycline and vehicle groups. These data provide the first evidence that minocycline, a "neuroprotective" drug, can reduce cardiovascular dysfunction after SCI and suggests that determining the independent impact of novel neuroprotective therapies on motor and cardiovascular function is critical.

Wave 4 - Oral Presentation Abstracts

BUCH B215

3:15pm-4:45pm

THEME: Individual and Society

Identity Variation: Ethnicity, Language & Multigenerationality?

Presenter: Emily Lam

Ethnic identity means the “sense of belonging to an ethnic group” (Phinney, 2001) which for some, is the center of their core identity regarding who they are. For certain individuals, it may be specific with words such as ‘White’ or ‘Hispanic’ but for others it might be more challenging to define themselves as fitting in one group. The reason may be that a simple question such as ‘Where are you from’ is not as simple as listing one place when your heritage runs for generations. Canadian pride lies in its multiculturalism and the ability for different cultures to be living in peace in one nation. A cultural melting pot is not a definition that is usually linked with Canada but do those cultures stay distinct as different generations start to call Canada their home or are in some ways are there cultural assimilation happening? The purpose of this research is to highlight issues with variation in ethnic identity among generations in immigrant families in first and second generations with the focus on linguistic proficiency. This will be done by examining the variation in identity amongst generations (of immigrants) and their linguistic proficiency in their heritage language and their national language using existing literature on identity and language. I hope to give insight about the variability on the development of ethnic identity and the role that languages have in altering one’s identity. As immigrant children are learning and growing stronger skills in their national language rather than their heritage language, how will this effect their identity? How will it affect Canada’s multicultural image?

Wave 4 - Oral Presentation Abstracts

BUCH B215

3:15pm-4:45pm

THEME: Individual and Society

Decolonizing Fashion: Methods of Resistance at the Vancouver Indigenous Fashion Week

Presenter: Paige Lougheed

Within the discipline of sociology and mainstream Canadian media, Indigenous peoples and Indigenous issues are often framed from a deficit standpoint, emphasizing the many challenges and oppressions that Indigenous people face (Dowell, 2013). However, while these issues are extremely important, large Canadian news authorities often fail to highlight or draw attention to the significant and wonderful acts of resistance to colonization that Indigenous people perform each day. Drawing upon the asset-deficit model approach (Shapiro & MacDonald, 2017), this research uses an asset approach to highlighting the methods of cultural and political resistance observed by participating fashion designers at the Vancouver Indigenous Fashion Week. The qualitative methods used to conduct this research were media content analysis, which included researching interviews and newspaper articles to inquire how different actors framed the event. The findings of my research demonstrate that four core frames were used by both participating fashion designers and journalists to shape the event as perceived by the public. To illustrate, some designers framed their fashion as being political, whereas other designers insisted their fashion was just art and had no political association. Furthermore, many journalists emphasized the relevance of cultural appropriation before asking questions about the details or purpose of the event. In my conclusion, I also draw comparisons to how the Australian Indigenous Fashion Week was framed by local media and how those differences are potentially the reflection of the cultural climate produced by the Truth and Reconciliation Commission of Canada.

Wave 4 - Oral Presentation Abstracts

BUCH B215

3:15pm-4:45pm

THEME: Individual and Society

Ethnic Stereotypes and the Peloponnesian War

Presenter: Sarah Thomas

The past few years were marked by conversations of identity politics, stereotyping, and othering, and scholars like Susan Olzak (2011) take notice. I will relate these issues to the Peloponnesian War. P.J. Rhodes (1987) in "Thucydides on the Causes of the Peloponnesian War" mentions the weight Thucydides puts on the expansion of Athens and Athenian ambition, and Rhodes examines Thucydides's representation of Athenian ambitions. What scholars fail to address is why Athens saw itself as rightful in its own ambition, which is Athenian ethnic stereotypes of other groups, which is comparable to the othering that occurs Olzak mentions in current ethnic conflicts over resources and territory. My project will examine how Thucydides uses stereotypes towards non-Athenian Greeks to inform his view on the causes of the war in *The History of the Peloponnesian War*, which outlines the causes and stories of the war as a piece of literature. I will then go on to show that this view shows how ethnicity played a significant role in the start of the Peloponnesian War. I will use the work of noted sociologists Shiping Tang (2015) and Susan Olzak (2011) as a benchmark to show how Thucydides' description of the War fits in with the description of an ethnic war. I will also closely examine *The History of the Peloponnesian War* to understand Thucydides' view on the war. Lastly, I will look at the work of scholars like Rhodes (1987), Levy (1983), and Tritle (2010) to further my understanding of Thucydides' view.

Wave 4 - Oral Presentation Abstracts

BUCH B313

3:15pm-4:45pm

THEME: Innovation and Technology

Understanding the Roles of Insulin Signalling and Type-2 Diabetes in Pancreatic Intraepithelial Neoplasia Formation

Presenter: Jamie Magrill

Pancreatic cancer is a poorly understood malignancy with a particularly dismal survival rate of less than 2% after 5 years. Although controversial, recent research suggests that Type-2 Diabetes is an important risk factor in the development of pancreatic ductal adenocarcinoma (PDAC), the most common form of pancreatic cancer. With nearly 500 million people currently living with diabetes and with PDAC projected to become the second-leading cause of cancer-related death in the next ten years, understanding the molecular mechanisms underlying PDAC and the formation of precursor lesions is essential to improving treatment and detection methods for at-risk patient populations. The most common PDAC precursor lesion, pancreatic intraepithelial neoplasia (PanIN), may be connected to Type-2 Diabetes via the insulin signaling cascade as well as downstream effectors including Akt and Erk. Studies have suggested that high levels of circulating insulin are connected to increased cancer incidence and mortality. This is an exploratory project investigating frequency of PanIN formation and differences in target proteins between mouse tissues with higher basal insulin secretion and those with lower basal insulin secretion. Preliminary results indicate that there is a higher frequency of PanINs observed in tissues from mice with higher basal insulin secretion, as measured via ImageJ quantification of H&E staining and Alcian Blue, which stains acidic mucins. Since insulin is the primary hormone implicated in Type-2 Diabetes, understanding its potential involvement with PDAC tumorigenesis and PanIN formation is important for the further characterization of pancreatic cancer and improvement of treatment options.

Wave 4 - Oral Presentation Abstracts

BUCH B313

3:15pm-4:45pm

THEME: Innovation and Technology

How the brain chooses between working and slacking: Investigating the circuitry involved in allocation of cognitive effort

Presenter: Leili Mortazavi

The decision to engage in a cognitively effortful task for desired rewarding outcomes is central to the human experience. Indeed, the lack of an adaptive cost-benefit analysis of choice relative to its outcomes is a prominent feature of many psychiatric disorders characterized by a lack of motivation or energy, such as depression. Previous imaging work in humans has identified distinct brain regions –cortical and striatal– that are recruited as participants consider options varying in cognitive effort. Most recently, these areas have been causally implicated in the decision to exert cognitive effort in studies exploring this specific kind of decision making among rats. In these studies, rats engage in a task known as the rat cognitive effort task (rCET), in which they choose between two levers associated with easy versus hard attentional trials, whose successful completion results in one or two sugar pellet rewards, respectively. However, it is unknown how the identified cortical and striatal brain regions interact with each other to guide decision-making involving cognitive effort costs. In the current investigation, different cortico-striatal pathways, were specifically up or downregulated using cutting-edge chemogenetic techniques. This work offers important insight into the brain circuits regulating effort-based decision-making, which may shed light on the aberrant cortico-striatal processes that give rise to symptoms characteristic to depression and other psychiatric disorders.

Wave 4 - Oral Presentation Abstracts

BUCH B313

3:15pm-4:45pm

THEME: Innovation and Technology

Low-cost innovations of wearable-technology

Presenter: Prashi Mawalagedara, Natic Aggarwal

The high demand of interactive wearable devices is in part credited the development of flexible electronics. Stretchable sensors are largely used because of their ability to accommodate for complex human movement and measure a variety of bio signals. In this project, a piezoresistive strain sensor is created using a new, cost effective fabrication process. The sensor is created by mechanically infusing graphene nano-flakes into an adhesive polymer pad. Through extensive testing, the sensor can experience up to 350% elastic strain and has a gauge factor of up to 160. Even after 10,000 cycles of stretching and relaxing, the sensor can maintain a strong and stable electrical response. These properties allow the sensor to effectively monitor a wide range of human motion and vital signs. Therefore, the sensor was tested by developing three wearable devices. These devices successfully monitored knee movement, finger movement, and radial pulses. The sensors were also used in haptic robotic devices that were able to control a robotic finger and a robotic hand. This project demonstrates the capabilities of these sensors for real-time monitoring and the ability to fabricate them cheaply and effectively. Further development will focus on improving the material composition and creating new applications.

Wave 4 - Oral Presentation Abstracts

BUCH B313

3:15pm-4:45pm

THEME: Innovation and Technology

Making beets blue: A multi-disciplinary approach to chemical modification of betanin

Presenter: An Goto

Beets are a source of red food dye regarded as safe for human consumption. But what if we could produce beets with different colours? Could we take advantage of the industrial production of beets to generate other human-safe dyes on a large scale? My project focuses on making chemical modifications to the red pigment in beets to make it blue. I will describe the use of computation methods to design, and chemical synthesis methods to make, a blue dye based on the pigment in beets. The results of my work may lead to the mass production of blue dyes from beets.

Wave 4 - Oral Presentation Abstracts

BUCH B315

3:15pm-4:45pm

THEME: Sustainability and Conservation

Inter-annual and spatial variability of methane and nitrous oxide distributions across the North American Arctic Ocean

Presenter: Zarah Zheng

Methane (CH₄) and nitrous oxide (N₂O) are two potent greenhouse gases which play important roles in global warming, and their atmospheric concentrations have significantly increased over the past century. To understand the marine contribution to the global budget of these greenhouse gases, we collected the North American Arctic Ocean water on three cruises in 2017 summer and fall, covering from Baffin Bay, the Canadian Arctic Archipelago, Canada Basin, Chukchi Sea, and Bering Sea, and analyzed the gas concentrations using a purge-and-trap gas extraction system coupled with a gas chromatograph-mass spectrometer. Together with the data collected in 2015 and 2016, we present the three years of CH₄ and N₂O concentration profiles throughout the North America Arctic Ocean. With these high spatial and temporal resolution profiles, we are able to observe the inter-annual variability and how biogeochemical dynamics occurring in this particular region affect the gas distributions and sea-air fluxes. Our results show that sedimentary processes generating N₂O in Chukchi and Bering Sea is the dominant source in this region, with significantly elevated N₂O concentration in 2016. Methane concentrations were more spatially diverse, indicating localized inputs. The low sea-air fluxes show that the Arctic Ocean is neither a dominant input nor output of these gases to the atmosphere. Our multi-year profiles provide insight into the CH₄ and N₂O cycling of the North American Arctic Ocean, and are a valuable data set for understanding the long-term impacts of the biogeochemical cycles in this Arctic region on the global budgets of these gases.

Wave 4 - Oral Presentation Abstracts

BUCH B315

3:15pm-4:45pm

THEME: Sustainability and Conservation

Summer 2017 Eukaryotic Phytoplankton Dynamics in the Jericho English Bay

Presenter: Katarina Kusa

Phytoplankton species like diatom, dinoflagellates and coccolithophores are microscopic single celled organisms that photosynthesize just like plants. These organisms sustain the entire oceanic food web. They absorb sunlight and use this energy to convert inorganic nutrients into carbohydrates, proteins and fats, which other living organisms can consume. Oxygen is important byproduct of this reaction. It is estimated that phytoplankton produce 30-40% of the world's oxygen. In the summer of 2016, satellites tracked an unusually large-scale phytoplankton bloom in the Strait of Georgia and off the west coast of Vancouver Island. This was of particular interest to marine scientists, as much remains unknown about the conditions that allow certain phytoplankton species to bloom successfully. The aim of this study is to create a time series graphs of when these different phytoplankton species change in abundance, to determine which biotic and abiotic factors contribute to these phytoplankton blooms in the Strait of Georgia. From June to October 2017, weekly qualitative and quantitative phytoplankton ocean water samples were taken at the Royal Vancouver Yacht Club pier in Vancouver, British Columbia. Phytoplankton diversity, abundance, and size were observed using microscopy and physical oceanographic measurements like ocean temperature and salinity, weather logs, and other abiotic factors like sunlight and wind speed where also collected to determine which of these factors affect phytoplankton blooms. This data is still being analyzed. Preliminary findings will be presented at the conference.