

13th Annual Undergraduate Research Conference

Poster Presentations

Poster	Presenter	Title	Page
1	Haley SEVEN DEERS	Who does it belong to?: Cultural Heritage and the Question of Repatriation	1
2	Jo SCOFIELD	Tourism and community engagement at Chichén Itzá	1
3	Karin WIEBE	Places of Remembering: An Analysis of Germany's Heritage of Remembrance	1
4	Robert MACDONALD	The End is Near, for Now: Cycles of Violence and Vigilantes in Michoacán Mexico	2
5	Michael FLOOD	Working Towards Equality With Capitalism: How Canada Can Leverage The Power Of Social Enterprises To Achieve Their Mandate	2
6	Victoria SCOTNEY	A Smile Goes a Long Way: An Agent-based Model of Smile Diffusion	2
7	Dunigan FOLK	The mediating role of cognitions on the relationship between personality and alcohol use in adolescents	3
8	Skyлар SCHMIDTKE	A Shot a Day Keeps the Doctor Away: Health Claims and Consumerism	3
9	Liam KING	An Investigation of the Buffering Effects of Self-Compassion With Respect to The Relationship Between Implicit Beliefs of Well-Being and Subjective Well-Being	3
10	Summer SMITH	Cognitive Performance and Subjective Well-Being	4
11	Kristian ZULINICK	The Effect of Instruction Sets on Compassion	4
12	Davis WIGGS	Physiological, psychological, and social benefits of canine therapy: Findings uncovered in a directed studies literature review	5
13	Chantelle WOOD	Adolescent Substance Use Prevention: Targeting Implicit Cognitions in the Classroom	5
14	Grant REGIER	Testing the Effectiveness of a School-Based Inoculation Procedure on Implicit and Explicit Substance-Use Cognitions	5
15	Brady LYNCH	Changing Attitudes towards Anorexia Nervosa: Comparing the Effects of Two Documentaries	6
16	Joanna GARCIA	Enduring Happiness and Continued Self-Enhancement: Design, Rationale, and Baseline Characteristics	7
17	Constantin MARIN-BEKE	Creating and testing a computerized approach bias assessment tool for implicit alcohol cognitions.	7
18	Joe KORNELSEN	The Use of Major and Trace Element Geochemistry in Diamond Exploration	8

19	Ayla DE GRANDPRE	Community Resilience and Slow Food: A comparative case study of Naramata and Cowichan Bay, B.C.	8
20	Kaylah VRABIC	An Analysis of Canadian Immigration Policy and the Rise of Filipino Labor Migration in Canada	9
21	Geoffrey GOETZ	Insect Overwintering Capacity in the Presence of Chinooks	9
22	Sylvain GRETCHKO	The Effects of Climate Change on Predator-Prey Dynamics	10
23	Julius WU	A Computer Vision based algorithm for counting both the dead and alive bio-cells	10
24	Marta MACDONALD	Biophysical characterization of flavodoxin from <i>Fusobacterium nucleatum</i> .	10
25	Adrian MONTHONY	Smoking seed; investigation into the germination promoting effects of forest fire smoke in <i>Balsamorhiza deltoidea</i> .	11
26	Keith TAVERNER	The Effect of Type II Diabetic Conditions on Neutrophil Cell Rolling	11
27	Adam YASUNAGA	Neutrophil Rolling Adhesion and Activation	12
28	Mitchell FIGURA	Gut Microbiome Mediation of Antioxidant and Inflammatory Regulation in the Context of a High Fat Diet	12
29	Brandon WHITMORE	The analysis of smoke-taint in wine by comparing enzymatic and spontaneous acid hydrolysis of glycoside-bound volatile phenols	13
30	Emma SWAN	The effect of dietary omega-6 polyunsaturated fats on aldehyde dehydrogenase II activity in mouse liver	13
31	Matthew HOJENSKI	Transfected gene detection via GCMS analysis of essential oils and transcriptome confirmation by PCR.	14
32	Morgan ALFORD	Novel derivatives of kainic acid inhibit select microglial functions	14
33	Ashley KERIK	SpongeBob SpiculePants: So fresh and so green, green.	15
34	Kiranpreet GILL	Clinical Monitoring of the Muc2(-/-) Mouse Model for Colitis	15
35	Jenna SCHERGER	Carnivore responses to snow	15
36	Nicole FERREIRA	The effects of genotype on lymphocyte expression profiles in strains of inbred mice	16
37	Reece BLAKE	The effect of ectomycorrhization on the nitrogen status of pine germinants in the Okanagan Valley	16
38	Hanujah GANESH	Efficacy and survival of <i>Pseudomonas fluorescens</i> isolates 4-6 and 1-112 for control of postharvest fungal pathogens on McIntosh apple	17
39	Hogun KANG	Heterologous Expression of Insect Organic Cation Transporters in sf9 Cells	18
40	Hanna ELLIS	The effects of organic cation-like transporter (orct) gene knockdown on uptake and	18

		transepithelial transport of TEA in the Malpighian tubules of <i>Drosophila melanogaster</i> .	
41	Nazli HASSANPOUR FARSHOUR	The effects of nicotine metabolism on cytochrome P450 gene expression in the midgut of the cabbage looper, <i>Trichoplusia ni</i> (Hübner)	19
42	Jacky DENG	Alternative Conceptions of Advanced Chemical Bonding Theories	19
43	Dixon KANTYMIR	A comparison of three different mass spectrometric glycomic strategies	20
44	An GOTO	Biochemical and Computational Investigation of Monodehydroascorbate Reductase	20
45	Sophia NG	Anti-Aging Effect of Young Extracellular Vesicles on aged CD-1 Mice model	21
46	Simon EDELMANN	Synthesis of novel kainic derivative used for labeling of kainate receptors	21
47	Ben TIET	Glycan composition analysis using capillary electrophoresis tailored to acidic monosaccharides	21
48	Fiona TYMM	Analytical Methods for Detection and Quantification of Non-Protein Amino Acids in Food and Environmental Samples	22
49	Isabelle CURYK	Characterizing the Intracellular Effects of a Thiosugar Analogue	22
50	Benjamin NOYOVITZ	Does grapevine exposure to exogenous phenolic compounds alter the biosynthesis of glycosylated, endogenous secondary metabolites?	23

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Poster Presentations

EME Lower-Level Foyer

Who does it belong to?: Cultural Heritage and the Question of Repatriation

Student: Haley SEVEN DEERS

Supervisor: Lindsay Der

In this poster I will be examining the process of repatriation in regards to cultural heritage, specifically the role that museums have to play. To do this I will be using several case studies. I will examine the different arguments surrounding this topic and also discuss the relevance and importance of the topic in regards to contemporary Canadian society and culture. Through this poster I hope to raise awareness of the issue and also generate a healthy discourse around the topic.

Tourism and community engagement at Chichén Itzá

Student: Jo SCOFIELD

Supervisor: Lindsay Der

Tourism at Chichén Itzá has increased dramatically over the past 20 years. Chichén Itzá was occupied as early as 415 A.D. and is the most visited Maya site in Yucatan, Mexico. As tourist traffic increases, positive and negative consequences of this traffic become more extreme, and therefore easier to see. This makes the high traffic site of Chichén Itzá an excellent case study to showcase some of the challenges associated with balancing the interests of multiple stakeholders in tourism-oriented heritage management. Tourism oriented heritage is heritage that makes access for tourists as easy as possible. This method of heritage management involves maximising the profit to be gained from hospitality industry amenities such as hotels, restaurants, gift shops and transportation. It also involves carefully balancing the interests of various stakeholders, such as government, local businesses, community members, and academics. There is extensive research on problems of commercializing heritage in this way; however, there is limited research that attempts to identify possible solutions. This poster explores how community-engaged research can provide an excellent starting point for identifying ways to reduce the negative impacts of tourism.

Places of Remembering: An Analysis of Germany's Heritage of Remembrance

Student: Karin WIEBE

Supervisor: Lindsay Der

The conclusion of World War 2 and the unconditional surrender of Germany in 1945 marked a start of a German introspection. Governments and community members were obliged to begin the work of selecting what places and objects were necessary to maintain as remembrance and what ones were better forgotten. The ensuing national and transnational discourse produced parks, monuments and historical signage markers across the country. This research is an anthropological exploration of places, key objects and attitudes that form Germany's heritage of remembrance. I will address changes in inventory that have occurred through addition, subtraction or re-purposing and ask how and why these changes are happening. I will argue that the inventory of Nazi heritage remembrance is shifting to reflect German society values connected to monumental immigration pressure.

The End is Near, for Now: Cycles of Violence and Vigilantes in Michoacán Mexico

Student: Robert MACDONALD

Supervisor: Jessica Stites-Mor

Mexico is no stranger to revolution. The re-appearing Autodefensas in Michoacán Mexico highlight how ordinary Mexicans are willing to risk life and limb for change. But looking back can we determine a meaningful purpose to the movement? Are Mexican revolutions scheduled like clockwork? This research will highlight how contemporary history has formed cycles of violence. It will then present Autonomy (sovereign independence from the state) as a feasible intervention measure that can halt the cycle of violence. The arguments presented here will be radical and creative. The reader will be left in constant contemplation of theory, logic, and history.

Working Towards Equality With Capitalism: How Canada Can Leverage The Power Of Social Enterprises To Achieve Their Mandate

Student: Michael FLOOD

Supervisor: Carl Hodge

A new form of hybrid corporation - the 'social enterprise' - has come to the forefront of enterprise typology. The model for social enterprise is a part of a broader, transnational movement that aims to build upon the work done by non-profits in developing a 'social economy'. Unlike the non-profit, however, social enterprises benefit from applying for-profit, market-oriented strategies to achieve their defined social, environmental, or community-related mission. The Canadian policy framework regulating these hybrid entities is vague; it has been largely unresponsive to innovations in the Third sector; and it ultimately stifles innovation in the social economy. The morality of the enterprise and the 'moral entrepreneur' are more critical now than they have ever been is contributing to needed systems change in the Canadian context. Canada has much to learn from the U.K. - and there are many political and economic innovations it alone could pioneer - in advancing the social enterprise agenda, an agenda that should wholly appeal to those on both sides of the political spectrum.

A Smile Goes a Long Way: An Agent-based Model of Smile Diffusion

Student: Victoria SCOTNEY

Supervisor: Liane Gabora

Smiling is a simple yet deeply moving act. This project synthesized research showing that (a) people reciprocate smiles, (b) smiling and being smiled at elevates mood, and (c) elevated mood is associated with proclivity to smile. Collectively, these findings suggest that smiling is contagious, i.e., smiles diffuse through a social network. We investigated how various factors affect the contagiousness of smiling using an agent-based model in which smiling affects a 'mood' variable, which in turn affected proclivity to smile. The society consistently stabilized on a proportion of smilers, the magnitude of which was a function of social connectivity. Using previous data on the effect of weather and cultural differences on smile reciprocity, we simulated how these factors affect smile diffusion. Smile diffusion was greater in the sunny condition than the cloudy condition, and in the American condition than the Japanese condition, and both effects were magnified by increased social connectivity.

The mediating role of cognitions on the relationship between personality and alcohol use in adolescents

Student: Dunigan FOLK

Supervisor: Marvin Krank

In this study, 560 grade 8 students were administered a survey measuring personality, cognitive variables, and alcohol use. Students then received a personality-based intervention. Implicit word associations and alcohol outcome expectancy liking scores were used as measures of substance-related cognitions. Assessments were conducted at 3 time points over an 8 month period. Results of this study suggest that personality is significantly related to alcohol use 8 months after initial measurement. More specifically, sensation seeking, impulsivity and negative thinking groups, were shown to have a significant relationship with alcohol use. The anxiety sensitivity personality group was not correlated with levels of alcohol use. The prior finding that alcohol outcome expectancy liking and implicit word associations are predictors of alcohol use was also supported by the results of this study. The hypothesis that the impact of personality on alcohol use is mediated by cognitions was also supported. The results of this study have implications for strengthening the understanding of the interaction between personality, cognitions, and alcohol use in adolescents. Comprehensive results, implications, and directions for future research will be discussed.

A Shot a Day Keeps the Doctor Away: Health Claims and Consumerism

Student: Skylar SCHMIDTKE

Supervisor: Marvin Krank

Concerns about public health have become an increasing problem across North America (Statistics Canada, 2014). As a result, various industries are looking to capitalize on the emerging health trend sweeping the nation. In recent years, some major competitors in the food industry have expanded their product lines to include health-friendly alternatives. However, previous research has shown that these alternatives often lack the nutritional benefits they promise (Emrich, Qi, Cohen, Lou, & L'Abbe, 2015). Instead, these products leverage the blind acceptance of consumers to labelling allegations, such as health claims. The aim of the present study is to explore the lesser known influence of health claims on alcoholic beverages. This knowledge is important in understanding the relationship between health perceptions and drug usage. A sample of 500 secondary students completed an Implicit Association Task to determine if the use of health claims influenced perceptions of health on alcoholic beverages. In addition, questionnaires assessing health values and nutritional knowledge were administered. The findings of this study are beneficial in providing information about the factors that lead to drug use in adolescence and how to prevent problematic use through labelling restrictions and the improvement of warning labels.

An Investigation of the Buffering Effects of Self-Compassion With Respect to The Relationship Between Implicit Beliefs of Well-Being and Subjective Well-Being

Student: Liam KING

Supervisor: Derrick Wirtz

Research has thoroughly examined the relationship between self-compassion and subjective well-being (SWB), yet no research has investigated self-compassion with respect to its ability to buffer SWB against the negative effects of implicit beliefs of well-being (whether or not an individual believes their well-being is changeable). For this poster, data was collected as part of a larger study in which community adults, $N = 84$, $M_{age} = 52$, age range: 24 – 76, were recruited from the Okanagan region. Preliminary analyses revealed a significant and moderate positive correlation between implicit beliefs of well-being and satisfaction with life (a component of SWB), $r = .23$, $p = .033$. Furthermore, implicit beliefs of well-being were found to be positively correlated with both affect balance (the second component of SWB), $r = .12$, $p = .28$, and self-compassion, $r = .18$, $p = .096$, although these were small and non-significant. A hierarchical regression analysis displayed that self-compassion did not buffer SWB against the effects of implicit

beliefs of well-being, $R^2 = .26$, $R^2_{adj} = .23$, $\Delta R^2 = .001$, $p < .001$. This study revealed potentially important relationships between implicit beliefs of well-being and both, satisfaction with life and self-compassion, that have yet to be investigated. Also, contrary to previous findings, there was no significant relationship discovered between implicit beliefs of well-being and affect balance. The major limitation in this study was its relatively small sample size. Given a larger sample, it may be found that there are significant relationships among implicit beliefs of well-being, self-compassion, and SWB.

Cognitive Performance and Subjective Well-Being

Student: Summer SMITH

Supervisor: Lesley Lutes

Independently, the research domains of cognition and subjective well-being have been studied immensely. While much is known about cognitive evaluations of life satisfaction, the empirical database is limited in research on the relationship between cognitive performance and subjective well-being. The purpose of this study, which compares the efficacy of two well-being treatments (ENHANCE and MBSR), is to analyze this relationship through data obtained via a self-report questionnaire and an objective measure of cognitive performance (ANAM, a computer-based measure). Subjective well-being is determined by the number of positive and negative life events that the participant lists on the questionnaire. Cognitive performance is analyzed by their performance (above average, average, or below average) on three working memory tasks on ANAM. Participants complete the measures at three time points throughout the duration of the study: baseline (beginning of the study), post (3 months after baseline), and follow up (6 months after baseline.) Results will be completed and analyzed in March.

The Effect of Instruction Sets on Compassion

Student: Kristian ZULINICK

Supervisor: Holli-Anne Passmore

Paul Davies

Empathy is an important psychological construct. It can be defined as the feeling of concern and compassion that arises when one witnesses another's suffering. Empathy has been shown to mediate important outcomes, such as positive attitudes and behaviours towards stigmatized groups. To experimentally manipulate empathy levels, researchers have followed a standard design. Participants are divided into two different groups. Both groups are exposed to a stimulus that is designed to make them feel empathy, such as a picture of an animal who is suffering. Both groups are also made to read instructions before they are exposed to the stimulus. The difference between the groups is the nature of the instructions they are given. One group is instructed to remain objective and detached while experiencing the stimulus (low-empathy condition), while the other group is instructed to imagine the feelings of the stimulus's subjects, and how they might be affected by their circumstance (high-empathy condition). Research that has used this design has produced a consistent result: those in the high-empathy condition experience more empathy than those in the low-empathy condition. The common interpretation of this result is that the high-empathy instructions increase empathy. However, the design of these studies does not warrant this conclusion. For example, it may be that high-empathy instructions do not actually increase empathy, but rather that low-empathy instructions decrease empathy. In the present study, we manipulated empathy by following the standard design, but we included another condition in which participants were not given instructions before experiencing an empathy-inducing stimulus. This gave us a meaningful comparison point for the other conditions. We found that the high-empathy group and the no instruction group experienced about the same level of empathy, while the low-empathy group experienced lower levels of empathy. This suggests that low-empathy instructions decrease empathy, while high-empathy instructions do not influence empathy levels. This has important implications for the findings of previous studies. They should now be reinterpreted in light of the findings of this study. It no longer seems appropriate to say that increased empathy levels lead to the positive attitudinal and behavioural changes that have been observed in previous studies. The findings of the current study also raise many important unanswered questions about the nature of empathy. Why do the low-empathy instructions decrease empathy, while the high-empathy instructions do not? What are the cognitive processes underlying empathy and how do instructions affect those processes?

Physiological, psychological, and social benefits of canine therapy: Findings uncovered in a directed studies literature review

Student: Davis WIGGS

Supervisor: John-Tyler Binfet

The field of Canine-Assisted Therapy (CAT) and Canine-Assisted Activities (CAA) is burgeoning. Whereas therapy canines were historically found primarily supporting health-impaired patients in long-term care facilities, therapy canines are now routinely seen in courtrooms, classrooms, funeral parlors, and on college campuses. The aim of this poster is to provide an overview of how CAA works, and to showcase the key physiological, psychological, and social benefits to children and adolescents arising from CAT and CAA. A literature review conducted as part of a directed studies course on animal-assisted therapy revealed several key findings. One of these findings related to the physiological indicators of well-being, which demonstrated that petting a canine promotes the release of hormones such as serotonin, prolactin and oxytocin. Furthermore, health benefits such as reduced blood pressure, heart, and respiratory rates were also found. Other findings include psychological benefits such as reduced perceptions of stress and anxiety, and social benefits including increased communication and social interactions. These findings will be supported with photos from UBCO's B.A.R.K. dog therapy program.

Adolescent Substance Use Prevention: Targeting Implicit Cognitions in the Classroom

Student: Chantelle WOOD

Supervisor: Marvin Krank

A myriad of drug prevention programs have been created targeting children and adolescents. In developing interventions, consideration must be given to the factors implicated in substance use, initiation and escalation. A review of research examining implicit adolescent substance use cognitions highlight important considerations. Unconscious thought processes have been identified as especially salient to adolescent decision-making, given that youth are developmentally prone to risk-taking, novelty seeking, and impulsive behaviour, as well as a general lack of forethought regarding behavioural consequences (Krank & Goldstein, 2006). The methods used in preventative training must be carefully selected in order to reverse any misinformation while being careful not to reinforce false beliefs (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). With this in mind, the Healthy Automatic Behaviors and Thoughts (HABIT) program was pilot tested at Coldstream Elementary School in Vernon, BC. HABIT is a drug use prevention program aimed at early adolescents. This program targets the cognitive factors related to early drug use through implicit cognitive training and explicit exercises that promote healthy choices and behaviours. The initial lessons focus on character development and personality traits. The first and second lessons were presented to a class of grade 6 and 7 students by their classroom teacher over two and a half weeks. The pilot test was observed and qualitative feedback was gathered from both the teacher and her students during and after the sessions. Observations were made on the effectiveness of the delivery approach, the written and visual content, and the timeframe allotted in consideration of teacher and student engagement. Based on their responses further refinement of the program will ensue.

Testing the Effectiveness of a School-Based Inoculation Procedure on Implicit and Explicit Substance-Use Cognitions

Student: Grant REGIER

Supervisor: Marvin Krank

Inoculation theory states that attitudes and beliefs can be made more resistant to change when they are exposed to repeated attacks (Banerjee & Greene, 2007). Unlike traditional information-based education which only involves presenting facts, inoculation training involves presenting possible challenges to a person's beliefs and then teaching how to refute said challenges. There has been limited research on the effects of inoculation-based prevention programs on implicit and explicit processing. The present study aims to assess the effectiveness of inoculation training methods in a school-based substance use prevention program for approximately n=200 grade 6 and 7 students. Half of the students will participate in a cannabis or alcohol inoculation training

session. These conditions will be counterbalanced. Outcomes will be measured with alcohol and cannabis outcome expectancy tasks, a word association task, and a response section for four scenarios in a cartoon format which will employ an original coding scheme. Hypotheses will be tested with a MANOVA. We expect the findings to demonstrate that inoculation training is effective in decreasing implicit associations between ambiguous words and substance use as well as decreasing explicit positive substance use outcome expectancies. The implications from this study will assist future researchers and educators in improving the quality of drug prevention programs in schools. Furthermore, it will increase our understanding of the dual-processing mechanisms in substance use prevention.

Changing Attitudes towards Anorexia Nervosa: Comparing the Effects of Two Documentaries

Student: Brady LYNCH

Supervisor: Carolyn Szostak

Anorexia nervosa (AN), an eating disorder, is characterized by low body weight and an intense fear of gaining weight. In addition, one's weight or shape often influences unduly their sense of self worth. AN is considered to be a serious mental health disorder. That is, it is a chronic disorder, and it has the highest mortality rate of all mental health disorders (MHD). Despite the availability of treatments, only a minority of individuals seek help. One of the main reasons why individuals with AN do not seek treatment is stigma – the negative, prejudicial, and discriminatory attitudes about this disorder that are often held by others and people with AN. The media has been found to contribute to mental health-related stigma. Individuals with mental health disorders, including AN, are often portrayed in a sensationalistic manner in TV shows and movies. These depictions promote stereotypes that are often based upon inaccurate information. For example, AN is often portrayed as controllable, suggesting that individuals with AN are to blame for their disorder. More recently, there is evidence that media presentations can both contribute to and help to counter stigma. The current study examined the effects of two documentaries about AN on stigma. Given that the content of documentaries is more accurate, it was expected that stigma would be decreased. However, because it is also important to capture the interest of the audience, the potential for reinforcing stigma also exists. Attitudes and beliefs about AN were assessed in 161 undergraduate students with questionnaires at two points in time. The first questionnaire was completed online 2-7 days before watching a documentary while the second questionnaire was completed in-person immediately after watching a documentary. The participants were randomly assigned to watch either *Anorexia nervosa: Being too thin* or *The deadly life of an anorexic*. The Eating Disorder Stigma Scale (EDSS; four subscales) and the Social Distancing Scale – Anorexia Nervosa (SDS-AN; 8 items) were used to assess stigma. The data were analyzed using a series of multivariate analysis of variance with one between group factor (Documentary) and one within subject factor (Time). Results were complex depended upon the measure and the documentary. Analysis of the EDSS scores revealed that, on average, participants believed that AN was more serious after viewing either documentary than before. However, both documentaries were also found to increase beliefs that people with AN are vain (e.g., they are obsessed with looking like supermodels). In contrast, differential effects of the documentaries were found with some of the SDS-AN items. For example, an interaction was found such that individuals who watched *Anorexia nervosa: being too thin* reported feeling more comfortable having a close relationship with someone with AN after the movie than before. In contrast, those who watched *The deadly life of an anorexic* felt less comfortable than before. Overall, both groups reported that they would feel more comfortable interacting with someone with AN in situations that were less intimate (e.g., co-worker or neighbor), relative to their initial beliefs. Taken together, while each documentary reduced aspects of stigma, the results also show that documentaries can have the opposite of the intended effect and increase stigma. These results contribute to the understanding of the ways documentaries can be an effective medium through which to reduce stigma associated with AN, and other MHDs. They also demonstrate that documentaries must be produced carefully to avoid increasing stigma.

Enduring Happiness and Continued Self-Enhancement: Design, Rationale, and Baseline Characteristics

Student: Joanna GARCIA

Supervisor: Lesley Lutes

Subjective well-being (SWB), a component of happiness, is a relatively new construct in the field-of psychology and is defined as one's personal evaluation of the amount of well-being they are experiencing at a given time in their life. Research has found evidence supporting that elevated SWB positively influences one's overall health, problem-focused coping mechanisms, efficient cognitive processing, and romantic and non-romantic relationships. Given the benefits of SWB, many researchers and clinicians have made attempts to increase SWB in participants and patients. However, the focus is often on reducing negative emotions. Improvements in happiness and SWB require more than simply an absence of negative emotions, but also the presence of positive thoughts, emotions, and behaviours, and a sense of fulfillment and meaning in one's life. ENHANCE (Enduring Happiness and Continued Self Enhancement) is a program that brings together evidence-based practices to help individuals learn new skills to improve their overall happiness and SWB. Previous research in this area has focused on interventions impacting happiness on a short-term basis, but ENHANCE aims to make long-term improvements on happiness. Participants were randomized into one of two experimental groups, ENHANCE or Mindfulness-Based Stress Reduction (MBSR). The ENHANCE group will covered ten principles of happiness organized around the themes of the core self, the experiential self, and the social self over the course of twelve weekly group sessions. The MBSR group worked through a series of self-guided exercises during this 12-week period, on their own time. Participants in both groups will complete a battery of psychosocial measures (e.g., SWB, self-esteem, healthy behaviours, perceived stress) at three time points: pre-intervention, three months post-intervention, and six months post-intervention. Additionally, information about the participants was gathered from their peers to comment on participants' moods at the three assessment time points. The purpose of the current study is to present the consort flow diagram and baseline characteristics of the ongoing ENHANCE Well-Being Trial.

Creating and testing a computerized approach bias assessment tool for implicit alcohol cognitions.

Student: Constantin MARIN-BEKE

Supervisor: Marvin Krank

Problem alcohol use can negatively impact the user and the lives of those around them. Cognitive approach biases have repeatedly been associated with various addictive behaviours, such as alcohol abuse, unhealthy eating, and illicit drug use. There unfortunately is difficulty in conducting effective cognitive research without utilizing expensive in-person cognitive assessments and longitudinal design methods. To overcome the limitations of not being able to use self-report methods for testing approach biases, implicit measures are often necessary. This study uses Wier's and colleagues (2009) schematics for a computerized assessment tool, called the Approach Avoidance Task, which we have modified for use in both an undergraduate and adolescent population. The assessment task uses proprioceptive arm movements to simulate pushing and pulling objects using a computer mouse. The moving of the objects is represented by exteroceptive zooming in and out of different images, including alcohol images, in different orientations. These stimuli are instructed to be pushed or pulled as quickly as possible and reaction times are measured in milliseconds through Inquisit software. This study pilots the task in the local secondary school system, where many of the students have not ever used alcohol. We also investigate how effective this task is at assessing the change of behaviours over a minimum two-week period in undergraduates and compare the results of drinkers and non-drinkers to the results from adolescents.

The Use of Major and Trace Element Geochemistry in Diamond Exploration

Student: Joe KORNELSEN

Supervisor: John Greenough

When carbon atoms within Earth's upper mantle are subjected to high pressure they may become covalently bonded and form diamonds. If mantle conditions remain stable, diamonds may reside within the mantle for millions of years until they are eventually transported near surface in xenoliths within alkali-rich kimberlite and lamproite magmas. Discovery of economically viable diamond deposits relies heavily on geochemistry of mantle derived diamond indicator minerals. This study analyzes fifty indicator minerals from the U2 kimberlite pipe located in the James Bay Lowlands of northern Ontario. The grains analyzed include garnet (peridotitic and eclogitic sourced), olivine, clinopyroxene, and chromite. Ten samples of each mineral are analyzed with the use of Electron Microprobe (EMP) and Laser Ablation Inductively Coupled Plasma Mass Spectrometer (LA-ICP-MS). Of these samples five of each mineral contain geochemistry indicative of an economic deposit and five of each mineral are associated with barren deposits. This study aims to identify major and trace elements that are revealing of economic diamond grades within a kimberlite host as well as explain element behavior within the indicator minerals. Peridotitic garnets that are enriched in Mg and Cr as well as Ca depleted are loosely termed G10 garnets. These garnets are the most relied upon mineral in diamond exploration. This study has further identified G10 garnets as enriched in light rare earth elements and depleted in heavy rare earth elements in comparison with the garnets of non-diamond indicating chemistry. Furthermore, EMP data show an enrichment in Ti and depletion in Fe of the G10 garnets. The G10 elemental composition may be explained by carbonatite metasomatism within depleted Archean mantle lithosphere. Eclogitic garnets that are indicative of diamonds have variable compositions, however those indicating diamonds are enriched in Ca, Ti, Zn, Mn, Ni, Fe, and Na but depleted in Cr compared to the non-diamond indicators. The Na and Ti enrichment is a result of coupled substitution that occurs when pressures are high enough to transform Si from 4 to 6 coordination. These high-pressure environments are characteristic of diamond formation. The variability of major and trace elements may be attributed to changing fluid chemistry in repeated metasomatic fronts moving through ocean floor materials. Olivines indicating diamonds are enriched in Mg and Ni and depleted in Fe and Zn. Substitution of Mg for Fe is common within high-pressure environments and the high Mg content is consistent with the minerals being sourced from depleted Archean lithosphere. Clinopyroxene in the form of Cr-diopside can represent kimberlite sourcing. Mineral grains associated with kimberlite are enriched in Cr and Mg along with high field strength elements Nb, Zr, Hf and Ta. The enrichment in these elements may further reflect late stage metasomatism of a depleted protolith. Chromite grains that represent diamond formation are enriched in Mg and Cr and depleted in Zn. The Zn depletion is a result of Mg affinity for the divalent lattice position. Major and trace element data revealed no further patterns within chromite samples.

Community Resilience and Slow Food: A comparative case study of Naramata and Cowichan Bay, B.C.

Student: Ayla DE GRANDPRE

Supervisor: Donna Senese

Change is an inevitable and perpetual process that cannot be escaped, only adapted to. However, as the natural and cultural worlds experience accelerated and unprecedented levels of change, both driven and affected by processes such as climate change and globalisation, communities worldwide are faced with a similar but problematic task: to prepare and adapt for hazards, shocks and stressors as quickly as they are occurring (Belliveau 2006, Calgaro 2014, Cox 2015, Pelletier 2016, Lew 2014). Fortunately, change is not only a disruptive force for humans, but also a constructive stimulus for innovation and the development greater sustainability. In response to this issue, scholars of various disciplines have developed the concept of resilience- as the ability to prepare and adjust to the changing state (Cox 2015, Cradock-Henry 2017, Drolet 2012, Lew 2014). However, very few solutions have been identified as to how resilience may be cultivated in our communities. The Slow Food movement was founded in 1986, in Bra Italy by Carlo Petrini, and introduced the world to the idea of "ecogastronomy": an approach to the production and consumption of food, which recognizes the connection between humans, food and the health of ecosystems (Slow Food 2009). The movement advocates food that is good (quality), clean (environmentally-sustainable) and fair (socially responsible), and encourages communities to live a slower and more enjoyable lifestyle (Slow Food 2009). Since being founded in 1986, Slow Food has expanded into more than 132 countries, and has led to the creation of global networks of Slow Food associations, such as Cittaslow, which promote the principles of ecogastronomy and seek to change the current system of production and consumption (Cittaslow 2017). It is possible that the

application of Slow Food principles at the community level could create greater resilience. Unfortunately, little is known in regard to how Slow Food and organizations like Cittaslow affect the social, economic and environmental fabric of the community. Thus, the purpose of this investigation is to explore if ecogastronomy and Cittaslow certification contribute to building greater resilience in rural communities. This research is a comparative case study of two Cittaslow accredited communities in B.C. (Naramata and Cowichan Bay) and uses a mixed methods approach including a literature review, qualitative interviews with farmers, producers, vendors and local government and will conclude with a written report.

An Analysis of Canadian Immigration Policy and the Rise of Filipino Labor Migration in Canada

Student: Kaylah VRABIC
Supervisor: Carlos Teixeira

The purpose of this study is to explore Filipino labour migration to major Canadian cities. Attention will be focused on: A) explaining why Canada has become the third largest receiving country for Filipino labour migrants and B) investigating the push/pull forces and national policies facilitating the movement (Philippine Statistics Authority, 7). The study will conclude with a case study of Filipino labour migration to Winnipeg Manitoba. Relatively few studies have been conducted with the goal of examining Filipino labour migration to Canada. Existing studies focus their attention on Filipina nurse migration, neglecting the numerous routes Filipino migrants use when coming to Canada. The study seeks to explain the ways in which Filipino labourers immigrate to Canada as well as how labour migration is facilitated both emigration policies in the Philippines and immigration policies in Canada. The study will conclude with a case study of Filipino labour migration to Winnipeg Manitoba. Relatively few studies exist concerning the Filipino community in Winnipeg, Manitoba, a city that contains the largest number of Filipino immigrants per total population (5% of Winnipeg residents are Filipino) (Statistics Canada, 2016). The primary research questions guiding this study are as follows, what are the demographic and socio-economic characteristics of the Filipino diaspora in Canada? What are the push / pull forces facilitating Filipino labour migration? Do Filipino labour migrants experience high or low levels of integration in Canada? Finally, what are the demographics of the Filipino community in Winnipeg Manitoba? The results of this study are meant to provide information to city planners and government officials concerning the integration of Filipino labour migrants into the socio-economic fabric of Canada. Poster Presentation.

Insect Overwintering Capacity in the Presence of Chinooks

Student: Geoffrey GOETZ
Supervisor: Rebecca Tyson

Insects brought in as biocontrol agents are an important component of lower-pesticide agriculture. In order for these agents to be successful, it is important that they be able to adjust to the local climate in the new environment. While source and destination climates are regularly compared when selecting a biocontrol agent, it is impossible to match every aspect of the two climates. The stem-mining weevil *Mecinus janthinus*, a key agent in the control of invasive Dalmatian toadflax, was released in several locations in Canada (Alberta and British Columbia) and northern United States (Montana, Idaho). The weevil established quickly in all locations except southwestern Alberta, where establishment initially appeared unsuccessful, but later did become established. One possible explanation for this delayed establishment in Alberta is the presence of strong Fohn winds called Chinooks. These winter windstorms can suddenly raise the local temperature as much as 20 degrees. Using a mathematical model to investigate how these winds can affect multi-annual population dynamics of an insect, particularly the time it would take for establishment, we postulate what was the effect of Chinooks on the *Mecinus janthinus* in Southwestern Alberta. These results can also be used to predict the success of other potential biocontrol agents in areas with similar climates.

The Effects of Climate Change on Predator-Prey Dynamics

Student: Sylvain GRETCHKO

Supervisor: Rebecca Tyson

In this investigation we study the effects of climate change on predator-prey population dynamics. The interaction of predators and prey is described by the Variable Territory model with Allee effects in an Ordinary Differential Equation (ODE) framework. Climate influence is modeled in this ODE framework as an exogenous driver which affects the prey growth rate. Mathematically, this exogenous driver is a function of time, the climate function, that describe how favorable the climate is. In this work we focus on the conditions that lead to extinction. A high performance software tool has been developed that allows the systematic exploration of various scenarios. Our results show that the predator-prey system is sensitive to rapidly decreasing values of the climate function. The amplitude of this negative variation as well as its duration are key factors, but more importantly, it is the moment when this negative change occurs during the predator-prey cycle that is critical for the survival of the species.

A Computer Vision based algorithm for counting both the dead and alive bio-cells

Student: Julius WU

Supervisor: Abdallah Mohamed

A cell-counting algorithm was created to efficiently count both dead and alive bio-cells from a smartphone taken photo. The algorithm uses Computer Vision techniques, and it proved to be reasonably comparable to similar algorithms. The algorithm successfully resulted in counted 90% of the alive cells and 75% of the dead cells (due to lighter dead cells blending with the background colour). The algorithm is different from similar ones such that it works with colour images instead of just greyscale image and is able to count two different types of cells (dead and alive) using the RGB channel.

Biophysical characterization of flavodoxin from *Fusobacterium nucleatum*.

Student: Marta MACDONALD

Supervisor: Kirsten Wolthers

Fusobacterium nucleatum (Fn), a common mouth microbe, is gaining more attention due to the role it plays in periodontitis, colorectal cancer and adverse pregnancy outcomes. Flavodoxin (Fld), a flavin mononucleotide (FMN) containing electron carrier, has proven to be essential for *F. nucleatum* and other pathogens such as *Helicobacter pylori*, *Streptococcus pneumoniae*, and *Escherichia coli* and we hypothesize that it can serve as a therapeutic drug target for treatment of *F. nucleatum*-related diseases. We compared the Fn-Fld gene with that of other Fld-containing microbes and found that a highly conserved glycine residue appeared as a lysine at position 13 in the Fn-Fld protein sequence. By reverting to the more common G13, we have investigated the involvement that the glycine residue plays in FMN binding and Fld function. We have cloned, expressed and isolated wildtype and K13G Fn-Fld in both the apo and holo forms and used stopped flow fluorescence to investigate FMN binding. In concentration and ionic strength dependence studies, we have determined that the bi-molecular rate constant (k_{on}) for K13G was approximately double that of the wildtype. This phenomenon was also investigated using temperature dependence. This study will be used in conjunction with other biophysical analyses of flavodoxin, to characterize the enzyme and develop potential inhibitors that may prove to be therapeutic in *F. nucleatum*-related diseases.

Smoking seed; investigation into the germination promoting effects of forest fire smoke in *Balsamorhiza deltoidea*.

Student: Adrian MONTHONY
Supervisor: Susan Murch

Balsamorhiza deltoidea Nutt. is an ecologically important perennial flowering forb found along the North-American western coast, from California to British Columbia. In Canada the species has experienced a 40% decrease in the population size in the last two decades and now consists of 8 extant colonies located solely in southern Vancouver Island. Today, it is classified as Critically Imperilled in Canada (Committee on the Status of Endangered Wildlife in Canada, 2009). Rates of germination of *B. deltoidea* are low and conservation efforts to re-establish *B. deltoidea* rely on germination and planting of seedlings. Prior work on seed germination of *B. deltoidea* has investigated a variety of imbibing methods, stratification methods and pre-treatments with varying success, with recent use of smoke water having achieved 42% germination (Applestein & Smith, 2014). I hypothesized that karrikins released by burning pine trees induce seed germination in *B. deltoidea*. To assess seed viability a TTC test was performed on a representative sample of seeds and viability was found to be 87%. Seeds were treated with karrikin1 (Kar1), karrikin2 (Kar2), karrikin11 (Kar11) or gibberellic acid (GA3) at 0, 5 or 10 μM . Seeds exposed to Kar2 had a significantly higher germination rate ($p < 0.05$) than controls. When corrected for seed viability, 100% of seeds treated with Kar2 germinated. The other karrikin treatments at both tested concentrations showed no positive effect on germination after 85 days. Gibberellic acid, a known promoter of germination, was tested at identical concentrations to the karrikins and failed to show germination promoting effect in *B. deltoidea*. These data show that Kar2 stimulates seed germination in the species, but this effect is not common to the other karrikins. Since karrikins are released by forest fires in the Pacific Northwest growing region of the species, these data could be evidence of co-evolution or ecosystem adaptations. Further research is required to determine the optimal conditions of growth for conservation of the species.

The Effect of Type II Diabetic Conditions on Neutrophil Cell Rolling

Student: Keith TAVERNER
Supervisor: Isaac Li

Neutrophils are one of the first responders to infections and are vital for the innate immune system. They roll in blood vessels on endothelial cell to get to the site of an infection. If the rolling velocity decreases, it can cause a decrease in the response to an infection. In diabetic conditions if neutrophils rolling velocity is slower then it could help explain the presence of increase infections in diabetic patients. To replicate blood vessels a flow chamber was made using coverslips. The coverslips were covered with polyethylene glycol to pacify the surface. P selectin was then added to allow the neutrophil cells to roll. The cells were added, and a flow rate was applied. To represent neutrophils, HL-60 cells were differentiated with a 1.5% DMSO incubation for three to four days. Diabetic conditions tested were hyperglycemia, increased insulin concentration, increased TNF-alpha and increased IL-6 concentrations. The cells were grown at a 5mM glucose concentration for a control and hyperglycemic values ranging from 9mM to 25mM. Insulin, TNF-alpha, and IL-6 were present at supraphysiologic concentrations. The addition of all these compounds was referred to as the diabetic cocktail. Cells were grown in these conditions for prolonged periods to represent Type-2 Diabetes. The rolling velocity of HL60 and neutrophil cells decreases in most trials with increasing glucose concentrations. This slower speed could be cause by an increased number of receptors therefore more bonds slowing the rolling. The rolling velocity of HL60 and neutrophil cells increases in most trials when grown in the diabetic cocktail.

Neutrophil Rolling Adhesion and Activation

Student: Adam YASUNAGA

Supervisor: Isaac Li

Neutrophils are one of the first immune cells to reach the site of infection and defend the body against bacteria during an inflammatory response. This is accomplished through a process known as neutrophil rolling adhesion and activation. Rolling adhesion is mediated by a catch bond that forms between p-selectin glycoprotein ligand (PSGL) 1 expressed on the surface of neutrophils and selectins expressed on the surface of endothelial cells. Rolling adhesion results in the activation of the lymphocyte-function associated antigen (LFA) 1 integrin on the neutrophil surface. LFA1 binds tightly to intercellular adhesion molecule (ICAM) 1 on the endothelial cell surface. This results in decreased rolling velocity and arrest at the site of infection allowing the neutrophils to transmigrate into the infected tissue. The chemical pathways involved in LFA1 activation have been well studied. However, the physical components have only been touched upon. The objective of this study is to characterize the changes in cell rolling velocity that occur due to LFA1 activation during the cell rolling cascade. To study this phenomenon, we used p-selectin and ICAM1 functionalized coverslips and a parallel plate flow chamber as our model system. Neutrophils were flowed over the surface by a syringe pump and the rolling cells were recorded with a high-speed camera mounted on a darkfield microscope. The resulting videos were analyzed with a MATLAB cell tracking program to quantify the cell rolling velocities observed in each experiment. The neutrophils were rolled on various p-selectin/ICAM1 surfaces as well as in the presence or absence of a chemoattractant. Preliminary results show that neutrophils rolled on a surface coated with both p-selectin and ICAM1 roll significantly slower than on a surface coated with only p-selectin. This is a good indication that our model system works and that LFA1 activation is occurring. The results from this study will provide the foundation of a larger project aimed at investigating how the forces involved in cell rolling influence LFA1 activation.

Gut Microbiome Mediation of Antioxidant and Inflammatory Regulation in the Context of a High Fat Diet

Student: Mitchell FIGURA

Supervisor: Sanjoy Ghosh

The natural gut flora is being linked increasingly to important health determinants, especially in regards to the development and stimulation of the immune system. The colonization of one's gut microbiota is heavily dependent on factors related to nutrition. Western diets have disproportionately high levels of n-6 polyunsaturated fatty acids (PUFA) which have been shown to have a negative correlation with the relative health of the gut flora. N-6 PUFAs have also been shown to have a positive correlation with the oxidative stress inflicted at the GI level resulting from an imbalance of free radicals and anti-oxidants. This constant immune stimulation leads to inflammatory mediators and cytotoxic factors that are underlying contributors to the many chronic inflammatory based diseases prevalent in western society today. While high fat diets have been well documented to have a positive correlation to inflammatory based diseases, the underlying elements such as oxidative stress that result in these clinical conditions have been less investigated. It has been shown that the absence of a microbial gut flora in mice resulted in decreased antioxidant levels, and the re-introduction of said flora resulted in antioxidant levels returning to normal. The purpose of this study was to further understand the role that the gut microbiome plays in mediating oxidative stress induced by high fat diets. Sterile and wild type *Drosophila Melanogaster* were subjected to high n-6 PUFA and low n-6 PUFA diets, as well as a low fat normal chow control diet. A subset of the sterile strain had their gut flora reintroduced through dietary implementation of naturally occurring (non-sterile) midguts. Oxidative stress under each of these conditions was monitored through the relative transcription of genes encoding for antioxidant enzymes such as superoxide dismutase and glutathione reductase. This data was obtained through qPCR analysis of RNA extracted from dissected midguts.

The analysis of smoke-taint in wine by comparing enzymatic and spontaneous acid hydrolysis of glycoside-bound volatile phenols

Student: Brandon WHITMORE

Supervisor: Wesley Zandberg

Wildfire smoke has a profound effect on the wine industry since some odor-causing compounds liberated from the burning of wood can be stored within grapes and become recovered in wines, ultimately leading to smoke-taint. These main compounds responsible for smoke-taint are a class of volatile phenols (VP) such as guaiacol, 4-methylguaiacol, syringol, and various cresols. When present in the wines above their sensory threshold, these volatile phenols result in aromas/odors that have been described as "ashy," "barnyard," and "smoky." Problematically, once in the grapes, these VPs are metabolized. More specifically, they are chemically linked to simple sugars by grape enzymes and the resulting glycosides lack aromas of their parent compound. Previous research has examined these glycosides and it has been hypothesized that they will spontaneously hydrolyze in wine, however this does not seem chemically plausible as the pH in wine is not sufficient enough to break the glycosidic bond. In contrast, we hypothesize that the hydrolysis of volatile phenolic-glycosides - resulting in smoke-tainted wines-is strictly catalyzed by yeast enzymes during the fermentation process and thus by altering the strain of yeast, which differentially express these enzymes, used during fermentation, wine makers may control levels of VPs that will be liberated from their glycosidic form. To test the hypotheses, wine was fortified with various glycoside-bound VP and aliquots were removed every two weeks for over a three-month period. The levels of bound and free VP were quantified. Four different strains of yeast were used in model ferments to examine the stability of these compounds during fermentation. Additionally, these same enzymes were used to examine whether or not the presentation of smoke-taint could be suppressed in wine made from smoke exposed grapes. In all sets of experiments, levels of intact glycosides in the experiments were analyzed using LCMS while the expression of free, taint-causing VPs were quantified with GCMS. The results collected here will contribute to the understanding of how these VP-glycosides are metabolized during fermentation and inform in-winery attempts to mitigate their release during the wine making process.

The effect of dietary omega-6 polyunsaturated fats on aldehyde dehydrogenase II activity in mouse liver

Student: Emma SWAN

Supervisor: Sanjoy Ghosh

Omega-6 polyunsaturated fatty acids (ω -6 PUFA) are commonly found in the Western diet. Excessive consumption of these fatty acids may potentially lead to the accumulation of reactive oxygen species (ROS) resulting in detrimental effects to health. An increase of such species can lead to cell death and tissue damage through reactions with integral macromolecules such as proteins and nucleic acids. Cells therefore have methods of preventing the build-up of ROS. One such method is through the activity of a mitochondrial enzyme aldehyde dehydrogenase II (ALDH II) which catalyses the transformation of reactive aldehydes to more stable products. An accumulation of ROS by due to high dietary ω -6 PUFA would be expected to increase the activity of ALDH II. To examine how ω -6 PUFA effects the activity of ALDH II, mice were fed various high fat diets consisting of either corn oil (an ω -6 PUFA), olive oil (a monounsaturated fatty acid) or anhydrous milk fat (a saturated fatty acid) as well as a control diet. Livers from these mice were then extracted and homogenized; differential centrifugation was performed to isolate the mitochondria so that ALDH II could be isolated. ALDH II activity was measured via spectrophotometric analysis. The results of this research will lead to a better understanding of the influence of dietary ω -6 PUFA on health and how the western diet may be adjusted to decrease the adverse affects of its consumption.

Transfected gene detection via GCMS analysis of essential oils and transcriptome confirmation by PCR.

Student: Matthew HOJENSKI

Supervisor: Soheil Mahmoud

Chrysanthemum plants were transfected with bornyl diphosphate synthase (BPPS) and borneol dehydrogenase (BDH) transgenes. These genes lead to the production of camphor, a plant terpene in Lavandula. It is known that BPPS catalyzes the reaction of geranyl diphosphate (Gpp) to bornyl diphosphate (Bpp). This Bpp is then converted to Borneol by an unknown enzyme. Borneol then acts as a substrate for BDH which creates Camphor and reduces NAD to NADH+. To elucidate the enzymes in the pathway, the genes were inserted into chrysanthemum so that the effects could be compared between the plants. The essential oils from transfected and wild-type chrysanthemum were extracted with steam-distillation and the compounds analyzed by Gas chromatography–mass spectrometry (GCMS). To confirm if the gene uptake was successful, tissue samples were collected and frozen to preserve an image in time of their gene expression. The plants mRNA was extracted and a cDNA library was created to be PCR amplified with the transgene primers.

Novel derivatives of kainic acid inhibit select microglial functions

Student: Morgan ALFORD

Supervisor: Andis Klegeris

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. Microglia, the immune cells of the central nervous system, interact with these pathological structures and become activated. Chronic microglial activation leads to the continuous secretion of pro-inflammatory mediators, which at high concentrations are damaging to neurons. Thus, adverse activation of microglia propagates the inflammatory status of the CNS and drives the progression of AD pathology. The goal of this project was to assess the therapeutic potential of two novel kainic acid derivatives as treatments of AD. The first objective was to determine whether these derivatives affect activated microglial functions that negatively impact neuronal cell viability. After treatment with either of the derivatives, microglia were activated by an inflammatory stimulus and their conditioned media was transferred onto neurons. Neurotoxicity of activated microglia, which had been 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 activated 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. By using a specific inhibitor, we showed that the anti-inflammatory activity of the new compounds is mediated at least partially by the enzyme aldose reductase. AD currently affects 40 million people worldwide. This number is predicted to double by the year 2030 unless an effective treatment is identified. This project unveils kainic acid derivatives as potential therapeutic strategies, which could positively impact the lives of AD patients and their families.

SpongeBob SpiculePants: So fresh and so green, green.

Student: Ashley KERIK
Supervisor: Ian Walker

Sponges are aquatic filter-feeding animals. While over 8,000 sponge species inhabit marine environments, there are over 200 freshwater sponge species worldwide, including 30 species in North America. Freshwater sponges provide shelter to algae in exchange for nutrients. These sponge-algal symbionts play a role in benthic primary productivity, and naturally purify water via filtration. Identification of sponges is principally based on the siliceous spicules which form their skeleton, specifically the distinct spicules which enclose their asexual reproductive structures known as gemmules. There is inadequate information available regarding the distribution of freshwater sponges and their interspecific relationships in western Canada. No systematic study of freshwater sponges has ever been conducted in the Okanagan. For this study, sponges were collected from 11 lakes in the Okanagan region, ranging from dilute subalpine lakes, to hardwater lakes near the valley bottom. In total, over 75 specimens were examined and identified. All co-occurring fauna were also identified. Identifying and cataloging freshwater sponge species of the Okanagan will provide the empirical evidence needed for proper management and conservation of these species. It will also create a baseline record facilitating future assessments of aquatic ecosystem health and community change, in relation to climatic change, alien species invasions, and other anthropogenic stressors impacting our freshwater resources.

Clinical Monitoring of the Muc2(-/-) Mouse Model for Colitis

Student: Kiranpreet GILL
Supervisor: Deanna Gibson

Muc2 knockout (Muc2^{-/-}) mice are deficient in the mucus forming protein Mucin 2 (Muc2). Muc2 provides protection to the epithelial cells located in the colon. A deficiency in Muc2 leads to changes in mucus composition, which predisposes the mice to the development of inflammation located in the colon. These mice develop clinical symptoms such as weight loss, change in physical appearance (ruffled coat, hunched, reduced movement), poor hydration, changes in stool consistency. As the severity of colitis increases it can lead to rectal bleeding and in some cases, a rectal prolapse. In this study, mice were weaned at 21 days after birth and placed on four iso-caloric, iso-nitrogenous diets containing 40% fat; 1) corn oil (omega-6 polyunsaturated fatty acids) 2) olive oil (monounsaturated fatty acids) 3) anhydrous milk fat (saturated fatty acids) 4) a blend of fats to mimic the Mediterranean diet pattern (16% MUFA, 13% SFA, 4% omega-6 PUFA, 2% n-3 PUFA). The four diets differed in the type of fatty acid content in the diet. Food and water were measured weekly in order to determine intake. Muc2^{-/-} mice were clinically evaluated weekly over a 9-week period using a validated scoring system. Throughout the course of diet treatment, the mice were clinically assessed and clinical scores were assigned. The clinical scores ranged from 0-11, with a low score of 0 indicating no symptoms of colitis and a high score of 11 indicating severe colitis resulting in humane endpoint of the animal. This study could lead to insights to help determine clinical guidelines and how various fatty acids influence colitis.

Carnivore responses to snow

Student: Jenna SCHERGER
Supervisor: Karen Hodges

Winter in the northern hemisphere imposes environmental challenges that drive morphological and behavioural adaptations in many carnivores. Lower temperatures accompanied by snow accumulation result in a high demand for energy conservation throughout this season. I reviewed the existing literature on carnivores and snow to determine what is known about how carnivores manage in this difficult season. Most literature focuses on snow and how difficult it is for carnivores to move through it. In response, carnivores often change foraging behaviours and activity levels, hunt different prey, and expand their home range during winter.

These seasonal adaptations allow for an increase in individual fitness and energy conservation. Although many studies have documented how difficult it is for carnivores to move through snow, there is a lack of data showing the energetic costs required for locomotion in snowy regions. Climate change is increasing snow density through fluctuations of warming and cooling, and decreasing the overall length of winter. In turn, I expect these changes will likely decrease the impact winter will have on a variety of carnivores that lack adaptations suitable for winter conditions. Both coyotes and red foxes have a large footload, which decreases the efficiency of movement through fluffy snow. As climate change alters winter conditions, these carnivores will benefit as hunting and reproductive success will both increase. Carnivores such as lynx and wolverine that are adapted for winter will face challenges and may lose southern habitats.

The effects of genotype on lymphocyte expression profiles in strains of inbred mice

Student: Nicole FERREIRA

Supervisor: Christina Haston

Radiation-induced lung disease (RILD) is a well-known complication from the use of ionizing radiation in radiotherapy against thoracic tumors. In recent years, it has been found that there exists a difference between inbred mouse strains and their predisposition to certain RILD phenotypes after exposure to radiation in the lungs, as well as a significant difference in post-irradiation survival times. This difference is likely attributed to varying immune activation across strains, however, whether this is a definite contributor is currently unknown. In a previous study, a section of chromosome 2 has been suggested to play a role in the pathogenesis of RILD. It is known that C57BL/6J (B6) mice typically survive longer post-irradiation, while C3H/HeJ (C3H) mice succumb earlier to their disease. When comparing the two strains, as well as a congenic strain of B6 mice which carried C3H genes at the section of interest in chromosome 2, the congenic mice succumbed at a time between the two parent strains. It is likely, then, that presence of C3H genes at this location is implicated in disease phenotype and survival time. However, it is unknown which specific C3H gene(s) is contributing to this change in phenotype compared to B6 mice. Towards elucidating this mystery, four lines of subcongenic mice were bred from the congenic chromosome 2 mice. Although it has been shown that the lymphocyte profile of both strains varies post-irradiation, an investigation between lymphocyte profiles of B6 and C3H mice at baseline prior to radiation treatment has yet to be performed. Here, we will look at the lymphocyte profiles of B6, C3H, and four lines of recombinant subcongenic B6/C3H mice, none of which have received any radiation. In this study, lung and tail tissue were harvested from B6, C3H, and recombinant mice. Tail tissue was used to isolate genomic DNA, which was then amplified through PCR using primers for each locus in the region of interest in chromosome 2. Once the genotype of the mice is confirmed, lymphocyte population will be measured using lung tissue via flow cytometry. Finally, statistical analyses will be performed to determine whether lymphocyte populations vary significantly between each strain of subcongenic mice, and additionally, whether any strain is C3H-like in its lymphocyte profile, supporting that locus as potentially contributing to RILD.

The effect of ectomycorrhization on the nitrogen status of pine germinants in the Okanagan Valley

Student: Reece BLAKE

Supervisor: Melanie Jones

A very important genus of tree for montane and boreal Canadian forests is *Pinus*. *Pinus ponderosa* (Ponderosa Pine) and *Pinus contorta* (Lodgepole Pine) are important in BC, ecologically, economically, and traditionally. British Columbia is home to an extensive logging industry, and forest fires are quite frequent. After a major disturbance such as logging, or a fire pine trees are often one of the first to germinate. This resilience to grow in such disturbed zones makes *P. contorta* and *P. ponderosa* trees of interest to researchers. A major reason the *Pinus* genus species can flourish in zones affected by wildfires or clear cuts is their extensive and complex symbiotic relationship with ectomycorrhizal fungi. Ectomycorrhizal fungi colonize root tips and form ectomycorrhizae, which provide the plant with essential soil nutrients such as nitrogen; meanwhile, the host plant provides the fungus with photosynthetically-derived carbon. This symbiosis is essential for the survival and normal development of members of the *Pinus* genus. The accepted paradigm is that ectomycorrhizal fungi will take up nitrogen from the soil and provide it to the plant; however, Joshua Smith, working under the supervision of Dr. Melanie Jones observed the reverse under laboratory conditions. In a

microcosm, Smith observed nitrogen moving away from the shoots and towards the roots and potentially towards the fungus. The objective of my study was to test whether the phenomenon Smith described could be observed in a field setting. In addition to observing the movement of nitrogen my goal was to identify the species of ectomycorrhizal fungi present in colonized seedlings. If nitrogen was drawn away from the plant and towards its ectomycorrhizal fungi, this would result in a significantly lower total N content of ectomycorrhizal seedlings than non-colonized seedlings. Samples of newly germinated lodgepole and ponderosa pine were collected from 6 sites across the Okanagan Valley in September and again in October. Root tips were examined using a dissecting microscope to identify which roots were colonized; seedlings were then classified as mycorrhizal or non-mycorrhizal. Seedlings were then dried and ground and sent away for nitrogen analysis. Molecular work has commenced to determine the fungal species present. Although data are still being analyzed, it is clear there is a correlation between the extent of colonization and the site. Furthermore, N content of ectomycorrhizal ponderosa pine seedlings appears to be lower than nonmycorrhizal seedlings at one site in September. At the other four site/date combinations with sufficient colonized seedlings to analyze, mycorrhization did not appear to affect N content. Results like these indicate that further research is required especially at the seedling-establishment stage as this determines the makeup of forests in BC

Efficacy and survival of *Pseudomonas fluorescens* isolates 4-6 and 1-112 for control of postharvest fungal pathogens on McIntosh apple

Student: Hanujah GANESH
Supervisor: Louise Nelson

Fruit loss due to postharvest pathogens is a serious issue with growing economic consequences within the Okanagan and other fruit producing regions of the world. Traditionally synthetic fungicides have been used as the main method of control. However, many postharvest pathogens have developed resistance to fungicides. This issue, in combination with strict governmental regulations, negative public opinion and health concerns regarding the widespread use of synthetic fungicides, has initiated research into alternative control methods. A promising alternative currently being explored is the use of biocontrol agents. This study evaluates the efficacy and survival of prospective biocontrol agents; *Pseudomonas fluorescens* isolates 4-6 and 1-112 in inhibiting the postharvest fungal pathogens, *Penicillium expansum* and *Botrytis cinerea* on McIntosh apples. *P. fluorescens* isolates 4-6 and 1-112 were tested to determine their ability to inhibit the fungal pathogens via in vivo and in vitro inhibition assays. The in vitro inhibition assays demonstrated that both isolates were capable of inhibiting the growth of each fungal pathogen on plates. The *P. fluorescens* isolates were more effective against *B. cinerea* than *P. expansum* and the greatest inhibition was seen with the 1-112 + *B. cinerea* treatment. In vivo inhibition assays were conducted to determine the optimal concentration of the antagonist to suppress decay on McIntosh apples during cold storage at 4°C. However, only minimal inhibition of both fungal pathogens was observed in vivo. Altering the concentrations of both isolates (from 6 to 9 Log CFU/ml) had little effect on lesion diameter and percent infection. To study the survival of the biocontrol within apple wounds, McIntosh apples were inoculated with each isolate, incubated at 4°C, recovered and quantified using dilution plating. The optimal culture medium for recovering the isolates from apple wounds was determined first. Of the four different media tested, 100% TSA and King's B agar supported the greatest number of bacteria. Biocontrol strain survival on McIntosh apples during cold storage was monitored at 0, 1, 2, 4, 6 and 8 weeks. *P. fluorescens* isolates 4-6 and 1-112 both exhibited long-term survival within the apples. Both strains had an initial decline in numbers at week 1 but then showed an overall increase in growth until the final sampling week. Specifically, a higher number of isolate 4-6 cells (expressed as Log CFU/mL) were recovered than of isolate 1-112 cells at each sample time. Further knowledge of factors enhancing the survival and efficacy of the isolates in controlling postharvest fungal pathogens of pome fruit will assist in their commercial development and may lead to a reduction in the use of synthetic fungicides.

Heterologous Expression of Insect Organic Cation Transporters in sf9 Cells

Student: Hogun KANG

Supervisor: Mark Rheault

Insects serve as agricultural pests and hosts for disease transmission which may have vast environmental, economic, and medical-related effects on human populations; this demands for effective control measures to be developed. Previous studies have shown that the model organism, *Drosophila melanogaster*, is capable of excreting tetraethyl ammonium, a toxic compound demonstrated to decrease survival. To observe the physiological mechanisms by which *Drosophila melanogaster* exhibit xenobiotic immunity, two distinct genes, *orct* and *orct2*, have been cloned from the model insect believed to have a role in the excretion of xenobiotics. Using molecular techniques, a plasmid vector was constructed containing a modified *orct* or *orct2* gene with a biochemical marker. The genetic constructs were then expressed in an insect-derived sf9 cell midgut line using liposome-based transfection for transient protein expression. Successful protein expression was verified by western blotting. We hypothesize that these overexpressed transporters will increase the uptake of the ¹⁴C-radiolabeled model xenobiotic tetraethylammonium (TEA) in overexpressing sf9 cells relative to control cells. Studying the transport of genes in isolation will allow for a full functional characterization of these detoxification mechanisms and provide an assessment of their potential as novel targets for new insect control measures.

The effects of organic cation-like transporter (*orct*) gene knockdown on uptake and transepithelial transport of TEA in the Malpighian tubules of *Drosophila melanogaster*.

Student: Hanna ELLIS

Supervisor: Mark Rheault

Student: Hanna Ellis Supervisor: Mark Rheault The increasing resistance of insects to conventional pesticides is a growing problem. Insects have a number of strategies to reduce the toxicity of pesticides including avoidance, sequestration, metabolism and excretion. Other than avoidance, all of these strategies eventually require the insect to excrete these potentially harmful xenobiotics. One pathway identified for removal of xenobiotics is through organic cation transporters (OCTs) in the kidneys. Previous studies have shown that the Malpighian (renal) tubules and the midgut of a model insect, the fruit fly, are capable of transporting organic cations. The ORCT transporter has been identified as a possible mechanism for the excretion of organic cations in the fruit fly *Drosophila melanogaster*. Previous work has suggested that the ORCT is located on the basolateral membrane of the Malpighian tubules and mediates the electrogenic uptake of organic cations from the haemolymph (blood) into the Malpighian tubule. In this study, we used tissue specific RNA interference (RNAi) technologies to knock down the gene responsible for coding of ORCT in the Malpighian tubules of *D. melanogaster*. We hypothesize that the knockdown of ORCT will decrease the ability of the Malpighian tubules to transport a model organic cation such as Tetraethylammonium (TEA). Previous experiments have confirmed that these RNAi methods can be used to successfully knock down gene expression of ORCT in the Malpighian tubules of the fruit fly. Using a UAS-*orct*-RNAi fly line crossed with a *c42*-GAL4 fly line, we generated RNAi flies with an ORCT knockdown targeted to the primary ion transporting cells in the Malpighian tubules. Malpighian tubules were isolated from both wild-type and *orct* knockdown flies. Isolated Malpighian tubules were exposed to ¹⁴C-labelled TEA to measure initial uptake of organic cations across the basolateral membrane of the Malpighian tubules. The amount of TEA transported across the Malpighian tubules was measured by scintillation counting and the transport rates of TEA were compared between wild type *D. melanogaster* and knockdown *D. melanogaster*. Identification and functional characterization of newly identified detoxification transporters in the renal tubules of insects may provide novel targets for development of insect specific control strategies for agricultural and vector disease insects. Poster Presentation.

The effects of nicotine metabolism on cytochrome P450 gene expression in the midgut of the cabbage looper, *Trichoplusia ni* (Hübner)

Student: Nazli HASSANPOUR FARSHOUR

Supervisor: Mark Rheault

The cabbage looper, *Trichoplusia ni* (*T. ni*) is a generalist insect (Lepidoptera: Noctuidae) that is an agricultural pest of crucifers and other crops of economic importance. Although synthetic pesticides are effective at controlling insect populations by targeting the nervous system, they can have negative off-target effects. Cytochrome P450s, glutathione S-transferases, and esterases are detoxification proteins commonly implicated in insecticide resistance. Upregulation of detoxification enzymes and inhibited binding of insecticides via target-site mutations are the main mechanisms causing insecticide resistance. Enriched metabolic detoxification of xenobiotics, such as plant toxins and pesticides, along with the subsequent development of insecticide resistance have been linked to the overexpression of cytochrome P450s in insects. Previous studies have suggested that generalist herbivore growth and development are inhibited by nicotine exposure, whereas specialists are not affected. However, recent research in our lab has shown that the Malpighian tubules of *T. ni* actively excrete and metabolize nicotine into three major metabolites; cotinine, cotinine-N-oxide, and nicotine-N-oxide. This study aims to reveal the genetic mechanisms through which nicotine is metabolized and excreted by *T. ni*, a model agricultural pest. Following 24-hour exposure of 4th instar *T. ni* larvae to increasing concentrations of dietary nicotine, RNA was extracted from midguts and converted into cDNA. CYP gene expression differences were validated through qPCR, with a focus on CYP genes in the xenobiotic metabolizing CYP3 family. We hypothesize that the *T. ni* midgut metabolizes nicotine through increased expression of cytochrome P450 transcripts and proteins. A greater understanding of how nicotine, a model plant alkaloid and its metabolites are excreted by a generalist insect such as *T. ni* will greatly facilitate our comparative understanding of insect xenobiotic metabolism and excretion. This research will increase opportunities for the development of new biochemical and physiological targets for the control of insect agricultural pests and disease vectors which are economically, environmentally, and medically valuable.

Alternative Conceptions of Advanced Chemical Bonding Theories

Student: Jacky DENG

Supervisor: Stephen McNeil

A key learning outcome for any university-level program in the chemical sciences is the ability to correctly apply the concepts of chemical bonding models in order to explain the physical and chemical properties of molecules. A large body of work has examined alternative conceptions of chemical bonding, and has developed concept inventories dealing with specific aspects. However, these studies have focused primarily on bonding concepts usually described at the secondary or introductory post-secondary level (e.g. atomic structure, ionic and covalent bonds, Lewis structures). We wished to identify and categorize alternative conceptions associated with valence bond theory, and to explore challenges and new alternative conceptions that emerge when students are learning to reconcile this model with that of Lewis structures. Semi-structured think-aloud interviews were conducted with second-year and senior undergraduates (N = 15), graduate students (N = 4), and a faculty instructor; interview subjects were drawn from across the life and chemical sciences. Interview questions were designed to explore the following research questions: (1) What do student representations of descriptions of molecules within the frameworks of Lewis structures and valence bond theory reveal about student understanding of these models? (2) What information do students perceive in expert-generated representations of molecules within each model? (3) What do student explanations of multiple representations of molecules reveal about their understanding of different qualities of chemical bonding models? (4) What alternative conceptions do students have regarding the use and utility of bonding models, and how prevalent are they? Interviews were transcribed and qualitatively coded with comparative analysis, and student response patterns were identified and categorized. New alternative conceptions associated with the use of valence bond theory were identified. Additionally, students were observed to conflate concepts of valence bond theory with other introductory principles, such as electronegativity and formal charges. Results also highlight student behaviours and attitudes related to valence bond theory, including students' lesser ability to confidently use and articulate key ideas from the valence bond theory model.

A comparison of three different mass spectrometric glycomic strategies

Student: Dixon KANTYMir

Supervisor: Wesley Zandberg

A comparison of three different mass spectrometric glycomic strategies Student: Dixon Kantymir Acknowledgements: Jaclyn MacMillan, Andrew Kennedy, D. Wade Abbott Supervisor: Wesley Zandberg Glycosylation is a very common post-translational protein modification which happens to over 50 percent of all proteins found in nature. These glycans (i.e. short carbohydrate polymers) attached to the proteins are utilized in many essential biological processes including but not limited to cell recognition, immune response, and general cell-cell interactions. Further, abnormal glycosylation has been observed in cells afflicted with many diseased states, from infections to cancers, and so this difference in glycosylation could be used as an indicator for diagnosis. The use of glycans as such biomarkers requires analytical approaches that precisely and accurately establish their relative amounts over replicate biological samples – which is a very difficult endeavor. Currently there are several different methods to identify and quantify glycans, most beginning with a glycan release step followed by a derivatization step to avoid analyte degradation. Then, samples can be analyzed via mass spectrometry in a “label-free” approach, or a variety of different isotopic, isobaric or fluorescent labels can be applied to enable sample pooling, internal standard normalization and the use of different detectors. As of now, there has been no systematic comparison of these different glycomic strategies. So in this study, the label free approach, an isobaric labeling approach and an isotopic labeling approach are completed for glycans obtained from chicken intestinal mucins and results compared between the different methods. These samples were collected from commercial broilers and these analyses will be valuable for assisting veterinarians in devising non-antibiotic strategies to combat intestinal infections in the poultry industry. The results from this study will also give more comparative information to analytical chemists about the advantages and limitations of different glycol-analytical approaches, helping answer the question of which method to select for a particular analysis. Poster Presentation.

Biochemical and Computational Investigation of Monodehydroascorbate Reductase

Student: An GOTO

Supervisor: Gino DiLabio

Kirsten Wolthers

Monodehydroascorbate reductase (MDHAR) is a plant enzyme that is part of a class of enzymes that protects the plant from reactive oxygen species. A recent study demonstrated that trinitrotoluene (TNT, a benzene derivative) is phytotoxic to plants by inhibiting the action of MDHAR (Johnston et al., 2015). However, because TNT is explosive, its use as an alternative to conventional herbicides is limited. This project focuses on using variants of benzene derivatives to determine herbicides that are as effective as TNT but safer to use. Computational methods were used to determine the binding of benzene derivative in the active site of MDHAR. Molecules that bind more strongly than TNT were expected to behave as effective herbicides. Additional criteria applied to select for promising herbicide candidates included its fat-water partition coefficient, general safety to humans, and cost. Validation of the molecules obtained from computer modelling was conducted by enzyme kinetic experiments to measure the Michaelis-Menten constant and the maximum rate of reaction. The results of this work are expected to contribute to a detailed understanding of the mechanism employed by MDHAR and to the development of effective and safe herbicides.

Anti-Aging Effect of Young Extracellular Vesicles on aged CD-1 Mice model

Student: Sophia NG

Supervisor: Isaac Li

As the average life expectancy rate is increasing, the problems associated with aging are following a similar trend. Therefore, it is significant to discover methods that will slow and/or reverse the negative effects of aging to increase quality of life in the later stages of life. Recent research has shown that blood transfused from young mice (i.e. young blood) reverses various neurological and physiological effects of aging in old mice. To better understand what components of young blood are involved in the aging process, this study explores the effects of extracellular vesicles in neurological and physiological processes. To model these processes, 14-month-old CD-1 mice (approximate equivalent to 47 years old in humans) were analyzed using the Barnes Maze Test (BMT), Forearm Grip Strength Test (FGST), and Novel Object Test (NOT). The project included re-creating and optimizing the BMT, FGST, and NOT. Experimental procedure included four different test conditions (1) young whole plasma, (2) isolated extracellular vesicles, (3) plasma without extracellular vesicles, and (4) a saline control. To isolate the extracellular vesicles ultracentrifugation was used. Samples were introduced in the animal through a tail vein injection. The physiological results varied; a portion of the sample was obese while others had abnormal tissue growth. Initial results indicate that the method should be repeated with a larger sample for significant conclusions.

Synthesis of novel kainic derivative used for labeling of kainate receptors

Student: Simon EDELMANN

Supervisor: Frederic Menard

Kainic acid is a neurotoxin that binds to kainate receptors (KAR) on the post synaptic cleft of neurons. The molecular effects of this interaction are not thoroughly understood. Labeling KAR with molecular probes in vivo will allow for selective fluorescence imaging of KAR without perturbing its function. There are currently no probes suitable for this study, and the three critical stereocenters on the kainic acid pyrrolidine ring make its synthesis challenging. Herein, we describe a scalable synthesis to a potent derivative of kainic acid which will be useful in creating a KAR labeling probe. The synthesis began with a methyl ester trans-4-hydroxy-L-proline salt and, after a 3 steps the preparation of versatile a kainic acid precursor was achieved. Current efforts are working towards attaching an azide group to the precursor which will allow for future linkage of a fluorophore, enabling KAR imaging.

Glycan composition analysis using capillary electrophoresis tailored to acidic monosaccharides

Student: Ben TIET

Supervisor: Wesley Zandberg

Glycans are carbohydrate polymers or oligomers composed of a variety of monosaccharide units. These glycans may be present in free forms, such as complex plant cell wall polysaccharides, or chemically bound to proteins, lipids or numerous other small metabolites. The biological function(s) of glycans are often dictated by the precise manner in which they are combined, and the determination of the relative levels of a glycan's monosaccharide constituents is often very helpful in the first step of their analysis. Although there are several analytical tools available for compositional analysis, these tools are poorly suited for the analysis of acidic monosaccharides such as galacturonic acid, glucuronic acid, iduronic acid, and sialic acid(s). In addition, the monosaccharide constituents of glycans are also often decorated with acidic functional groups like sulfates and phosphates. These modifications have significant impacts on glycan function, but are completely excluded from analysis by current compositional analysis techniques. The major focus of this research was to develop a method to enable the simultaneous analysis of both acidic and neutral monosaccharide species. The utilization of capillary electrophoresis separation with laser-induced fluorescence detection (CE-LIF) allows for this to be achieved via applying an electric field to discriminate various monosaccharides, which are fluorescently labelled

with the fluorophore, 8-aminopyrene-1,3,6-trisulfonic acid (APTS). Our progress towards devising a CE-based glycan compositional analysis technique and its application to the compositional evaluation of highly sulfated O-linked glycans that were extracted from the intestinal mucus of animal research models of intestinal disease and infections will be reported. The developed method was also used to monitor the glycosylation of grape secondary metabolites, and how the levels of these are altered by yeast enzymes during the fermentation process to make wine.

Analytical Methods for Detection and Quantification of Non-Protein Amino Acids in Food and Environmental Samples

Student: Fiona TYMM

Supervisor: Susan Murch

Beta-N-methylamino-L-alanine (BMAA) is a non-protein amino acid produced by cyanobacteria and accumulated in ecosystems and food webs. Recent studies have linked BMAA exposure to incidence of neurodegenerative diseases such as Alzheimer's disease and Amyotrophic Lateral Sclerosis (ALS). Analysis of BMAA in complex sample matrices is complicated by at least 3 naturally occurring isomers, N-(2-aminoethyl) glycine (AEG), 2,4-diaminobutyric acid (DAB) and β -aminomethyl-L-alanine (BAMA). More than 80 publications have reported detection and quantification of BMAA and its isomers but results vary. The objective of this study was to compare 4 analytical methods: (a) 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (AQC) derivatives using reverse phase liquid chromatography (RPLC), (b) propyl chloroformate (PCF) derivatives using RPLC, (c) underivatized extracts using TSKgel Amide-80 hydrophilic interaction liquid chromatography (HILIC) and (d) underivatized extracts using ZIC-HILIC for accuracy, precision, ruggedness and selectivity. Data show that both HILIC methods fail to separate BAMA from BMAA. There is no difference in the method limit of detection (MLD) or IUPAC LOD but when LOD is determined by standards in a sample matrix, the underivatized methods detect only at higher concentrations. Sample matrix interferences were found in all methods. Each of the methods has conditions that result in Type II errors and failure to detect is not evidence of absence. It is important to develop reliable and accurate methods to detect BMAA in food and water samples in order to reduce exposure and risk to human health.

Characterizing the Intracellular Effects of a Thiosugar Analogue

Student: Isabelle CURYK

Supervisor: Wesley Zandberg

Glycosylation is the most predominant form of protein posttranslational modifications, and nearly half of all proteins observed in nature bear some form of glycan (i.e. carbohydrate) modification. Glycoprotein-borne glycans, from single monosaccharides to large, complex oligosaccharides, modulate an array of biological functions integral for cell life. Aberrant glycosylation patterns are a hallmark of cancer cells and, in some instances, these changes in protein glycosylation are directly linked to tumor progression and/or malignancy. Thus, some of the enzymes, called glycosyl-transferases (GTs), that assemble protein-linked glycans have been identified as viable chemotherapy targets. To date, however, very few specific GT inhibitors have been developed, although chemical GT inhibitors are required to serve as leads for drug optimization, validating of specific GTs as potential chemotherapy targets in in vitro and in vivo cancer models. One of the first GT inhibitors reported was a sulfur-containing analogue of the monosaccharide N-acetylglucosamine (GlcNAc), called 5-thio-GlcNAc (5T-GlcNAc), in which a single oxygen atom (specifically, the endocyclic anomeric oxygen) is replaced with a sulfur atom. Although to date 5T-GlcNAc has been unambiguously demonstrated to inhibit a sole GT, it nevertheless has the potential to inhibit any of the dozens of GlcNAc-specific GTs in cells or, alternatively, be used as an alternative substrate in competition with the natural, oxygen-containing analogue. Recently, a single study has reported some indirect evidence that 5T-GlcNAc may potentially inhibit other GlcNAc-requiring GTs, and, although these were not characterized, this sparks interest in how this analogue affects other GTs. CHO (Chinese hamster ovary) cell lines have been used as the source of mammalian cells to monitor the influence of the thio-analogue in vitro. We hypothesize that: 1) 5T-GlcNAc is used as an alternative substrate by one GT- leading to synthesis of glycans that cannot be efficiently transferred to proteins nor participate in glycan recycling; and 2) that 5T-GlcNAc acts as a potent, competitive inhibitor of alpha-1,3-mannosyl-glycoprotein 2-beta-N-acetylglucosaminyltransferase 1 (MGAT1), a GT that has been identified as a priority chemotherapy drug target. These hypotheses have been tested in vitro in Chinese hamster ovary (CHO) cells, using mass spectrometry to differentiate between the use of 5T-

GlcNAc as a substrate, and its inhibitory impact on MGAT1. Our recent progress characterizing the intracellular effects of 5T-GlcNAc will be described.

Does grapevine exposure to exogenous phenolic compounds alter the biosynthesis of glycosylated, endogenous secondary metabolites?

Student: Benjamin NOYOVITZ

Supervisor: Wesley Zandberg

Exposure of ripening *Vitis vinifera* berries to phenolic compounds in forest fire smoke induces changes that, following vinification, result in “smoke tainted” wine with unpleasant sensory characteristics. Many of the compounds that have been correlated to smoke taint are phenolic products of the phenylpropanoid biosynthetic pathway in plants. Grapes and wine contain many phenylpropanoid compounds hypothesized to have beneficial health effects related to their antioxidant properties or to involvement in a specific reaction or pathway. These compounds are thought to include hydroxycinnamic acids (e.g., p-coumaric acid), flavonols (e.g., quercetin), and stilbenes (e.g., resveratrol), among others. Both the identity and quantity of phenylpropanoids present in grapes and wine may be affected by agricultural and vinification processes, phenolic compounds from exogenous sources (e.g., smoke), and endogenous secondary metabolic pathways, especially those involving phenylpropanoid storage in the form of glycosides. The development of accurate, predictive tests for smoke taint in wine is complicated by the potential for the volatile phenolic compounds linked to smoky aromas and flavours to be of either exogenous or endogenous origin. The exposure of grapes to exogenous phenolic compounds in smoke was hypothesized to (1) affect the biosynthesis of endogenous phenylpropanoids, and (2) affect their storage within grapes as glycosylated analogues. Once characterized, these metabolic changes could be used to develop a predictive test for the potential to produce smoke-tainted wine from smoke-exposed grapes. An extensive set of putative phenylpropanoids, and glycosides thereof, were identified by screening ultra-high performance liquid chromatography-mass spectrometry (uHPLC-MS) data sets previously collected from smoke-exposed and control Pinot Noir grapes. Well-characterized exo-glycosidases and tandem uHPLC-MS/MS were used as orthogonal approaches to support the identification of these compounds. Solid-phase extraction (SPE) and uHPLC-MS methods were adapted to permit the analysis of phenylpropanoids in both grape and wine samples (from smoke-exposed and control samples) under identical experimental conditions. These methods enabled identification of a broad range of phenylpropanoids and their glycosides present, or absent, in both smoke-exposed and control grapes from three different vineyards. The methods also allowed investigation of the metabolism of these compounds by yeast glycosidases during fermentation, a process that affects the solubility, stability, and bioavailability of these health-promoting compounds in wines.